

# Embedded IoT Applications

IoT Deployment | Automation | Transportation  
POS & Kiosk | Medical



**ADVANTECH**

*Enabling an Intelligent Planet*

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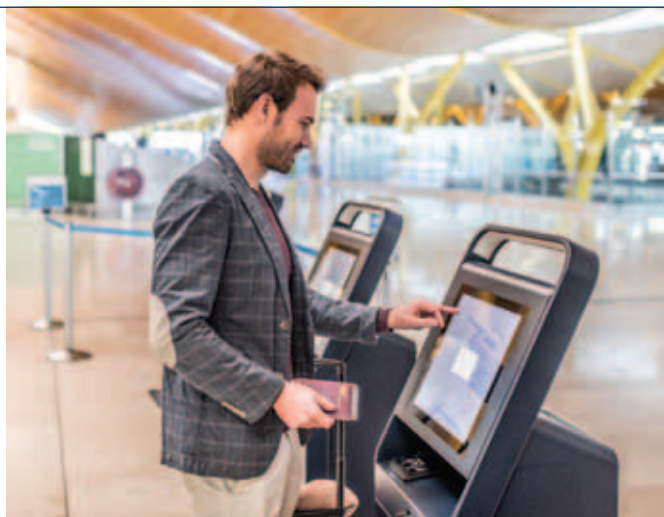
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**Medical**



# About Embedded IoT

## Leading the Next Wave of Embedded & IoT Innovations

As a global leader in the embedded computing market, Advantech's Embedded-IoT Group offers a wide range of embedded boards, intelligent systems, industrial peripherals, and design-in services. We provide an impressive array of streamlined services: from R&D and manufacturing, to global support and customer service. Addressing the market for IoT applications, the Embedded-IoT Group offers integrated IoT solutions, covering edge computing and cloud capabilities. These include the M2.COM wireless sensor node, IoT Gateways, Edge Intelligence Servers (EIS), the WISE-PaaS software platform, and third party cloud services. Advantech recently announced the Edge to Intelligence Solution-Ready Package (SRP) series to further accelerate IoT development and implementation.

### Industrial Peripherals

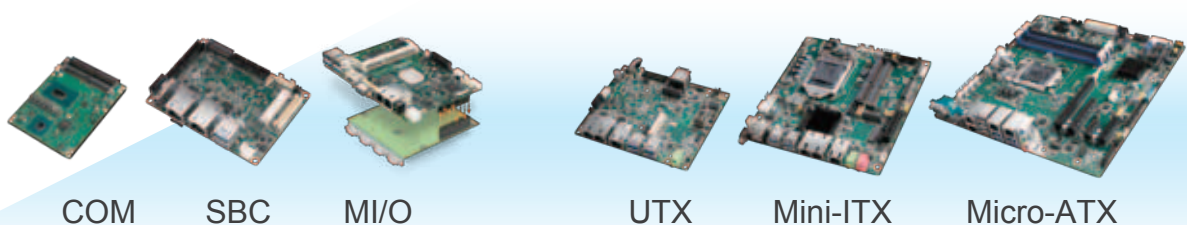


### Intelligence



### Embedded Systems

### Vertical Focused Systems



### Small Form Factor

### Industrial Motherboards

## Leading Embedded Technologies

As a pioneer and leader in the embedded market, Advantech continuously researches and develops value-added embedded software services, leading embedded technologies, and innovative form factors.

## Dedicated Regional Embedded Service Teams

To meet all embedded application requirements, Advantech employs regionally-based service teams capable of providing dedicated expertise, design-in services, and customer support.

## Ecosystem Partnership

Advantech allies with leading industry partners - Intel, Microsoft, Arm, AMD, NXP, TI, etc. - to provide up-to-date technologies and comprehensive product offerings.

## A One-stop Model: From Embedded Design-in Service to IoT Integration

We provide a one-stop service model for the successful integration of embedded boards, systems, software, displays, and peripherals, as well as a series of integrated IoT solutions and services from edge computing to cloud services to accelerate the IoT solution business development and implementation worldwide.

## Software Built-in



## Edge to Intelligence Solutions



## Edge AI Solutions



## SW Distribution & Cloud



## Arm-based Platforms

## Wireless Solutions

# WISE-PaaS/DeviceOn

## Power Up IoT Devices with 24/7 Operation Management

Advantech's brand-new designed IoT device operations and management solution gives users a transformational plug-and-play experience. Beginning with onboarding devices, WISE-PaaS/DeviceOn's fast and simple setup helps provide instant intelligent edge onboarding, data acquisition, and status visualization at the device operations center. Power on/off are also available at the tap of a button for quick and easy access. OTA software updates itself securely by sending software patch, firmware, software, and configuration updates through batch provisioning. The App is designed to ensure maximum efficiency in IoT device operations and management.

## WISE-PaaS Empowers Edge



### Device Management

- Device Monitoring & Diagnostics
- Device Control & Updating



### Data Management

- Data Acquisition & Storage
- Secure Data Access



### Connectivity Service

- Device Connectivity
- Plug-n-Play Peripherals



## Device

DeviceOn

**DM**

### Device Management

- Secured Device Onboarding
- Remote Monitoring & Control
- Automated Alert Notification

DeviceOn

**E2I**

### E2I

- Protocol conversion
- Edge intelligence
- Real-time visualization

# Marketplace & VIP Program

## Mutual Success with Innovation Business Growth

The WISE-PaaS Marketplace is an online software store that features Advantech's exclusive software services, diverse IoT cloud services, IoT security services, WISE-PaaS IoT software services, and pre-packaged solution packages. The WISE-PaaS Marketplace also integrates IoT partners' cloud and software solutions to accelerate the development of tools for upgrading existing systems to the cloud. Customers can subscribe to WISE-PaaS Marketplace services using WISE-Points provided with WISE-PaaS VIP membership packages to obtain cloud-based software solutions that facilitate innovation for the IoT.

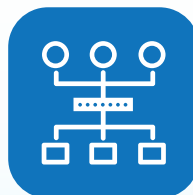
# S/DeviceOn

## Edge Intelligence



### OTA

- Software & Firmware Updates
- Advantech BIOS Updates



### Rule Engine

- Distributed Rule Monitoring
- Flexible Trigger & Action



### Data Security

- McAfee Threat Protection
- Acronis Backup Recovery

## On.App

### DeviceOn

### OTA

### OTA

- Software, firmware & configuration updates
- Advantech BIOS updates

### DeviceOn

### FaceView

### FaceView

- Facial recognition
- People counting
- Behavior detection

# Application Story

## IoT Deployment

Through digital transformation of industry, products are integrating into intelligent systems. According to IDC news, by 2019 45% of IoT-created data will be stored, processed, analyzed on the edge of the network, with increasing edge intelligence and connectivity driving intelligent system volume. Edge intelligence will be a core value delivering growth in IoT implementation.

Advantech facilitates this trend by collaborating with ecosystem partners to provide comprehensive wireless solutions, edge computing, software, and cloud services for a wide array of IoT applications.

### 3 Winning Facts



Large-Scale Deployment



Integrated Solutions



Management Software



- ✔ Remote Monitoring System for IC Testing
- ✔ Wireless ePaper Display Solutions for Smart Warehouse
- ✔ Wireless IoT Sensor Node and Gateway Solutions for Smart City



# Remote Monitoring System Optimizes IC Testing Workflow and Efficiency



## Project Summary

**Country:** Taiwan

**Industry:** IC industry

### Challenge:

- Enduring harsh manufacturing environments while operating 24/7
- High breakdown rates of commercial-grade PCs

### Solution:

- EIS-D150, high-performance edge intelligence server
- EIS-S230, Kubernetes-based data service servers

### Benefits:

- Enhanced equipment management capability, optimized IC testing process, improved overall productivity and efficiency
- Greater robustness and reliability on the production line environment and maintenance

One of IC design company is the world's leading TV controller SoC supplier, whose production volume is so huge that their manufacturing base in Taiwan at any given moment has to use hundreds of computers to perform tests on thousands of TV modules at the same time to verify whether the functions of the chips they design and produce fulfill specific customer requirements.

## Challenge

In the past, they used commercial-grade PCs to perform the task, but suffered constant issues due to the high breakdown rates, and more than not the commercial PC computer suppliers were reluctant or unable to change or modify components to meet their specific industrial needs. What's more, due to the lack of a network management platform, their IC test engineers had to stay close each computer to oversee the test processes and results, and if needed, change and input new test conditions into the computer, which is a highly time and labor consuming process.

## Solution

To implement this project, the company deployed hundreds of EIS-D150 units into their IC test department to replace the commercial PCs they originally had. Each EIS was connected to a set of IC test equipment, which controlled the testing process and uploaded test data to an Advantech EIS-S230 backend server. The EIS-S230 central server is based on Kubernetes container technology, providing benefits of easy scalability and centralized monitoring and management over the air.

### Centralized Remote Monitoring Control System

The company deployed Advantech's edge intelligence server in place of their standard PCs and constructed a remote monitoring control system based on the Advantech WISE-PaaS/DeviceOn IoT platform which would carry out and oversee all IC testing processes. With their new IC testing monitoring control system in place, IC testing monitoring control system IC test engineers only have to sit in a central control room to view data on a dashboard to oversee hundreds of field computers performing all the tests. They were also able to update programs and software over the air (OTA) from a server without the need to visit the computers in the field. Now they can input new test conditions into a group of field computers remotely, over the air at once, and the system will automatically keep records of software versions and historical data for future lookups. In this way, The company has managed to upgrade their equipment management capability and improve testing workflows and efficiency, thereby enhancing their overall productivity and efficiency.

