MyAdvantech

The Magazine for Global Advantechers and Partners

Autumn **2007 No.1**

Railway

QINGZANG Soars Skyward

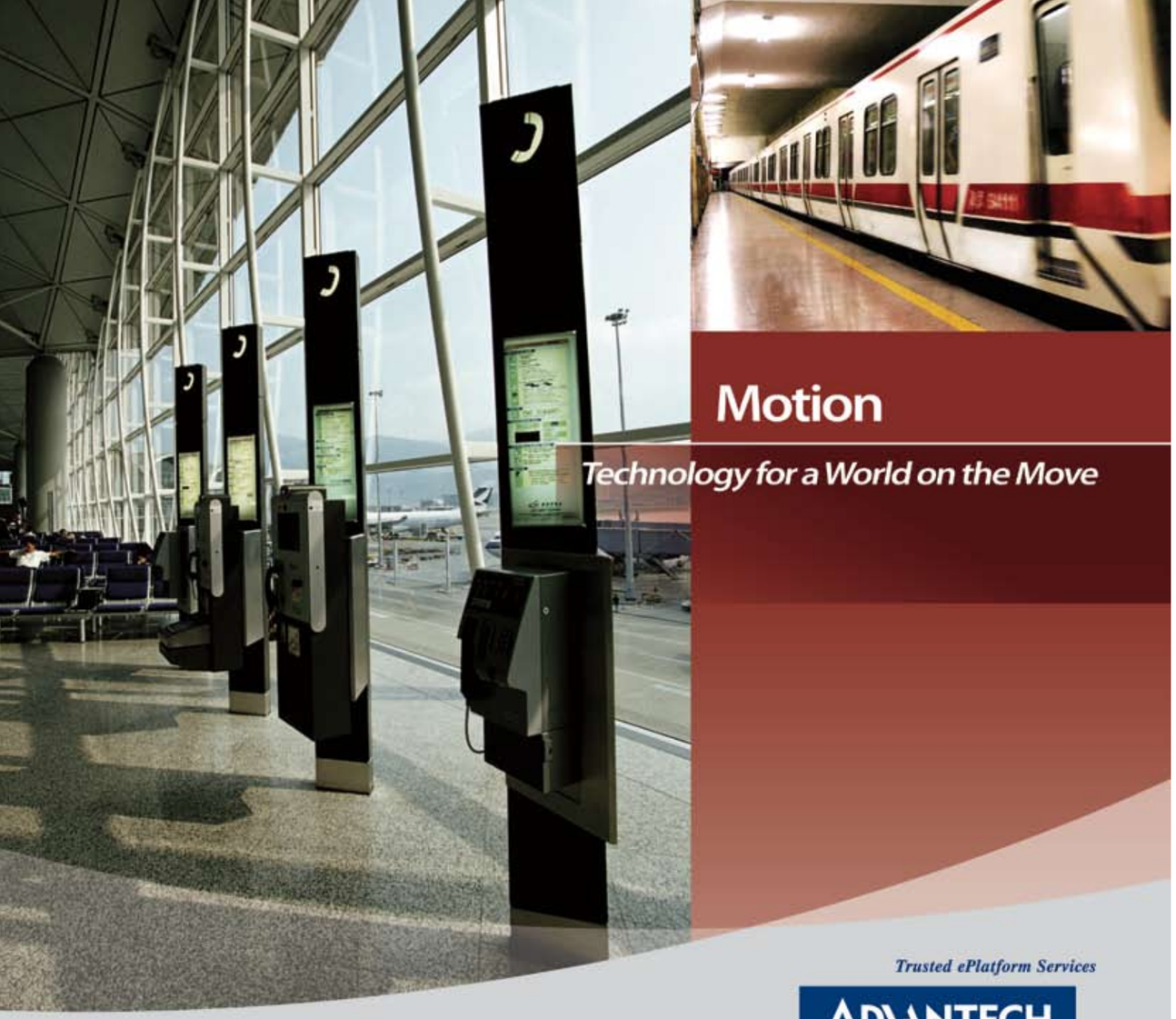
Advantech's TDCS Enables
the Passage Across "The Roof of the World"

Mobile Technology Lends a
Human Touch to Healthcare

Digital Signage
Jazzes up Your Life

PICMG 1.3 Brings a Quantum Leap

The Next Standard
in the Industrial Computing



Motivating Grand Inspirations

If the world were truly flat, we would soon run out of obstacles to inspire creative solutions. Dedicated to finding dynamic solutions, Advantech always conceives ways to keep humanity moving forward. Whether you need to ensure smooth traffic flow, gather up-to-the-minute airport flight data, or provide super-efficient e-Bus operations, Advantech designs multimodal transportation solutions for customers across a wide spectrum of environments and applications.

www.advantech.com

Contents

Viewpoint

05 Advantech's Globally Integrated Enterprise Transformation

Joyful eLifestyle

06 Mobile Technology Lends a Human Touch to Healthcare

10 Information - Its Omnipresence

12 Mobility First, Security Foremost

Technology Forum

15 Programmable Automation Controllers Find Their Niche…Everywhere!

18 Exploring Video Surveillance Trends

20 PICMG 1.3 Brings a Quantum Leap

Special Report

24 Extraordinary Wonders on the Tibetan Plateau

26 Qingzang Railway Soars Skyward

Inside Advantech

30 Building a Hothouse for the Next Great Invention

32 Advantechers around the Globe

Published by
Advantech Co., Ltd.

Publisher
K.C. Liu

Address
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei, Taiwan 114
Tel +886-2-2792-7818
Website www.advantech.com

Editorial Supervisor
Corporate Marketing

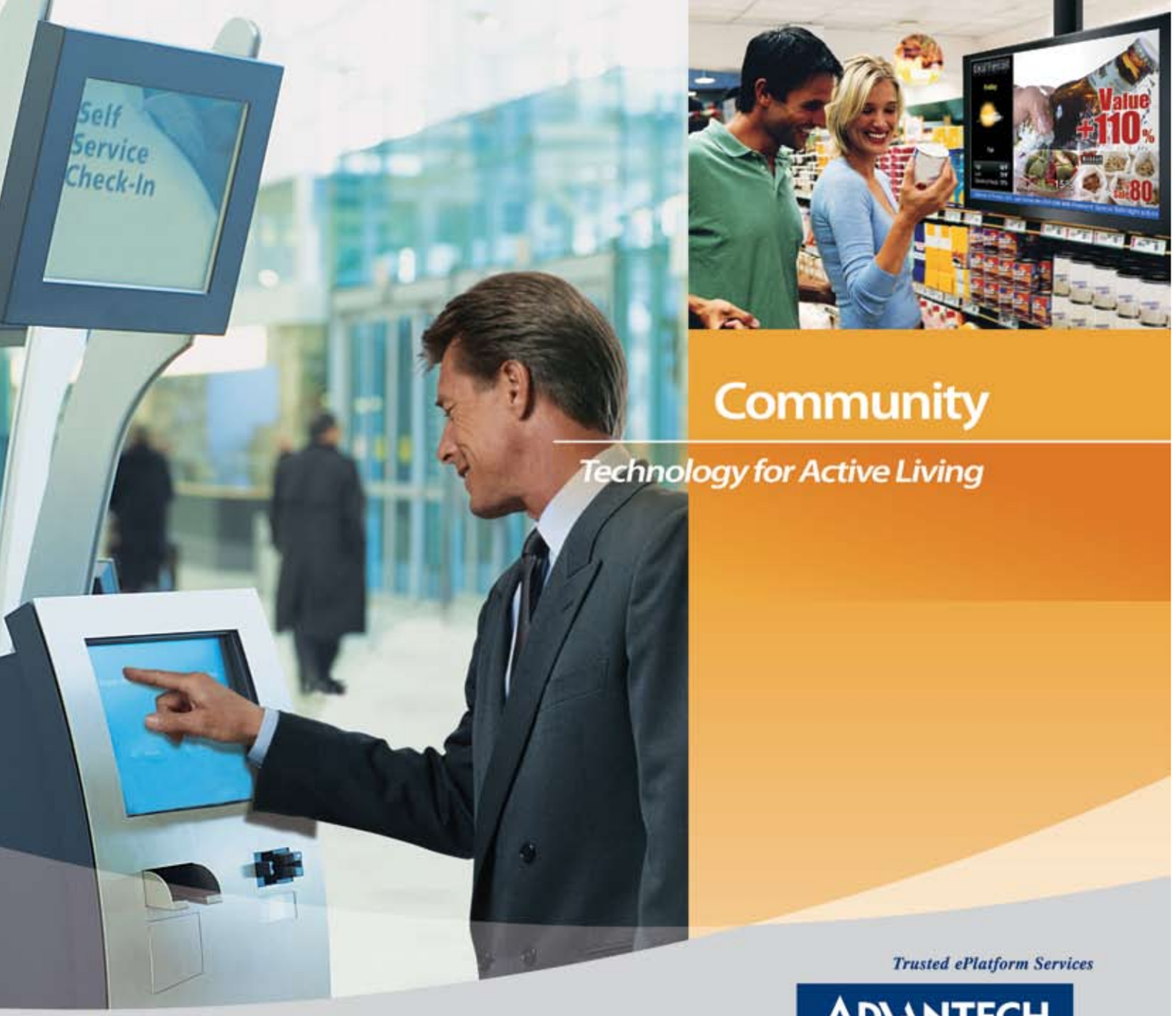
Editorial Committee
Sharon Chuu
Charlene Tang
Meg Chen
Lynette Andersen
Chuck Harrell
Edna Garcia
Rosanne Lee
Wolfgang Heinz-Fischer
Monika Paitl
Martin Marshall
James Kiley
Andy Taylor
David Antoniuk
Jean Chu
Jessie Lin
Mandy Chen
Monica Sun

Art Director
Charlene Tang

Editorial
CONDÉ NAST INTERCULTURE GROUP – Interculture Custom Media
Director Sophia Liao
Address 15F, No.51, Sec.2, Jilung Road, Taipei, Taiwan 110
Tel +886-2-2732-8899
Editor-in-Chief Nora Huang
Managing Editor Peggy Lai
Art Editor Jane Yang

Initial Issue 2007.09.30

MyAdvantech is published for ADVANTECH Co., Ltd. by Interculture Custom Media. All rights reserved. Reproduction without permission is strictly prohibited.



Fulfilling More Than Dreams

Society's advancement is often measured through the refinements of urban living. From self-service information kiosks to digital signage, from one-touch residential terminals to medical point-of-care sites, Advantech develops custom technology platforms to help partners set smart examples for better living. Advantech stands with customers at the forefront in shaping the good life. Realizing your dreams never had so many options.

www.advantech.com

Transforming Advantech into a GLOBALLY INTEGRATED ENTERPRISE

Facing the ongoing globalization trends, and to position Advantech as a competitive player in the fast growing vertical markets, Advantech will launch a comprehensive Globally Integrated Enterprise (GIE) transformation program from now on and throughout year 2008.

For years, Advantech has been actively expanding its global presence to accommodate market needs. All these efforts have transformed Advantech into a Multinational Corporation (MNC) spanning Europe, Americas and all of Asia. Recently, Advantech has experienced slower than expected growth. I believe that one of the root causes is the out-dated MNC structure. The "GIE" term was invented by IBM and has been adopted by many successful global enterprises; I firmly believe GIE is also the right way for Advantech to expand into the future.

Advantech's present organization and operations are still based on the traditional MNC model. This model sets boundaries between product divisions and sales regions, which limits our potential growth in this ever changing and competitive global market. I deeply believe we need to transform Advantech into a real GIE company to facilitate the next generation of growth. To be competitive, we need to change from the one-headquarter-multi-regions model to the GIE model. In the GIE model, the key success factors are to establish direct command chain and end-to-end domain knowledge transfer within each vertical sector from the product divisions to the sales teams. Another key factor lies in serving the vertical markets from the customers' point of view. Sales teams will no longer be limited to selling products from just their own product groups; they will also sell products from other groups, and even external alliance partners to deliver total solutions. This will also help to reduce redundant resource consumption and internal conflicts.

