MyAdvantech

The Magazine for Global Advantechers and Partners

Spring **2014 No.14**

Optimized Logistics Drive Smart Fleets

Smart Fleets Improve Safety in Mine Operations

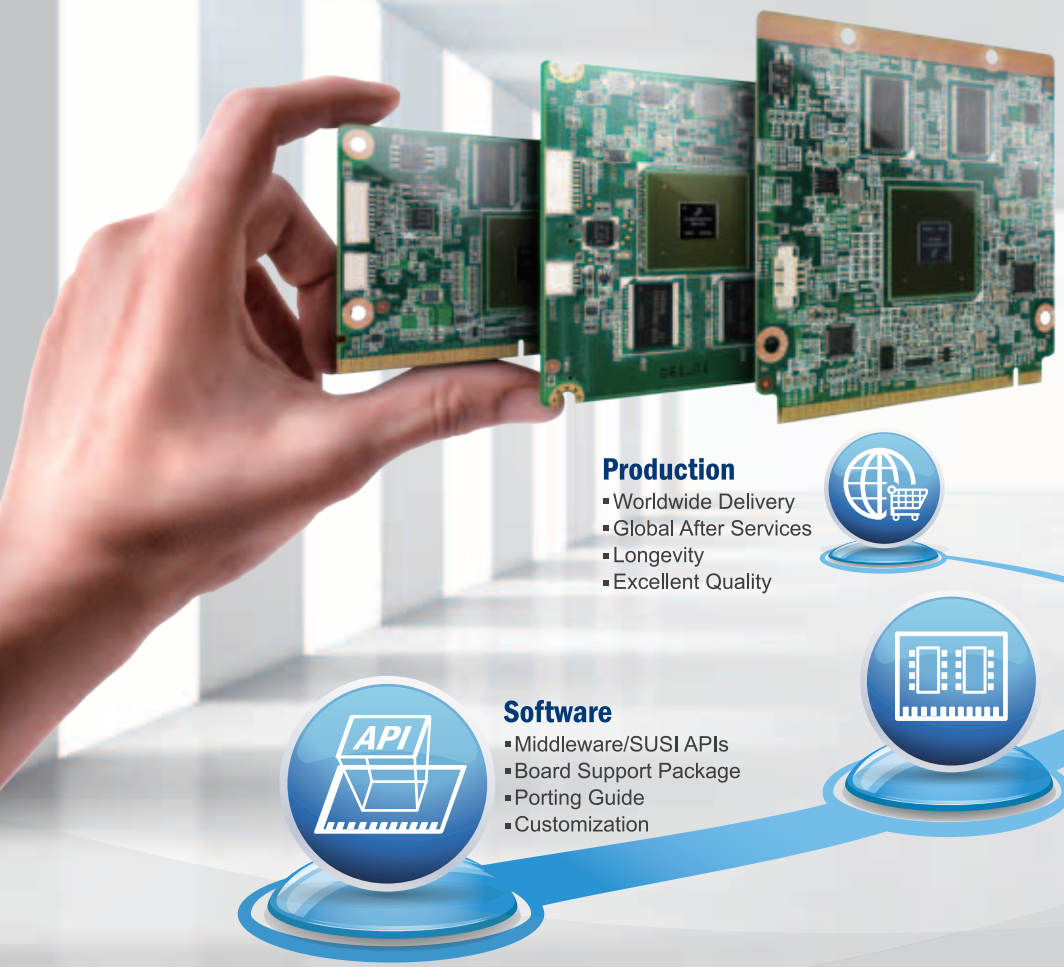
Optimizing IT for Improved Cargo Management

Behavior Management for Truck Drivers

A New Generation of Machine Vision Applications

Through a combination of hardware and software, Advantech's latest platform, A+ Vision and AIIS makes System Integrators capable of developing excellent AOI systems for industrial inspection and precision manufacturing.

Seamless RISC Design-in Services



Production
- Worldwide Delivery
- Global After Services
- Longevity
- Excellent Quality

Integration
- Test Plan/Program
- Function/Reliability Test
- Certification
- Peripherals/Accessories

Hardware
- Evaluation Kit
- Reference Design
- Design Review
- Issue Fixing

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- Middleware/SUSI APIs
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- Porting Guide
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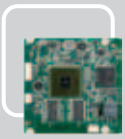
ADVANTECH

Enabling an Intelligent Planet

The most difficult part of ARM-based application development is at the integration stage. The careful integration of software and hardware can be time-consuming and take a huge amount of engineering resources to overcome any failures or defects—long before mass production has even started. So, Advantech provides you with a full-range of RISC Design-in services including software, hardware and middleware, which expedites your development cycles and speeds your products' time-to-market.

Advantech RISC Solutions - Freescale ARM Cortex-A9 i.MX6



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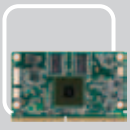

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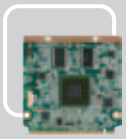

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Intelligent Ethernet I/O

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Enabling an Intelligent Planet

Customizable Functionality and Flexible Connectivity

- Daisy chain connection with Ethernet auto-bypass on loss of module
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- Group configuration feature for mass updates
- Graphic condition logic (GCL) modular distributed control using peer-to-peer connection
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- Web language support: XML, HTML 5, Java Script, REST

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ADAM-6224
4-ch Analog Output Ethernet Module with integrated 2 port switch

ADAM-6250/6251
15-ch /16-ch Isolated Digital I/O Modbus TCP Module

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16-ch Isolated Digital Output Modbus TCP Module

ADAM-6260/6266
6-ch /4-ch Relay Output Modbus TCP Module with 4-ch DI

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Telematics Help Fleets Improve Supply Chain Management

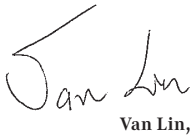
The Internet of Things (IoT) is changing the face of cities of the future, bringing intelligent technologies and adding convenience. An important facet of intelligent city is digital logistics and efficient fleet management. Fleets use telematics to monitor the location, movement, and status of vehicles, building a comprehensive view of their networks. This advanced approach not only allows warehousing and logistics to correctly receive and deliver goods, it also eliminates blind spots in the business. Fleet vehicles are difficult to manage without an investment in technology as they are often on the road and out of touch with the rest of the inventory chain. Not only logistics, another segment that benefits from technology is emergency fleet management, police car, fire engine and ambulance operators can take advantage of instant communications to improve efficiency and enhance safety.

A key use of IT tools and intelligent applications is to improve business efficiency and reduce operating costs. To achieve the goal, how to transform large amounts of data into meaningful information becomes very important. Many examples come to mind: In warehousing, using 3D-positioning techniques can be used to convert static data into instructions to guide warehouse forklifts indoors as they move inventory. In traffic applications, gathering the speed and position of cars can alleviate traffic jams. Through software analysis, in-vehicle video systems can be used for anti-collision, lane deviation, and other safety warnings, or it can even be used to automatically adjust a car's speed based on the official speed limit. In delivery applications, the use of electronic signatures ensures the safe delivery of goods, and keep logistics' operators informed about shipping schedules in real-time . For disaster relief, personnel can speed up operations and improve critical rescue times by real time data capture. On an accident scene, injury assessment and initial rescue information can be uploaded to hospitals accelerating the process of first aid treatment. Emergency crew safety is also enhanced by vehicle telematics systems as they rush to an accident site, and handheld devices operated by crews further enhance task efficiency and personal safety.

IT tools also help manage people and their behavior. An example is installing video surveillance equipment to monitor improper driving habits and reduce collisions in cold storage areas. Personnel are protected, food safety is ensured, and employers are further protected against employee theft or other malicious behavior. In law enforcement, optimal routes for police patrols can be calculated, increasing public safety and decreasing criminal activity.

In addition to providing comprehensive in-vehicle computers for warehousing and logistics, long-haul fleet, local fleet, public transportation, emergency rescue and other applications, Advantech has introduced expert-level support to the eco-system, which delivers a richer project experience for downstream vendors and participating third party suppliers. System integrators will also find perfect, one-stop solutions, resulting in a win-win situation for all parties.

We believe that by sharing our expertise, we add value. Leveraging digital information in a meaningful way greatly contributes to the success of fleet management solutions, and enhances our products and services.



Van Lin,
Director, Advantech iService Business Group

15 Years of Thin Client Excellence

This year marks a partnership that has been producing industry-leading thin client technology for the past fifteen years. The two partners, Advantech's Industrial Automation Group (IAG), and Automation Control Products (ACP), a US-based company, have reason to celebrate; the market is primed for growth.

By Martin Marshall
Interview with Tom Jordon, V.P. Marketing of Automation Control Products (ACP) and Pictures from ACP

As thin client computing has become more ubiquitous in automation, so too has the need for thin client management software. Once found in only complex distributed control systems in refineries and other process plants, thin clients and HMI systems are now found in many guises and many locations, from industrial machines and tooling systems, to manufacturing production lines and water treatment plants. Thin client management software has evolved and changed with new requirements to become more flexible and capable.

Where ACP and Advantech's partnership fits into this evolution is in supplying this increasing demand. ACP is the creator of ThinManager®, a unique software suite for the management of thin clients and terminal servers. The software delivers trendsetting centralized management solutions for modern factory applications, using simple application interfaces and appealing visual resources. ThinManager protects hardware from obsolescence, allows for automatic configuration of clients, promotes high availability, redundancy and failover, and offers load balancing, all in a secure computing environment. What's more, ACP's thin client solutions are proven in the field with HMI and SCADA applications.