### Worry-Free Data Visualization and Device Management

Advantech Edge Intelligence Server built-in WISE-PaaS/DeviceOn software platform integrates all development tools and documents needed for developing IoT and cloud applications, including a dashboard creator tool for producing customizable dashboards with intuitive interface for data visualization and device management. The IoT software platform also contains Intel's Node-RED flow logic editing tool which provides easy-to-use yet powerful tools to quickly make changes to the IC testing process for small improvements and updated test workflows, or programs that can quickly be deployed to targeted field computers via the OTA function provided by the system.

#### Solution Diagram





# Wireless ePaper Display Solutions for Smart Warehouse



## Project Summary

**Country:** Taiwan

**Industry:**

Industrial Computer Company

### Challenge:

- Content on paper could not be managed automatically
- LCD devices consumed considerable power
- Installing common display devices required cable deployment

### Solution:

- EPD-023, ePaper display device
- ePaper Manager, CMS software
- WISE-3610Z, IoT gateway

### Benefits:

- Built-in battery lifetime up to several years
- The EPD-023 can receive three tasks simultaneously
- Requires no additional cables to install the devices

In this case, Advantech maintained its own RMA repair centers to provide services for customers worldwide. In order to ensure a fluent RMA repairing process in Taiwan, the warehouses keep around 5000 parts in regular stock for both domestic and international requests. By contrast, warehouses using traditional methods are at risk of wasting time and making costly human errors.

## Challenge

Advantech Taiwan RMA center stocks 5000 kinds of parts. The first challenge involves ensuring that mass quantities of wireless EPD devices operate in the same field without any data loss. The other key challenge revolves around locating the right parts from 5000 different location points, taking the correct quantity, and gaining feedback on stock status. EPD-023 provides three LED indicators to show collection information. Moreover, EPD-023 can receive three tasks at the same time in one EPD-023 for efficiently collecting different parts. It promises an easy-to-install maintenance solution. EPD-023 can automatically join networks and enjoys a battery lifetime of up to several years.

## Solution

To solve these issues, Advantech relies on the CMS ePaper manager to control everything. Users can operate different tasks from a simple UI. A WISE-3610Z gateway acts as a network coordinator to manage the mass network topology. Finally, Advantech EPD-023 provides wireless and accurate data transmission to show RMA material quantities and related data. The EPD-023 indicator helps collectors locate target RMA materials. Users can simply walk into the warehouse and collect necessary parts without facing any obstacles.



## Cost-Effective Control of the Stock Status

Advantech RMA has 15 bases worldwide. Providing stock status is not enough for this huge organization—all materials need to be managed to satisfy daily operation requests without wasting resources on overstocking. Advantech needs to utilize the total stock globally for better customer response time and cost savings. For one scenario, users applied requests online, then the ePaper manager delivered the collection information to the targeted EPD-023. When EPD-023 received the task, the corresponding LED lit up to guide people to the collection material. Sometimes, the stock was out and users relied on the barcode scanner to scan the “No stock” QR code on EPD-023 to warn the management system. After completing collection, the stock is updated and labels are printed out for shipping. The picking process is performed automatically by our wireless EPD solution. This not only lowers the response time, but also improves stock status accuracy while reducing human resource costs.

## Easy EPD Device Installation and Management

Since RMA fields have mass quantities of end devices, we offer place and play deployment for EPD devices. As long as you import the mac address into ePaper manger, EPD devices will join the network automatically. We also provide two-way communication between end EPD devices and ePaper manager. We can install the EPD device without any power and internet wires. Moreover, our ePaper manager provides four major features to manage the device. First is device management to report device status and user can remote control EPD device. Second is the most important feature: “image generator.” Since all information shown on the EPD device are BMP images, we offer the template editor to drag and drop image components. Users can design images and data fields for image automation. Third is system account management. Finally, service management provides EPD image auto-delivery and FW OTA. Advantech provides a full solution fitting the IoT era.

### Solution Diagram



**EPD-023**

Wireless 2.9" ePaper display with 2.4G wireless control MCU

# Efficient Wireless IoT Sensor Node and Gateway Solutions for Smart City



## Project Summary

**Country:** Taiwan

**Industry:** Smart city

### Challenge:

- To connect a huge number of devices
- Manages devices effectively
- Budget control for IoT solution implement

### Solution:

- WISE-1510 wireless IoT Node
- WISE-3610 wireless IoT Gateway
- Arm Pelion Service

### Benefits:

- Enabled large-scale data acquisition and real-time monitoring so as to provide reports and produce bills
- Paved the way for big data analyses to provide insights for improved energy saving policies in pursuit of smarter and greener city

IoT and sensing technologies are improving our quality of life in many ways, from intelligent transportation, smart street lighting and smart metering; making cities into smarter, more efficient cities that offer new convenience and innovative services. Riding the digital tide, many public utilities have started to test smart metering of power, water, gas or other energies, using integrated sensors and communication devices that enable real time data acquisition, automatic billing, cloud-based management, and event-triggered notifications.

## Challenge

Smart City applications often require the deployment of huge numbers of devices over a large area, and the efficient, large-scale deployment and management of application devices at an affordable price is crucial for success.

## Solution

Due to the seamless Advantech hardware and software integration and the Arm's unique Device-to-Data Platform, the solution simplified device on-boarding with quick and secure device registration and provisioning, saving time and resources needed for deploying a large scale IoT system.

### Arm Pelion IoT Platform Makes IoT Management Easier

With services and solutions provided by Arm Pelion IoT Platform, a SI can easily and quickly provision functions including data acquisition, remote monitoring, and device management. Software updates can be implemented over the network from a remote management center with end-to-end security, eliminating the need for onsite visits and manual practices. The SI can also use tools provided by Arm Pelion IoT Platform to create logic rules for triggering short message notifications as part of billing system or alarm system management. Arm Pelion IoT Platform also provides tools for developing a dashboard to present data with figures, tables, or plain text. User-end dashboards can also be developed that let utility subscribers use browser-supported devices to review their energy use and billing.

### Big Data Analysis with Cost-Effective Communication

When accumulated device data in the cloud data lake grows to a scale sufficient for big data analysis, analytic tools are also available for users to extract meaningful information that can help the city better understand its energy consumption and map out strategies for energy conservation. Such Smart City applications require constant delivery of large amount of small data packets to the cloud, so Advantech recommends the use of LoRa wireless communication for data transmission; it features lower power, lower maintenance cost, and reliable data delivery over long distances. At the hardware level, Advantech WISE-1510 is recommended for deploying wireless sensor nodes, and WISE-3610 for wireless IoT gateways; both are based on a simplified RISC structure using Arm processors or microprocessors and supporting a variety of communication methods including low power LoRa LPWAN.

#### Solution Diagram



# Application Story

## Intelligent Automation

IoT enables real-time access to devices and machines in automation. This evolution will allow IoT to penetrate further into digitized automation systems. Intelligent automation requires smart equipment that can generate information automatically, adapt to new situations and provide remote access and insight to optimize productivity, and lower total cost of ownership.

With Advantech embedded IoT system, board, and software platform solutions, the production line can be automated with robotic machine control as well as visual inspection and data visualization through our software service. To fulfill smart factory requirements, we offer wireless modules, sensing nodes, motion cards, and systems for data collection and analytics at the network edge to enable monitoring and control in real time.

### 3 Winning Facts



Simplify Deployment



Value-Added Software



IoT Development Tools



- ✔ Robotic Manufacturing for Automobiles
- ✔ Production Line Optimization
- ✔ Production Line Inspection Solution



# Robotic Manufacturing for Automobiles



## Project Summary

**Country:** Europe

**Industry:**  
Automobile manufacturing

### Challenge:

- Demands for process control, information display, and data acquisition
- Compact and ruggedized design with all cables securely connected
- Software platform for integrating IoT functions

### Solution:

- ARK-2250 fanless embedded computer

### Benefits:

- Fanless/wide-voltage/wide-temperature/ lockable cables designs
- VGA /HDMI/optional 3rd party for versatile display
- High computing performance and multiple I/O support
- Pre-installed WISE-PaaS/DeviceOn software

The automotive industry has seen the biggest users of automated robotic systems in the manufacturing sector. The ever-increasing manufacturing speed and precision brought by advancements of robotic technology have given automakers an important competitive edge in producing premier quality automobiles. Safety, quality, and capability are the main reasons for adopting robotic technology.

## Challenge

In addition to process control and information display, this project also had demands for data acquisition, edge intelligence, and remote monitoring control functions. As the computer will be mounted on the arm of a monitor providing task information at each workstation for operators to view, the system needed to offer appropriate display outputs. The power, LAN, and all the wires and cables have to be securely connected to ensure operational reliability and stability. Industrial-grade ruggedness in terms of wide voltage and temperature range support was also needed for operation in the harsh manufacturing environment of a car production plant.