In terms of market positioning, Advantech will adapt to supply Application-Ready Platforms and Service-Ready Platforms, in addition to existing General Computing Platforms, with special emphasis on developing the Industrial Automation, Medical Computing, Gaming, Self-service, Real Estate Intelligence, Vehicle Computing, and Digital Signage vertical markets. Besides vertical sectors, we will continue to serve existing general ePlatform customers with our current segmentation models: Design To Order Services (DTOS) for key accounts, Channel Sales Forces (CSF) for channel partners, and Direct Marketing Forces (DMF) for general accounts.

As vertical sectors conduct end-to-end communication across regions, regional heads will become enablers who coordinate, administer and host the local working infrastructure. Most regional heads may also take lead in one key vertical business sector. With regard to supply chain management, the newly established Customer Fulfillment Center (CFC) will streamline the logistics process and provide customers with effective end-to-end services. The whole idea is to optimize Advantech's business process and work flow at the right place with the right talent, regardless of their location and department boundary.

All GIE operations and processes will be systematically designed with help from IBM's professional consulting service. Later this year, the company will formally announce the GIE organization adjustment to kick off this new GIE model in 2008. Hopefully by 2010 Advantech will be a fully-fledged GIE. I predict that these new changes will foster both the professional growth of our global business as well as the personal growth of all Advantechers.

KC Liu, CEO of Advantech

Mobile Technology Lends a Human Touch to Healthcare

Mobile healthcare services are no longer a fantastic, out-of-reach practice possible only in movies, thanks largely to communication technology advances. The emergence of mobile healthcare vehicles and in-home care facilities has made life easier for both medical carers and patients with difficulties who need to travel distances.

Script by Zheng Junzhong | Translation by Shannon Hu | Photography by Shi Jihong
Photograph provided by Taiwan Digital Images and Advantech

Mrs. Smith, a chronic asthmatic awoke from her dreams to an overcast, dreary morning and began her routine measurement of peak expiratory flow rate (PEFR or PEF). She keyed in the index into her cell phone to uplink it to her hospital's computer monitoring system. She then received a text message on her cell phone that reminded her to increase her medication dosage and check to see if her PEF has been effectively lowered afterwards.

Next, Dr. Coles who was making his rounds, found himself standing by the bed of a small boy at the children's hospital explaining the boy's bone fracture conditions to his father. Dr. Coles accessed the hospital database using the medical tablet PC and wireless network mounted on the medical equipment platform to retrieve the boy's X-ray, which came immediately to life on the monitor. Dr. Coles spent less than five minutes to put the father at ease by updating him on the boy's status.

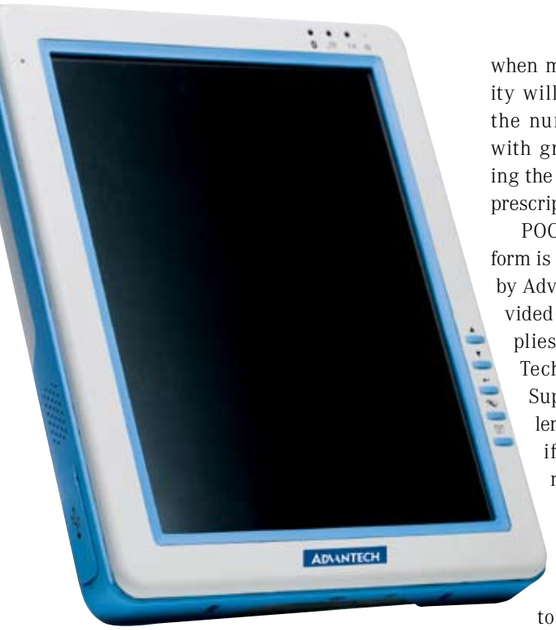
These scenarios evoke in many people a sense of envy: "Wouldn't it be wonderful if such convenience was available to me when I seek medical attention!" As a matter of fact, these technologies are becoming more and more readily available in real life, and more accessible to all; the impressive development of which should be credited to rapidly advancing "Mobile Healthcare" technologies.

Wireless Technology Unleashed the Potential of Mobile Healthcare

How is Mobile Technology defined? Deputy Chairman Mr. Xu Minghui of the Information Department at Taipei Wan-Fang Hospital provided a pithy definition: "Mobility is the antithesis of stationary. Mobile healthcare can be more generally explained if one looks at it from that point of view." The term is, in the main, defined by a capacity for servicing patients anytime, anywhere with accessible medical care and resources by means of manifold mobile communication technologies and facilities. It can also be divided into two categories, and both are important elements of a mobile healthcare network: mobile healthcare facility installations and operations, and distance healthcare and health ministrations away from the hospital.

Mobile communication technology advances have been seminal in propelling the rise of mobile healthcare. With WLAN, 3G mobile telecommunication, Wi-Fi, WiMAX, and ZigBee technologies gradually coming in full bloom, and tablet PC's, cell phones and PDAs growing more lightweight and powerful, all the requisite infrastructure is in place, which in turn, can be an excellent motivator for furthering mobile healthcare.

Additionally, the advent of an aging society and growing healthcare provision also promises bright prospects for the mobile healthcare market and industry. According to the statistics from the United Nations, the population of



seniors age 65 and older will account for almost 30% of the total population by 2050. MIC of the Institute for Information Industry also pronounced that the output value of global healthcare industries by 2015 will reach US$597 billion. Mobile healthcare therefore has been widely acknowledged as the beacon of future medical treatment and hi-tech medical industries.

The Greatest Niches: Mobile and Timeliness

Mobile healthcare fits the bill when it comes to innovative services and applications from the perspectives of both medical staff and patients alike. Tim Cheng, Sales Manager of Advantech Taiwan cited hospital healthcare as an example: “Nurses in the past had to return to the nursing station before they could key diagnostic data into the computer. But the presence of mobile healthcare platforms has expedited their jobs, allowing them to put to good use special equipment on the medical platform than enables them to directly key in patient data which is then fed to the backend system; or collect data from it by means of Wi-Fi connection when making their rounds. This ability will greatly simplify the work of the nursing staff, supporting them with greater efficiency, while lowering the risks of erroneous diagnosis or prescriptions.

POC-S155 mobile healthcare platform is an innovative solution designed by Advantech with valuable input provided by Chang-Gung Medical Supplies & Equipment Corp, INQ Gen Technology, and Yiyang Medical Supplies. POC-S155 offers excellent versatility with optional specifications in keeping with the need of the users: the height, accessories and size can be proportionately modified. Advantech’s new slim and light Medical Tablet PC also aims to provide medical professionals with an effective mobile solution at work; weighing only 2.5 kg with a touch screen, it is a great companion for doctors on multiple sites across the whole hospital. Furthermore, it can still be used and be charging while attached to a nursing cart.

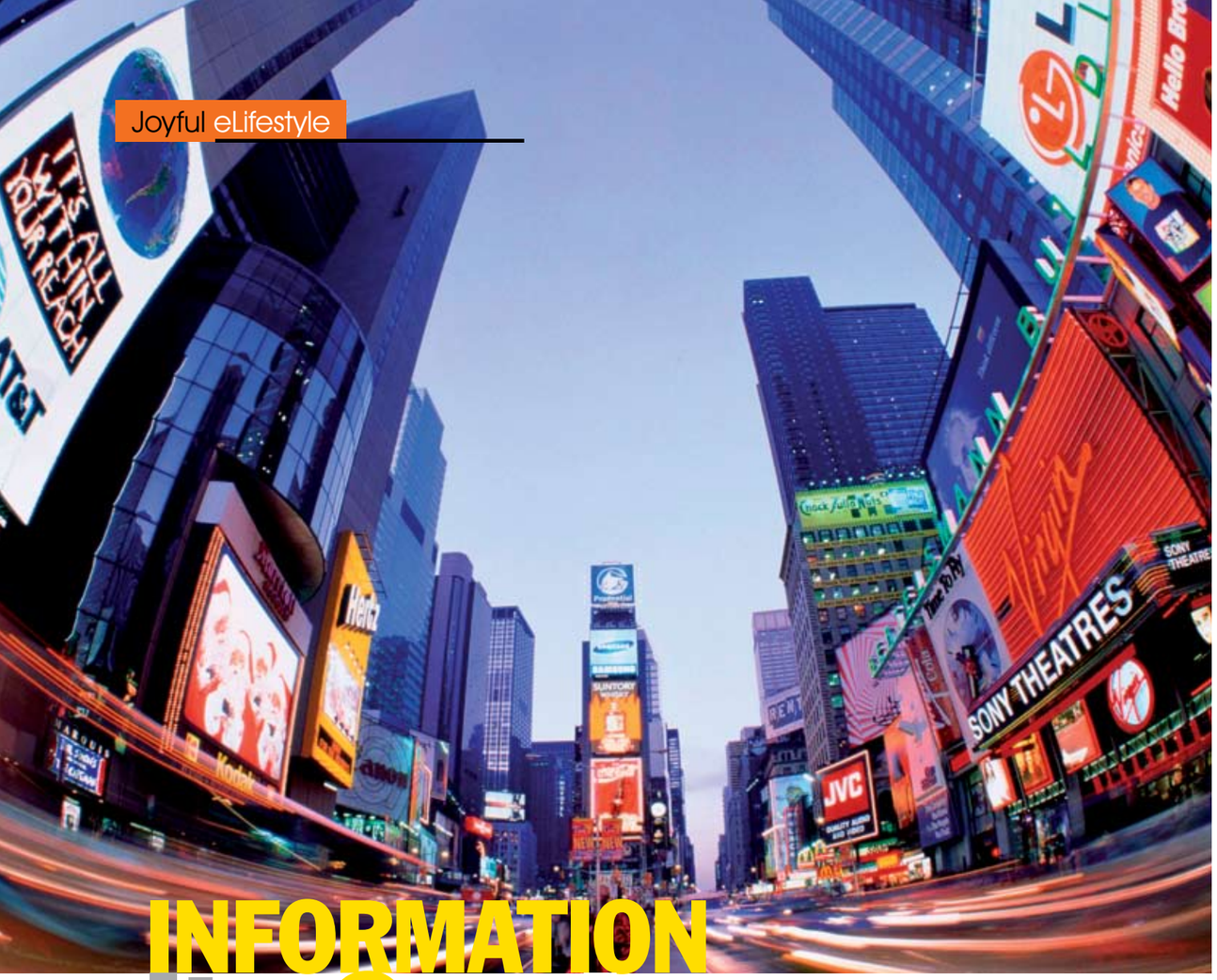
And for in-home care away from the hospital, mobile healthcare affords chronically ill patients and patients discharged from hospital precious assistance. Distance health monitoring systems can measure and collect patient’s blood pressure, pulse and blood sugar indexes, and uplink them to the hospital or healthcare service providers. Medical staff can readily watch and keep track of patient’s conditions by means of a specific device like the UbiQ in-home care solution, which can conduct a simple Q & A session when necessary. The UbiQ in-home care solution was co-designed by Advantech and the Institute for Information Industry; this simple, easy-to-operate panel provides users with immediate assistance and service.

Digitization, Visualization and Interactivity

The popularity of mobile healthcare has propelled Advantech to launch a series of development programs for healthcare. Advantech’s solid foundation in industrial computing has invested the company with excellent technological strengths in the development of mobile healthcare products: such as nursing carts currently employed by the children’s ward at the Taipei Veterans General Hospital, or the in-home care solution co-designed by Advantech and Kaohsiung Medical University. The Company is also working to expand and introduce similar care facilities inside ambulances in the future.

