Fanless Embedded Systems
Fully Modular Design for Quick Integration

- Ultra Small Series
- Slim / Mountable Series
- Multiple I/O Series
- High Performance Series
- Value Series
- Video Surveillance Solutions

Plug & Play modular expansion accelerates integration
Industrial I/O with isolation protection
Seamless Communication RF certified
Modular Embedded Systems
Designed for Diverse IoT Applications

Advantech new ARK fanless embedded systems are designed to provide rapid configurable I/O solutions for diverse industrial and embedded applications. This modular design feature maximizes benefits with without additional customization time, NRE, and cost. All possible configurations are fully tested and verified by Advantech and have been certified by extensive international standards, including EC, FCC, CB, UL, CCC, BSMI, as well as safety standard of UL, CCC and BSMI, the most complete certifications list among competitors.

**Plug & Play modular expansion accelerating integration**
Advantech iDoor technology enables changeable and differentiated I/O port configurations on our modular ARK systems. iDoor offers many industrial I/O solutions including RS232/422/485, digital I/O, and GbE, providing flexible and convenient selections for any diverse applications. Additionally, ARK Plus is an expansion module interlocked to the base of an ARK system to accommodate more I/O ports, MIOe add-on board, removable hard disk or an additional iDoor slot. In addition to the standard offering of a 12v DC input, a changeable power module provides wide voltage support of 12~24v or 9-36v DC and are available to customers as optional.

**Industrial I/O with Isolation Protection**
In some applications such as factory automation, I/O isolation is important for protecting systems and electronic equipment. Electronic equipment and signal and power transmission lines can be subjected to voltage surges induced by electrostatic discharge or uneven power supply. This may lead to signal disruption or even destruction of whole systems. Advantech developed iDoor modules with opto-isolation that prevents these problems and ensures long product lifetimes.
Seamless Communication with RF certified
Connectivity is key in IoT and Advantech ARK embedded systems have complete solutions from hardware to software, providing reliable connection to sensors, machines, cloud computing centers, and any possible devices with networking capability. ARK systems come with miniPICE or M.2 interface for wireless communication module installation. Advantech ARK IoT gateway solutions have FCC and CE RF certification, to ensure seamless WiFi communication.

Innovative Software Services
Advantech have long continued to provide all kinds of system integration services, and in the cloud computing era we will continue to offer more intelligent platforms and services. Through new ideas and technologies, Advantech has created a series of innovative software products such as WISE-PaaS/RMM for remote device management, and iManager for intelligent self management. WISEPaaS/RMM serves as one part of Advantech’s IoT software solutions, focusing on IoT device remote monitoring and management, and bridging the layers in Advantech’s IoT Platform Architecture. Advantech strives to integrate collaborative partnership solutions with Intel, Microsoft, Windriver, Intel Security, Acronis and others by providing pre integrated, pre validated hardware and software building blocks to enable seamless and secure data flows from the sensor to the cloud and back. Our iManager intelligent self management software makes our systems more manageable, power-saving and secure. This effectively relieves system developers and users of the complexity of device management and maintenance, and simplifies the operation of embedded devices. Entire systems can be managed easily and remotely to save cost. From front end to back, Advantech leads the industry in a new generation of intelligent systems.
IoT Gateway Starter Kit

Pre-integrated Hardware/Software/Services Solution Package

The Advantech IoT Gateway Starter Kit provides a pre-configured system featuring an Intel® Celeron® J1900 SoC and WES7E with 4GB Memory and 500GB HDD. There are 2 gateways selected for the Starter Kit which have been verified through the Microsoft Azure Certified for IoT program; the ultra-small ARK-1123H, or the multiple I/O ARK-2121L. They are both designed to withstand harsh environments, with good scalability for networking and versatile I/O communication. Advantech’s own WISE-PaaS/RMM Pro software solution is also included in the package for remote IoT device monitoring and management, and device monitoring/control and security (via Intel® Security/ McAfee). WISE-PaaS/RMM is ready to run on Microsoft® Azure Marketplace to enable big data analytic services. For IoT design-in services, we provide a gateway and security SDK, 100+ RESTful APIs. Node-RED logic editor design tools and associated documents. With 3 hours of online consulting services, customers will have their own exclusive access to submit, manage and track the status of their new service. Any partner or customer who purchases the starter kit is eligible to become a VIP member in our IoT developer forum community. On the forum there are dedicated Advantech technical experts for technical Q&A, and the latest technical tools and documents for download.

