

**ADVANTECH**

*Enabling an Intelligent Planet*



IoT Solutions  
Alliance  
Premier



# ***Railways and Beyond***

**Reliable Computing Solutions for  
Intelligent Transportation Systems**

# Smart Rolling Stock Solutions and Railway Networks

With a growing global population, the need for intelligent transportation systems also grows. Railway networks, as well as other transit systems, are adopting information technology at an incredible pace in order to serve the needs of integrated transportation systems. Advantech, in partnership with its railway operators and integrators world-wide, has dedicated resources to deploy unique embedded technologies and cost-saving railway applications, such as closed-circuit television, passenger information systems, driver machine interface, media & entertainment systems, wayside controllers, and mobile solutions for railways.

Advantech's EN 50155, EN 45545, and IEC 60571 ARS series are railway standards certified, which guarantees the high levels of shock and vibration resistance that enhances their operating longevity. With years of experience in designing computing solutions specifically for rolling stock and railway networks, Advantech's mission is to achieve unparalleled reliability that aims to realize safe, efficient journeys for passengers and goods alike.

## Advantech Railway Solutions - ARS Feature Highlights P.3



Optional Power Input Voltage



Seamless Communication



Wide Operating Temperature



Expansion Modules



Unparalleled Reliability

## Certifications



## Passenger Information Systems

Passenger information systems (PIS) allow real-time information, including timetables, emergency notices, and commercials to be displayed on digital signage installed in train carriages. PIS also facilitate the integration of multiple subsystems to enhance passenger comfort and enable seamless communication between the driver and control center.

P.5

## Media & Entertainment Systems

Media and entertainment systems (MES) improve the passenger experience by providing interactive multimedia content and constant wireless Internet access. The provision of real-time information and entertainment by collaborating content providers will keep passengers well informed and entertained while in transit.

P.10



### Closed-Circuit Television (CCTV)

Closed-Circuit Television (CCTV) provides a comprehensive in-train surveillance system solution, improving passengers' safety with surveillance in train carriages and driver cabs. The operation of each coach can be recorded through IP cameras and transmitted directly to the box PC for real-time, high-definition display. This allows staff in the driver cab to monitor all train carriages.

P.7

### Driver Machine Interface

The driver machine interface (DMI) serves as the interface between the vital computer (VC) driver, facilitating data visualization and the transmission of control commands. Properly designed DMI solutions not only increase efficiency and reduce operational downtime, but also enhance system control and machine maintenance.

P.9

### Wayside Control Systems

Wayside control systems are used to manage operational performance and monitor rolling stock, infrastructure assets, and the direct surroundings to improve intercity and long-distance journeys. The ideal railway wayside control system should cover all expansion requirements and leverage existing infrastructure to improve overall performance, safety, and maintenance.

P.11

### Mobile Solutions for Railways

Railway operators are increasingly replacing existing systems with mobile devices that enable real-time data access and control. Providing railway staff with real-time access to updated travel information, including ticketing, timetables, delays, and weather conditions optimizes the workforce and increases the level of customer support offered.

P.12



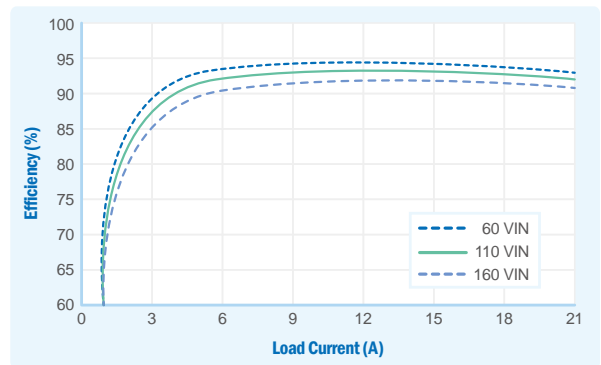
# ARS Key Feature Highlights



## Optional Power Input Voltage

24/48/72/110 VDC

The unique ARS power design supports a wide operating temperature range and multiple input voltages. Because high temperatures typically result in power loss, maximum power consumption must be cautiously estimated during the initial design phase. Additionally, power derating situations must be accurately calculated to ensure normal function under high temperatures. At the opposite extreme, low temperatures can lead to boot failures. To prevent this, all system components must be verified to ensure system bootup after exposure to cold environments.