In addition to fulfilling fundamental medical requirements, Patient Infotainment Systems in hospital wards are another growing new trend. Working as a bedside computer; doctors and nurses can update patients’ health status; while patients can use them to play online games, watch pay-per-view movies and enjoy other entertainment.

Digitization, Visualization and Interactivity will dictate the course of direction for medical technology applications in the future, and mobile healthcare fits the bill perfectly. Of course, that’s not to say that there is no room for improvement, that’s why Advantech vows to commit even more research energy and resources into mobile healthcare platforms and in-home care devices. ■



INFORMATION Its Omnipresence

LCDs, electronic billboards, projection screens and other emerging display types have stealthily made their entrance into – and transformed – our lives. They are seen everywhere – inside elevators, on streets, at train stations and at retail store counters, displaying glitzy advertisements and news messages.

Script by Zhang Shengyi | Translation by Shannon Hu
Photography by Liu Weizhen
Photograph provided by Taiwan Digital Images

Digital Signage Jazzes up Your Life

Friday evening, an exhausted Alex gets off work. He drags himself to the MRT station and is immediately swallowed up by throngs of people. Oblivious to the traffic, Alex sets his mind on his weekend plans to unwind. He looks up at an overhead LCD and sees the trailer for The Bourne Ultimatum. The movie hits the theaters that night and Alex, intrigued, immediately calls his girlfriend and asks her to meet at the theater. While speaking on the phone, he glances up at the train arrival schedule on the display to make sure that he doesn't miss the train.

Amy, a "fashionista" at heart, loves designer bags. As she window shops aimlessly down a street lined with high-end boutiques, a fashion show playing on an LCD screen inside a store catches her eye. She is charmed by the handbag sported by the catwalk model, and steps into the store to ask about it. As the clerk rings up her purchase, Amy notices a message ticking on the screen, reminding shoppers of a special gift offer for purchases over US$500 at the VIP Lounge. She makes a mental note not to forget to pick up her gift.

The traditional marketing approach is constituted predominantly by TV ads, print media and outdoor billboards to attract consumer attention. Nowadays, the versatility provisioned by Digital Signage has effortlessly surmounted time and spatial limitations that often constrain traditional media, allowing entertainment and informational content, interspersed with tantalizing creative advertisements to play on split windows. Digital Signage marketing is now looking to be the next big "thing" in retail media!

Versatile Applications Generate Enormous Market Potential

The colorful digital content and messages on Digital Signage seem to fill the fragmented lulls of the urbanites with small but satisfying pleasures. Research shows that the marriage of image and sound best attracts attention. The whopping expensive TV ads at their best are one-way broadcasts, but Digital Signage entices consumers and advertisers to interact two-way with its touch-screen display and diverse digital content.

The widely popular KaiCool arcade in Taipei is a "purikura" (a word of Japanese origin, its quasi-English meaning is "print club") photo booth that successfully partners digital signage with various props and adornments – a testament to the aforementioned research result.

A study released by leading worldwide market research and strategic consulting firm, California-based Info Trends/CAP Ventures, forecasted that digital signage revenue will grow from US$550 million in 2003 to US$2 billion in 2009, an outstanding 364% growth. Other than crowded public venues (train stations, retail stores, chain convenience stores, etc.), Digital Signage technology will also be extensively adopted in hospitals, clinics, banks and beauty parlors.

Content played on Digital Signage screens can be flexibly adapted to the nature of each location, delivering targeted messages to specific demographics. For example, the "Hospi-channel" that currently dominates projection and display screens in clinics and hospitals, is a syndicated health message broadcast system that caters to crowds in waiting rooms. Large TV screens are mounted in these waiting rooms to play medical association/foundation-bankrolled information (e.g., urogenital issues and treatment), healthcare messages provided by pharmaceutical companies or consumer product suppliers and other self-made messages to increase the marketing channels for potential new merchandise, medication, operations or vaccines. Doctors at the clinics can inquire whether the patients are thoroughly informed of their conditions and treatment options during sessions. Also, when patients ask about new possible remedies, treatments not covered by their health insurance or self-paid regimens; doctors can offer impersonal suggestions without having to directly merchandise new therapies or drugs, because patients have already seen the relevant messages in the waiting room.

Multiform Packages to Accurately Assess Advertising Effects

Lucrative market potential has inspired Advantech to surpass its competitors in Taiwan, preempting the uncharted territories of Digital Signage technology development and designing a cohesive line of new products. In addition to the latest fanless designs, Advantech also packages a Software Development Kit (SDK) for embedded software development. Meanwhile, Advantech has partnered with an array of digital signage software companies, bolstering its technologies with staunch multimedia file management and software program editing know-how to provide robust digital signage solutions. Not yet resting on its laurels, Advantech moves to furnish buyers with customized product development and 3 to 5 years of value-adding technical support.

Indisputably, Digital Signage applications and development in the future will translate into an unusually wide spectrum of business offerings. The technologies portrayed in the futuristic film noir Minority Report may be seen in real life – real soon. ■

Mobility First, Security Foremost

Lifestyles in Taipei have been completely revolutionized through the introduction of its renowned Mass Rapid Transit (MRT) system. Everyday, thousands of commuters travel on the MRT, which requires a complex security system.

Script by JC | Translation by Shannon Hu | Photographs provided by Interculture and IMAGEMORE

Diane, a typical Taiwanese commuter, boards the MRT everyday from Tucheng, to travel to her office in Taipei's Xinyi District. The commute takes less than 40 minutes, giving her ample of time to preview her daily agenda. Before the MRT was commissioned for service, Diane had to leave home at least an hour earlier and endure heavy traffic congestion into Taipei City throughout the trip. Worst of all, when she finally reached Taipei, Diane would have to worry about making it to work on time as she struggled to find a place to park her car. This sort of mayhem was a daily nightmarish ritual for many Taiwanese residents. Now, Diane has time to read and relax while commuting to and from work.

The MRT began operation on the Muzha Line on March 28th, 1996, followed by successive openings of stations in Danshui, Zhonghe, Xiaonanmen, Xindian, Nangang, Banqiao and Tucheng forming an intricate and extensive travel network.

Currently, there are seven MRT routes at a total distance of 74.4 kilometers long. According to statistics by the TRTC (Taipei Rapid Transit Corpotation), there was an average of 1.02 million MRT commuters in May, 2007; in other words, there are at least one million commuters like Diane who use the MRT everyday, as they supplant their former means of transportation with the reliability and efficiency of rapid transit. Taipei's MRT has become indispensable to its citizenry, making itself an integral part of people's lives, improving their safety, efficiency and stress levels on commutes everyday.

Security Comes with Convenience

A total of 126 cities across the world have installed rapid transit systems, with over half of these systems in North America and Europe. Despite being only 11 years old, the TRTC has never wavered in its commitment to improving the system in order to provide commuters with the most amenable, comfortable, and secure commuting experience; among which, security is of the utmost importance.

TRTC's statistics show that to this day, 208 rail obstruction incidents have been reported since MRT began operation in 1996. Some of these breaches occurred during off-hours and went unnoticed. The obstructions were not detected until they were dragged behind the MRT for about 300 meters.

To prevent such obstructions from causing major disasters, TRTC has installed a patrol at each station platform during rush hour. The patrols will immediately whistle to sound an alarm in the event of any obstruction, and they will press the emergency button to notify the control center when necessary, exercising vigilance against any potential mishaps. Additionally, a "Platform Rail Obstruction Surveillance Alarm System" has been instituted at stations where traffic is unusually heavy. The system comprises a rail section/platform (yellow line buffer zone) monitoring mechanism, broadcast/early warning/surveillance, illumination, even emergency service suspension device. Under the auspices of new technologies, TRTC is now able to preempt and identify possible hazards and sound an early warning/cue. With this mechanism in place, TRTC can instantly identify the type and magnitude of such hazards and take the necessary measures to minimize any damage.

Multiplex Security Systems Safeguard MRT Assurance and Convenience

Monitoring Train Procession Safety

The Platform Rail Obstruction Surveillance Alarm System is a joint brainchild of Advantech, TRONY Science & Technology Development Co., and Orbit Technology Inc. This System involves the installation of customized embedded automation controllers (UNO-2050), designed by Advantech that nestle against the rail near the platform. The UNO-2050 is compact, easily installed, vibration-resistant, durable, and powered with a robust I/O integrated interface. Furthermore, its unique fanless design resists iron particles generated during train procession that could potentially damage the system. Additionally, the firmware provided by Orbit Technology offers special signal transmissions, high-performance data computing, and setup-and-play capabilities. It's operated by an infrared radar detector at platform/rail area, end wall entrance rail, the gap between train and station end wall entrance, and platform cordon.

The end result of this setup is that the UNO-2050 will pick up disruption signals from the infrared radar detector as soon as unidentified objects fall in the cordon area and sound the alarm to activate the monitoring system. The system display zeroes in the location of the drop, notifies TRTC personnel, and informs the engineers to decelerate or brake.

This whole process might sound elaborate, but it actually takes less than a second, and it can detect objects down to the size of a basketball. System installation is expected to be completed by September 2007.

Taipei Commuters Now Experience Improved Convenience & Safety

To expedite incoming and outgoing traffic at the stations, TRTC has adopted new lock gates, toll collecting machines, coin exchangers and value-adding MRT EasyCard systems that ensure high stability, heat and vibration resistance. UB Union Technologies Inc. is credited for designing this new accommodation service, which is now gracing the subway systems in Guangzhou, investing travelers with many convenient amenities. ■

UNO
Embedded Automation Computers

Trusted Embedded Automation Computers
Fanless, Cableless and Diskless Design

- Embedded Design without Moving Parts for Harsh Environments
- Embedded Linux, Windows CE & XP Embedded Ready Platform
- Compact Size with DIN-Rail/Wall/Panel/Desktop Mounting Options
- PC/104, PC/104+, PCI-104 and PCI Expansions

ADVANTECH
eAutomation

UNO-1019
Intel XScale UNO
With 2 x LAN, 4 x COM, CF Card

UNO-2059E
AMD GX2 UNO
With 4 x COM, LAN, PC Card

UNO-2182
Intel Core 2 Duo UNO
With 2 x LAN, 4 x COM, DVI

UNO-3074
Intel Pentium M UNO
With 4 x PCI, PC Card

www.advantech.com/eA

Programmable Automation Controllers

Find Their Niche…Everywhere!

In environmental monitoring, in factory automation systems, and in the networks necessary to transfer data, we can see PACs everywhere within the manufacturing enterprise to serve and connect systems for better operations.

Script by Billy Piovesan, Advantech Industrial Automation Group
Images provided by Advantech

In the beginning there was the relay and the timer. And in the process industries, there was the hardwired controller. A generation ago, digital electronics made the hardwired relay and controller obsolete in favor of the PLC, the programmable logic controller. Made to be fully deterministic and have limited control functions, PLCs were able to sweep hardwiring into the dustbin because they were easy to program in the "ladder" style of electrical wiring diagrams, and they were easily re-programmable so that they could accommodate changes on assembly lines and in batch processes.

But PLCs are limited. Ladder-logic programming cannot be used for complex mathematical formula, such as the basic PID algorithm found in every single loop controller in a process plant, for example. Then, along came the PC. Inexpensive computing power became ubiquitous and easily affordable. PCs were tried early on in industrial control, but early operating systems and hardware were not up to the stresses and standards of the industrial workplace.