As plant floor processes become more automated, operators need to have more information on the processes at their fingertips, especially as the requirements for local display and control have become more complex. Thin clients solve this need by serving applications across distributed networking infrastructures; loading programs and operating system from a central server. The technology includes terminal services, virtualization, and virtual desktops, as well as thin client PCs which have no hard drives or local storage and many of which don't even have a local operating system.

ACP Adds Value to Thin Client Management

Thin clients are often combined with a Human Machine Interface (HMI), and when the HMI has a small form factor, the entire product, HMI and thin client, may be physically only as large as the HMI display itself. Regardless of the size of the industrial environment, or number of facilities, thin client systems need management, control, and security. ACP, whose roots can be traced back to 1999 as an integration company, has grown into a global leader in thin

client management with its focus on software that makes administrating computers in modern factory environments much easier, safer and more reliable. Their ThinManager software suite allows administrators to easily deliver centralized applications, data and information to end-user devices including thin clients, PCs and even mobile tablets. ThinManager provides a feature-rich toolset that increases the value of end-user devices by giving them additional functionality such as support for multiple user sessions, multiple monitors and more.

Advantech Terminal Units on the Factory Floor

Advantech has been supplying ACP with its HMI terminal units for over 15 years. ACP has taken the platforms, designed for industrial-grade use in factory environments, and delivered outstanding applications and centralized support via ThinManager. Advantech supplies ACP-approved products from its TPC and UNO product series. The units are typically installed as end-user terminals within industrial workspaces. Applications are delivered from one central location which makes installation and configuration very efficient.

Tom Jordan, V.P. of Marketing for ACP ThinManager said, "I get to talk to partners and customers all the time about why our ThinManager platform with Advantech thin client terminals is the best choice for delivering applications and content to end-users in any environment. We have many projects under our belt that make good examples of how well these products work together. Advantech stands out for us as a partner because of the people we have relationships with between our companies. All good business, all good partnerships stem from good people. Advantech has good people who sell and support their products."

It is important to note that almost every installation of Advantech terminals and ThinManager share common traits. The hardware is longer lasting. It can stand up to industrial environments by resisting high heat, vibrations, and other factors that can kill less robust units. The hardware also runs applications efficiently and consistently,

taking advantage of high-end features like MultiMonitor and Multisession technology. Finally, the hardware is easy to support and replace in the unlikely event of failure. Adoption of thin client hardware as the defacto, end-user device in modern factories still has tremendous room for growth, and designing sustainable, lean hardware solutions for delivering content to the modern manufacturing workforce is the way to meet that growth head on.

The Thin Future of Factory Automation

With the latest release of ThinManager, even more features are making their way to the factory floor with the promise to lower energy costs, drive sustainable technologies, and deliver enhanced security. Innovation on the factory floor equates to better numbers on the bottom line, and in today's competitive world, these numbers can make or break businesses.

Great partnerships like the one between ACP and Advantech offer the industry rock solid, reliable solutions by pushing data into the hands of employees and giving management the metrics needed to guide its decision-making processes. ■

ACP THINMANAGER.COM

Automation Control Products (ACP) began developing thin client management software in 1999. Based in Alpharetta, GA., ACP distributes its flagship ThinManager platform around the world to equip modern facilities with a robust, reliable platform that manages severs, thin clients, IP cameras, virtual machines, mobile devices, and more. Over 1,000 companies in 30 counties, including one in then Fortune 500 companies, use ThinManager and ThinManager-Ready Thin Clients for their daily operation.

Smart Fleets Improve Safety in Mine Operations

Mine environments are different from regular roads, so fleets moving in a mine will encounter more hazardous situations. Fleet management systems can help us monitor all relevant data and warn us of abnormal conditions to increase the security of operators and decrease property losses.

By Sharlene Yu and Pictures from Advantech
Interview with Lu-Bin Zhang, Project Manager of Micromine

In an open-pit mine in Ghana in South Africa we can see dust and smoke floating over rough ground and machines and equipment everywhere. Roaring excavators dig out crushed ore, where the so-called "king of metal"- gold is hidden. On the ground, truck drivers keep their eyes on the weight of their loads to prevent exceeding the maximum load of 200 tons. The management personnel in the dispatching room also pays attention to the data, because heavy loads will result in failure of engines, heavy wear on tires and increased safety risks, alternatively light loads fail to conform to production efficiency.

At the mine site, a lot of mining trucks move in and out, rushing through the roads to transit ore to the treatment plant from 2~3 kilometers away. For each monster truck, worth tens of millions of dollars, is concerned, a collision means a serious accident or asset loss. But now, with their vehicle mounted intelligent management system's Collision Avoidance System installed, truck drivers can carefully traverse routes to avoid collisions when receiving messages that other vehicles and machines are approaching, ensure workers' safety and reducing maintenance costs.

This gold mine belongs to Gold Fields of South Africa Ltd. (GFSA). In fact, 50% of known global gold resources, totally 89000 tons, are in South Africa. The open-pit mine uses a mine fleet management system that Micromine and Advantech co-developed in 2012. The system has been installed on about 40 loaders and trucks totally. Micromine is a mining industry software developer, established in 1986 in Australia. The company's Pitram mine production real-time control and report/decision system has been successfully applied to various kinds of mines in North America, Canada and Australia.

Real-time Monitoring for Instant Command

Micromine's Pitram software system, Advantech's TREK-743 vehicle mount computer and MESH Network's wireless transmission constitute a complete mine fleet real-time dispatching management system. To the platform, Advantech will add different modules via the integration function of Advantech's vehicle mount computer according to the requirements of customers, such as an anti-collision system, oil-level monitoring system, weighing system and tire management system. And all related data will be transmitted to the back end management platform via vehicle mount computers and displayed on the screens of the trucks to inform operators on the spot.

With the mine fleet management system, task dispatching and vehicle dispatching commands can be immediately transmitted to, and shown immediately on the screens of, Advantech's vehicle mount computers for drivers to execute. The vehicle mount computer will also collect login and logout times of drivers, engine starting times, daily vehicle usage times, mine loading amounts etc, and display them on the screens of vehicles or for management at the back end.

For emergencies, such as road collapses, drivers can send distress and position messages directly to ask for immediate help. In the past, drivers could only ask for help by shouting loudly, but a drivers' voice can easily be drowned out by noise. Speed monitoring is also necessary because drivers may exceed the speed limit so as to earn more money. Nevertheless, the system can effectively manage all these unforseen events and warn these drivers against these.

Soft/Hardware Integration for Platform Stability

Lu-Bin Zhang, the project manager of Micromine, said that, "Over the past 20 years, we tried to introduce mine fleet management systems from various hardware suppliers without much success. However, we decided to completely use Advantech's products finally because Advantech's vehicle terminal has better price/performance ratio, stability and lower maintenance cost."

If vehicle mount computers crashed frequently, maintenance teams need to move between different mine sites to repair them, which is extremely hazardous, and suspension of work will cause losses. Therefore, stability is Micromine's top priority when selecting a vehicle terminal.

"With this mine fleet management system, we can increase mine production efficiency by about 10%. For example, we need 10 billion CNY to dig out a hundred thousand tons of gold ore; however, with the new system, we only need 9 billion CNY. In Nevada, United States, the director of a dispatching room having the same management system also stated that, "With the system, we can immediately acquire reports and avoid unnecessary cost because the management digitization and informatization are significantly enhanced." Due to its high performance, another mine fleet, also belonging to GFSA in Ghana, will also introduce the mine fleet management system and Advantech's TREK series products to their 40 truck fleets in 2014.

Considering the requirements of China's mine fleets, Micromine has started to pro-actively run the business in China from 2012. Their fleet management solutions co-developed with Advantech have grabbed much attention from mine companies. It is anticipated that some further achievements will be made in 2014 to help China's mining industry management be even more intelligent.■

Optimizing IT for Improved Cargo Management

By M. D. Wang and Pictures from Advantech
Interview with Jamie Bai, General Manager of Pacific Star Technologies Corporation

Throughout history, water transport has been the primary channel for moving cargo, and about 90% of the world's goods are still transported in this way. Massive container yards form a modern feature of this business, and they require sophisticated IT systems to efficiently manage container storage. Pacific Star Technologies built an optimal IT system for Kaohsiung Harbor by leveraging their rich experience with Advantech-DLoG vehicle-mount terminals.

When one enters the Kaohsiung Harbor container yard, one sees various cranes weaving between piled containers. If you pay attention to these cranes, you will find they are very busy, but they are still in good order. The transfer and piling of all these containers is extremely accurate; the cranes seldom make a mistake. Jamie Bai, the general manager of Pacific Star Technologies Corporation, says, "The containers in a harbor are similar to a general storage operation. It's just another kind of storage management and the key indicator of its performance is precision".

Specialized IT for Specialized Port

A fairly high level of technical expertise is required to undertake the creation of a port IT system, with its associated container storage fields. Without a lot of practical experience, it is difficult to enter this market. The port environment is highly specialized, with sea wind, high vibration, and innumerable steel containers, all of which pose challenges to the operation and maintenance of IT equipment. However, these are exactly the reasons why Pacific Star Technologies installed more than 100 Advantech-DLoG vehicle mounted products in the harbor.