## Solution

At each workstation of the assembly facility, the ARK-2250 was mounted onto robotic monitor arms and connected to power, network, monitoring sensors, and actuators with lockable wires and cables. To enable data acquisition, data display and remote monitoring control functions, the ARK-2250, as well as the backend server, are deployed with Advantech's WISE-PaaS/DeviceOn software platform.



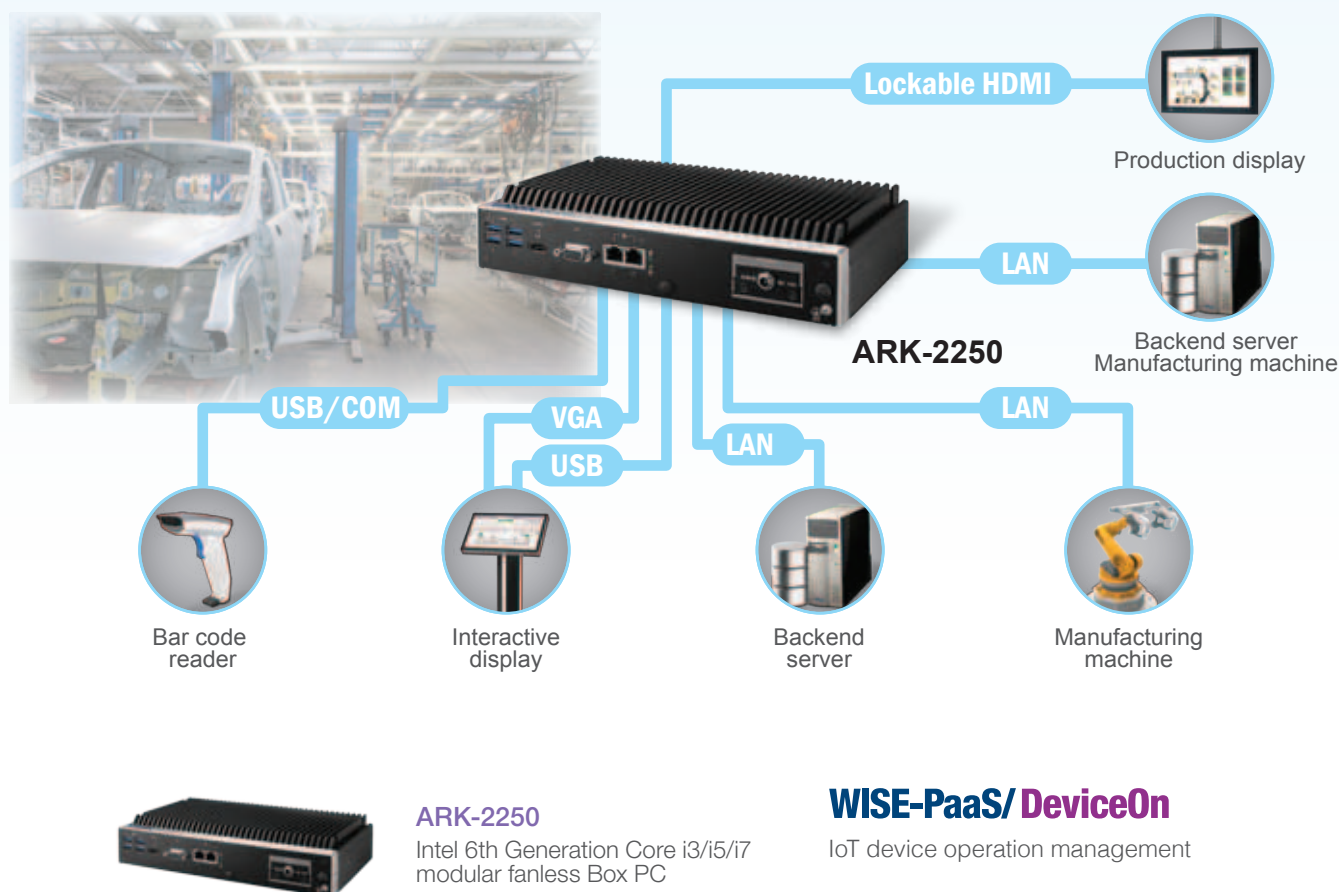
### High Computing Performance, Rich I/O Support and Extension Capability

Equipped with Intel 6th generation Core U-series (i3/i5/i7) processor, the ARK-2250 delivers high computing performance in a 260 x 54 x 140.2 mm (10.24" x 2.13" x 5.52") compact sized mechanical design to integrate nicely with the high speed automated automotive production lines. The ARK-2250 controller will also stop the process immediately when it discovers any problems based on data collected from the safety sensors. For display options, ARK-2250 provided HDMI, VGA, and optional 3rd party display interfaces. Supporting a unique ARK-plus expansion module and i-Door I/O modules, the ARK system can be easily expanded to enrich storage and industrial interfaces on an optional basis. Industrial users like automotive makers, when retrofitting their production lines to produce new models, can rely on ARK computers which can be flexibly adjusted or upgraded for reconfiguration to meet design changes with minimum extra capital investment.

### Pre-Installed WISE-PaaS/DeviceOn Enabling Data Acquisition and Remote Monitoring

In terms of software support, Advantech ARK computers are all deployed with the Advantech WISE-PaaS software platform, which aggregates and integrates the software resources needed for customers to develop their own industrial control, IoT, or cloud applications. Advantech's WISE-PaaS/DeviceOn software was used to develop remote monitoring control and IoT applications. It provided a very easy-to-use dashboard builder that allowed the system integrator to develop their own cross-platform and cross-device dashboard. Now the factory managers can view data and quickly understand the status of their production lines via any browser-based computer, smartphone, or other mobile device from anywhere at any time.

#### Solution Diagram



# Production Line Optimization for Industry 4.0



## Project Summary

**Country:** Europe

**Industry:** Intelligent manufacturing

### Challenge:

- Connecting different protocols for data collection to optimize production efficiency
- Selecting IoT gateway for harsh operating environments in factory

### Solution:

- UTX-3117 fanless IoT gateway
- Alleantia I4.0 Plug & Play Solutions Kit

### Benefits:

- Multiple-connectivity with -20~60°C extended temperature
- 5,000+ machine drivers where customer can create new encrypted machine driver

With the rise of Industry 4.0 and the Internet of Things (IoT), factory and equipment manufacturers are finding that implementing automation in their operations not only improves throughput and quality but provides other benefits as well.

## Challenge

Our customer in the Europe was looking for a palm-size IoT gateway to implement in their production line to collect data and optimize the production efficiency. However, there are many different machines and devices in the market that are using different protocols to communicate, which makes data collection harder. The IoT gateway solution was not only required to meet the limited installation and harsh operating environment, but also able to covert different protocols for communication.

## Solution

Advantech offers a IoT gateway solution UTX-3117 along with Alleantia I4.0 Plug & Play Solutions. UTX-3117 uses the latest Intel Atom E3900 series, Celeron N3350, and Pentium N4200 series processor technology to provide a real-time IoT computing, power-efficient, plug & play gateway solution. Alleantia I4.0 Plug & Play Solutions bridges the OT and IT, and it solves the complexity of the brown-field by abstracting into a consistent data model which can feed various applications. It includes more than 5,000 device drivers from 30+ vendors and provides to upper layers an abstract data representation.



### Multiple-connectivity with -20~60°C Extended Temperature

UTX-3117 is designed with 3 RF modules with 5 antennas which serves as the core for RF and wireless data collected from the sensors and devices in wide area. UTX-3117 supports various protocols including LowPAN, Zigbee, WiFi, BLE, LoRa, NB-IOT, and analyses useful data before sending it to the Cloud via 3G/LTE, WiFi, Ethernet. UTX-3117 uses an optimized thermal design that can sustain full load operation in -20~60 °C and also supports 12-24V DC input to meet the factory environment needs.

### Software Integration for Protocol Conversion

By integrated with Alleantia I4.0 Plug & Play Solutions, the UTX can connect various industrial machinery, equipment and devices based on a machine driver concept. The Alleantia I4.0 Plug & Play Solutions contains more than 5000 machine drivers including: Photovoltaic, Power inverters, Power meters, I/O module, LV/MV breaker, PLCs, CNCs where customer can create new encrypted machine driver by themselves. Its non-silo architecture also facilitates interoperability and IT-OT system integration.

## Solution Diagram



#### UTX-3117

Intel Atom E3900/Celeron N3350/  
Pentium N4200 series fanless IoT  
gateway

#### Alleantia I4.0 Plug & Play Solutions

Enable multi-vendor equipment  
interoperability and connectivity

# Production Line Inspection Solution for Smart Factories



## Project Summary

**Country:** Europe

**Industry:** Automation

### Challenge:

- 24/7 operation
- Reducing production costs
- Improving production effectiveness
- Remote monitoring and management

### Solution:

- EPC-U2217 Plug & Play Box PC

### Benefits:

- Palm-sized with -20~60°C extended operating temperature and 12~24V DC input for automation
- Isolated CANBus, EtherCAT, 3 GbE, dedicated I/O support
- ESD protected contact 6KV/air 10KV for better system protection
- On-board eMMC, mSATA, and SATA dual storage for best-system reliability

By 2022 the global machine vision equipment market is projected to grow to \$13.62 billion due to the rapid evolution of smart factories. To bolster production line efficiency, machine vision solutions allow manufacturers to avoid allocating manpower for manual visual inspections and faulty component identification.