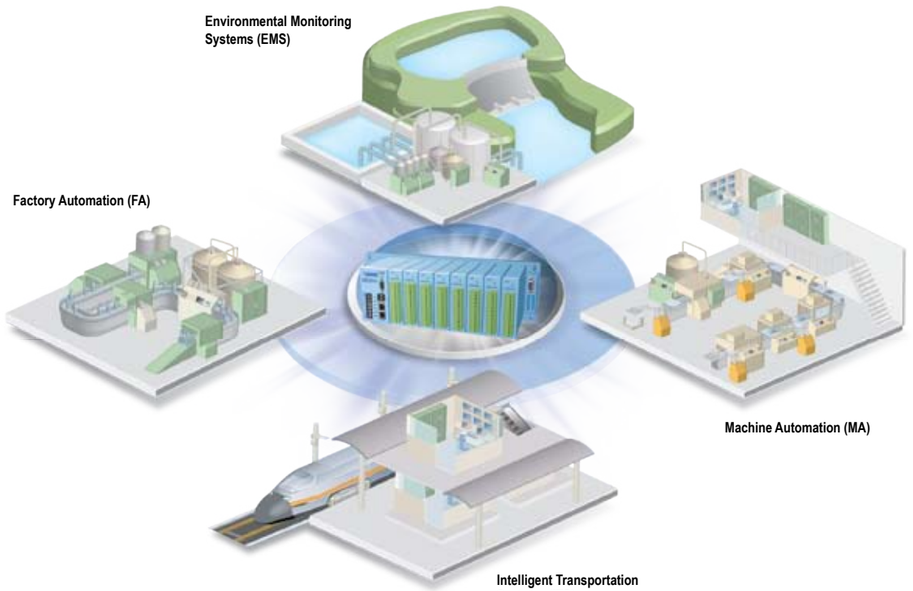
One of the biggest issues was determinism. In many industrial automation environments, especially in motion control and other discrete automation applications, it is absolutely required that an instruction get where it is supposed to go, when it is supposed to get there. PC operating systems are non-deterministic and have variable latency, depending on processor loading or the requirements of the operating program.

The Rise of the PAC

Several companies, including Advantech, have produced a powerful and

Multi-domain Functionality

PAC's will play a major role in different application domains by adhering to open industry standards and providing multidiscipline programming and functionality.



useful hybrid of the programmable controller and the PC. This device is generally called a PAC, or programmable automation controller. ARC Advisory Group is generally credited with coining the name PAC, and analyst Craig Resnick defines a PAC as having these characteristics:

- Multi-domain functionality, including logic, motion, drives and process on a single platform.
- Common tagging and a single database.
- Software tools that allow design by process flow across several machines or process units.
- Open, modular architectures that mirror industry applications from machine layouts in factories to unit operations in process plants.
- De-facto standards for network interfaces and languages, etc., allowing data exchange as part of networked multi-vendor systems.

These characteristics taken alone or together are the reasons why PAC devices have grown dramatically in market acceptance since 2001.

One Platform, Multiple Domains

Many OEMs and end users of automation systems and controls work in more than one domain. For example, even a highly process oriented plant such as a fine chemical manufacturer has requirements within the plant for motion control, packaging, inventory management, and automated identification systems, as well as continuous and batch process control requirements. The need to integrate Laboratory Information Management Systems (LIMS) and Process Analyzer Technology (PAT) Initiatives, and sampling initiatives around the plant have made it necessary to network multiple domains.

A PAC can be used in a wide variety of applications in a wide set of domains within the manufacturing enterprise from inside the facility management system, in the environmental monitoring and handling system, in the factory automation systems themselves, and in the networks necessary to transfer the data from the plant floor and auxiliary control systems to the automation software and control centers and from there to the enterprise management systems themselves.

Single Database Functionality

One of the significant differences between PLCs and PACs is the way they handle input/output functions. PLCs constantly scan all the I/O in their systems continuously at a very high scan rate. While this enables very fast I/O response, it also limits the number of I/O points a PLC system can handle. PACs, by contrast, use a logical address system and a single tagname database very similar to traditional SCADA and DCS systems. Thus, a PAC can identify and map I/O points as needed.

The fact that PACs handle I/O and data in the same manner as traditional SCADA and DCS systems means they can more easily be interfaced directly with those systems. PACs are often used as substitutes for SCADA RTUs (remote terminal units) and DCS field controllers, just because they work in a logically similar manner with data.

Powerful Software Tools

To extend the capabilities of field automation controllers, the IEC has created programming software standards, IEC 61131-3 and others. These standards take the ability of programming in about twenty ladder-logic commands and replace it with a full featured programming capability. In addition, there's the concept of function blocks. A late addition to the world of PLCs, function blocks come directly from the Distributed Control System (DCS) world. PACs are designed to utilize function blocks and function block programming rather than the more limited ladder-logic programming of the PLC.

Because PACs are in essence PCs, they are capable of being programmed in a variety of higher order programming languages. Suppliers of PACs have produced complete suites of programming software tools to enable very sophisticated operations to be controlled by PACs. For example, Advantech produces software for PAC programming, HMI creation, SCADA, data acquisition and distributed control architectures, and an OPC server for connection to other control systems and even to MES and enterprise integration systems.

Open Architectures and Standards-Based Systems

PACs are based on open architectures that permit a variety of form factors to be used yet the devices themselves are the same or similar. A PAC can be used as a motion controller, a data logger, a process controller, and other devices with a minimum of design and configuration changes. And the PAC can handle control, communications, data logging and can communicate multiple types of information through multiple information gateways simultaneously.

All of the PACs are interconnected using standard networks from Modbus and Modbus/TCP on the factory floor to Ethernet throughout the plant, to TCP/IP and .NET to connect to the Web and the enterprise. It is this ability of the PAC to use standard and standards-based networking and communications that has driven the PAC to its pre-eminence as the factory automation controller of the future.

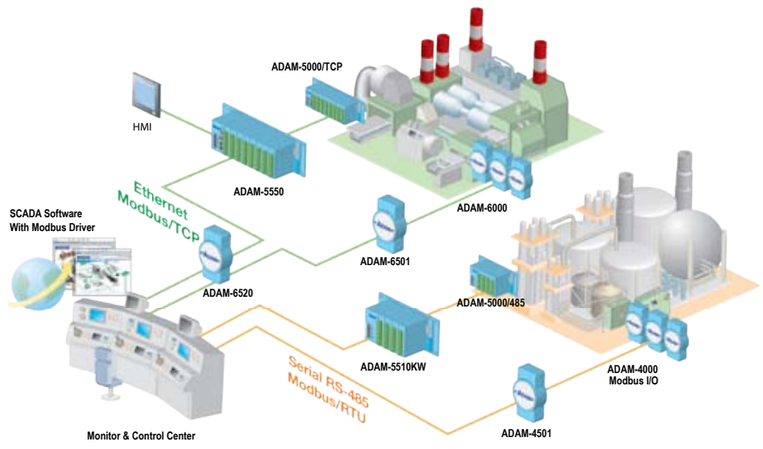
Thus, a machine control PAC can communicate with its sensors or other I/O via Modbus, with other PACs in the same factory cell with Modbus/TCP, or CANbus or CANopen, or Profibus. It can communicate with other PACs or HMI/SCADA or DCS via Ethernet or through the use of an OPC Server, and with the enterprise through the use of various OPC or .NET services, depending on what data it is serving and to where, simultaneously.

The Power of Open Systems

The PAC has provided incredible power to OEMs, system integrators, and end users interested in procuring the best possible automation solution using best of breed products and software. PACs can be used for data acquisition, for communication control, for process control... for nearly any control related task in the manufacturing environment. Data can be acquired, processed, used for field-level control, and reported higher in the enterprise using integrated hardware and software. ■

De-facto Communication & IT Standards

Utilization of Modbus, Ethernet, Internet and IT standards such as FTP, Web Server, Email Alarm and OPC



Exploring Video Surveillance Trends

The ceaseless advancement of computing power and network bandwidth is driving the increasingly dynamic video surveillance industry. This article describes some key technology trends that you cannot ignore if you want to take advantage of the new business opportunities created by the evolution of digital video surveillance.

Script by Aaron Yeh, Product Manager, Digital Video Platform Division of Advantech
Photographs provided by Advantech

Ever since the 9/11 terrorist attack, security has become a major issue in the technology field. After digital technology was adopted by the video surveillance industry a few years ago, the development of this industry was gradually influenced by the IT market and its technologies. This influence is set to grow with the ceaseless advancement of computing power and network bandwidth, so the connection or even the integration of video surveillance and IT industries will undoubtedly be the future trend. In the following article, we will walk you through the four stages of the integration of the video surveillance and IT industries.

First Stage: The Digitalization of Video Processing and Storage

The basic components of video surveillance are video cameras; cables for video signal transmission; image processing and storage devices; and display and backend management systems. Traditional video surveillance uses CCTV cameras, Coaxial cables, VCRs and TV monitors. The first step of integration with the IT industry is the digitalization of processing and storage. Video data uses an enormous amount of storage space, so video compression technology is needed to store a large amount of video data effectively. Therefore, the first stage of integration is based on three digital video technologies: capture and digitization, efficient compression and storage & playback of compressed video.

The digitalization of video processing and storage has opened a booming market for digital video recorders (DVR), which offer significantly increased functionality over traditional VCRs. The popular standalone DVR is a good example. CODEC technologies such as Motion JPEG, Wavelet, MPEG-1, MPEG-2, MPEG-4 or H.264 for higher compression ratios are key technologies in DVRs. Even though these technologies require higher computing power, with the ceaseless advancement of the semiconductor production process, these technologies have gradually been applied in mainstream markets.

Second Stage: Connecting Video Surveillance to the Digital World

In this stage, many new PC-based DVR applications are created by integrating video surveillance with a backend information system. Taking factory automation as an example, video surveillance is no longer an independent monitoring system, but a part of an entire automated facility or the IT infrastructure. The use of standard x86 hardware and operating systems such as Windows XP or Linux make digital video easy to integrate with vertical applications.

In the past, Advantech provided its clients with a distributed control I/O and industrial computing platform as the automation solution. Once digital video became prevalent, digital video became synchronized with factory automation, so data and control streams could simultaneously flow to an integrated backend IT system. With the integration of alarm and video surveillance systems, Advantech's clients can respond to emergencies and carry out follow-up analysis more effectively by using video image analysis when an event occurs.

From the IT perspective, the main focus of this stage is on software for video recognition, e-map, intelligent information searching, alarm monitoring and control, object tracking, etc. A system like this will need to be comprised of OCX or SoftLogic modules for specialized backend integration. In addition to the factory automation, we now have more and more requirements from vertical applications to integrate digital video functions into embedded systems like ATMs, POS terminals, medical devices, gaming systems and in-vehicle devices.

Third Stage: The IP World

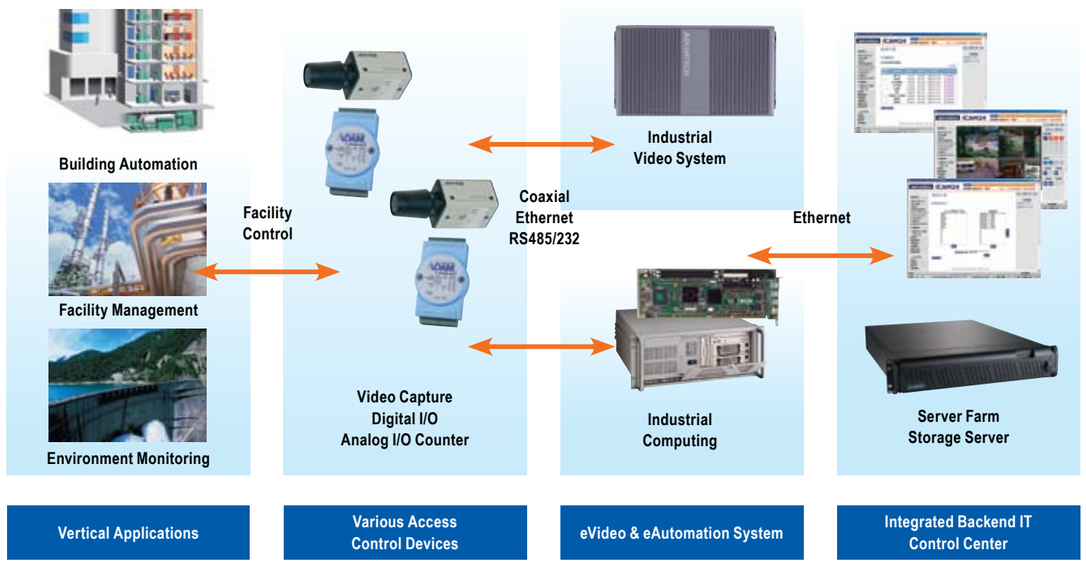
In David C. Moschella's Waves of Power, the development of the information era is divided into four periods, the System Period, the PC Period, the Network Period, and the Content Period, in which the value of the Network Period refers to the prevalence and availability of broadband network connections. We are presently between the Network Period and the Content Period. The transmission of video streams through IP networks will unquestionably become another focus of integration. New terms, such as IP surveillance or network video, are representatives of such integration.