MTC6 vehicle mounted computer is mainly used to send instructions as well as information. The size of a shipping container is quite big; in general, standard containers usually run either 20 or 40 feet long, and container yards are huge. Currently, there are five distinct container yards in Kaohsiung Harbor, with a total area of 2.94 million square meters. Container management is similar to general storage management; both of them involve the placing or removal of goods. Container management involves huge areas and usually in harsh environments; thus, IT systems appropriate to the two applications are completely different.

Mr.Bai said, "We already built the IT system for transmitting instructions in the harbor ten years ago. The harbor area is very broad, so wireless communication is the most appropriate IT technology for this type operation. As in other container yards, Kaohsiung Harbor used a handheld transceiver system before. Each crane driver was assigned a wireless handheld transceiver and instructions were sent to drivers via these transceivers. However, pure manual mode had lower accuracy and depended highly on paper processes. Drivers and operators in the background had to record a lot of data; also, management could not accurately control situations

because they could not get overall data results until a month or even a season later, which wasted a lot of time and manpower. Since the MTC6 vehicle mounted computer was introduced at Kaohsiung Harbor, drivers receive the latest instructions via touch screens and then report their status. Operators in the office can immediately track the locations of drivers and transportation schedules to adjust task allocation, and managers obtain analysis reports right away which significantly improves the whole operation."

High Quality Technology Forges Good Relationships

Pacific Star Technologies has used Advantech-DLoG products for a long time. Mr.Bai says, "I have been very familiar with these products even before DLoG merged with Advantech." Does he ever try any other products? In fact he had tried other products in an effort to save money, but results were not good. He says specifications of those products were similar. And when used for a short time, two weeks or a month, the comparative performances were very close. But if they used them over longer times, differences in quality were evident.

Therefore, when installing vehicle-mounted computers on container stackers at Kaohsiung Harbor, the first choice of Pacific Star Technologies was MTC6. Good products cost more, but their higher qualities satisfy customers. This is a win-win situation for both buyer and seller. If you sell cheap products of poor quality, your customer can only obtain fulfillment in the short term. However, customers will blame you later, when products malfunction over and over, and this ultimately hurts the relationship between buyer and seller. Advantech-DLoG products are rugged and stable; ideal for port settings. MTC6 passes many standards tests, such as IP65, IP66. The products perform reliably even in harsh environments with serious vibration. All I/O ports have covers to prevent ingress of dust and water, and the anti-shatter touchscreen is tough. Experiments have proved that it can sustain the impact of a 500 gram metal ball dropped from a height of 100 meters. That's the kind of toughness needed in a cargo port environment.

Assured German Quality with Local Service

We need not only stable equipment, but also follow-up maintenance. Generally speaking, the service life and replacement time for a harbor IT system is about 8 years. This is an outdoor, seaside environment, and operation involves a great deal of vibration. In this situation, maintenance is very important. Mr.Bai indicates that "DLoG are a German brand, and German brands impress everyone because their products are rigorous and reliable." On the other hand, he also indicates that Germany is so far away from us. With a support center in Germany, it takes a lot of time to maintain equipment and replace components. But since Advantech partnered with DLoG that problem was solved. Now maintenance and component replacement is accomplished in a short time. With assured German quality and local service; it really is a perfect combination!

As global marine transport centers, the cargo throughputs of the three biggest harbors in Taiwan are quite constant, and their requirements for IT equipment keep constantly growing. Mr.Bai says that Pacific Star Technologies will keep focusing on the market, integrating Advantech products and solutions to provide optimal IT systems for harbor transport service providers.■

In-vehicle Surveillance with Fleet Management
One Powerful Box Fulfills All Your Needs

ADVANTECH DLoG

Competence in Mobile Computing

Advantech-DLoG in-vehicle computing and fleet management solutions translate real-time vehicle, cargo, delivery, and worker data onto dynamic, understandable displays. We have integrated surveillance functions with fleet management to enhance security, lower operating costs, and increase productivity.

TREK-668
In-vehicle Surveillance with Fleet Management Computing Box

- Automotive grade working temperature range (-30° C to 60° C)
- Rich I/O including CAN, RS-232, RS-485, J1708, 8DI/4DO (isolated), Line out, Mic in, USB.
- 4/8/12 channel analog video input, one PSE for IP Camera supports 30 frames D1 resolution per channel per second. (Supports up to 16 channels for half D1 resolution)
- Built-in communication modules, including GPRS/HSDPA/CDMA, WLAN & Bluetooth, supports dualSIM, dual HSDPA, supports dual SIM cards and dual WWAN module mechanism

TREK-303DH
7" Smart Vehicle Display

- 7" display with touchscreen supports 800 x 480 resolution
- -30 to 70° C wide range temperature
- Five user-defined function keys, 2-watt speaker x 2, and USB host.
- Supports auto-dimming
- One cable connects with TREK box solutions
- Power on/off button on the side
- CE/FCC/CCC certified

TREK-723
RISC Based All-in-One Mobile Data Terminal

- 7" LCD (800 x 480) with resistive touchscreen
- 24/7 monitoring & reporting
- WinCE6.0, Linux, and Android
- Built-in CAN bus with J1939 protocol
- Built-in GPS with AGPS feature, BT, CDMA/GPRS/HSPA+
- Operating temperature -30 ~ 70° C (TREK-723)

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Behavior Management for Truck Drivers

Unlike previous fleet management systems which only offered vehicle tracking and dispatching features, new systems now emphasize real-time management, which relies on powerful computing capabilities in the vehicle to process real-time data collected by its sensing system, so that immediate feedback and responses are achieved to further enhance operational efficiency and safety—not to mention significantly reducing operating costs.

By Sunny Chen and Pictures from Advantech
Interview with Van Lin, Director of Advantech iService Business Group

Looking at December's monthly figures, the sales rep frowned at the report in his hands which showed all the speeding tickets that the entire team received that month, and which had exceeded more than last month's tickets. What's worse, the team even had five car accidents. The report also showed total mileage was reduced but fuel consumption actually increased by 10% compared to last month. Mike, the sales guy immediately knew that all of these problems had to do with driving behavior, but was there a better way to manage driving behavior? This is a question many fleet owners ask

On the U.S. highway, one often sees many huge trucks roaring by. These truckers are out on the road all day long, and seldom return to their dispatch centers. For example, one main provider of B2B interstate transportation services, known to be one of the best in U.S. transportation industry, owns up to 16,000 vehicles located in different dispatch centers across the country. In the past, this company used to have a fleet management system that could only provide GPS tracking and scheduling, but as far as "people management" was concerned, an effective behavior management system for truckers was not available.

So, if there was a driver behavior violation that broke agreed company rules, fleet managers could only punish an individual driver afterwards, such as docking their salary. A real-time system could have provided warnings with corrective advice, action, and even penalties.

Driving Behavior Sensor - Helps Drivers Follow the Rules

Fleet operators want to have a solution that can help them further manage driver behavior so as to reduce their insurance costs, accident probability, and wear & tear on tires and parts, all aiming towards the overall goal of the punctual delivery of goods. Driving Coach is an instant fleet management device that combines Vnomics' software and Advantech's hardware, and perfectly meets fleet owners' expectations.

Through sensing mechanisms, the device is able to detect any actions that truck drivers take with their vehicle. As soon as there is a behavior that is prohibited, against the rules or just dangerous, the Driving Coach system will immediately send reminders and alerts.

Some drivers park their trucks at the roadside to eat their food in the vehicle and enjoy the free air conditioning - sometimes for hours. Some drivers have a habit of pressing the gas pedal or the brake pedal suddenly. Some drivers don't use their turn signals and some drivers even wait until the last second to shift gears, resulting in their vehicles running at a high speeds in low gears. All of these behaviors result in a significant increase in fuel consumption, maintenance costs, and even safety problems. All of these events can be sensed, and if they violate

the rules, the system will sound an alarm and display a message asking drivers to rectify the situation.

Advantech's in-vehicle computer can also read any error codes from the engine, including temperature abnormality, low oil levels etc. Not only will drivers be informed of this information, but also back-end management. Depending on the circumstances, the system will enforce the mandatory or non-mandatory policy to deal with a problem immediately. For example, a message might appear on the display requiring the driver to go to any nearby service station to check the oil level within 30 minutes. If driver fails to respond after that time, then the back-end management staff will be notified to ask the driver to explain why he or she was unable to follow the command.

Fleet Efficiency Reduces Operating Costs

As long as drivers follow all the instructions, each vehicle can save up to about $ 3,000 USD a year including fuel, and maintenance fees. In fact, through the TPMS (Tire Pressure Monitoring System), one can avoid car accidents, and file for compensation from the tire company under the product warranty. There is up to 20% fuel consumption difference "before and after" using this system. All of these savings will be reflected on the monthly report and fleet owners are satisfied with the improvement.

Advantech's TREK-550 is the real-time fleet management's in-vehicle computer and the display uses the TREK-303. Advantech's Director of iService Business Group Van Lin said, "Vnomics' fleet management software solution is 100% compatible with Advantech's in-vehicle computer. In order to avoid frequent recalls of vehicles for system repairs, the equipment used in fleet management must be highly stable and reliable, and must have a high capability to integrate with additional modules in order to meet customer demands for expansion. These are the reasons why Vnomics continues to collaborate closely with Advantech."