## Challenge

In traditional factories, production lines deploy manual labor to check products for appearance defects, print correctness, and product label portion sizing. However, manual detection sometimes misses errors and/or makes mistakes. Image inspection solutions are helpful for ensuring product quality while reducing liability. Such production line inspection systems only require low-profile solutions for image analysis. Furthermore, the production line space is limited and it requests small machine vision solutions for implementation into the production line.

## Solution

Advantech offered the EPC-U2217 embedded system equipped with the latest Intel Atom processor technology. This offered a 30% CPU performance enhancement and 45% graphics performance boost. EPC-U2217 also featured machine vision software and a camera for a comprehensive production line inspection solution. Using this solution for product appearance inspection and analysis improved overall product quality and saved on liability costs.

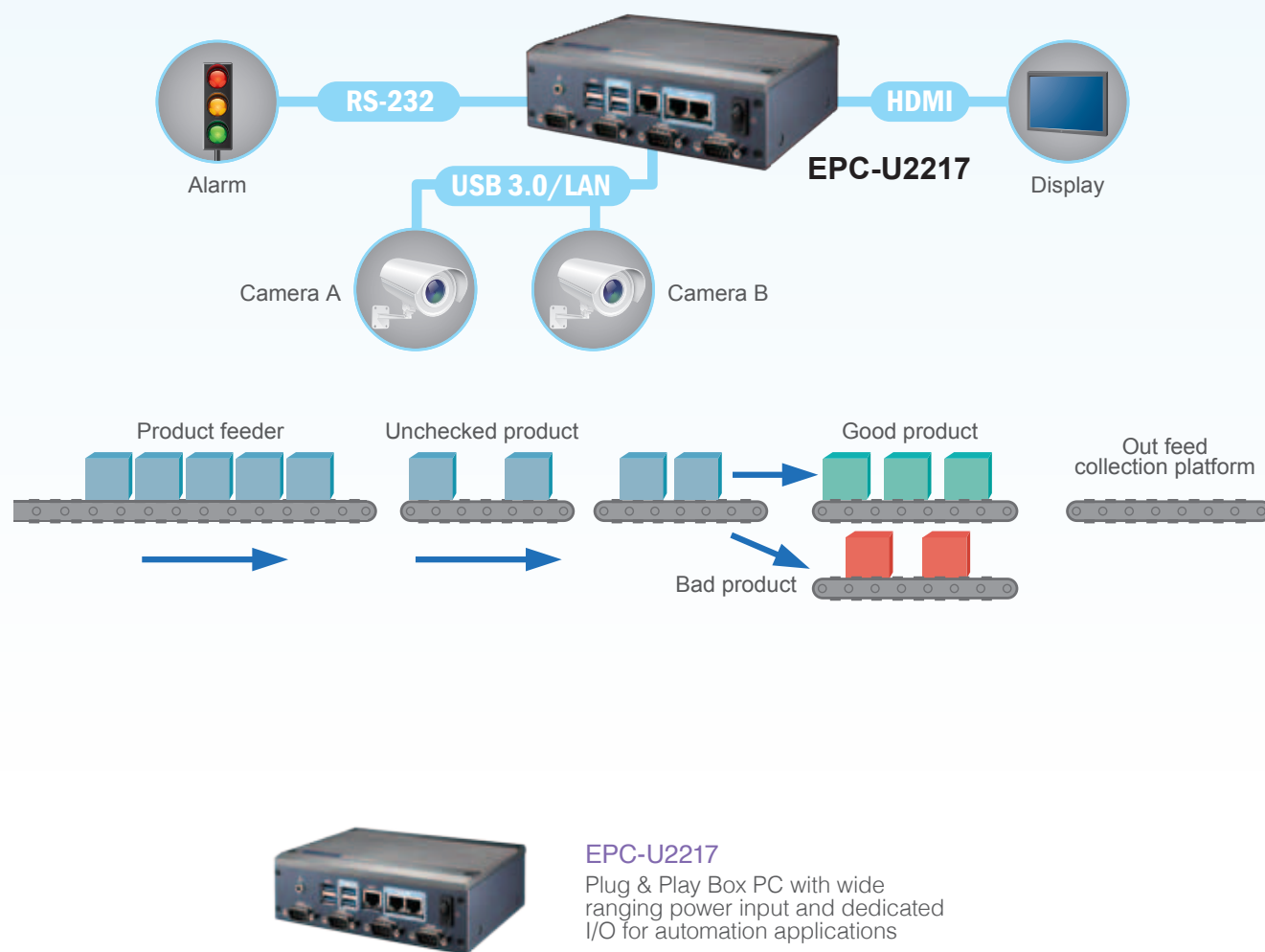
### Palm-sized, Fanless Design with Wide Temperature Support

EPC-U2217 measures 170 X 117 X 52.6mm with a fanless design which can be easily integrated into limited installation space. With its innovative top heatsink system thermal solution, it supports a -20 ~60°C wide operating temperature range for harsh environmental conditions in different factories. It also provides wide-ranging power input, from 12V to 24V DC, which allows customer to directly use the system under different power suppliers without requiring extra adapters for power transfer.

### Dedicated I/O Design and Dual Storage Support

Despite of its palm size, EPC-U2217 still provides sufficient I/O, including 4 USB 3.0 and 3 LAN support for the USB camera or IP cam, 4 COM ports, EtherCAT, and an isolated CANBus for robotic and/or device control. EPC-U2217 is designed with one M.2 E-key and one full size MiniPCIe slot for expansion and wireless integration. It supports on-board eMMC for superior data security and reliability. Data is saved in the SSD or mSATA for better performance support.

#### Solution Diagram



# Application Story

## Transportation

The global market for Intelligent Transportation Systems (ITS) is projected to reach US\$34.8 billion by 2022, driven by a growing population, inadequate road infrastructures, and the need to enhance road safety, whilst reducing traffic congestion and pollution through smart and efficient traffic management (GIA report, 2016).

To respond to market trends, Advantech cooperates closely with partners to help provide a diverse range of solutions for intelligent transportation applications. We not only provide the latest embedded computing products but we also offer more value through our various embedded design-in and software services. We provide certified design, multiple I/O, and flexible integration services to fulfill any application requirements.

### 3 Winning Facts



Certified Design



Diverse Communications



Flexible Integration



- ✔ In-Vehicle Video Surveillance
- ✔ Flight Information Display System
- ✔ Video Monitoring of Pantographs



# Enhancing Vehicle Security with Mobile Video Surveillance



## Project Summary

**Country:** Europe

**Industry:** In-vehicle surveillance

### Challenge:

- Compact and solid design with wireless options (WiFi/3G/4G)
- Connection to an IP camera, PoE (Power over Ethernet)

### Solution:

- ARK-2250V modular in-vehicle fanless system

### Benefits:

- Diverse, extended I/O modules
- Extreme performance for real-time video transcoding and multi-channel analytics
- Hardware and software level APIs to ease integration

Mobile/In-vehicle surveillance market is changing and fast catching up with new technological advancements. One of the key components in this industry is the IP camera solution which is migrating from traditional analog to IP solutions. In addition to IP cameras, the mobile NVR (Network Video Recorders) computers are another key element. Mobile NVR solutions offer high quality, flexibility, scalability, easy installation, and compatibility with the changing and critical needs of customers. They increase personal safety and prevent vandalism.

## Challenge

With mobile NVR solutions, robustness, wide operating temperature support, compact and solid design with wireless options (WiFi/3G/4G) are basic requirements. To connect to an IP camera, PoE (Power over Ethernet) is a must. This allows a single cable to provide both data connection and electric power to devices, which makes ease of installation and less cabling. Video capability to provide live views, recording, and slow video analytics is also needed.

## Solution

Advantech's ARK-2250V modular fanless embedded computer for transportation features extendable mechanical design. It's perfect for the complex system requirements of the vehicle and rolling stock markets. ARK-2250V adopts Intel 6th generation Core i5/i7 processors, delivering the necessary computing and graphics power to easily perform real-time video transcoding. Dual memory channel support helps optimize software transcoding efficiency, and various display outputs are available up to ultra HD.

## Transportation Certification

In order to ensure transportation systems run stably in harsh environments, all series are certified by E-mark, EN50155, EN50121, IEC 61373, or 5M3 certifications. Depending on different usage scenarios, the maximum operating temperature can reach -40~70 °C with a fanless cooling system.

## Flexible Optional Configurations

Because customers face different hardware requirements from end users, our transportation solutions provide flexible optional configurations. To fulfill surveillance applications, our systems can provide up to 8 x PoE ports for IP camera connection through a single cable, so customers can save time and money on installation. For in-vehicle infotainment servers, our systems can extend wireless communication to cover WiFi, 3G, or LTE requirements. Sometimes storage is a critical issue for mobile devices. Due to outside operation, data/video recording could last as long as 15/30/60days, so ARK-2250V provides different SATA configurations such as, 1 x mSATA + 1x SATA, or 1x mSATA + 2x SATA.