The most direct change brought about by IP networks will be replacing traditional peer-to-peer coaxial cable with an integrated IP network, but the impacts are not limited to this. The advantages of IP surveillance include the integration of various applications on the IP network. There is an excellent example from Japan. Japan Rakuten provides a set of integrated videos and various IP-based services connected with rebroadcasts of sports games through the broadband network. Through different cameras on the field, users watching the sports game through the IP network can choose to view the game with cameras from different angles. Moreover, they can also obtain information relevant to the game instantly, replay certain moments of the game, or search the offensive and defensive records of the players. These functions are integrated in one screen.

Fourth Stage: Business Innovation and Video Surveillance

As technology progresses from the Network Period to the Content Period, the impact of innovation on business models is tremendous. When computing power and broadband become mature, the first beneficiary will be video surveillance. What is the so-called business model? A quote from What Management Is? by Joan Magretta explains it as "a set of assumptions about how an organization will perform by creating value for all the players on which it depends, not just its customers." For example, Amazon.com, eBay, iTunes, and even controversial peer-to-peer music sharing are all representatives of value chain business model innovation that subverted the tradition.

Market and technology boundaries have been broken to create totally different industries from traditional telecommunication service companies. For example, Skype or the latest 3G mobile phones create a whole new service model. Therefore, the influence of service models that subvert the traditional value chain in the video surveillance industry will be something that needs to be considered by all video surveillance companies. ■

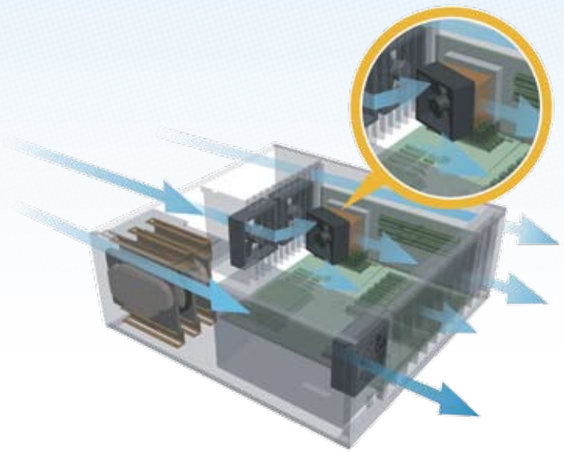


The Integrated Structure of Video Surveillance & Factory Automation

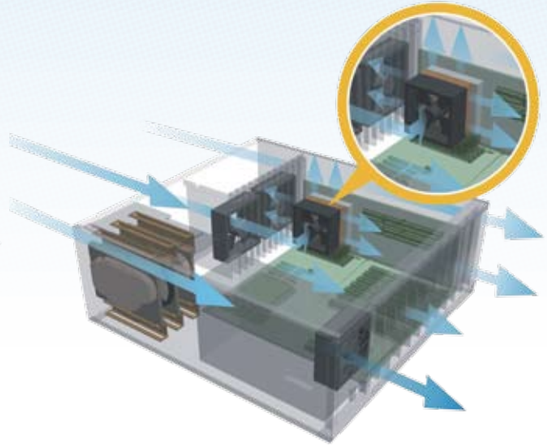
PICMG 1.3 Brings a Quantum Leap

Generally, the purpose of a new standard is to solve existing technical issues. The SHB Express (PICMG 1.3) specification not only breaks through certain present limitations, but also brings in impressive functional advancement. It is believed that SHB Express will become the IPC mainstream standard in the near future.

Script & images provided by Advantech



Advantech's enhanced thermal design



Conventional thermal design

As technology evolves, parallel bus interconnects established by the PICMG 1.0 and 1.2 standards have been running into inherent bandwidth limitations, especially when designing systems using today's high throughput I/O devices and chipsets. The SHB Express specification has arisen to correct data bottlenecks by replacing parallel PCI/PCI-X buses with serial PCI Express links from the System Host Board (SHB) to backplane. Different configurations of PCIe x1, x4, x8, and x16 links, as well as advanced features such as IPMI, Serial ATA, USB, and Ethernet connections are defined to boost overall system performance. The SHB Express specification brings all the advantages of PCI Express, and opens the door to the next generation of industrial computing platforms.

Expanding throughput with high-speed, high-bandwidth serial links

By leveraging point-to-point serial PCI Express technology, SHB Express is capable of scaling all the way up to 10,266 MB/s through 20 PCI Express lanes and a PCI bus, and in the future, beyond that.

Supporting advanced I/O connectors

SHB Express brings SATA, USB 2.0, Gigabit Ethernet and Intelligent Platform Management Bus (IPMB) to the backplane to save the cost of expansion cards. This also reduces the number of pin headers on CPU cards for more board layout space while simplifying internal cabling for enhanced airflow and system reliability. Reduced complexity and modular design together result in faster MTTR.

More efficient power management

While previous standards only defined signals for AT compatible power supplies, SHB Express defines ATX and BTX power management signals to support the ACPI power management standard. SHB Express supplies 500 W via the backplane to support today's latest power hungry CPUs without extra power connectors. Furthermore, enhanced power management enables systems to run cooler for extended product life, longer MTBF and reduced RMA costs.

	PCI-ISA (PICMG 1.0)	SHB Express (PICMG 1.3)
Interface	ISA + PCI (32/64-bit)	PCI Express (x16 + x4) + PCI-X (32-bit/66 MHz)
Bandwidth	538 MB/s	10,266 MB/s (10 GB/s)

Leveraging commercially available, off-the-shelf I/O cards

SHB Express enables commercially available, off-the-shelf PCI Express peripheral cards to be used in industrial computing platforms. This key advantage over PICMG 1.0 enables designers to leverage commercially available solutions and significantly broaden the application scope of their SHB Express systems. For example, designers can choose from the latest high-performance PCI Express x16 graphics cards to enable SHB Express to handle new medical imaging applications.

Maintaining backwards compatibility with PCI and PCI-X

PCI, PCI-X and PCI Express peripherals can all be used in SHB Express systems. PCI Express shares the same addressing model as PCI/PCI-X, so existing drivers, operating systems and applications software can still be used. This backward compatibility protects previous investments in PCI/PCI-X technology while facilitating a smooth transition to PCI Express.

Advantech's SHB Express Solutions

Today, Advantech is extending leadership in the single board computer market by building the most comprehensive family of RoHS compliant SHB Express solutions. Advantech's total solutions include System Host Boards, the largest selection of backplanes, a full line of chassis, as well as support for all peripherals. Advantech also offers comprehensive compatibility and testing services, meaning system designers can source all of their system requirements from a single, one-stop vendor, significantly reducing development time and costs.

Advantech's SHB Express design policy provides clear solutions that ensure system compatibility. The line-up of SHBs and backplanes cover all major market segments, from high-end

Advantech Server-class Backplanes

BP Model	Segments	Slots Per Segment							
		PCIe				PCI-X			PCI
		x16	x8	X4	X1	64/66	64/100	64/133	
PCE-7B06V-04A1E	1	-	-	-	-	-	-	-	4
PCE-7B06V-30A1E	1	-	2	-	-	-	2	1	
PCE-7B06-04A1E	1	-	1	-	-	-	-	-	4
PCE-7B08-04A1E	1	-	2	1	-	-	-	-	4
PCE-7B13-64B1E	1	-	2	-	-	4	2	-	4
PCE-7B13D-04A1E	2	-	1 or 2	-	-	-	-	-	4
PCE-7B19-88A1E	1	-	2	-	-	8	-	-	8
PCE-7B16Q-02A1E	4	-	1-	-	-	-	-	-	2

Advantech Graphics-class Backplanes

BP Model	Segments	Slots Per Segment							
		PCIe				PCI-X			PCI
		x16	x8	X4	X1	64/66	64/100	64/133	
PCE-5B06V-04A1E	1	-	-	-	-	-	-	-	4
PCE-5B05V-30A1E	1	-	-	-	-	2	2	1	
PCE-5B06-04A1E	1	-	-	-	-	-	-	-	4
PCE-5B06-00A1E	1	-	-	-	4	-	-	-	-
PCE-5B07-04A1E	1	-	1	1	-	-	-	-	4
PCE-5B12-64B1E	1	-	-	-	-	4	2	-	4
PCE-5B13-08A1E	1	1	-	-	3	-	-	-	8
PCE-5B12D-04A1E	2	1	-	-	-	-	-	-	4
PCE-5B18-88A1E	1	1	-	-	-	8	-	-	8
PCE-5B16Q-02A1E	4	1	-	-	-	-	-	-	2

server-class solutions to graphic intensive products. Customers can easily recognize specific solutions according to their product class. Customers requiring server-class solutions may choose the “PCE-7000” series SHBs with “PCE-7B00” series backplanes. For excellent graphics performance, customers can select the “PCE-5000” series SHBs with “PCE-5B00” series backplanes.

Advantech’s precise naming policy offers clear purchasing guidelines that help prevent incorrect or incompatible SHB and backplane combinations. In addition, Advantech’s SHBs are designed to be securely fixed to the chassis with a specially designed front bracket for improved system-wide vibration tolerance.

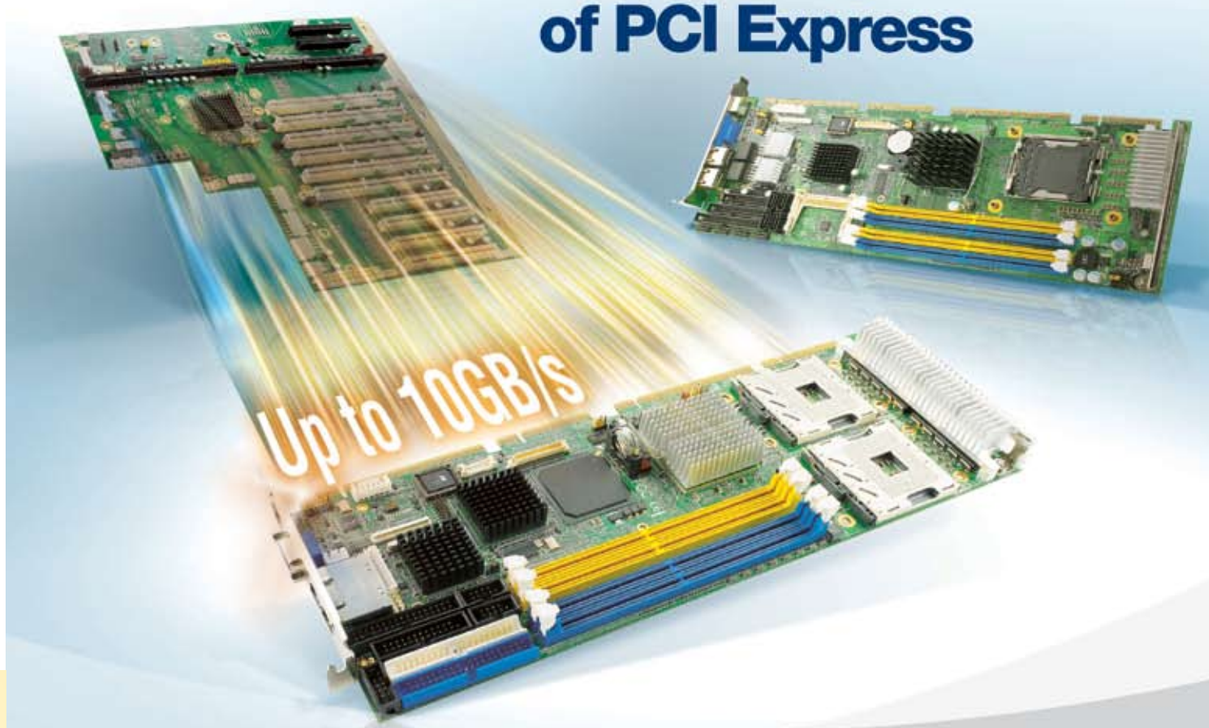
Advantech SHB Express backplane solutions feature strong expansion capabilities and are the industry’s most comprehensive. Ranging from four slots up to nineteen slots for 4U to 7U rackmount and wallmount chassis, and butterfly types for 1U/2U rackmount chassis, these backplanes allow optimized system configurations with flexible combinations of PCIe (x1, x4, x8 and x16), PCI-X and 32-bit/33 MHz PCI slots. For added flexibility, Advantech provides a quick, low-cost and professional backplane design service. Advantech also offers versatile 1U to 7U rackmount and wallmount chassis, and a new chassis specifically designed for SHB Express.