Unlike other in-vehicle computers that can only collect data to send to the back office for further processing, Advantech's in-vehicle computer has a powerful chipset that can perform real-time calculations so it can provide immediate information and instructions to truck drivers. Van Lin also said, "Real-time is the core concept behind Vnomics' Driving Coach solution. In-vehicle computers must be able to handle large and complex amounts of data while the vehicle is in motion, in hot or cold environments—now that's a challenge!"

By combining Vnomics' software and Advantech's hardware, the Driving Coach fleet management solution can monitor and correct truck driver behavior, thereby enhancing road safety and reducing operating costs. Focusing on these goals, Vnomics and Advantech will pay close attention to customer needs, continue to strengthen the integration of hardware and software technologies, and develop more solutions that help fleet operators to effectively improve their management.■

Optimized Logistics Drive Smart Fleets

The application of an intelligent fleet can not only optimize cost control management for the logistics and transportation industry, but can also be applied to emergency services such as ambulance and fire services to improve the efficiency and execution of their tasks as well as ensuring the security of all staff whilst engaging in official duties at the front line.

By Sharlene Yu and Pictures from Fotolia
Interview with Van Lin, Director; Brian Hsieh, Assistant Manager; HC Lee, Project Manager; Irene Cheng, Product Manager of Advantech iService Business Group

Improving service quality and reducing operating costs are objectives that all logistics service providers try to reach. Now, many products and solutions, such as vehicle mount computers, wireless mobile devices, GPS, vehicle diagnostics and monitoring, are used in the management of fleets, carrying out all requests in the intelligent application of logistics and providing multiple functions such as fleet dispatching and scheduling, vehicle location tracking, and real-time management for freight, driver behavior management, and more. They allow logistics service providers to effectively manage their fleet using regular IT tools such as mobile and real-time systems. Police vehicles and fire engines for emergency rescue at the front line can use fleet management to promote the efficiency and execution of their service, and ensure the security of their officers on duty.

Manage Vehicles, Freight and Employees

Van Lin, the Director of Advantech iService Business Group, indicates that fleet management is a very important

part of intelligent logistics, and its prime directive is to optimize management costs. In the past, prior to modern logistics and fleet management systems, administrators found it difficult to determine the status of their vehicles when they left with freight, and it was impossible to re-assign new tasks on-the-fly before vehicles had returned to the dispatch center. Now with wireless networks and GPS satellite positioning, fleet management systems are capable of tracking the locations of several vehicles simultaneously, and indirectly determining whether freight has been delivered to the assigned location on time; all this is good but it still does not optimize cost control management. But now, via vehicle mount computers and network systems, administrators can not only can manage vehicles and freight, but can also manage employees. Inappropriate driver behavior can be monitored, such as over speeding or over braking which can rack up costs on fuel, tire replacements, oil consumption and vehicle damage. Tire pressure detection means vehicles can send warning messages to drivers before a breakdown occurs, and this also assures the security of the freight delivery, and decreases insurance and maintenance fees on vehicles. Furthermore, a vehicle mounted system can accurately calculate gas and oil quantities and consumption and prevent drivers from stealing fuel and other malicious activity. In addition, drivers can immediately upload all information to the system in the logistics center as soon as freight has been delivered to the assigned location, and the administrator can accurately control delivery schedules to prevent fines due to delayed freight delivery.

Dedicated Soft/Hardware Overcomes Challenges

In order to achieve real-time management for a fleet, a vehicle mount system requires several peripheral devices, such as wireless communication, satellite positioning, CAN BUS vehicle control systems, sensors and cameras. Plus, the power supply, shock resistance and temperature of its core computer should be able to overcome harsh environments so it can work normally.

Van Lin indicates that in-vehicle computers should conform to several special requirements. For instance, unstable power supplies and excessive noise often occur in old trucks, and insufficient voltages cannot activate its system. Sometimes, when connecting to peripheral devices, an instant high voltage may burn the motherboard, and bumpy countryside roads mean trucks can experience power drop offs or have their computers crash. What's more, systems which fail to conform to wide-temperature operation cannot work normally in extremely hot or cold weather. All these factors can mean dispatches fail, and in the worse-case scenarios, the system has to be sent back to the factory to be repaired.

Advantech systems not only overcome these through their advanced and rugged in-vehicle hardware technologies, but also transform all the complex data collected by intelligent software into useful information. For example, images with high resolution can be uploaded to headquarters for real-time monitoring, and images can be further analyzed to perform multiple functions, such as obstacle avoidance, automatic speed limiting, driver behavior monitoring, and anti-theft. Regarding connectivity, Advantech vehicle-mounted computers can make the most of Wi-Fi bandwidth and select the cheapest system capable of transmitting the most data over long distances which significantly saves network communication fees for logistics service providers.

Security and Efficiency Enhances Fleet Applications

The application of fleet management can achieve profit maximization for logistics service providers. Moreover, with an advanced vehicle mount tablet computer, it can improve the efficiency of police and fire services who need to maintain social order, prevent fires and provide emergency medical service. The emergency work of the police and fire services can be classified into two broad categories; patrolling, spot checking and maintaining order; and an emergency response service for accidents and disasters. A logistics fleet dispatch system can be used to perform standard vehicle dispatch operations for the former, and for rescue missions which often occur in harsh outdoor environments in poor weather conditions like storms with high winds and heavy rains, special designs are needed. Not long ago, we used to use paper maps to search locations; now we use smart phones and tablet computers with satellite positioning built in. However, these kind of commercial products are not designed for special tasks and they can only be used in 0~40 ˚C environments, which means they may not receive signals reliably or suffer interference, plus their poor shock resistance makes them tend to crash or malfunction.

Advantech rugged tablet computers have passed MIL-STD-810G four feet drop tests, IP54, and EN50155 vibration tests, and are designed for harsh environments. They are suitable for multiple applications, including field services, manufacturing, warehousing, factory equipment maintenance, emergency services, and transportation, to name a few. Current customers not only demand that vehicle mount products should be rugged, but they also demand that they should be special-purpose. For example, logistics storage, long-distance container transportation, urban courier service, public transportation, and emergency rescue vehicles—all require unique designs and solutions. Advantech logistics solutions are the smart choice for many different kinds of fleets and logistics industries.■

Intelligent Logistics Management Boosts Efficiency

For the purpose of effective management, cost reduction and fast delivery, logistics systems should integrate all information, automation and networking into system applications. Advantech provides all products and services needed to provide more transparent and intelligent management systems for the logistics supply chain.

By Sharlene Yu and Pictures from Fotolia
Interview with Van Lin, Director of Advantech iService Business Group

Logistics is now a huge business, both mature yet complex. According to a definition from the logistics management association: “Logistics is the physical distribution of objects, whereby it integrates multiple functional activities, including transportation, storage, load and discharge, packaging, distribution, processing and information. And through management processes, it creates value and satisfies the requirements of both customers and society.” Over the whole supply chain, there are many companies capable of providing raw materials, semi and finished products and services, and several operational requirements such as information flow and capital flow, which means logistics has become a multifaceted and complicated business. So, to achieve effective management, cost reduction and fast delivery, it is a necessary to integrate information, automation and networking into logistics, or even develop it further as an intelligent management component through the Internet of Things (IoT).

Vehicles are the Key Carriers

Van Lin, the Director of Advantech iService Business Group, indicates that it is the most important and basic element of a logistics system to promote efficiency and reduce cost. Intelligent logistics management should make the most of information collected from multiple sources to achieve real-time and effective monitoring. This way, suppliers can provide faster services for customers with

lower cost. What's more, he further points out that, "Vehicles are the key carrier in any logistics system. Ships carry freight into the harbor, cranes are used for unloading containers, trucks are needed for carrying containers to storage, and forklift trucks are used for carrying goods from storage to 18-wheeler semi-trailer rigs for carrying goods between storage and retailers—different cargo points need different kinds of vehicles to carry goods."

Advantech defines logistics as the information and control management systems that cover the whole process. From harbors to storage centers and retail points, Advantech provides a wide range of products and solutions to satisfy all these different application requirements. Van Lin explains that if we want the harbor cargo throughput to run smoothly, the gantry crane should use a rugged and stable vehicle mounted terminal (VMT). We also need a good dispatch and management system for the trucks in the harbor to collect information, such as loading times, harbor schedules, and container and storage locations in order to efficiently transport cargo from the harbor to the customer. After goods are put into storage, we then need to use forklift trucks with RFID and barcode scanners to accurately locate items from storage and pass on to assigned points or trucks for delivery to their final destination.

Rugged Vehicle Mount Systems are Essential

Because we need to monitor goods throughout the whole process, logistics systems for all vehicles should be highly stable. Van Lin explained that it is easy to manufacture a personal computer for consumers, but it is very hard to design a reliable vehicle mounted computer because the specifications are very strict. For example, a vehicle mounted computer should take battery endurance, wide temperature ranges, network transmission, shock and vibration, and humidity resistance into consideration. Professional software techniques and advanced hardware designs are needed to provide high-quality vehicle mount computers for these vehicles. Van Lin said that, "General products can only sustain shock and vibration of less than 10G, but the durability of our products can sustain vibrations of up to 20G. And of course, wide-temperature operation is always a basic requirement of Advantech's products. Plus, all the screens of our touch computers use reinforced glass with high shock resistance. The water and dust proof capabilities of our products are designed according to the requirements of working in storms or other extreme environments."