## Solution Diagram





# Flight Information Display System for One of the World's Largest Airports



## Project Summary

**Country:** Turkey

**Industry:** Transportation

### Challenge:

- Secure, real-time passenger information delivery
- 24/7 operation
- Easy maintenance for 3,000 FIDS located in the terminal

### Solution:

- DS-280 4K OPS-based digital signage player

### Benefits:

- OPS-compliant design for easy integration and maintenance
- Supports up to three displays
- Dual LAN with Intel AMT remote management
- Professional experience in the FIDS industry

Istanbul new airport, which opened on Oct. 29, 2018, has the world's largest single terminal building. The new airport will fly to more than 350 destinations with an annual passenger capacity of up to 200 million people. As a bridge between Europe, the Middle East, and Asia, the new airport is expected to overtake Atlanta as the world's busiest.

## Challenge

To handle such a huge number of passengers, a Flight Information Display System (FIDS) was deemed an essential system for wayfinding and navigation, and the airport intends to deploy more than 3,000 FIDS in its first terminals. To guarantee real-time delivery of information and provide the best 24/7 service to passengers, a secure and reliable FIDS system was required. Moreover, remote management and maintenance was very important since the FIDS was deployed in multiple places including check-in counters, boarding gates, and baggage claim areas across the terminals. Lastly, to accommodate to the new modern and stylish airport, the FIDS system needed be compact and neat without additional cables.

## Solution

Advantech has several years of professional experience in the FIDS industry and many international airports worldwide have already installed Advantech's digital signage platforms. For this project, Advantech DS-280 met customer requirements and high standards with a combination of full-range services, industrial-grade reliability, and best overall performance/cost.



## Highly Reliable Slot-In Signage Solution Meets High Standards

DS-280 adopts an OPS (Open Pluggable Specification) modular design which can be easily slotted into the display for a fully integrated solution. The cableless signage player is powered by the latest 6th generation Intel Core i7/ i5/ i3 BGA processor delivering an exceptional 4K graphic performance through Intel HD Graphics 530. DS-280 supports one internal Mini PCIe interface for wireless connection, so real-time passenger information can be seamlessly sent to DS-280 via Wi-Fi module for real-time delivery.

## Easy Maintenance and Remote Management

More than 3,000 FIDS were deployed in multiple locations across the terminals, so simple remote maintenance and management were very important requirements. DS-280 is based on an OPS platform reducing exposed cables and wires, bulky add-on peripherals, and frustrating power supply issues. It allows easy installation and removal for maintenance without disturbing the screens; this greatly accelerates installation and saves on costs for the system integrator. DS-280 can drive three larger format displays via HDMI2.0 and DP1.2 interface making it a powerful multi-display cost-effective signage solution. DS-280 is also integrated with Intel's AMT (Active Management Technology) solution which helps IT staff to access, control, repair, and help protect networked FIDS devices in real time.

### Solution Diagram



#### DS-280

4K OPS-based digital signage player, supporting up to three displays



#### Intel Active Management Technology

Intel AMT enables IT managers to repair, and help protect networked computing assets

# Video-Based Monitoring of Pantographs on High Speed Tracks



## Project Summary

**Country:** China

**Industry:** Railway

### Challenge:

- High-performance CPUs to support video monitoring operations
- High resistance to vibration and wide temperature support
- Compact size for limitations in space

### Solution:

- MIO-5272, 3.5" single board computers

### Benefits:

- Intel Core i ULT i7 performance & rich I/O interface
- Patented high-performance thermal solution with proprietary dynamic heat dissipation design

China's fast-developing railways are about to reach a total length of 120,000 kilometers by 2020, with 18,000 km of them belonging to 200+ km/h high speed class. In the last few years, the construction of high-speed rails in China has reached its pinnacle, amid the increasing use of IT-based intelligent equipment and applications. Among them, video-based monitoring systems have become prominent in improving China's high-speed railway communications.

## Challenge

Modern high-speed trains are driven by electrical power via an apparatus called a pantograph, which is mounted on the roof of trains to collect power through sliding contact with an overhead power line. It is difficult to monitor their condition, and they can be easily influenced or obstructed by environmental factors during operation. Incidents such as entanglement by trash bags or loss of contact with the overhead wires will produce shorting or failure in the pantograph-catenary electric transmission system. Real-time video monitoring of pantographs is an effective proactive method for discovering problems; allowing plenty of time for repairs and maintenance.

## Solution

To meet the requirements of video-based monitoring for high-speed rails, Advantech provided our customer with MIO-5272 3.5" single board computers (SBC), which offer high performance and low power consumption, allow fanless operation, and provide -40~85°C wide-range temperature support, delivering high reliability and ruggedness for long-term stable operation in harsh environments.

## Outstanding CPU Performance and Rich I/O Interface

The Advantech MIO-5272 is a 3.5" small-sized SBC adopting the Intel Core i ULT i7 processor, which provides high-performance computation with merely 15W of power consumption. MIO-5272 also provides multiple I/O support, including COM, USB 3.0, 8-bit GPIO, mSATA, and more. USB 3.0 can be used for connecting line cameras or IP cameras. Meanwhile, the provision of MIOe high-speed expansion interface will allow users to flexibly expand interfaces for PCIe, SMBus, USB 2.0/3.0, LPC line-out, power supplies, or DP, all based on user needs. Advantech MIO-5272 is a high performance, highly reliable and flexible SBC product.

## Patented High-performance Thermal Solution

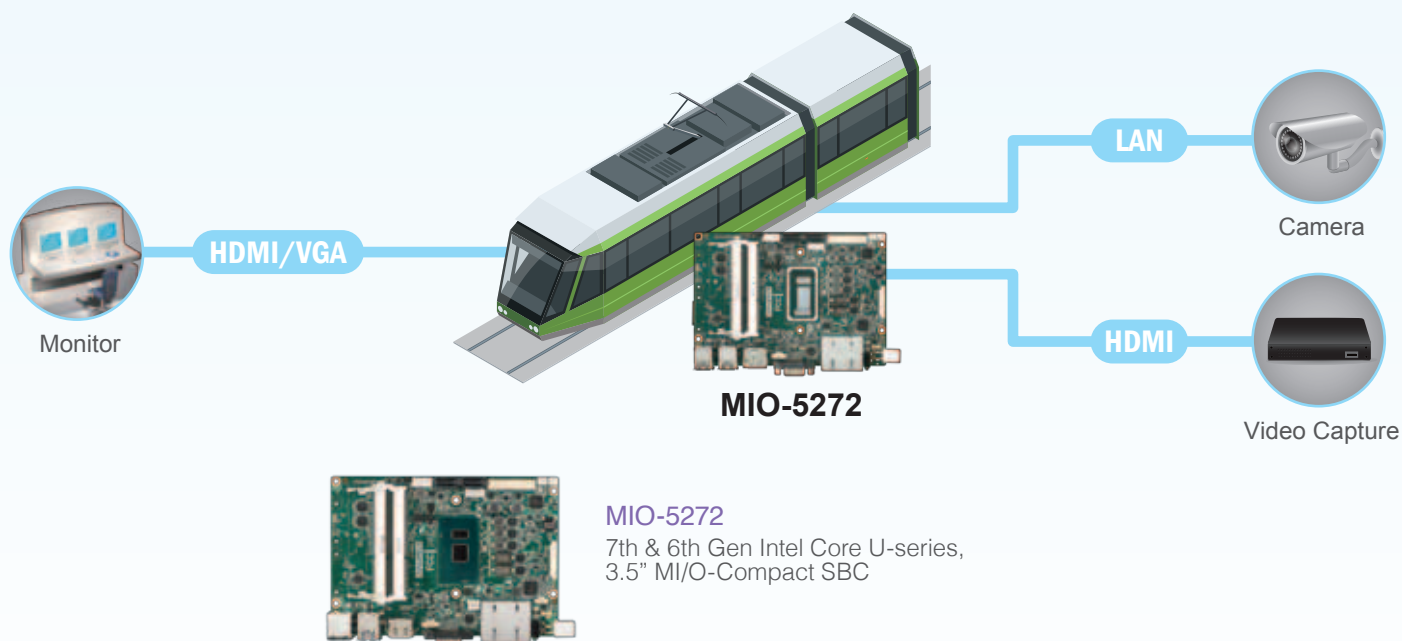
MIO-5272 is supported by Advantech's proprietary dynamic heat dissipation design, which uses an active copper/aluminum heat sink to dynamically conduct heat from chipsets for fast heat-dissipation which permits fanless system design. This patent-protected thermal solution has the following features:

1. The heat sink can automatically adjust and moderate the attachment force between the device and heating chips—such as CPU processor—to maintain a close contact for more effective heat transfer while avoid causing arcing of the host board.
2. The Advantech-proprietary heat dissipation solution allows the use of smaller sized heat sinks delivering higher performance heat dissipation. If using the same size, the Advantech heat sink can lower more than 15°C of temperature compared with conventional heat sinks. Therefore, the Advantech host board, even when it is equipped with a CPU adopting Core i7-grade processor, can normally operate under -40~85°C temperatures for great long-term reliability.
3. Good vibration-resistant capability allows for long-term reliable operation in the railway environment which is prone to shock and vibration.

## Embedded Software Services

In addition to exclusive hardware designs, Advantech SBC products have complete embedded software built in, tailored to run on Windows Embedded Standard 7 OS, providing higher reliability than general embedded OS.