Real-time Access IoT Developer Forum

For a quick jump into the core discussion with professional consultants, Advantech built an IoT Developer Forum. The IoT Developer Forum is a real-time, online platform for sharing the IoT technologies news and posting questions. Discuss a variety of development topics, from getting started to working with the latest software and IoT technologies. Any customers who purchase the Starter Kit are eligible to become VIP members in our IoT Developer Forum community. On the Forum there are dedicated Advantech technical experts for technical Q&A, and for download, the latest technical tools and documents that help customers shorten their design phases and speed their launches.

iotforum.advantech.com
**IoT Data & Gateway Management**

- **Data Management**: Provides data acquisition and protocol unification with standard MQTT to cloud for data analytics and prediction.
- **Remote Control**: Remote control connected gateway system and I/O with dashboard console and RESTful APIs.
- **Gateway Monitoring**: Inspects the condition of connected devices and software through a dashboard and system management console.
- **Application Intelligence**: 100+ RESTful APIs for IoT application development with advanced Application Logic Designer (Node RED).

**Enable Data Analytic Services**

- **Virtual Machines**: Access WISE-PaaS/RMM configured to run in Azure with confidence knowing that each solution has been vetted through Microsoft Azure.
- **Machine Learning**: Leverage a variety of machine learning services such as forecasting and product recommendations for predictive maintenance.
- **Power BI**: Azure and Power BI provide a complete set of services for data analytics from data processing through to visualization.
- **Event Hubs**: Cloud-scale telemetry ingestion from websites, apps, and devices.

**Software Development Kit**

- **Gateway SDK**
  - 12+ WISE Agent Handler
  - Development Tools
  - Technical White Paper
  - Developer Training Guide
- **Application Logic**
  - RESTful APIs Packages
  - Node RED Application Logic Editor
- **Gateway Security**
  - OpenSSL
  - Microsoft BitLocker
  - Advantech Security ID (Manager)
  - Intel® McAfee Security Support
- **Board Level SDK**
  - Yocto Linux BSP (x86/ARM)
  - Win10 IoT Core BSP
  - Library: Alljoyn, IoTivity, MQTT
  - SUSI API, SQL Lite,

**Technical Support Service**

- **Online Consulting**: Provides 3 hours of online consulting service. Online technical support system is ready to serve 24/7. You can use your exclusive account to submit, manage, and track issues.
- **Online Forum**: When you join the IoT Developer forum, you will receive the latest versions of software resources and video training courses. [iotforum.advatech.com](http://iotforum.advatech.com)