Roaming, Indoor Navigation and 3D Positioning

For large storage facilities of thousands of square meters, Wi-Fi has a fatal shortcoming because it can only provide wireless transmission within 100-200 meters. As a moving forklift truck may frequently move between one hot spot and another, a vehicle mount system on the truck may often lose connection to the network. However, a roaming function provided by Advantech can provide an optimized switch operation to make the system always connect to the network. Likewise, general GPS cannot position a vehicle indoors, but Advantech provides an indoor navigation application for current high-end positioning systems, it can guide forklift trucks in the storage facility to correctly take goods from a rack by RFID and Wi-Fi hot spots. In another aspect of 3D positioning, forklift trucks can move to a stereoscopic rack with the height of several meters to easily find and take a designated pallet or container; storage centers for Heineken and BMW in Germany, and IKEA in Sweden are successful examples. Also, a truck with an Advantech vehicle mounted computer can serve as an autonomous vehicle; the Auto Guided Vehicle (AGV) can move along a designated route after receiving instructions from the system to take goods from a rack and then automatically move to another rack only by different color stripes on the floor without any rails. After all designated goods are taken from the racks, the vehicle will carry these goods to a truck.

One-stop Shopping with Expert Sales Advice

In addition to all these vehicle mount systems for different types of vehicles, Advantech also provides corresponding rugged tablet computers or handheld devices for equipment that storage management personnel use to perform stocktaking or picking for couriers who send or receive goods. Van Lin stated that, "Regarding logistics storage applications, in addition to computer equipment and network devices, we provide a one-stop shopping service. That is to say, we not only provide our own products, but also provide our best suggestions about wiring, power distribution, software interfaces, network installation and barcode selections depending on the requirements of our customers. Partners in the Advantech ecosystem can also provide support services for the peripheral requirements for our customers."

Van Lin says that Advantech can solve problems that customers do not even know they might have in the future. When thinking about the logic of project assessment in order to replace the old sales model that only introduces the project specifications to customers, Advantech shares professional knowledge accumulated from a large number of successful cases of vehicle mount applications to system integrators to help compensate for their shortcomings. Thus, they can provide better system planning to build advanced logistics systems for their end customers. Finally, we can achieve a win-win-win situation for end customers, system integrators and Advantech. ■

Key Technology for the Smart City
RISC Processor Architecture

By Sharlene Yu and Pictures from Advantech
Interview with Aaron Su, Director of Advantech Embedded Core Group

Advantech launched a standardized service to leverage advanced technologies and reduce system integrators' design effort while promoting the popularization of RISC-based smart city solutions.

The Internet of Things (IoT) comprises of billions of smart interconnected devices, each with their own ID, with cloud computing services processing all the information. Future smart cities will connect with all these devices and facilities to build up a ubiquitous and intelligent system with integrated management of information that is reliably delivered via the cloud. Currently, most system builders are ramping up product roadmaps for the new era, but the smart city concept and IoT still have plenty of challenges to overcome before the dream fully becomes reality.

The Director of Advantech's Embedded Core Group, Aaron Su indicated that the related hardware and software infrastructure on the upper layer of intelligent computing (Macro Computing) has mostly been completed. However, if all decisions (including thousands of devices on the

bottom layer) are made via the cloud computing layer, then a huge network burden would lead to congestion, delays or even crashes without warning, resulting in the failure of intelligent services to deliver. Therefore, "Decentralizing the decision making process and letting the sensing layer balance the heavy loads are the best ways to truly realize the vision of, "connectivity for anything, at anytime and anywhere," he said.

Simple Tasks from Simple Architecture

Different from the Macro Computing upper layer which executes multiple tasks on a single device and is prone to shut downs which can damage the whole system, Micro Computing focuses on an individual simple task through one or several devices, and this dispersion approach ensures a more stable operation even when some devices fail. In order to meet the requirements of the sensing layer such as small size, low power consumption, low cost and dedicated use, Reduced Instruction Set Computer (RISC) architectures have become the first choice for perception applications.

Aaron Su believes that the last mile technologies of a smart city should be able to provide specialized and simplified solutions instead of trying to cover all possible functions regardless of whether they are needed or not, such as x86 based solutions try to do, consuming more power and more resources. Designing embedded applications with a RISC-based System-on-Chip (SoC) platform can shift the focus onto required functionalities only; excluding a lot of unnecessary features early on in the development process. This also has the advantage of lower power consumption, compact size and faster booting (less than one second), as well as reducing licensing costs by utilizing free operating systems like Linux. In other words, products based on RISC architectures can provide smaller and better appointed systems while implementation costs are relatively lower than those with x86 architectures.

In response to these trends, most chip makers have launched various RISC-based products for perception layer IoT applications of like Texas Instruments' (TI) and Freescale processors. TI's OMAP 5 processors are high-performance products with superior graphics capabilities and their low-power Sitara processors offer rich control features. Likewise, Freescale's i.MX family (single-core, dual-core and quad-core) of processors provide high integration, low power consumption and multimedia support for vertical industries.

Popularization of RISC-based Solutions

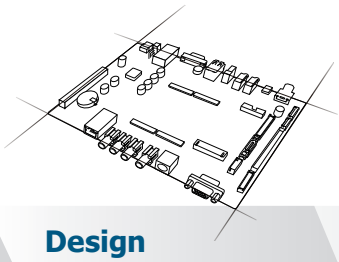
Despite there being so many excellent processors with suitable architectures for IoT, system integrators still encounter problems . Aaron Su explained, "Taking ARM as an example, the company doesn't manufacture but licenses its RISC processor architectures to other semiconductor manufacturers such as TI and Freescale that sell processors without motherboards. Therefore, system integrators still need to put a lot of time, manpower and resources into designing a new project for the vertical market which is characterized by small-volume but large-variety production. This practice means ARM-based projects often have low returns on investment which affects the popularity of RISC technology."

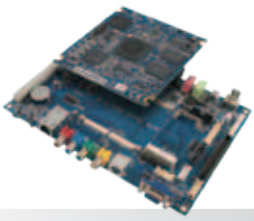
For each new project, system integrators have not only to hire professionally qualified engineers who are proficient in ARM design, but they also have to choose components by themselves as well as conducting a variety of inspections and tests after the design stage. Inevitably, some design problems such as being unable to connect to peripherals through the I/O bus, or needing special drivers or software, or adding more network ports will increase development time. Also, communicating with original manufacturers to find appropriate solutions also significantly disrupts project schedules too.

For a long time, Advantech has played an intermediary role between chip suppliers and the system integrator, "We can benefit both of them and bridge the gap between supply-side and demand-side to accelerate the popularization of RISC-related products and applications," said Aaron Su who further stated, "Advantech has solved many customers' design problems in the past and offered customized solutions to improve performance such as providing ready usable software and hardware that has passed a series of tests, quickly getting responses from suppliers to change unsuitable interface, or adding graphics acceleration software and extra Ethernet and CANBus ports to meet customers' special requirements. Though the demands of each vendor are different, they are accustomed to being self-sufficient, so Advantech helped to create a standardized service with software and hardware products so that developers can get the best solutions directly without doing everything themselves.

Rugged Hardware Standards for Harsh Environments

Generally, there are no standardized form factors for the RISC architecture. Until two years ago, some of manufacturers introduced Qseven and SMARC standards for handheld applications and RTX standard for rugged applications. These standards use a new concept to facilitate modular design by dividing embedded motherboards into two major parts: modules and carrier boards. Since the module gathers the core components (including CPU, memory, flash, power, etc.) with pre-defined dimensions and pin functions, developers can reuse the same ARM-based module and no longer need to spend a lot of effort developing the core platform and redesigning the entire board for each new project.





Planning

- Consultant services suggest appropriate solutions considering technical trends, specs and schedule
- Offer suitable evaluation kit(s) for customer evaluation

Design

- Technical documents for optimizing layout/schematics
- Referenced schematics to speed up development of carrier board
- BSP ready for AP development
- Customer's carrier board schematic review

Integration

- Board level integration support
- Peripheral module integration
- Consult for HW/SW fine-tuning
- SW customization services
- Optional thermal solution for system integration

Validation

- Test tools ready to validate customer's solution
- Consultant services for HW/SW related issues
- Test sample validation-Production run confirmation

Aaron Su emphasized that Advantech is capable of offering a range of modules to meet diverse standards. "The majority of ARM-based systems are used in harsh environments such as those with wide temperature differences and strong environmental interference, so we defined RTX 2.0 (RISC Technology eXtended) to optimize RISC-based platforms. By using 12 layer PCB designs of only 2.0 mm thickness, our products have the best circuit design and highly stable signals as well as being excellent against soldering cracks and deformation. Compared to golden finger connections, RTX's four board-to-board connectors offer superior electrical performance with better resistance to oxidation and vibration. The connection method you use will heavily affect the overall reliability of your system and the unsatisfactory design structure will further increase problems. Accordingly, RTX 2.0 is perfect for applications that require high stability and reliability such as robotic arms and limbs," Aaron Su stated.