### Solution Diagram



# Application Story

## Kiosk/POS

POS and self-service kiosks are to be seen everywhere these days in retail stores, airports, restaurants, hotels, banks and many other places. With many years' experience behind us and proven success in POS and Kiosk applications, Advantech provides a comprehensive range of products including both x86 and RISC platforms in different form factors, such as 3.5", Mini-ITX, systems and more. With optimized I/O options, industrial displays, flash and memory solutions, dedicated embedded software services, and design-to-order services, Advantech offers a one-stop-shopping service that has powered thousands of POS and Kiosks applications in multiple fields.

### 3 Winning Facts



Scalable Computing Solutions



Interactive Interface



24/7 Security



- ✔ EV Charging System
- ✔ Intelligent Vending Machines
- ✔ Virtual Teller Machine



# Rugged EV Charging System for Outdoor Environments



## Project Summary

**Country:** Korea

**Industry:** EV charging

### Challenge:

- Required rugged, flexible, and durable design to meet outdoor environment
- Needed to meet all Korean government's safety, global warranty, and support services

### Solution:

- IDK-2115 15" XGA 1,200cd/m2 ultra high brightness industrial display kit
- MIO-5251, 3.5" rugged single board computer

### Benefits:

- Wide temperature support
- Flexible expansion and multiple I/O options through Advantech innovative MI/O extension connector

From 2000 onwards, the self-service fuel dispensing market in Korea has grown rapidly with an annual 15% market growth rate. This trend has led the self-service fuel dispensing market into new channels of business such as the EV charging system. The EV charging system is expected to be an emerging market opportunity especially because the Korean government supports its introduction. It is estimated that more than 2,000 devices will be deployed over the next few years and revenues will reach USD 700K.

## Challenge

A leading industrial company in Korea was looking for an integrated solution that met all the government's safety and outdoor environment requirements. The integrated solution needed to be rugged, flexible, and durable. In addition, the global warranty and support are needed for customer's international business.

## Solution

For EV charging system, Advantech combined IDK-2115, a 15" XGA 1,200cd/m2 ultra high brightness industrial display kit with MIO-5251, 3.5" rugged single board computer. Furthermore, Advantech offers a solid worldwide support system and prepares a number of certifications for exporting products globally.

### Wide Temperature Support

To ensure stable operability under harsh outdoor environment, the integrated system need to comprise rugged and durable hardware. MIO-5251 SBC with RAM/mSATA SQFlash SSD supports operating temperatures between -40°C~85°C for critical environments. Moreover, it supports the combination of SBC and LCD display. IDK-2115 LCD kit supports wide temperature operation of -20° C ~ 60° C making the device ideal for any outdoor location.

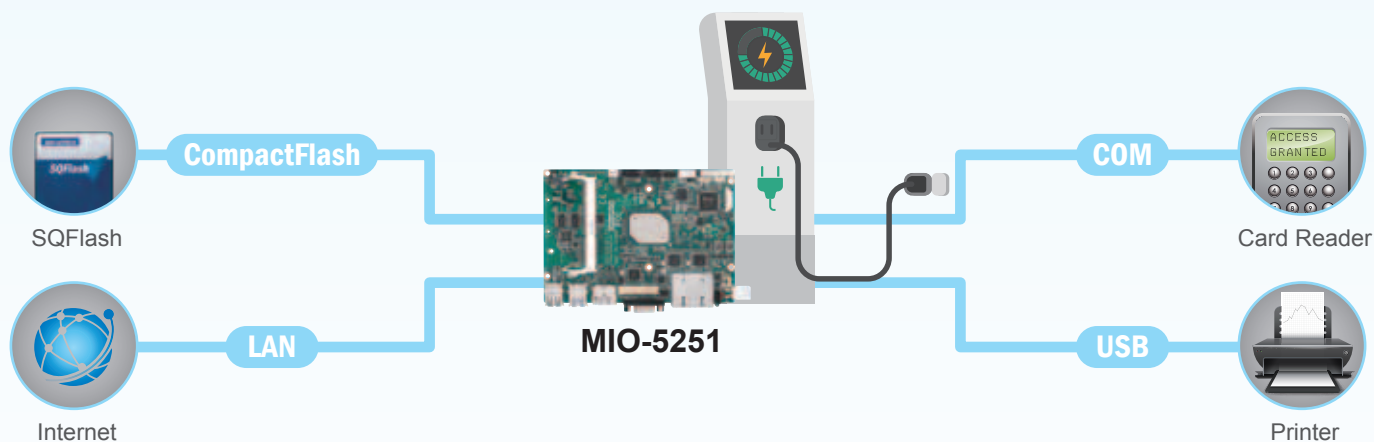
### Flexible Expansion and Multiple I/O Options

MIO-5251 is equipped with multiple I/O options on ports such as 2 x RS-232 and 2 x RS-232/422/485, and 2 x Giga Ethernet which can connect to several devices such as printers or POS. The customer could also expand I/O ports quickly through the MI/O extension connector to meet any urgent upgrade needs and CPU performance was boosted based on new requirements.

### Superior Outdoor Visibility with Advanced Reliability

Advantech provided IDK-2115, a 15" LCD kit with ultra-high brightness and optical bonding solution which together perfectly met the outdoor requirements. Advantech designed advanced LED backlight and boosted the brightness from original 400 cd/m2 to 1200 cd/m2, making it appear bright and clearly readable even in direct strong sunlight. The anti-glare coating on the cover glass also enhanced the readability of the display, improved vandal resistance and protected display from dust and moisture.

#### Solution Diagram



#### MIO-5251

Intel Celeron J1900 & Atom E3825/  
E3845, 3.5" MI/O-Compact SBC



#### IDK-2115

15" XGA 1,200cd/m2 ultra high  
brightness industrial display kit

# Fanless Arm-Based Box PC for Intelligent Vending Machines



## Project Summary

**Country:** China

**Industry:** Vending machines

### Challenge:

- Multiple I/O ports
- 24/7 operation
- 4G and Wi-Fi connection
- Over-the-air updates & remote management

### Solution:

- EPC-R4680 Rockchip RK3288 Quad Core Box PC
- AIM-Linux/Android Service
- WISE-PaaS/DeviceOn

### Benefits:

- Ready for smart retail application
- Reliable Wi-Fi and LTE network
- Multiple I/O ports for diverse peripherals
- Embedded software services
- Remote control and management support

With the increase in rent and labor costs, there's an increasing demand for vending machines. A recent Research and Markets report predicts that the global intelligent vending machines market is expected to reach US\$ 11.84 billion by 2025. This includes intelligent/ connected vending machines that feature real-time inventory tracking, touchscreen capabilities, and cashless transactions.

## Challenge

One vending machine system integrator in China asked for a low power consumption PC controller with multi USB and UART ports for connecting to various kinds of peripherals, and wireless Internet access in order to reduce the cost of intelligent vending machine installation.

## Solution

Advantech provided an Arm-based EPC-R4680 embedded Box PC that powered by Rockchip Arm Cortex-A17 RK3288 Quad core processor with high performance and 4K display. This solution provides HDMI+VGA, HDMI+LVDS, or VGA+LVDS multiple display combinations with different content to meet various customer needs. Supporting WIFI/BT and 3G/4G wireless connection via internal M.2 and Mini-PCIe interface, the vending machine connected to the Internet for e-Payments, remote control, administration and management, recovery and updates. EPC-R4680's industrial quality and ultra-low power consumption design ensures it works stably under 24/7 operation and provides plentiful I/O such as 5 x USB2.0, 1xUSB OTG, 6 x UART, Giga Ethernet and 8 x GPIO, making the system highly expandable and future proof.



### AIM-Linux/Android Embedded Software Service and Longevity Support

Advantech not only provided specialized hardware solutions, but also provided excellent AIM-Linux/Android embedded software services. We helped the customer develop many customized features for their vending machines such as boot screens, timing switch, screen rotation functions and more. We also offered Android OS 6.0 with longevity support, with the option for the customer to upgrade to the latest version Android in the future.

### Wi-Fi and 4G Module Integration

For connectivity, the vending machine needed WiFi and 4G to access the Internet reliably. However, it took more effort to find drivers for the wireless modules. To solve this problem, we integrated an IEEE 802.11 b/g/n Wifi and Bluetooth combo module, and a FDD-LTE/TDD-LTE/WCDMA/GSMA network module with a mini-PCIe interface. Both WiFi and 4G modules are integrated with antennas, RF cables, and an antenna base on EPC-R4680, so the customer could choose wireless connectivity as necessary.

### WISE-PaaS/DeviceOn remote Remote Management Integration

To fulfill the requirements of remote management, we suggested the customer integrate our Advantech WISE-PaaS/DeviceOn device operation management software. With WISE-PaaS/DeviceOn, the customer could easily monitor each vending machine's status and remotely control and diagnose each device independently or collectively.

## Solution Diagram



#### EPC-R4680

Rockchip Arm Cortex-A17 RK3288  
Quad Core Box PC

#### WISE-PaaS/DeviceOn

IoT device operation management

#### AIM-Linux & AIM-Android Services

Arm-based embedded software services

# Virtual Teller Machine with Multiple I/O Capability and Software Services



## Project Summary

**Country:** China

**Industry:** Banking

### Challenge:

- Highly reliable hardware design with multiple USB, serial ports, and expansion slots
- Embedded BIOS and security protection software support

### Solution:

- AIMB-503YH Micro-ATX motherboard

### Benefits:

- Abundant I/O and expansion for stable connectivity
- Advanced USB power switch control via GPIO
- Customized BIOS, built-in WISE-PaaS/DeviceOn with McAfee for security support

By providing real time, face-to-face conversation with bank service specialists, smart Virtual Teller Machines (VTM) can cover 95% of traditional counter services while prolonging service hours to reduce labor and banking costs. As VTMs gain popularity, digital security is becoming a crucial issue - for data protection, backup, and storage.

