Embedded-IoT

Embedded Systems for Transportation
Certified Designs for In-Vehicle, Rolling Stock Applications

- In-vehicle series
- Rolling stock series
- Eco partners alliance

ADVANTECH
Enabling an Intelligent Planet
Embedded Systems for Transportation

We provide in-vehicle and rolling stock embedded systems with designs unique for transportation industry applications. These products feature in-vehicle/rolling stock certifications (eMark/EN50155), high extension capability for communication interfaces, wireless 3G/LTE and GPS communication support, and wide operating temperature designs. With flexible and modular hardware design capability, we can efficiently meet customers’ function requirements and time-to-market, and enable applications including fleet management, mobile surveillance, passenger information system, traffic surveillance and management, and much more.

Embedded modular design

EMARK In-Vehicle Certification
- ISO 7637-2 (Power)
- IEC 60721-3-5 SM3 (Shock/Vibration)

Railway EN50155 Certification
- EN50121-3-2 (EMC)
- EN50121-4 (EMC)
- EN50155 Tx (-40~70°C)
- IEC 61373 (Shock/Vibration)

Stackable extension
- Communication
- Storage extension
- Data acquisition
- ODM

Eco-Partner Collaboration – Key to Success

Advantech collaborates with professional ecosystem partners to provide building blocks required for delivering integrated and innovative solutions to the market. We work closely to ensure compatibility and reliability of our combined solutions, in order to help customers reduce integration efforts, time-to-market, and related costs.

Eco-Partner Program

- Generate additional revenues by being a “solutions seller”
- Grow your market share by leveraging Advantech brand
- Explore new opportunities with Advantech global sales team
- Professional training and support worldwide

Join us at eco-partner@advantech.com

Embedded peripherals
- RAM
- mSATA
- Wireless
- CANBus

Vertical accessories
- IP Camera
- Camera Access Controller
- Signage Displays
In-vehicle embedded systems

- In-vehicle standard: EMARK, IEC 60721-3-5
- Intelligent power ignition management and wide voltage support 9~36Vdc
- GPS, 3G/ LTE wireless communication functions

- Detect driver fatigue and abnormal behavior to prevent accidents
- Display messages for passengers to keep updated on station information
- Monitor in-vehicle and surrounding status to prevent accidents and enhance passenger safety
- Analyze vehicle health data for preventive maintenance
- Track vehicle movement for real-time location monitoring
- Display videos and multimedia in the bus for passengers to be entertained
- Display messages for passengers to keep updated on station information

Product offerings

**ARK-2121V**
- Intel Atom E3845 QC with 4PoE
- Up to 720p 120fps
- -30 ~ 60°C

**ARK-2151V**
- Intel Core i5-4300U DC with 4PoE
- Up to 1080p 120fps
- -20 ~ 60°C

**ARK-2250V**
- Intel Core i7-6822EQ QC with 8PoE
- Up to 1080p 240fps
- -20 ~ 70°C

On Board Surveillance
Monitor in-vehicle and surrounding status to prevent accidents and enhance passenger safety

Entertainment
Display videos and multimedia in the bus for passengers to be entertained

Passenger Information System
Display messages for passengers to keep updated on station information

Driver Behavior
Detect driver fatigue and abnormal behavior to prevent accidents

Vehicle Diagnostics
Analyze vehicle health data for preventive maintenance

Fleet management
Track vehicle movement for real-time location monitoring

In-Vehicle
Rolling stock embedded systems

- Railway standard: EN50155, EN50121-3-2, IEC61373
- 24Vdc EN50155 S2/C1 compliant, 48/72/110Vdc options
- 2nd extensible layer for PoE+, COM/DIO, storage and add-on modules

Safety Monitoring
Detect abnormal events and forbidden objects to enhance passenger safety

Cabin Environment Monitoring
Collect real-time environmental sensor data to detect temperature, smoke, and fire, for safety precautions

BYOD Infotainment
Enhance passenger experience by providing entertainment content through mobile devices

Alarm System
Alert passengers about emergency situations to enhance safety

Traveler Information System
Display real-time train schedules for passengers to keep updated on latest information

Product offerings

ARK-2231R / 2250R
- Intel® Atom™ / Core™ i platform
- Ruggedized M12 connector design
- -40~70°C EN50155Tx