**Gateway System Specifications**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ARK-1123H (Ultra Small)</th>
<th>ARK-2121L (Multiple I/O)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor System</strong></td>
<td>Intel® Celeron® J1900 Quad Core 2.0GHz SoC</td>
<td>Intel® Celeron® J1900 Quad Core 2.0GHz SoC</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td><strong>Integrated O/S</strong></td>
<td>WES7E</td>
<td>WES7E</td>
</tr>
<tr>
<td><strong>Anti-Harsh Environment</strong></td>
<td>Operating Temp: -20 ~ 70 °C</td>
<td>Operating Temp: -20 ~ 70 °C</td>
</tr>
<tr>
<td></td>
<td>Anti-Vibration Certification: IEC 60068-2-64</td>
<td>Anti-Vibration Certification: IEC 60068-2-64</td>
</tr>
<tr>
<td><strong>I/O Interface</strong></td>
<td>Essential I/O Interface Support, RS232/422/485X 1</td>
<td>Scalable I/O Interface by iDoor, RS232 X2, RS232/422/485X 4</td>
</tr>
<tr>
<td><strong>Wireless Networking</strong></td>
<td>Wireless Expansion Capability - Mini PCIe X1</td>
<td>Wireless Expansion Mini PCIe X1 with SIM Holder</td>
</tr>
<tr>
<td></td>
<td>High Speed Ethernet Giga LAN X 2</td>
<td>High Speed Ethernet Giga LAN X 2</td>
</tr>
<tr>
<td><strong>Multi Media Support</strong></td>
<td>Full HD Graphic Engine Embedded</td>
<td>Full HD Graphic Engine Embedded</td>
</tr>
<tr>
<td></td>
<td>Full Range of Media Format Support</td>
<td>Complete Media Output Support: HDMI+VGA</td>
</tr>
<tr>
<td><strong>Storage Capacity</strong></td>
<td>2.5” Drive Bay and mSATA Support</td>
<td>2.5” Drive Bay and mSATA Support</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>133.8 x 43.1 x 94.2 mm (5.27” x 1.7’’ x 3.71”)</td>
<td>264.5 x 69.2 x 133.0 mm (10.41’’ x 2.72’’ x 5.24”)</td>
</tr>
</tbody>
</table>
Video Surveillance Solutions for In-vehicle, Outdoor and Railway

ARK vertical series solve problems and put System Integrators ahead of the competition with proven hardware systems, along with confirmed compatible software and peripheral connectivity. They improve efficiency and accelerate your implementation of in-vehicle, outdoor and railway video surveillance applications.

Integrated Solutions to Achieve Higher Efficiency

Vehicle-grade and Rugged Solutions
- Vehicle Certification: E-Mark, ISO-7637-2, IEC-60721-3-3 5M3
  Railway Certification: EN50155, IEC61737
- Vehicle power ignition management with isolated protection
- Wide range operating temperature up to -30 ~ 70 °C

Supports Diversity of Wired/Wireless Communications
- Up to dual SIM and 3G/LTE modules for dual streaming and connection redundancy
- 3 antenna holes reserved, flexibility for 3T3R WLAN module
- Optional CANbus interface for vehicle monitoring & recording
- GPS receiver built-in, for easy traffic route management

Provides 28 In-vehicle & Surveillance SDK and APIs
- Vehicle ignition management
- Connected device care: PoE (IP camera health monitoring)
- Driving behavior monitoring: CANbus, G-sensor, GPS
- SUSIAccess remote device management

Rolling Stock System
- Rugged-design compliance with IEC61373 shock & vibration standard
- Stackable design with extensible I/O ports for connecting various devices

Smart Parking
- Multiple I/O for gate control, ticketing and security surveillance
- High system performance supports license plate recognition, facial recognition and access control applications
**Traffic Monitoring**
- Traffic flow monitoring, recording and file archive for further analysis
- Intelligent video analytics such as vehicle counting and license plate recognition

**Fleet Management**
- 28 vehicle-related SDK and APIs accelerate application development
- Built-in GPS and G-sensor with wireless connectivity and CANBus for flexible fleet management strategies

**Mobile Surveillance**
- e-13 certified with intelligent vehicle power ignition management
- High resolution recording at 3MP, 120 FPS - supports analytical applications such as facial recognition

**Railway Surveillance**
- EN50155 certified for operating in critical environments with wide operating temp range -40°C ~ 70°C
- High video capacity 1080P, 240fps and file backup capacity for 1 month
Product Series
Newly Designed for Modular Systems