## Challenge

Hoping to take advantage of VTM technology, Advantech's China-based customer required a highly reliable hardware design. The design needed to support multiple USB, serial ports, and expansion slots for stable connectivity with numerous external devices. Software support, including embedded BIOS and security protection, was also needed.

## Solution

In this case, the customer used Advantech's AIMB-503YH Micro-ATX motherboard, which supports the Intel Core i7/i5/i3 processor for outstanding CPU and graphics performance. The 16 USB ports and 10 Serial ports connect with multiple external devices - cash dispensers, receipt printers, and scanners - using a single motherboard. The motherboard provides dual independent displays and three PCIe slots for high expansibility. The enhanced USB power switch design helps customers control on/off power and their application independently via GPIO for maximum reliability.

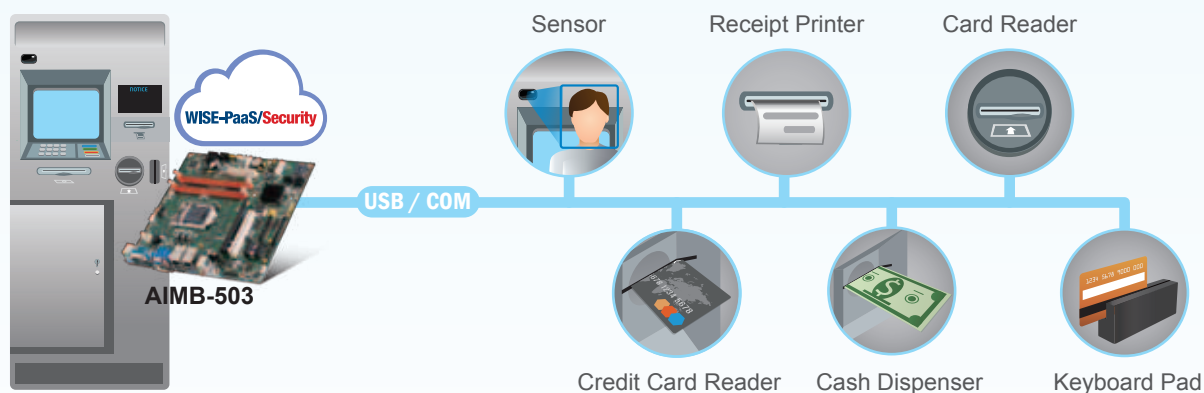
### Reliable USB Power Design

Each USB port can be controlled and powered on/off separately by GPIO and users can implement this feature through a custom API. The system can auto reset USB devices when abnormal behaviors are detected.

### Customized BIOS and Security Software Support

As an integrated solutions provider, Advantech's customized BIOS service offers a major advantage for partners looking for optimized performance. Moreover, the AIMB-503 bundles Advantech's smart, value-added WISE-PaaS/DeviceOn IoT software to help users perform remote monitoring and real-time management. WISE-PaaS/DeviceOn offers system data recovery powered by Acronis and security protection from McAfee to ensure reliable and efficient banking operations.

## Solution Diagram



#### AIMB-503YH

Industrial motherboard with multiple I/O capability, customized BIOS & security software support

#### WISE-PaaS/DeviceOn

IoT device operation management

# Application Story

## Medical

Healthcare for senior citizens and persons with disabilities will be one of the main issues for smart cities. For intelligent, connected medical devices, which provide superior care quality and remote management of clinical information, stable and ruggedized embedded solutions are widely used. System reliability, data accuracy, and security are crucial ingredients to advancing the medical industry in the IoT era.

With strong customization capability and experience in medical grade devices and systems, Advantech not only delivers qualified medical computing products but also act as a strategic and innovative partner for medical customers.

### 3 Winning Facts



Medical Certificates



Solid Product Lifecycle Control



Embedded SW Integration



- ✔ Ultrasound Devices
- ✔ Portable Ultrasound Systems
- ✔ Nursing Carts



# New Thermal Solution Empowers Ultrasound Devices



## Project Summary

**Country:** China

**Industry:** Ultrasound

### Challenge:

- Balance between high-performance computing and heat dissipation
- Support high definition image output

### Solution:

- SOM-5894 Computer-On-Module
- COM Design-in Service

### Benefits:

- SOM-5894 with high-performance to fully meet the design requirements of Ultrasound devices
- Advantech highly efficient thermal solution to solve the heat dissipation problem
- Design assistance based on our clients' carrier board

In the medical field, Ultrasound requires high-speed board design based on multi-bus signal acquisition channels, signal acquisition and has to comply with many rules in medical field. Especially device must work at a normal temperature to provide a stable operation.

## Challenge

Medical device requires high-performance boards which causes the heat dissipation problem easily. This problem develops when a high performance CPU generates massive heat. Also, in order to support high definition image output, an integrated GPU design while consuming low power is required. Because of various requirements, there are some challenges that customers suffer from:

1. Constraints in airflow of the medical device enclosure that requires complicated design.
2. Using max graphic performance of the CPU/GPU results in max TDP is used and needs to be dissipated.
3. Difficult to achieve cost effective and reliable solution
4. Low cooler noise is one of important factor in silence medical space.
5. Scalability of performance and easy maintenance are key issues.

## Solution

Equipped with Intel the 4th generation Core i series CPU, Advantech SOM-5894 module is based on a COM Express Basic, Type 6 form factor, and can provide high-performance signal processing power and fully meets the design requirements of Ultrasound devices. SOM-5894 has high processing performance and rich expansion interface features which help designers to achieve flexible design requirements of Ultrasound devices.

### Platform-Leading Performance

SOM-5894 module is based on Intel Haswell platform, which provides significant performance boost over the previous generation of processing speed.

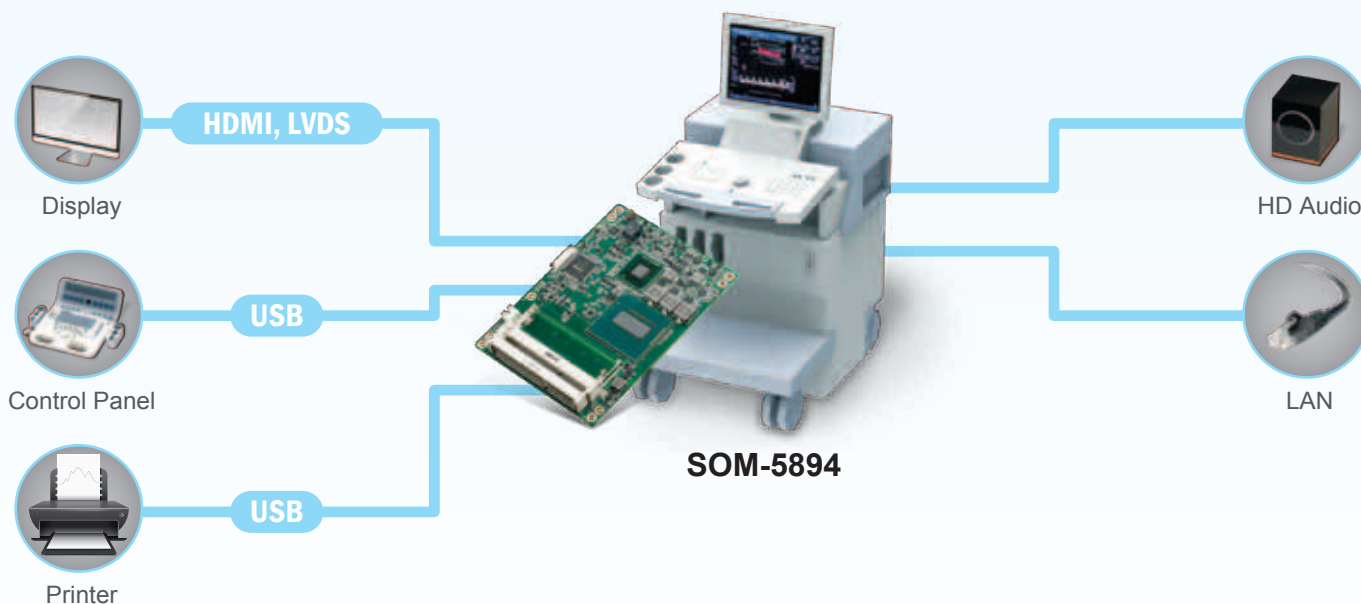
### Dynamic Heat Conduction System

Advantech has developed a highly efficient thermal solution— the Dynamic Heat Conduction System (DHCS). The advanced DHCS technology effectively improves heat transfer performance, which solves the heat dissipation problem when a high performance CPU generates massive heat. With the help of the Dynamic Heat Conduction System, devices and systems can run smoothly and the chances of a breakdown or malfunction can be reduced.