Advantech’s core competence is all about building comprehensive, yet highly integrated computing platforms. Unified pin assignments and I/O port locations ensure compatibility and expandability for system upgrades. Industrial grade mechanical design features include specially designed rubber mounts for SHB card anti-vibration protection and an angled CPU heat sink and fan that works with chassis fans to boost cooling performance. These enhancements increase MTBF, extend operating life and lower TCO. ■

Industrial Grade Graphics Cards for Flexible Applications

Advantech has announced a complete portfolio of industrial grade graphics cards to give customers more flexibility in their multimedia applications. All PCI Express graphics cards are low-profile and are powered by XGI Volari™ XP10 GPUs with 128 MB of DDR VRAM. The PCA-5680-59 has a PCIe x16 interface and supports two high-quality DVI-I interfaces in one high density DMS-59 connector for precision image and color display. The PCA-5680-00 has a PCIe x16 interface and supports DVI-I and VGA outputs for mainstream applications. The PCA-5660 has a PCIe x1 interface and supports a DVI-I output for cost-effective entry-level display applications. In the legacy PCI and AGP interface sector, the PCA-5630 is quipped with a XGI Volari V3XE GPU, 128 MB of DDR VRAM and an AGP 4X interface. It supports VGA and DVI outputs to enhance legacy motherboard 2D/3D performance. The PCA-5612 is equipped with an XGI Volari Z9s, 32 MB of DDR2 VRAM and a PCI interface. It supports VGA and DVI connectors to provide basic display functionality. All cards are fanless and come with Advantech’s well-known longevity and reliability.

Embedding the Power of PCI Express



Trusted ePlatform Services

ADVANTECH

Enjoy Bottleneck-Free Performance of SHB Express™ (PICMG 1.3) Solutions

Advantech’s SHB Express computing platforms feature PCI Express technology, delivering scalable performance with a total of more than 10 GB/s of I/O bandwidth. These platforms maintain backward compatibility with PCI and PCI-X, and allow customers to leverage commercial I/O cards. Plus, the unified pin assignments and I/O port locations ensure compatibility, and expansibility for system upgrade.

PCE-7210
- Supports dual Intel® Xeon®/ Low Voltage Intel® Xeon® processors
- Dual channel DDR2 400 ECC registered SDRAM up to 8 GB
- Dual GbE via PCIe x4 port

PCE-5120
- Supports Intel® Pentium® D/ Pentium® 4 processors
- Dual channel DDR2 533/667 SDRAM up to 4 GB
- Single/Dual PCIe x1 GbE

PCE-5B12-64A1E
- 12-slot backplane
- One PCIe x16, six PCI-X, four 32-bit/33 MHz PCI slots

* Optional two PCIe x8 slots

ACP-4320
- Dual front-accessible SATA HDD trays
- Front system status indicators
- Enhanced anti-vibration mechanical design

www.advantech.com

Advantech Headquarters
Tel: 886-2-2792-7818
MKT.ACL@advantech.com.tw

Extraordinary Wonders on the Tibetan Plateau

Many tourists thronged to the train passageway to take in the magnificent view of the Tibetan Plateau as the Qingzang Railway huffed to pick up speed, heading into the boundless land that seems to stretch skyward. These railway constructions that took years to build have been successfully translated into a technological miracle.

Script by Li Liwen | Translation by Shannon Hu | Photographs provided by Taiwan Digital Images

Known as "the roof of the world," the Tibetan Plateau is a natural Paradise on Earth that is pristinely beautiful. This unique topography and climate have formed a special people and an unfathomable way of life in harmonious communion with Mother Nature and grounded steadfastly on the serenity and assurance of their religion. The Plateau's remarkable make up and reclusiveness, clothed with a riveting, ethereal magic, lures a multitude of visitors from modern metropolises and civilizations to explore its secrets. The birth of the Qingzang Railway has significantly bridged the distance between tourists and the Roof of the World.

The railway stretches 1,957 kilometers from Xining to Lhasa. The section of the railway between and Xining and Golmud, at 815 kilometers in length, was inaugurated in 1984. The newer section of the 1,142 kilometer railway between Golmud and Lhasa was commissioned in 2006. This long, winding rail line is more than just a miracle of Chinese transportation architecture; it also represents a triumph of technology. The lovely lakes, expanses of grasslands, magnificent tundra, glaciers and mountains will fill you with awe as you travel through the inspiring wilderness on the greatest railway journey on earth.

Crossing the Highlands and Mountains

The traction engine for powering the line between Chengdu and Golmud is the Class SS7 electric locomotive; and a NJ2 diesel railcar is used to power the train all the way to Lhasa. This custom-made diesel railcar for the Qingzang Railway is powerful enough to drive the train all the way up to Tanggula train station at an altitude of 5,072 meters.

It's a 20-hour ride from Xining to Lhasa. The train provides everything travelers need in an aim to keep passengers' spirits high over the long ride. There are dining cars, baggage cars, hard and soft sleeping cars with bunk beds and engine controllers to keep the trains properly air-conditioned. One of the greatest distinguishing features of the train is that it operates at high altitude, so oxygen supply connectors and oxygen generator controllers are properly installed in the cars to help passengers to get over altitude sickness.

Every kind of amenity to ensure passenger comfort - oxygen generator, blowers (ducted mechanical fans), refuse compactors, fire alarms, storage rooms, and couchettes - comes with 3-language signage. Quality waste treatment is a key element among all facilities on the train to safeguard the ecology of the Plateau. A vacuum waste collection system with sewage and waste containers is installed on each train. The waste is gathered by local treatment cars as soon as trains arrive at their destination, keeping the rail line clean.

Architectural Magic on the Plateau

The harsh, inhospitable climate and permafrost areas on the Plateau pose a tremendous challenge to railways. The word, "tundra" is frequently used when the press alludes to the Qingzang Railway. The tundra is a focus of world attention that poses a technological dilemma hotly debated by international experts. The soil on the Plateau freezes and hardens like an ice block during winter, hence the name, permafrost or tundra. Yet as the temperature drops, the tundra swells dramatically, and elevates just about every building in the region; but during summer, buildings dip into the earth as the tundra thaws out with the rising temperature.

Several measures where taken to tackle these problems. First of all, the architects averted building the rail lines in geologically complex areas. Secondly, bridges were built across unstable tundra regions. Thirdly the architects used ventilative embankments and sheet-stone roadbeds, heat-conducting tubes, thermal insulation and other new technologies to keep permafrost temperatures at a consistent level, improve roadbed stability and ensure safety. Upon completion, the Qingzang Railway management also installed a system to monitor tundra rail-bed, vegetation, climate and possible landscape variations along the line to better guard against accidents.

Mystical and Spectacular Landscapes

The Qingzang Railway is the world's longest and highest rail line. The sublime sights in this snowy country provide tourists a fantastical, surreal experience. It's no wonder that since its inauguration, ticket availability has been slim.

The Tibetan Plateau, at an altitude of more than 4,000 meters, is surrounded by towering mountain ranges. It is bordered to the west and south by the Himalayas and to the northwest by the Kunlun Range. We get a glimpse of Tuotuo River, the fountainhead of the Yangtze River; Qinghai Lake with its sparkling surface and endangered Tibetan antelopes; Kunlun Range Tunnel, the longest permafrost tunnel in the world; the mysterious Snow Mountain and glaciers at Tanggula Mountain; and distinctive Tibetan temples. Every view strikes an emotional chord that leaves a permanent imprint in your heart. ■

QINGZANG Railway Soars Skyward

Advantech took part in one of the 21st century's most daunting railway constructions yet, breaching the high altitudes of the Tibetan Plateau to provide passage across "The Roof of the World". Advanced technology defied harsh climates and Advantech's TDCS beat the competition to become the heart of the magnificent Qingzang Railway.

Photos and scripts provided by Advantech | Translated by Shannon Hu | Photographs provided by Taiwan Digital Images and Advantech

Dubbed "The Roof of the World," the Tibetan Plateau is known for its aridness, low oxygen levels, and extreme inhabitability. Despite these obstacles, a section of the railway between Golmud and Lhasa was recently developed using cutting-edge technology and engineering ingenuity. Out of 1,118-kilometers of track, 965 km was built at altitudes exceeding 4,000 meters. This stretch includes the Tanggula Pass which, at 5,072 meters above sea level, is the world's highest railway track. Nearly 100 Advantech industrial computers are now required to operate tirelessly over extended periods of time in this climate, in which the arid weather and low pressure poses severe challenges on electronic components.

Since its inauguration on July 1st, 2006, the Qingzang Railway weathered its first year and successfully transported thousands of tourists across the marvelous expanse of the Tibetan plateau. The Advantech-developed Train Dispatching Command System (TDCS), plays a crucial role in controlling rail traffic, and what's more, another Advantech brainchild, the world-renowned ADAM modules, were extensively applied to the electric monitoring of the vacuum generator to control the complex waste management system of the train.

The Heart of the Train: TDCS

The TDCS consists of a second-class, three-level Wide Area Network (WAN). The term, "second-class," refers to the Local Area Network (LAN) of the railway dispatch command center, and the railway bureau's primary area network. The term "three-level" includes the Ministry of Railways (MOR), the railway department, the bureau, and the railway stations. The MOR constitutes 14 railway bureaus; the TDCS of every bureau is more or less the same in basic structure. The Qingzang branch has 112 stations in operation.

Advantech's industrial computers are predominantly applied in the dispatch centers and the display systems of the stations. The dispatch center at Qingzang branch, located in Xining City of the Qinghai Province, is currently armed with three such large dispatch screens in keeping track of instant operation conditions of the trains at various points. This is made possible through Advantech's industrial computers exchanging station information and train operation messages from the servers, and output through DAQ modules and output cards, which feed all of this data to specific areas on a large screen through a driver. As a result all the service, track and interval information is instantly shown on-screen.