Ultra Small
ARK-1100 Series
- **Palm Size**: 133.8(W) x 43.1(H) x 94.2(D)mm
- **Green**: Ultra low power consumption, minimum 5 Watts
- **Wide Temperature**: -30 ~ 70°C operating support
- **Multi Storage**: 2.5" HDD/SSD or mSATA
- **Expansion**: MiniPCIe + SIM for wireless communication
- **Mounting Solution**: Wall, VESA and DIN-Rail kits

Multiple I/O
ARK-2000 series
- **Compact Size**: 265(W) x 69(H) x 133(D) mm
- **Platform**: Intel® Atom™ to Intel® Core™ i
- **Wide Temperature**: -20~70°C operating support
- **Wide Range Power**: 12V or 12~24V or 9~36V
- **Rugged Design**: 5Grms vibration/ 50G shock
- **Complete Storage Options**: 2.5" HDD/SSD, mSATA, CFast
- **Expansion**: Up to 2 MiniPCIe + SIM for wireless communication, MIOe module, and iDoor module compatible
- **Flexible I/O Design**: Leverage MIOe module to differentiate vertical applications

Multi Expansion/ High Performance
ARK-3500 series
- **Extreme High Performance**: Intel® Core™ i, up to Quad core i7
- **Wide Operating Temperature**: -10~60°C w/ SSD, 0~50°C w/ HDD
- **Wide Range Power**: 12V DC or 9~34V DC design
- **Rich Storage**: Up to 2 x 2.5" (removable) HDD/SSD, 2 x mSATA, CFast
- **Rich Expansion**: PCI, PCIe x 1, PCIe x 4, MIOe module, up to 2 miniPCIe...
Ultra Slim – 223(W) x 46.6(H) x 133(D) mm
Platform – Intel® Atom™ to Intel® Core™ i
Easy Backup – One removable 2.5” drive bay
Multiple Display – VGA, HDMI or optional LVDS
Expansion – MiniPCIe for storage or wireless modules
Mounting Solution – Wall, VESA and DIN-Rail kits

High Value
ARK-6300 Series

Compact Size – 200(W) x 64(H) x 200(D)mm
Platform – Intel® Atom to Celeron series
Dual display – VGA + DisplayPort
Maximize I/O – Up to 8 x USB and 6 x COM
Storage – 1 x 3.5” HDD or 1 x 2.5” HDD, 1 x mSATA
Expansion – Up to 2 x MiniPCIe slots, iDoor module compatible

Surveillance/ In-vehicle/ Rolling stock
ARK-S, ARK-V and ARK-R Series

Rugged, Mobile NVR Solutions
Video Capability – D1, 720p to 1080p 240fps
Secured I/O – Isolated COM, GPIO and DC input
Diverse Communications – GPS, WLAN and 3G/LTE
Wide Power Range – 9~36Vdc with vehicle ignition management
Flexible Expansion – MiniPCIe expansion slots, CANBus optional
Rugged Design – IEC 60721-3-5, IEC 61737
Certifications – E-Mark, EN50155, EN60950, ISO-7637
Application-focused Diagrams

LPR Enabled Parking Management & Revenue Control

Application Requirement
Traditionally, the management of vehicles entry or exit and payment in parking lots were manual based. This made it difficult to track the time spent by vehicles in the parking lot, and difficulties in confirming payments, which resulted in operational losses. To solve this problem, the customer was looking for a solution to digitize parking lot management.

Winning Factors
ARK-1123H
- High CPU (ATOM Bay Trail J1900) and Graphics performance in small form factor design
- Provide two configurations by T-P/N, with different memory and SSD sizes
- For similar applications, they used the same MB (MIO-2263) as in the ARK-1123

Data acquisition at Liquor manufacturing plant

Application Requirement
Monitors and saves data from the manufacturing unit, then processes it to the warehouse controlled by the local government (DEPOS), and then to the vendors. ARK-1122H will act as a controller/gateway to gather liquor bottle data acquired from distilleries, and using the built in application software data will be uploaded to the cloud. A barcode scanner, printer, mouse & keyboard, and GSM module will also be configured to the ARK-1122H.