### Powerful Graphics Engine

Support hardware encoding / decoding, HD video acceleration, covers a variety of display interface —HDMI / DVI / Display Port, support ultra-high-resolution image B output, even small lesions graphics can easily be discovered , thus greatly improving the accuracy of diagnosis; also support three independent displays.

## Solution Diagram



#### SOM-5894

4th Generation Intel Core processors H-series + QM87



#### COM Design-in Service

Design assistance based on our clients' carrier board

# Display Solutions for Portable Ultrasound Systems



## Project Summary

**Country:** America

**Industry:** Medical

### Challenge:

- High image quality and reliable LCD solution
- An intuitive user-friendly interface which can be operated even with surgical gloves on
- To meet dust and moisture resistance and easy cleaning requirements

### Solution:

- IDK-1115P 15" display kit with PCAP touch solution

### Benefits:

- Highly consistent image reproduction and DICOM compliant
- Elegant all flat PCAP design with IP65 rating
- In-house optical bonding solution

Ultrasound is an effective diagnostic tool in emergency rooms, anesthesia, critical care, pain management, and other bedside applications. They are used to help evaluate, diagnose and treat medical conditions, and their high resolution imaging and user-friendly interface improves diagnostic confidence and efficiency. Recently, portable ultrasound systems have made strong inroads into the point-to-care market.

## Challenge

Our customer, a worldwide leading medical equipment manufacturer, was looking for a high quality LCD display solution for its new portable ultrasound systems. The portable ultrasound systems needed to provide consistently high quality images and be super reliable so that doctors don't lose on screen information. They also needed to be equipped with an intuitive user-friendly interface, so that the learning curve to operate them was minimal and the focus was on making accurate treatment decisions. An IP65 rated front cover was also critical to avoid the possibility of dust and liquids effecting image quality which could cause incorrect diagnosis. They also needed to be able to be touch operated with surgical gloves on, even with gel applied.

## Solution

Advantech provided IDK-1115P, a 15" display kit with projective capacitive (PCAP) touch solution and a DICOM compliant AD board integrated, cover glass customization and optical bonding which together perfectly met the customer's requirements.



## Highly Consistent Image Reproduction Improves Diagnostic Accuracy

IDK-1115P, a 15" display kit designed with high resolution of 1024 x 768 and MVA technology, delivers professional imaging with wide viewing angle, high contrast ratio, and fast response time. IDK-1115P comes with an AD board, which meets the DICOM standard for image communication and image file formats. The AD board provides color management functions which help improve brightness stability, gray scale, color temperature and color gamut. IDK-1115P is integrated with PCAP multi-touch screen which allows operation with gloves on and delivers smooth intuitive gesture controls. Customized logo print on the cover glass was also offered.

## Rugged Designs Make Cleaning Easy

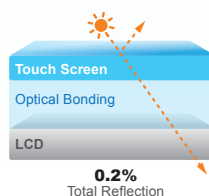
To further increase readability under strong ambient light conditions in hospitals, IDK-1115P was applied with anti-glare coating on the cover glass and the anti-smudge coating make cleaning easy. The outstanding mechanical design helps these medical devices meet IP65 rating requirements for dust and moisture resistance. To better enhance the contrast resolution and improve ruggedness, an optical bonding coat was applied between the panel and touchscreen. As a result, IDK-1115P provides better medical imaging quality with reduced light loss and longer battery life for the better mobility. It also improves the reliability and durability of the touch screen by making it more ruggedized to prevent accidental damage.

### Solution Diagram



### IDK-1115P

15" multi-touch display kit with a DICOM compliant AD board



### Optical Bonding Solution

- Reduce the reflectivity to 0.2%
- Enhance vandal resistance

# Nursing Carts with High Performance and Multiple Expansion Capability



## Project Summary

**Country:** Europe  
**Industry:** Medical

### Challenge:

- Needs industrial motherboard with high CPU & graphic performance
- Expansion capability for WiFi/3G/LTE modules

### Solution:

- AIMB-232 THIN Mini-ITX motherboard
- EWM-W157H wireless module

### Benefits:

- THIN & fanless Mini-ITX to support Core i processor
- High CPU and graphic performance with medical compliant thermal solutions
- Supports WiFi/3G/LTE modules

Nursing carts are lightweight and durable mobile stations used in medical facilities for storing and conveying medications and emergency medical supplies, as well as for dispensing medication and assisting with nurse education. Nursing cart applications are designed to enhance patient care, decrease paper work, and ease the workload for nurses and other healthcare professionals.

## Challenge

One of our customers based in Europe in the medical field wanted to upgrade and enhance their nursing carts' reliability and capability for data processing and medication delivery. As the nursing carts needed to transfer critical data back to the nursing station instantly, WiFi signal strength was crucial. The customer was looking for a control board with high CPU processing and graphic performance, and multiple expansion capability for WiFi/3G modules.

## Solution

To meet the customer's requirements, Advantech provided AIMB-232 THIN Mini-ITX motherboard integrated with an EWM-W157H wireless module. AIMB-232 uses Intel Mobile UTL processor for better performance, along with 40-45% height reduced low profile I/O design and medical compliant thermal solution, which is ideal for portable medical applications. EWM-W157H allows 433Mbps wireless data rates for high-throughput wireless applications.

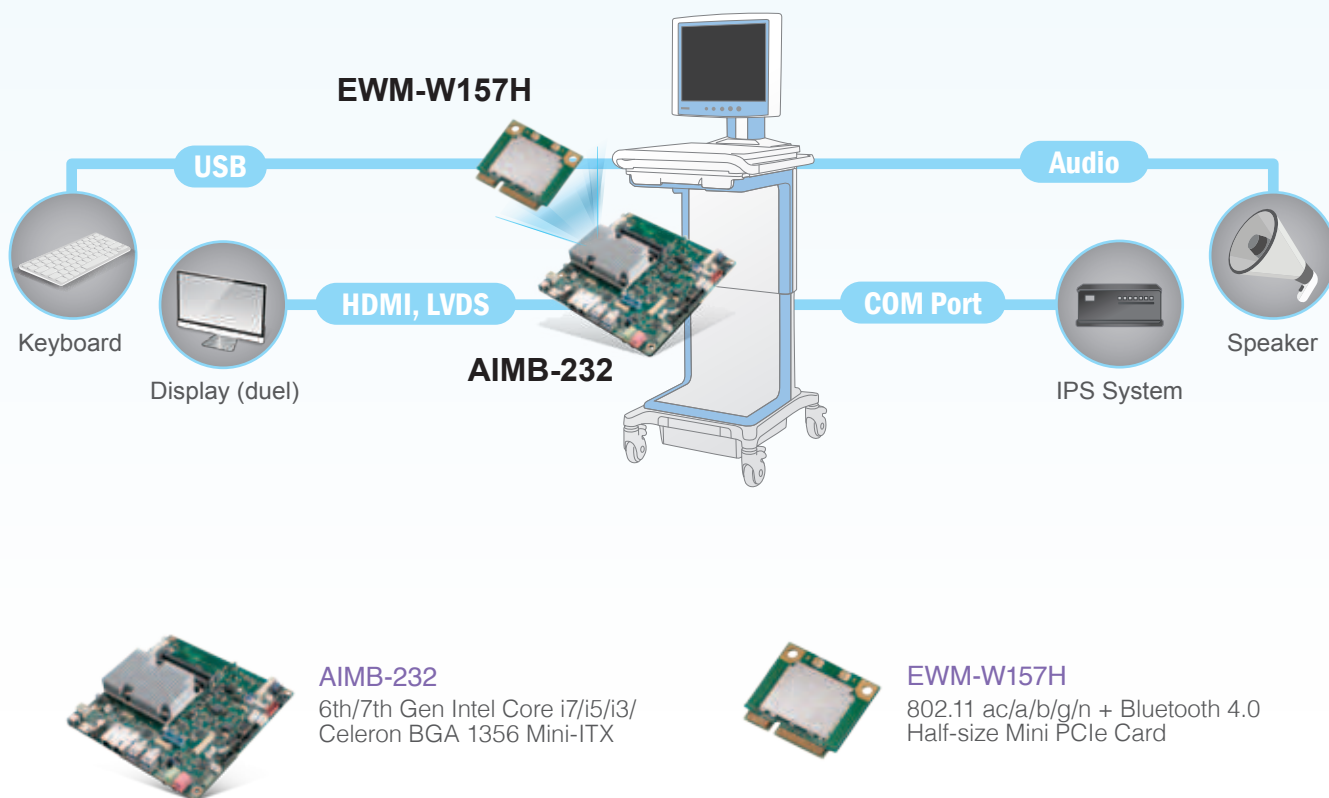
### High Graphic Performance with Fanless Design

Advantech's AIMB-232 is equipped with an Intel Mobile UTL i3/i5/i7 processor, provides three independent displays, and supports high graphic performance up to 4K at 60Hz resolution. Mostly importantly, AIMB-232 is low power and fanless design to offer noiseless and easy-to-maintain solution which is suitable for the nursing cart application in the hospital.

### Expansion Capability for WiFi/3G/LTE Modules

With two Mini PCIe expansion slots onboard for WiFi/3G/LTE and storage, AIMB-232 is compliant with EWM-W157H WiFi modules, which are fully compatible with Windows and Linux OS.

#### Solution Diagram



## Leading Embedded Innovations to AIoT Future



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