Moreover, in the station subsystem applications, Advantech's industrial-grade computers are used as train service and power supply monitoring terminals. The train service terminals are actually the nucleus of the TDCS subsystem, and their primary task is the production of electronic reports of transportation statistics, displays of the station floor plan, reception and application of dispatching commands through the TDCS network, data collection of train arrivals and departures, and wireless transmission of engine commands. In the power monitoring station, various data is collected from the station signal facilities to form an array of electronic reports, with instant monitoring of various facility operations to help maintenance crews to preempt any potential problems or glitches for analysis and remediation, and to conduct distance diagnosis and troubleshooting through the internet.

Waste Management System

The Tibetan Plateau is part of the breathtakingly magnificent Shangri-la, the unspoiled "Roof of the World." It's a primitive, unique and fragile ecosystem, whose destruction would trigger irrevocable disasters. At the same time, the plateau constitutes large tracts of permafrost; rising temperatures on the sides of the rails may very well cause the tracks to deform

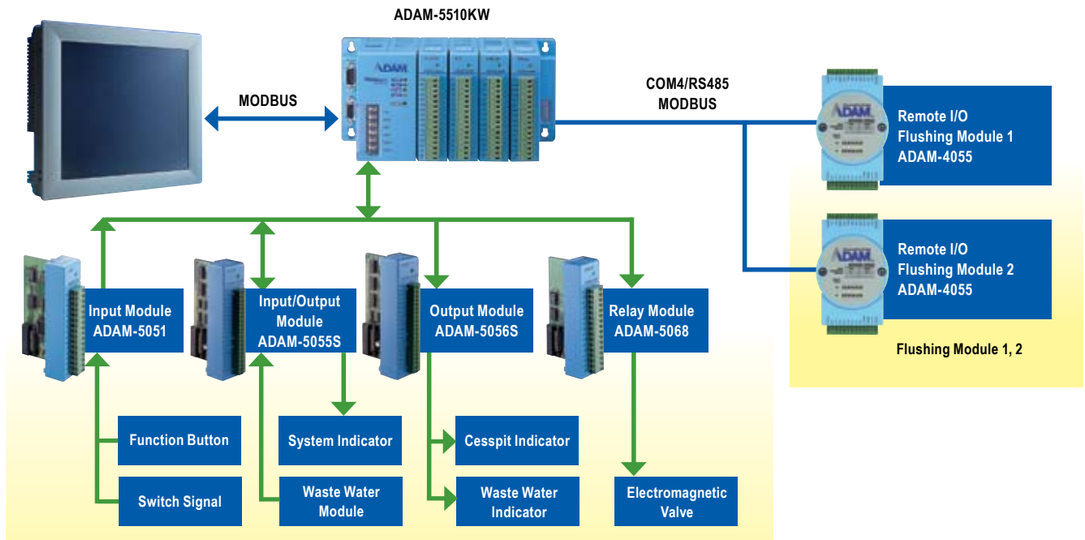
or collapse, which is a grave safety issue. For environmental protection and safety considerations, trains that enter the plateau are required to have absolutely no emissions of wastewater or waste materials. Advantech's Softlogic Digital Controller was subsumed into part of the Qingzang Rail project, keeping stringent vigil on the vacuum waste collecting system in every carriage bound for Lhasa from Beijing, Chengdu, Zhongqing, and Xining, keeping the 1,118 km line clean and unblemished.

The vacuum generator waste collecting system pumps wastewater into a waste materials collection box below each carriage. Upon arriving at the stations, the collecting vehicles will pump out the waste and discharge it collectively to prevent lavatory refuse from contaminating the rails. The monitoring system is composed of Advantech's ADAM-5510KW, ADAM-5051S + ADAM-5056S + ADAM-5055S + ADAM-4055. The master control module is used to govern the medium trunk motions (including the formation of vacuum and evacuation) and waste material trunk motions. Additionally, the master control module is armed with a system breakdown alarm with display, storage, and signal output capabilities (via touchscreen panel terminal facility), expediting the maintenance crew's system inspections.

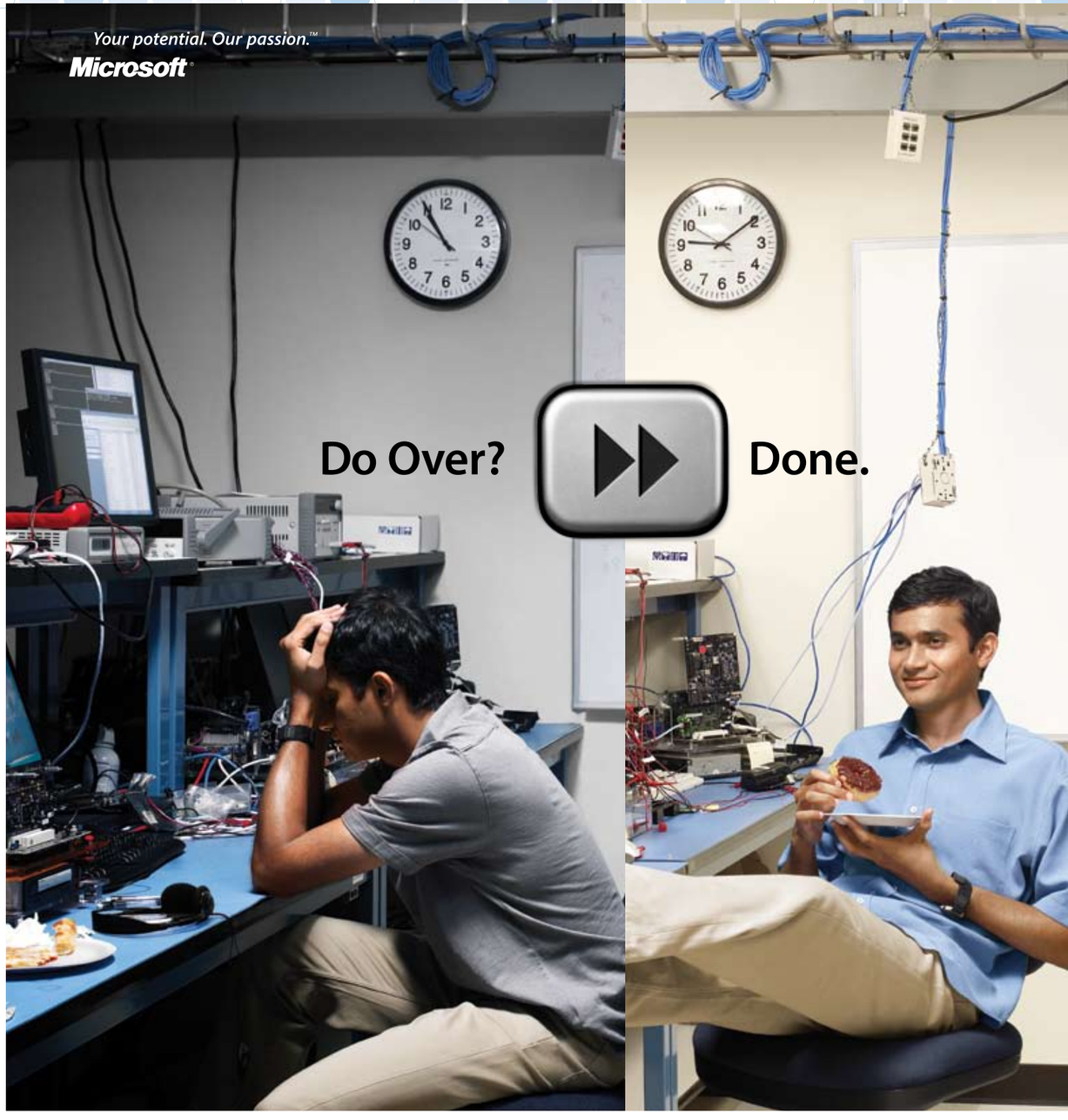
Withstand the Tests of Nature

In May, 2002, the Qingzang Rail Company inaugurated Advantech's TDCS on 69 stations from the existing Haishiwan to Golmud, using a total of 215 Advantech industrial computers - predominantly IPC-610's. In addition to replacements during station renovation works, most of these industrial computers are still in operation, chalking up more than 30,000 hours. A total of 45 stations dotted the railway from Golmud to Lhasa (inaugurated July, 2006); out of these 45, seven stations are outfitted with 3 Advantech industrial computers; the other 38 stations have 2 industrial computers in operation, adding up to 99 computers.

Finally, train service terminals at the TDCS are placed inside the station workroom a little more than 10 meters away from the tracks. Enormous vibrations are generated when several-thousand-ton trains zoom pass the stations. Despite these hardships, Advantech's industrial computing products have withstood all tests, and remain successfully operational, earning not only the extensive acclaim of the Chinese Ministry of Railway, but also automation industry professionals worldwide. ■



Master Control Module & Waste Collecting Control System
Vacuum Generator Waste Collecting Electronic Control System



FAST-FORWARD YOUR PROJECT WITH WINDOWS EMBEDDED.

New devices mean new challenges. Speed your design to market with end-to-end development tools backed by the long-term commitment of Microsoft® and the support of the global Windows® Embedded partner community. See how CoroWare reduced development hours by more than 60% vs. Linux at **microsoft.com/embedded**

©2007 Microsoft Corporation. All rights reserved. Microsoft, Windows, the Windows logo, and "Your potential. Our passion." are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Windows® Embedded

Building a Hothouse for the Next Great Invention

Early Design Workshop

Script by Zhuang Anhua | Translation by Shannon Hu | Photograph provided by Advantech

In this age when the customers' demands come before everything else, the million-dollar question remains: "What's the next big 'Thing' product that can hit the market, and still withstand the test of time?" Interestingly enough, popular products often target the unspoken needs of clients, and usually, the best products go out of their way to meet demands, and appeal with the utmost business value.

Any business aspiring to an invention as simplistic yet as sensational as the iPod, should take great pains to clearly discern what the end-users really want. This might be easier said than done, but there are certainly ways and means of clever investigation. If he or she is using their head, a designer first addresses questions like: "which needs will arise, and under which particular scenarios, whenever our new product is used?" Based on sensible projections that satisfy the scenarios, the next step is to build a prototype. Of course, one must attempt to defy all the negative precedents and avoid stereotypes, and finally, rid the design model of every unnecessary excess. Then, the project can be wrapped up through repeated tests and modifications. Finally, one might unveil the next market leading "big thing" that will "wow" the entire world.

The object of the "Early Design Workshop" aims to fulfill the goals described above. Inaugurated in 2006, the workshop is a twice-a-year event that provides a forward-thinking workshop involving a tight-knit group of experts from both Industry and Academia, all of whom are united in the desire to co-operate and achieve real results.

Advantech and industrial designers from UDDC (Union Design & Development Corp.) joined forces with university students to establish an experimental "product development team." Advantech's role was to "toss up" some new product themes, giving students the opportunity to bounce design ideas to and fro. Obviously, the object was to encourage students to let their creativity run free. Of course, their sometimes outlandish, sometimes clever product concepts were carefully reviewed by professionals at both Advantech and UDDC. The ultimate result was a selection of products that presented a wonderful marriage of originality, high business value and economic benefit.

Back to the Basics: Product Users are the Nucleus

The spirit of any successful product lies in the idea that it meets the expectations of users. However, product development endeavors sometimes inadvertently fall into competitive dead ends if caught up in a fierce market "tug-of-war," between competing models, for example, without actually satisfying real customer demands.

The "Early Design Workshop" presented the perfect vehicle for stimulating innovative practices and conscientious, user-centric thinking – all backed by thorough studies of various application scenarios. One of the most effective techniques applied by the Workshop is to encourage students to adopt a "macro" perspective, and from this all-encompassing point of view, students are asked to conduct a more focused analysis that targets various user groups according to various social, lifestyle and economic criteria. Next, the workshop participants progress to develop application "Scenario Stories," mainly so they can compare compelling conceptions and circumstantial conditions, all with a view to proposing potential solutions to the most likely problems. Of course, the final objective of all this intensive work is to produce a specific design blueprint.