Winning Factors
ARK-1122H
- High flexibility to custom 3G module for site location
- Highly reliable design for embedded applications
- Custom OS (Linux)
- Rich connectivity with digital signage.
CNC cutting machine in USA- Flexibility and expandability

**Application Requirement**
A customer wanted to develop a new low cost PC that controls their cutting systems. Each CNC machine will need multiple Mini-PCs, multiple touch screens, and several user interface. The Mini-PC used a hard shell enclosure for the motherboard and was installed in a cabinet to minimize exposure to water, dust and temperature. The PC hardware had to be able to support future revisions of software through to 2018. The Mini-PC system required a 4th generation Intel VGA, dual Ethernet ports, four USBs, DVI and HDMI for connecting to a touch monitor.

**Winning Factors**
**ARK-1550**
- High flexibility to custom 3G module for site location
- Highly reliable design for embedded applications
- Custom OS (Linux)
- Rich connectivity with digital signage.

Liquid handler in USA- High performance and longevity

**Application Requirement**
This application is for a laboratory automation workstation. A customer wanted a compact and high performance PC to control liquid handling. The system needed a built-in enclosure to connect to different controllers as well as the robotic arm and camera. The workstation enclosure not only increased the accuracy of the 3D framing position, but it also improved overall efficiency.

**Winning Factors**
**ARK-3510**
- Compact
- Fanless
- High performance CPU
- Easy to integrate
- Longevity support
Embedded Computers in Self-service Ticket Machines

**Application Requirement**
For self-service ticket machines, there should be no mistakes while handling cash, bank transactions and issuing tickets, otherwise it could cause serious losses for banks and customers. As the solution needed to connect to the display, video capture card, bank card reader and ticket printer, there was a high demand on the host’s serial ports and their scalability. Also, video storage required large amounts of storage, and the host needed to adapt to various environmental conditions such as humidity, dust, high temperature, and severe cold.

**Winning Factors**
ARK-3500
- Supports up to Intel® core i7 quad-core processors
- Equipped with many extension ports to satisfy numerous connection requirements
- Supports Wi-Fi / 3G / GPS wireless communication, allowing swift data transmission to the backend for compiling ticket and visitor statistics
- Supports a wide voltage range between 9 to 34V

Using Embedded Industrial Computers in Smart Bus Signs

**Application Requirement**
Smart bus signs operate in the outdoor environment and they are constantly being affected by temperature, humidity and dust. As the equipment needed to be able to adapt to severe winter cold and blazing summer sun, it needed to have a wide operating temperature range. To reduce the impact of dust on the equipment, the configuration has to be designed such that it was sealed and fanless. The system uses a power supply from the city’s power network, so it might have potential problems relating to an unstable electrical grid. As a result, the system required equipment that supported wide voltage inputs to ensure normal operation.

**Winning Factors**
ARK-2121F
- 20-60°C wide temperature range caters to the harsh high and low temperature conditions of an outdoor environment
- 12-24V wide input voltage range is well suited to work with an unstable power supply
- Multiple IO interfaces allow for subsequent system upgrades
Entertainment system on e-Bus

Application Requirement
Entertainment systems require high computing power and graphic capability for media streaming. For this application, a dual display was essential to offer flexibility for different in-vehicle applications. ARK-V is equipped with legacy VGA for the driver’s panel and HDMI for high resolution displays that met the bus application requirement. It also integrated with industrial-grade peripherals (-40~85°C) to overcome harsh environments.

Winning Factors
ARK-2151V
• Customized power switch button through DB9
• Lockable HDMI connector to avoid cable accidental released
• Outstanding CPU and Graphics Performance for media streaming

Mobile NVR for Vehicle and Tough Environments

Application Requirement
The issue of security for vehicles and buildings has always been a concern to business managers and owners. For them, the ability to track, monitor, and keep updated with their assets remotely is an extremely important requirement for cutting losses, improving service efficiency, and streamlining workflow. Therefore, it is critical to have a surveillance system (NVR) in place. However, in the market, such systems were either too bulky or limited in their ability for diverse connectivity and wireless functions. The ARK-2121V was selected for its removable storage capacity, suitable performance, robustness, wide operating temperature support, and compact and solid design with wide connectivity and wireless options.