Additionally, he also said that since it is common to get 5V, 12V or 24V power in factories , RTX 2.0 products provide wide voltage input ranges of (5V~24V) as the basic specification so preventing high voltage damage to the motherboard and simplifying the system without adding conversion designs for insufficient voltage which results in the system being unable to boot. To eliminate electrical drift problems which are caused by temperature variations, Advantech cautiously selected the components for its RTX module and each of them meets extended temperature ranges of (-40˚C~85 ˚C). Moreover, the thicker PCB with optimized trace width and trace space can strengthen stability as well as the rigorous testing before shipment which ensures the highest quality is achieved.

Standardized API and Design Services

As for software, a complete programming environment not only requires an Embedded OS and Board Support Package (BSP) but also needs an Application Programming Interface (API) suite for developers to call and test the hardware resources. For example, when vendors want to employ different processors, the same function may be collocated with different calling address and thus increase potential risk for the customer's application software. To facilitate application development, "Our unique SUSI API firmware creates a perfect method to always call the same address, making system integrators able to upgrade their systems with ease," Aaron Su said.

In addition to hardware and software standardization, Advantech has developed a standard service flow (so called Design In Support Services) for project development from planning, design, integration to verification. Aaron Su indicated, "Most designers do not know which solution is more appropriate for their system at the planning stage. Our consultancy service allows them to fully understand all the related technologies while helping them to develop their ideas. Advantech's proven reference designs and circuit layouts also benefit customers. If they want to implement Ethernet, System Bus, CANbus or other interfaces, they can directly copy and use our resources without wasting time redesigning".

During the integration phase, Advantech's dedicated service engineers can provide the required assistance to customers in all stages of creation and development such as pre-debugging for software code modification or circuit diagram improvement. For validation and testing, Aaron Su stressed that it is difficult to find the right testing tools for ARM RISC design in the market and often they have to write test programs for each project. So, for the purpose of reducing customers' design effort, Advantech proposed a standardized service process, including software, hardware and design services for RISC-based projects so that developers can leverage this key technology of the smart city and thus expand the variety of applications for the sensing layer. ■

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iDoor Technology Provides Totally Flexible I/O Options

For different applications, different industrial computers are needed. Advantech provides its highly-integrated and flexible iDoor technology for users who need customized solutions. Flexible and agile iDoor technology creates more diverse automation applications in a short period of time.

By Long Lin and Pictures from Advantech
Interview with Ren-Jie Zhang, Assistant Manager of Advantech Industrial Automation Group

Application diversity is a characteristic of embedded systems. Any automation-related application, such as financial services, healthcare, retail, construction, manufacturing and so on uses embedded systems. Because, different applications require different kinds of industrial computers, this presents a dilemma for manufacturers; i.e. how to meet the needs of customers whilst delivering customized products within the shortest time.

Ren-Jie Zhang, the Assistant Manager of Advantech Industrial Automation Group, indicated that from internal sales statistics, there is great demand for customized products. Unfortunately the market response was slow due to a lack of resources, manpower, and many other factors. Therefore, Advantech tried to find ways to improve this situation. According to market research reports, the demands for customized industrial computers are roughly divided into the following three categories: The first is basic customization, such as changing logos, stickers, colors, labels, and so on, which is simple and easy with fast delivery time. The second is moderate customization, which has the highest demand: to add or modify certain features of standard products, such as adding a LAN port. The third is highly-modified customization: standard products must

be re-designed and manufactured because they cannot completely meet customer demands.

The biggest challenge for Advantech is how to meet the above requirements without changing mechanical design drastically, to create the greatest customization flexibility, and to speed up product delivery time. After much research and discussion , Advantech developed iDoor technology which offers a high degree of integration with rapid market response. iDoor technology is the new weapon of Advantech IPC.

Standardization, Optimization, Integration

iDoor emphasizes integration and product flexibility, allowing users to configure their I/O requirements according to their needs. In order to achieve this goal, iDoor needs the following three characteristics.

First, the interface and color standardization: iDoor uses a mini PCIe interface embedded on the motherboard. According to the current market trends, mini PCIe can have many add-on functions, and also meet the needs of the Fieldbus protocol. As for color, iDoor complies with the color convention of Fieldbus protocol, which is easy to recognize and more intuitive. In addition, Advantech also provides a variety of functional modules with their representative colors.

Second, size optimization: the iDoor size is 81*19.4 mm, suitable for Advantech's various platforms such as embedded box PC, industrial tablet PC with touch interface, and so on.

Third, the integration of multiple functions: Customers can decide functions for themselves. iDoor application modes include:

(1) Fieldbus protocol: like Ethernet/IP, Profibus, Profinet, EtherCAT, and Powerlink. The I/O module extending from the Mini PCIe can be used as a Fieldbus.

(2) Used as an expansion of the Memory/Storage: To connect the motherboard with iDoor via Mini PCIe interface, serving as a redundant memory or storage to reduce the risk of system malfunction.

(3) Digital / Analog I/O: To embed plug-in digital or analog I/O modules in the industrial computer via iDoor (e.g., Advantech ADAM modules). It is very convenient for users who only need a small number of I/O points, and can also reduce system installation costs and space.

(4) Communications WAN / MAN / LAN: To integrate iDoor into Wi-Fi/GPS/GPRS/LTE modules with Mini PCIe interface, and to put an antenna on the chassis; thus, industrial computers can have wireless transmission.

(5) Connecting to different sensing modules like temperature, brightness, smart meters, and others.

Highly Flexible and Agile

iDoor not only provides different types of I/O via Mini PCIe interface, but also extends the motherboard features without taking up space in the chassis. Take the CFast memory card as an example. In the past, the CF slot took up a lot of space in the chassis, so when customers needed to customize, they could only stack embedded computers because of the limited space. They had to re-adjust or design the chassis, and therefore delay the delivery time. With iDoor technology, the I/O of the CFast card can be directly put on to iDoor and connect to the motherboard SATA interface, providing greater possibilities for applications.

Therefore, iDoor flexibility is not only used to expand I/O, but also to extend motherboard features. Advantech fully respects the different needs of customers and customers can use their expertise to tailor different application systems and to create their own unique market differences.

For system integrators, in addition to those application modes mentioned above, iDoor allows customers to develop their own MiniPCIe card, their own exclusive iDoor functions, and even iDoor shell colors (eg: combining company Logo), to shape their brand image through color recognition. For those key accounts, they can integrate industry expertise in automation applications via iDoor. Because iDoor is so flexible, even if there will be further expansions in the future, users do not have to worry about compatibility. Advantech iDoor technology makes products better able to respond to customer needs and create value with customers through product development, thereby creating more diverse automation applications. ■

Supply Chain Management in the Automotive Industry

By Advantech iService Business Group and Pictures from Advantech

The automotive industry is not only one of the world's most important economic sectors by revenue, it also takes up a leading role in terms of quality expectations, product variety and process complexity. Driven by globalization and increasing customer requirements, car manufacturers are forced to offer a large range of vehicle models and options. Just for example, one single model series of a premium German automobile brand can reach 1017 possible automobile variations! The enormous product variety-induced complexity and the pressure of tough international competition make it hard to ensure efficient logistics. That is the reason why industrial computing plays a major role throughout the entire automotive supply chain, from allocation and storage of raw materials and components to production and delivery to timely spare parts procurement.

Completely Knocked Down: The CKD Principle

Instead of shipping whole cars to overseas markets, automotive manufacturers prefer to ship vehicle components to be assembled on-site in local manufacturing plants. The reason: Import duties for "completely knocked down" (CKD) products are often considerably lower than for finished end products, and the components occupy less

freight volume, reducing the freight costs as well.

Some parts and components are produced at company-owned production facilities, while others are supplied by international sub-contractors. Ensuring that this enormous variety of car components supplied by various sources in different countries is delivered to the production plant bang on time is a logistic tour de force. This calls for well-engineered mobile computing solutions.

All German car manufacturers use Advantech-DLoG forklift terminals, for instance for production logistics processes, in-house transport, scanning transport goods, and purchase order processing.

Inbound Production Logistics

The model and options variety in automobile production requires flexible manufacturing, optimal sequencing and individual allocation of parts and components. This production principle is called just-in-sequence, or "string of pearls". Each "string of pearls" describes the predefined sequence of individual production steps each single car runs through in different manufacturing areas, from body-making to painting to final assembly.

The challenge is to deliver the correct individual automotive parts to every workplace in the production line, and that in the exact sequence in which the vehicles are being assembled on the production line. If a necessary component is not supplied in time, the pre-planned work sequence of all subsequent workplaces in the production line has to be changed accordingly.

Advantech-DLoG's extremely robust vehicle terminals like XMT 5, MTC 6 and the brand-new DLT-V8310, mounted on forklifts and tugger trains, ensure that parts and components are delivered to the production line on time and in sequence.

Operator and Tool Management

The workers at each assembly station have to know exactly which individual parts and components they have to mount on every single, individually configured car.

The rugged information terminals of the UTC series can display these important production data on the shop floor, as well as changes to production steps and components. Moreover, they can inform workers about the correct use of their tools, such as presetting the correct torque for every single screw.