Advantech engineers and students factored in various unique possibilities into their Workshop discussions and research. For example, students questioned why the USB sockets of Advantech's existing monitor computer systems are installed with a plug-like cap. Advantech's engineers explained that industrial computers may be exposed to dust, water drops or oil residues – in just about any scenario. In light of these facts, Advantech engineers had already designed a liquid- and dust-proof cap to protect USB sockets. Engineers reported that they often used either their own nails or coins to open the cap. From this observation, some students cleverly inferred that the caps should be attached to the computers on a connectable string so that, if removed, the taps would not be misplaced or lost.

In such scenarios, the students – as amateur IPC engineers – are often more likely to consider computer design from the user's point of view; and their critical, and hopefully constructive, thinking is also more likely to overcome any limitations that may have been placed on the engineer's original design; in this way, invention proceeds towards what is often the simplest or most creatively efficient solution. The Advantech engineers took inspiration from the students and modified their design accordingly.

Breaking Away from Creative Confinement and Convention

Jonney Chang, Product Manager of the Industrial Automation Group, who helped to lead the first Workshop, described the experience as a "very challenging, highly volatile, yet splendidly planned process – with rewarding results." He added, "we often experience some sense of confinement when we look at our own designs. But the students, who have no prior inkling about our products, always manage to surprise us with refreshing ideas whenever they study them." He discovered that youngsters are almost never shy about articulating questions and thoughts that would effectively challenge Advantech's design team. The result was that the engineers and technicians were obliged to answer the students' questions with polite professionalism, and together, they assess the market-worthiness and potential of the products.

The most successful and product development process will always take into account the end-user's requirements, expectations and demands – instead of going out on a blind hunt to build efficacious products and attain technological breakthroughs by chance, accident or even, through good luck.

In a characteristically generous move, Advantech invited academic experts to come along and help organize the "Early Design Workshop" into an even more effective vehicle for edifying the participation of the students, and to better engage their learning. The results opened a creative window of opportunity for everyone.

Participants in the most recent "Early Design Workshop" focused on developing workable prototypes and mock-ups. These prototypes effectively assist the product team to make deliberate and comprehensive decisions before officially launching products, mainly to cut down risks and to economize on lost time.

To date, over a dozen Advantech products have gone through this regenerative process of study and reinvention – and all of the innovations were grounded in the students' original designs. ■

Henry Nielsen
Business Development Manager
Advantech USA

I am responsible for sales and building alliances with strategic partners in the SRP (Service-Ready Platform) market segment in North America. I listen very carefully to our customers' requirements and then help them find solutions using Advantech products. After that, I work with our product divisions to make sure that our future products have the right features at the right times. In my nearly 30 years in the electronics industry, I have been fortunate to meet and interact with key people at companies like Samsung, Motorola, Apple, and Sony-Ericsson. Their examples have shaped how we approach our customers today.

I grew up in Oregon's mid-Willamette Valley and attended college at Oregon State University. I studied chemical engineering, music, and French. I've been lucky enough to visit many other parts of the world, but the mid-Willamette valley is still one of my favorite places – no matter what time year, it's always green.

I play the piano, starting when I was 7. I studied classical music through college, and also learned to compose, to improvise and to play jazz.

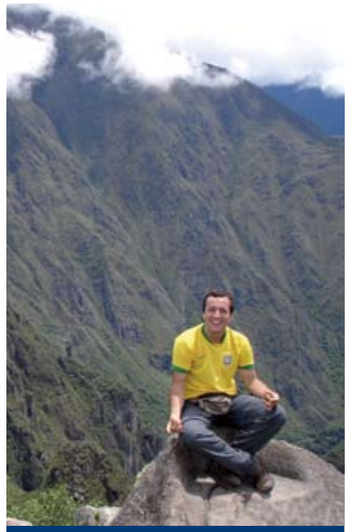
I also love to cook. I enjoy the satisfaction of planning a meal, imagining how the various flavors and textures will go together, then preparing the dishes and sharing them with my wife and our friends. I often adapt classic French or Italian dishes to reduce fat and calories without sacrificing flavor.

My wife Janet and I both love to travel. There are many places in the world that we enjoy visiting, but usually the place I want to go next is somewhere I haven't yet visited.

My first experience with Advantech products was back in 2000 while I was a student of the Federal University of Itajuba. I was impressed with the countless possibilities offered by technologies for enriching and advancing our lives. When I first joined Advantech in 2003, I was employed as an Applied Engineer. Now, I am in charge of developing the emerging ePlatform business in Latin America. Working with both the HQ and Brazilian teams, I develop and implement new strategies to meet the demand of the Latin American market. It is a very price sensitive market, so analyzing trend-setting industries and then delivering the best value to our customers is my goal.

Today, the scenario in Latin America looks very promising; the region is growing and so is the demand from SI's for Advantech products in traditional markets like medical devices, gambling and transportation. Moreover, new business models along with new production of boards in CKD (complete knock down) have given us a capacity to attack new markets in Brazil including commercial and banking automation. Star products like Digital Signage has received enthusiastic acceptance from the market too. Combining all these exciting opportunities together with the traditional Industrial PC market will inspire us to achieve new expansion in several new directions.

I would like to take this opportunity to invite my Advantech colleagues to visit Latin America in their free time. You are welcome to visit us, and get to know the culture of this huge and rich continent, full of amazing cities and attractions like the Amazon river, Rio de Janeiro, Buenos Aires, Machu Picchu, Fernando de Noronha, Iguazu Falls and Brazil's annual street Carnival. The positive, optimistic populace of South America is always quick and eager to receive people from around the world.



Lucas Toledo
Product Sales Manager
Advantech Brazil

Trusted ePlatform Services

ADVANTECH

Advantech Single Board Computers that Provide Reliable Factory Automation Solutions

- Easy Expansion by PCI, ISA, PC/104 and Advantech MIO/160
- Compact, all-in-one single board computers
- Fanless and low-power consumption
- 24/7 non-stop operation
- Conformal coating against dust and moisture
- Glued DRAM for improved shock resistance

PCM-9386 + MIO-6253
3.5" SBC with Intel® ULV Celeron® M & extra 4 COMs add-on module

PCM-9375
3.5" SBC with AMD® LX800 Solutions

PCA-6773
ISA Board with Intel® Celeron®/Pentium® Solutions

PCI-6886
PCI Board with Intel® Celeron® M Solutions

www.advantech.com

Advantech Headquarters
No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District,Taipei, Taiwan, 114, R.O.C.
Tel: 886-2-2792-7818
Fax: 886-2-2794-7304
Email: ECG.ACL@advantech.com

Event Calendar

OCT 2-4
ISA Expo
Houston, TX USA
Hall: Main
Booth: 2152

OCT 9-12
MILIPOL
Paris, France
Hall: 7
Booth: 3M121

OCT 17-18
Embedded Systems Show
Birmingham, UK
Hall: 10
Booth: 700

OCT 29-31
MILCOM 2007
Orlando, FL, USA
Booth: 635

OCT 30-31
Assembly East
Boston, MA, USA
Hall: Main
Booth: 748

OCT 31- NOV 2
Safety & Security Asia 2007
Suntec City, Singapore
Hall: 4
Booth: 4E-18

NOV 6-7
Remote Monitoring and Networking
Scottsdale, AZ, USA
Hall: Main
Booth: 202

NOV 13-15
Global Gaming Expo
Las Vegas, NV, USA
Hall: Main
Booth: 317, 538

NOV 14-17
Embedded Technology
Kanagawa, Japan

NOV 14-17
Medica 2007
Dusseldorf, Germany
Hall: 15
Booth: C47

NOV 25-30
RSNA 2007
Chicago, IL, USA
Booth: 3151

Nov 27-29
SPS/IPC/DRIVES
Nuremberg, Germany
Hall: 8
Booth: 428

NOV 27-30
ControlAsia 2007
Suntec City, Singapore
Hall: 4
Booth: 4C4-12

DEC 11-13
Power-Gen International
New Orleans, LA, USA
Hall: Main
Booth: 4774

Worldwide Office

Greater China

China
Beijing 86-10-6298-4346
Shanghai (ePlatform) 86-21-6294-9911
Shanghai (Industrial Automation) 86-21-6282-8959
Shenzhen 86-755-8212-4222
Chengdu 86-28-8545-0198
Hong Kong 852-2720-5118

Taiwan
Taipei (ePlatform) 886-2-2792-7818
Taipei (Industrial Automation) 886-2-2218-4567
Taichung 886-4-2378-6250
Kaohsiung 886-7-229-3600
Hsinchu 886-3-516-9320

Asia Pacific

Japan
Tokyo 81-3-5212-5789
Tokyo (ePlatform) 81-3-5212-5789
Tokyo (Industrial Automation) 81-3-5212-5789
Osaka 81-6-6267-1887

Korea
Seoul 82-2-3663-0405

Singapore 65-6442-1000

Malaysia
Kuala Lumpur 60-3-5621-0602
Penang 60-4-397-3788
60-4-397-4188

Thailand
Bangkok 66-2-248-3140

India
Bangalore (ePlatform) 91-80-2337-4567
Chennai (Industrial Automation) 91-44-4230-3878
Mumbai salesbom@advantech.com

Australia
Melbourne 61-3-9797-0100
Sydney 61-2-9482-2999

Europe

Germany
München (European Head Office & ePlatform) 49-89-12599-0 epc@advantech.de
Düsseldorf (Industrial Automation) 49-211-97477-310 iag@advantech.de
Amberg (Design Center) 49-9621-9732-100 aedc@advantech.com.tw

France
Paris (ePlatform) 33-1-4119-4666 afr@advantech.fr
Grenoble (Industrial Automation) 334-7670-4700 afr-eA@advantech.fr

Italy
Arezzo (ePlatform) 39-0575-98661 info.eplatform@advantech.it
Milano (Industrial Automation) 39-02-9544-961 info.eautomation@advantech.it

Netherlands
Breda (ePlatform) 31-76-523-1270 eplatform@advantech.nl
Roosendaal (Industrial Automation) 31-165-550-505 info@advantech.nl

UK
Ascot 44-1344-989-500 info@advantech-uk.com

Poland
Warsaw (Service Center) 48-22-33-23-730

Russia
Moscow 7-495-232-1692

Americas

USA & Canada
Cincinnati, OH (Industrial Automation) 1-513-742-8895 1-800-205-7940
Milpitas, CA (Industrial Automation) 1-408-519-3891 1-800-205-7940
Carlsbad, CA (Network Computing) 1-760-918-9288 1-800-557-6813
Irvine, CA (Embedded & Applied Computing) 1-949-789-7178 1-800-866-6008
Milpitas, CA (Industrial Computing) 1-408-519-3898 1-888-576-9668

intel Leap ahead™

Intel. Powering an Industrial Revolution.

Intel provides a full range of components and platforms to meet the demands of the digital factory—from Test & Measurement devices and advanced Human-Machine Interfaces to Industrial PCs and Factory Automation & Control systems. Intel's embedded lifecycle products provide the real-time operation and energy efficient performance of processors based on Intel® Core™ microarchitecture. Create your own revolution with Intel's advanced platform technologies, development tools, and an ecosystem of leading third-party vendors—including members of the Intel® Communications Alliance. Visit us online today. The industrial revolution is about to begin.

www.intel.com/go/industrial

©2007 Intel Corporation. All rights reserved. Intel, the Intel logo, Intel. Leap ahead., the Intel. Leap ahead. Logo, Intel XScale and Intel Core are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Harmony

Technology for a Vibrant Planet

Trusted ePlatform Services

ADVANTECH

Combining Human with Nature

From Beijing to Brunei, Monterey to Munich, Advantech develops optimized environmental monitoring tools tailored to customers' unique needs. We understand that getting the most out of technology is critical for maximum protection of our environment and achieving true harmony between humans and nature. Partnering with Advantech is partnering with our planet.