AMK-R102E
- 4 x isolation COM
- 16 x isolation DIO

AMK-R104E
- 8 x 10/100 PoE+
- 1 x 2.5" drive bay

AMK-R100E
- 8 x GbE PoE+
- 1 x 2.5" drive bay

Stackable Extension Options
### Selection Guide

<table>
<thead>
<tr>
<th>Application</th>
<th>Outdoor</th>
<th>In-Vehicle</th>
<th>Rolling Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td>ARK-2121S</td>
<td>ARK-2151V</td>
<td>ARK-2231R</td>
</tr>
<tr>
<td>Processor System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Intel Atom E3845</td>
<td>Intel Atom Celeron 2980UV</td>
<td>Intel E3845/3860</td>
</tr>
<tr>
<td>Frequency</td>
<td>1.91 GHz / 1.9 GHz</td>
<td>1.6 GHz / 1.9 GHz</td>
<td>1.9GHz / 2GHz</td>
</tr>
<tr>
<td>Core Number</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>BIOS</td>
<td>AMI EFI 64 Mbit</td>
<td>AMI EFI 128 Mbit</td>
<td>AMI EFI 64 Mbit</td>
</tr>
<tr>
<td>Chipset</td>
<td>Intel Atom QC E3845</td>
<td>Intel Atom Celeron 2980UV</td>
<td>Intel E3845/3860</td>
</tr>
<tr>
<td>Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>DDR3L 1333 MHz</td>
<td>DDR3L 1066 MHz</td>
<td>DDR3L 1333/1667 MHz</td>
</tr>
<tr>
<td>Max. Capacity</td>
<td>8 GB</td>
<td>8 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Socket</td>
<td>1 x 204-pin S-0-DIMM</td>
<td>1 x 204-pin S-0-DIMM</td>
<td>1 x 204-pin S-0-DIMM</td>
</tr>
<tr>
<td>Display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VGA</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
</tr>
<tr>
<td>DVI</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
</tr>
<tr>
<td>HDMI</td>
<td>1 x Full-size Mini PCIe w/ SIM holders</td>
<td>1 x Full-size Mini PCIe w/ SIM holders</td>
<td>1 x Full-size Mini PCIe w/ SIM holders</td>
</tr>
<tr>
<td>Ethernet Controller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM Port</td>
<td>2 x isolated</td>
<td>2 x isolated</td>
<td>2 x isolated</td>
</tr>
<tr>
<td>Expansion Interface</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MINI PCIe</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
<td>1 x Full-size Mini PCIe</td>
</tr>
<tr>
<td>SIM socket</td>
<td>2</td>
<td>2</td>
<td>1 (accessible)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPS</td>
<td>Support GPS, GLONASS, GALILEO and QZSS signals</td>
<td>Support GPS, GLONASS, GALILEO and QZSS signals</td>
<td>Support GPS, GLONASS, GALILEO and QZSS signals</td>
</tr>
<tr>
<td>G-Sensor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ComPort</td>
<td>2 x RS-232/422/485</td>
<td>2 x RS-232/422/485</td>
<td>2 x RS-232/422/485</td>
</tr>
<tr>
<td>LAN</td>
<td>2 x RJ45</td>
<td>2 x RJ45</td>
<td>2 x RJ45</td>
</tr>
<tr>
<td>Vibration Resistance</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Power Supply Voltage</td>
<td>9 – 36 VDC max w/ isolation</td>
<td>9 – 36 VDC max w/ isolation</td>
<td>9 – 36 VDC max w/ isolation</td>
</tr>
<tr>
<td>Power Adaptor</td>
<td>AC 208V, 100W</td>
<td>AC 208V, 100W</td>
<td>AC 208V, 100W</td>
</tr>
<tr>
<td>Operating Temperature (air flow 0.7 m/sec)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shock Protection</td>
<td>M12 A-coded</td>
<td>M12 A-coded</td>
<td>M12 A-coded</td>
</tr>
<tr>
<td>Physical Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>264.5 x 69.2 x 133.0 mm</td>
<td>264.5 x 75.1 x 133.0 mm</td>
<td>264.5 x 98.4 x 133.0 mm</td>
</tr>
<tr>
<td>Operating System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td>Yes (Win7, 8, 10)</td>
<td>Yes (Win7, 8, 10)</td>
<td>Yes (Win7, 8, 10)</td>
</tr>
<tr>
<td>Linux</td>
<td>Yes (by Project)</td>
<td>Yes (by Project)</td>
<td>Yes (by Project)</td>
</tr>
<tr>
<td>Certification</td>
<td>CE/FCC Class A, CB, BSMI</td>
<td>CE/FCC Class A, CB, BSMI</td>
<td>CE/FCC Class A, CB, BSMI</td>
</tr>
<tr>
<td>Safety Certifications</td>
<td>UL, CCC, BSMI</td>
<td>UL, CCC, BSMI</td>
<td>UL, CCC, BSMI, CB, E13</td>
</tr>
</tbody>
</table>