Spare Parts Logistics

The prompt supply of spare parts is very important for an efficient after-sales service, and an essential aspect for customer satisfaction. In the automotive industry, though, the variety of parts and components to be kept in stock is extremely large because of the vast range of car models and individual configuration options. Moreover, replacement parts must be available for car owners for a long time – some German car companies actually can supply original spare parts for historic cars that are well over 30 years old.

A German car manufacturer has launched an extensive project in order to advance the company's spare parts logistics. Starting in 2003, this SAP based after-sales parts program has been introduced at many international warehouse locations. The project is supposed to improve parts held availability throughout the network, reduce operating cost and parts inventory levels and increase overall parts business productivity. It standardizes and integrates the spare parts logistics process throughout the entire supply chain, comprising:

- The complete supply process from the car dealers' orders all the way to full payment
- Forecast and planning of future spare part demands
- Connecting all partners to the spare parts logistics system
- Warehouse management from incoming goods to outgoing goods, including stock transfer and annual stocktaking
- In this area, for instance Advantech-DLoG MTC 6 vehicle mount terminals with 10" und 12" displays on forklifts or order pickers ensure precise and flexible management of original parts logistics.

Maximum Durability for Uninterrupted Production

Advantech-DLoG mobile computing solutions support said processes, reduce error and failure rates, and facilitate uninterrupted production. This increases the ROI, guarantees consistently high product quality, and ensures that deliveries and deadlines are met. That's why automobile manufacturers set great value on reliable and fail-safe industry computers.

However, automotive manufacturing is a very demanding environment for computing hardware. The terminals are exposed to substances that are very hurtful for electronic devices. One example is carbon, a material that is growing more and more popular in automobile design. Carbon dust is highly electrically conducting and prone to cause short circuits if settling on a CPU. Still, this causes no trouble for Advantech-DLoG's XMT 5, MTC 6 and DLT-V8310 vehicle mount terminals. They are completely sealed against dust and water in line with the IP67 protection class, guaranteeing flawless operation even in moist or polluted environments.

Furthermore these vehicle mount terminals are well protected against shock and vibration. That's important, given that warehouse floors often are quite uneven, with potholes, railway rails etc. Most forklifts or tugger trains do not feature any suspension or shock absorbers, so every impact caused by going over a bump is directly passed on to the vehicle mount terminal. Advantech-DLoG terminals are impervious to this strain. In addition, the touch screen displays are very tough and highly durable when it comes to mechanical impact and wear. The high-quality displays are easy to read even in direct sunlight and bright, reflective environments.

As a weak mount can be the weak point of a tough terminal, Advantech-DLoG offers a wide selection of tested and certified brackets and mounts for their terminals, keyboards and scanners, including custom-developed options. It is even possible to mount the terminals without leaving a mark – a perfect solution for vehicle leases.

Reliable WLAN Connectivity

Moreover, Advantech-DLoG's XMT 5, MTC 6 and DLT-V8310 terminals feature WLAN diversity for maximum availability. Optimized antennas and individually customizable wireless cards ensure a safe and reliable data connection even in difficult conditions. The design of the antenna of a mobile terminal is crucial for optimum roaming behavior. Its mechanical stability is just as important as its balanced radiation behavior.

Advantech-DLoG has designed a solution in collaboration with leading antenna manufacturers. The antennas are tailored optimally to the housing of the vehicle mount terminals. This makes them extremely resilient and provides an optimum transmission compared to off-the-shelf antennas. If the vehicle's driver cabin is bound to interfere with the WLAN radio connection, we can supply remote antennas that can be mounted on the vehicle's driver cabin.

Think Global – Act Local

Service structures and levels vary from company to company and location to location. Advantech-DLoG uses various services resources in order to provide their automotive industry customers with comprehensive local service, from mounting or installation to logistical service ticket handling. In many countries, we already work with our own network of recommended local service partners. If an auto manufacturer prefers certain service providers, we will fully support them and integrate them into our network.

The value of our global presence and the durability and reliability of our industrial terminals has been recognized in the automotive sector for years. This is why all German car manufacturers and many other international car companies and automotive suppliers have chosen to use our products in important areas worldwide. ■

Advantech Intelligent Micro Computer

Compact, Lightning-fast Solution for Machine Automation

ADVANTECH

Enabling an Intelligent Planet

Advantech Intelligent Micro Computer

What makes these micro computers different is their compact turnkey design which not only saves space but means they can be quickly and easily deployed without prohibitive integration costs. AIMC series micro computers are typically 50% more space saving compared to traditional wallmount systems. Until now, most production manufacturers had adopted full-size IPC solutions for their machine automation applications. But increasingly, fewer add-on cards are becoming the norm in machine automation, for example a single motion, I/O or artificial vision card can fulfill most applications.

AiMC Series

AiMC-2100
Micro Computer, Intel® Core™ i7/i5/i3 CPU, 1 Expansion, 250W 80Plus PSU

AiMC-3200
Micro Computer, Intel® Core™ i7/i5/i3 CPU, 2 Expansion, 250W 80Plus PSU

AiMC-3420
Micro Computer, Intel® Core™ i7/i5/i3 CPU, 3 Expansion, 300W 80Plus PSU

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A New Generation of Machine Vision Applications

Through a combination of hardware and software, Advantech's latest platform, A+ Vision and AIIS makes System Integrators capable of developing excellent AOI systems for industrial inspection and precision manufacturing.

By MD Wang and Pictures from Advantech
Interview with TY Wei, Prpduct Manager of Networks & Communications Group, Jason Ko, Product Manager of Embedded System Group

Intelligent manufacturing has become a new role model for the manufacturing industry, encouraging machine vision applications to grow rapidly in recent years. As the major technology in automated production lines, Automated Optical Inspection (AOI) systems must integrate diverse hardware and software technologies for a number of devices including industrial cameras, lens, lights, and industrial computers and inpection software that can process and analyze all image data, and provide full automated functionality.

Advanced Multifunction Solution with Ease of Use

To meet these demands, Advantech recently developed a new machine vision library called "A+ Vision" for use in applications for AOI and automatic precision manufacturing. Based on x86 architecture, it provides five major features: A+ Image Processor, A+ Pattern Matcher, A+ Object Extractor, A+ Measure, and A+ Aligner. Featuring an easy to use graphical interface, intelligent parameter adjustment and flexible customization makes the library incredibly practical yet powerful. Advantech also provides a user-friendly Software Development Kit (SDK) and reference sample code to facilitate application development. With an intuitive graphical user interface, it enables users to quickly configure their settings by clicking and dragging, thereby reducing the learning curve and program development time.

Despite the complexity of all the parameters, visual adjustment allows users to find the optimal parameter settings much faster. Generally, there is a trade-off between improving the detection accuracy and speeding up the processing time during the parameter tuning process. Therefore, when taking into account accuracy and speed, finding the best parameter setting is a big issue for Systems Integrators. A+ Vision provides a unique wizard, guiding users to tune parameters step-by-step through visual adjustment.

Flexible customization is another important feature for machine vision application builders. Currently, most of the available software tools from Europe and America are restricted by standard functions, meaning system integrators can only choose those tools that best fit but they

still struggle to apply specific modifications needed for their customers' requirements. But thanks to the own image-processing technologies and the advanced algorithms developed in house, Advantech expectes A+ Vision to be a leading brand in Greater China and Asia, and supports system integrators by customizing the software as they wish, thereby significantly increasing design flexibility to meet customer demands.

In addition to industrial inspection, machine vision applications have been applied in other diverse fields because of advancements in technology. For example, a precision alignment platform that controls the manufacturing process can precisely laminate, drill and cut touch panels, or directly print conductive materials on a variety of substrates. As the trend towards smaller sizes and light weight materials for smart phones and tablets has evolved, manual alignment has gradually been unable to fulfill the requirements of yield, thereby triggering a demand for high precision alignment to get more accurate positioning. In the just completed (Shenzhen) International Touchscreen Exhibition 2013, Advantech displayed an A+ Aligner solution for precision alignment. By integrating with A+ Vision, a motion control card, 2 5-megapixel industrial cameras, and a three-axis alignment platform, the solution attracted a lot of attention from participants and visitors.

Meeting Three Major Requirements

Apart from feature rich libraries, a high-performance computing platform is necessary to deliver system operation efficiency for precision image analytics. As a general rule, a large-scale system provides high-speed features and smaller systems require lower energy, but Advantech, which not only specializes in industrial computers, but also has vast experience in machine vision applications, introduced a new hardware solution to challenge this orthodox concept.

By using a unique thermal module and minimal wired design, Advantech Intelligent Inspection System (AIIS) is able to improve the air flow inside machines and optimize overall performance and physical dimensions. Less than 3 liters in volume, the appearance of AIIS is similar to a Thin Client and can be equipped with the latest CPU technology such as Intel Core i7 to cope with large area detection and multi-camera applications like PCBA or paper inspection.

Many integrators assemble their machine vision platforms by themselves which can inevitably cause incompatibility problems between different interface cards, system platforms and operating systems, as well as causing delays in development schedules. AIIS provides rich I/O connectivity that includes the most popular and latest interfaces such as Power over Ethernet (PoE) and USB 3.0 for image acquisition, as well as DIO ports for switch signal control and COM ports to connect all the various devices. For example, supporting PoE and USB 3.0 provides huge bandwidth for high frame-rate and resolution industrial camera, while eliminating the need for power distribution and cable routing.