Winning Factors
ARK-2121V
• High performance and expandability (very flexible)
• High reliability
• Compact & robust design, wide operating temperature
• 4x Ethernet RJ-45 10/100Mb PoE ports and available space on front and rear panels for additional interfaces
• Good, removable storage capacity
• Diverse wireless functions
Fully Customization

Selected I/O and Power

Operating System
- Windows 10 IoT Enterprise
- Windows 10 IoT Core Pro
- Windows Embedded 8.1
- Windows Embedded 8
- Windows Embedded 7

Peripherals
- Industrial Memory
- Wireless Module
- Industrial Storage
- Display Module

Regional Service & Customization Centers

<table>
<thead>
<tr>
<th>Country</th>
<th>Cities/Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Kimber</td>
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<tr>
<td>Taiwan</td>
<td>Taipei</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Eindhoven</td>
</tr>
<tr>
<td>Poland</td>
<td>Warsaw</td>
</tr>
<tr>
<td>USA/Canada</td>
<td>Mirabas, CA</td>
</tr>
</tbody>
</table>

Worldwide Offices

Greater China
- China
  - Toll Free: 800-810-0345
  - Beijing: 86-10-6238-4346
  - Shanghai: 86-21-3832-1616
  - Shenzhen: 86-755-8212-4222
  - Chengdu: 86-28-8546-0106
  - Hong Kong: 852-2729-5116
- Taiwan
  - Toll Free: 886-2-2972-7818
  - Taipei: 886-2-2972-7818
  - Nantou: 886-2-2218-4507
  - Taichung: 886-4-2329-0371
  - Kaohsiung: 886-7-2230-5000

Asia Pacific
- Japan
  - Toll Free: 0800-510-1055
  - Tokyo: 03-3692-1021
  - Osaka: 06-6802-1021
- Korea
  - Toll Free: 0800-363-9499
  - Seoul: 02-3658-9494
- Singapore
  - Singapore: 65-6442-1000
- Malaysia
  - Kuala Lumpur: 03-3772-4188
  - Penak: 04-357-9188
- Indonesia
  - Jakarta: 62-21-751-1839
- Thailand
  - Bangkok: 66-2-248-3140
- India
  - Pune: 91-20-3948-2075
  - Bangalore: 91-80-2545-0206
- Australia
  - Toll Free: 1300-308-531
  - Melbourne: 01-2-9792-1000
  - Sydney: 01-2-9792-1000

Europe
- Germany
  - Munich: 49-499-12986-40
  - Dusseldorf: 49-2103-97-885-0
- France
  - Paris: 33-1-4119-4666
- Italy
  - Milan: 39-02-9544-961
- Benelux & Nordic
  - Breda: 31-76-5233-100
- UK
  - Newcastle: 44-191-262-4644
  - London: 44-0-870-483-1433
- Poland
  - Warsaw: 48-22-31-51-100
- Russia
  - Moscow: 8-800-555-01-50
  - St. Petersburg: 8-800-555-01-20
- Czech Republic
  - Ostrava: 420-485-521-020
- Ireland
  - Galway: 353-91-922444

Americas
- North America
  - Toll Free: 1-866-578-9666
  - Cincinnati: 1-513-742-8896
  - Milpitas: 1-408-619-3898
  - Irvine: 1-949-420-2500
  - Ottawa: 1-613-434-2731
- Brazil
  - Sao Paulo: 0800-772-5355
- Mexico
  - Toll Free: Mexico City: 1-800-467-2416
  - Mexico City: 52-55-6275-2727

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