Building intelligent systems is the goal of fully-automated unmanned factories, AIIS incorporates remote device management software - SUSIAccess, allowing customers to supervise all systems and monitor real time values such as CPU temperature, fan speed, voltage and SMART of hard drives. When an exception occurs, the system can auto-send an email or notification to the manager's computer and mobile phone. Through the built-in G-sensor, AIIS will also remind the user if there are any abnormal activities in the equipment.

Advanced Multifunction Capabilities

Manufacturing processes encounter increasing efficiency requirements and higher accuracy, hence major efforts are ongoing to strengthen visual inspection systems both in software and hardware. At the World Partner Conference 2013 (WPC), Advantech demonstrated a beer production line inspection concept by combining A+ Vision software and AIIS-1240 hardware platform equipped with four high-frame-rate industrial cameras. The solution was able to detect four different areas on one beer can simultaneously, and complete the inspection of three to four cans within one second. For more sophisticated applications such as touch panel processing, high-resolution cameras provide micron-level alignments and adjustment. As industrial inspection and precision manufacturing processes create different demands, then faster, more-accurate, higher-density, more-flexible solutions are critically needed for developing a new generation of intelligent machine vision systems. ■

Aviva Wang

Corporate Marketing Director, Advantech China

Hi everybody, greetings from Aviva in Shanghai!

I feel both excited and nervous to be given this chance to introduce myself to the Global MyAdvantech magazine audience. As an editor of the MyAdvantech Chinese version magazine, I know how popular this magazine is with all Advantechers and partners and how many readers it has. I really hope the following "sketch in words" can let you know me better: Aviva Wang—marcom in Advantech Shanghai, China.

I joined in Advantech in Sep 2004, nearly 10 years ago, focusing mostly on product marketing. I've been asked many times how do I keep passionate and motivated in the same job? Well, I honestly never thought much about this question. However, when I do look back, I see the many challenges at work but because I'm motivated by my passion, I'm always eager to break through these challenges. I think you could describe me as a self-motivated person with a lot of different interests. I am lucky to be here at Advantech which encourages self-development. Of course, my passion also depends on the fertile soil of Advantech: it's global view, broad scope and open culture, which is nourished by all marketers and groups around the world, keeping me engaged and constantly learning.

I don't know whether you've noticed it but Marcoms make up the biggest female team in Advantech, they help to promote Advantech and our products to worldwide markets. And you may also have already noticed that everyone of them is beautiful, talented and utterly professional, but what you don't know is they are also outstanding in both work and life. What's more, as a marcom in Advantech, even though we sometimes feel stressed, we all actually enjoy this kind pressure, and regard it as motivation, keeping us focused and striving for the best—for ourselves and for Advantech!

Joel Ong

AOnline Sales Manager, Advantech Singapore

Greetings from "The little red dot", a small vibrant island located in Southeast Asia with over five million people squeezed onto 700 square kilometres.

This is Joel Ong, AOnline Sales Manager, from Advantech Singapore. I joined Advantech in 2013 and it's an exciting and wonderful experience serving our general account clients (long tail customers) and acquiring new potential customers. Work never becomes boring with daily new challenges and new adventures. I'm honoured to have the opportunity to work with talented individuals across different department who are passionate and striving hard toward our common goals.

Work hard, play hard—you only live once!

Stéphane Blanc

Key Account Manager,
Advantech Europe

Hi, I'm Stephane, iAutomation Key Account Manager for France/Spain/Portugal. I've been working with Advantech for around 7 years now in different positions starting from FAE, then moving to European IO & Control PSM, and now for a year as KA Manager. This is what I appreciate about Advantech: the possibility to expand our work scope—always with the complete trust of the company in our capabilities. I always dreamt of moving to a sales activity but still involved with technical requirements. I think that today the KA position has allowed me to fulfill that dream.

A good team spirit today is even more necessary than ever. Without the support of a good FAE / Inside Sales / OP and all backbone logistics, efficiency is not possible. Today, all my colleagues are a really great support for me.

I started working in the Automation sector in 1996 and was able to touch all areas of it: hardware, but also software (helped by the previous company where I was working with SCADA, programming tools, business intelligence).

On the personal side, I'm married with 2 children (5 and 8 years old), and live in a beautiful mountain area called Grenoble, where I can enjoy ski and mountain bike sports—for a truly beautiful life!

Peter Tang

Customer Service Director,
Advantech America

"Satisfaction lies in the effort, not in the attainment, full effort is full victory." As the Customer Service Director, I strive to do things right the first time. They may just be little things, but usually they make the difference between winning and losing. During my 12 great years of service for Advantech America Service Center (AASC), I was truly blessed having opportunities to lead service operations and to promote value-added customer support service to our customers. Focused on Advantech's mission from "Trusted ePlatform Services" to "Enabling an Intelligent Planet", the AASC RMA team and I are dedicated to providing the highest standards of after-sale support, customer service, and teamwork with the other colleagues of Advantech. Together we recognize that our success depends on our ability to accomplish our mission and honor our commitments. Although sometimes what seems like the right thing to do could also be the hardest thing you have ever done in your life, it's always worth it in the end!

Before starting my career with Advantech, I worked for opto-electronics and semiconductor companies where I gained experiences in material planning and order fulfillments, international supply chain management, and global operations control. That knowledge contributed to my ability to continuously increase and strengthen all customer expectations and satisfaction to Advantech's high standards, as well as leading Advantech›s service innovation to success. I will always enjoy being an Advantecher and will always be proud of AASC as it continues to serve its customers with its can-do attitude and dedicated teamwork.

Offering One-stop Services from the Intelligent Campus-Kunshan A+TC

Advantech+ Technology Campus (A+TC) occupies three buildings spread over six acres in Kunshan China, and was officially opened in January 2014. In order to show Advantech's commitment to long-term development of smart city and IoT solutions, the campus is named A+TC , the "+" (plus) standing for the constant pursuit of the Good to Great spirit of enterprise (the word "plus" in Chinese also means "together"), symbolizing that through A+TC, Advantech will join forces with partners to empower the intelligent planet of today and tomorrow.

The A+TC campus itself is an immaculate example of the practical application of intelligent building systems, with actual examples throughout the entire campus from the parking lot, to reception, and from meeting rooms to the office spaces. Each incorporates a range of energy-saving and intelligent solutions from Advantech such as Building and Energy Management Systems (BEMS), human sensing control, video surveillance, solar panels, wind power stations and a rain recycling system.

To save energy more efficiently, the i-Meeting System can control air-conditioning and light, automatically reduce energy depending on weather conditions, number of people, even body temperatures of people on-site, but not in the sacrifice of comfort. There are signage systems residing in various areas of the building delivering fresh digital content including the i-Reception area, an interactive TV-wall, e-Catalog, and welcome board. By direct implementation of intelligent systems in different scenarios, Advantech has tried to demonstrate the, "We use what we sell" concept to illustrate how our products and solutions are suited to our customers' needs; and which also reveals our customer-oriented strategy.

Additionally, A+TC is also an exhibition and demo center for smart city technologies and solutions. The 8th and 9th floors of the main building will be used as a smart city solution exhibition place, where visitors can further understand Advantech's comprehensive range of products and solutions as well as experiencing the actual applications and scenarios.

Advantech will not only use A+TC as an actual showcase for intelligent buildings to further promote its concept and market adoption, but we will also utilize this campus as a collaborative and embedded R&D design-in center. Meanwhile, combining with our Kunshan manufacturing plant which is just 400 meters away from A+TC, and our most important production site for Advantech outside of Taiwan, we aim to leverage the "cluster effect" so as to provide one-stop services from research and development to sampling and manufacturing. ■

Digital Logistics

Enhancing the Delivery Efficiency of Goods

ADVANTECH DLOG

Competence in Mobile Computing

One Stop Shopping Fulfills Your Needs

Advantech is the first company to provide a comprehensive product portfolio covering harbor, warehousing, logistics and fleet management applications. With the integration of mobile data capture technology and partner supply chain software, we can help our customers better control their supply chains and inventories, move products faster to save time and help increase productivity.

Rugged-Design Industrial Mobile Computers

Advantech offers integrated systems that work under a wide range of temperatures, certified power systems, a full suite of RF protocols, vibration and shock resistance. A comprehensive software developer kit facilitates application development, speeding up time-to market for system integrators and helping reduce costs.

www.advantech-dlog.com

Partnering for Smart City & IoT Solutions

驅動智慧城市創新 共建物聯產業典範

ADVANTECH

Enabling an Intelligent Planet

Partnering for Smart City and IoT Solutions

Advantech holds “Enabling an Intelligent Planet” as our corporate vision, and “Partnering for Smart City & IoT Solutions” is our concrete goal; we will continue collaborating with various partners to build new paradigms in each vertical field. Advantech will consistently follow our LITA (Altruistic) spirit, positively cooperating with partners and engaging in innovation to develop every Smart City opportunities.

研華科技 推動智慧城市創新 共建物聯產業典範

研華以「智能地球的推手」作為企業願景，將「驅動智慧城市創新」作為具體目標，並與各產業夥伴協同合作深耕各垂直領域，共建各式物聯產業典範，期望能持續以利他的精神，積極創新並與夥伴共創智慧城市的每一個可能。

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