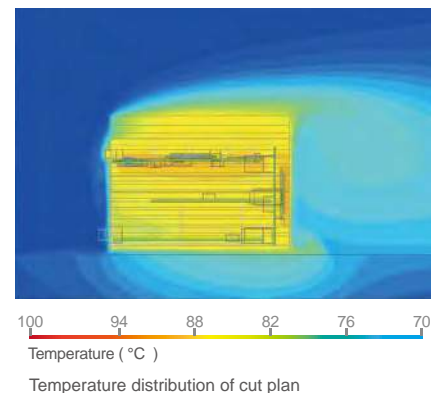


## Wide Operating Temperature

TX -40 ~ +85°C

ARS thermal design is based on precise material selection, and module configuration to achieve thermal design optimization. The design greatly improves heat dissipation through the combination of aluminium and copper components that dissipate and guide internal hot and cold air exchange efficiency. We use copper pipes that meet the strict standards for wide temperature working environments (up to +85°C).

	Ambient temperature outside vehicle	Internal cabinet temperature	Internal cubicle over-temp. during 10 min	Air temp. surrounding PCBA
T3	-25 ~ +45 °C	-25 ~ +70 °C	+85 °C	-25 ~ +80 °C
TX	-40 ~ +50 °C	-40 ~ +70 °C	+85 °C	-40 ~ +80 °C





## Seamless Communication

Supports GPS and AGPS for positioning, GSM-R for voice and data transmission, as well as WLAN and LTE to achieve seamless communication.



## Unparalleled Reliability

### IEC 61373 Category1-B

Anything mounted inside an equipment case which is mounted directly on or under a vehicle body vs. Category 1-A, cubicles, subassemblies, equipment and components mounted directly on or under a vehicle body.

### Shock Test (operation)

5G, 50 ms – 30 ms – 30 ms on 3 axes vs. 10G, 11 ms

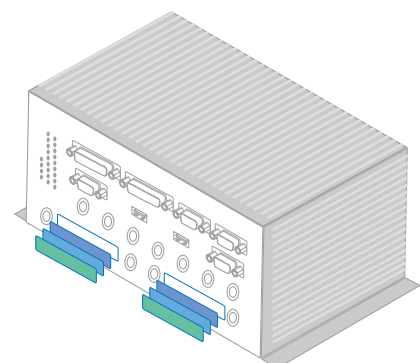
### Random Vibration Test (operation)

5 ~ 150 Hz, 5G, 3 axes, 5hr/per axis vs. 5 ~ 500 Hz, 2G, 3 axes, 1hr/per axis



## Diverse Expansion Modules

Multiple swappable trays allow customization with expansion modules. Standard offerings such as CAN, SSD, COM, MVB, and serial modules, or custom modules as required.



# Passenger Information Systems (PIS)

*Provides real-time access to information such as timetables, emergency notices, and advertising promotions*

To improve the passenger travel experience, railway operators have gradually adopted real-time passenger information systems (PIS). Integrated with all railway network information, including train, station, and control center data, PIS are designed to optimize communication between the driver, control center, and passengers.

## Application Requirements

- Compliant with all railway industry standards for high reliability
- Rugged design supports a wide operating temperature range
- Shock and vibration tolerance for harsh in-vehicle environments
- Independent ARS-P systems prevent a control box PC failure disrupting the entire system

## Advantech Solutions

- The ARS-P3800 system was designed from the ground up to provide a robust solution with an IP-54 rating for ingress protection, which minimizes the risk of malfunctions resulting from water or dust
- The special thermal design is certified to EN 50155 T1 standards and supports a wide operating temperature range (-25 ~ +55 °C) and continued operation even after a 10-ms power outage
- The inclusion of shock and vibration tolerance protects the system from failure or malfunction when employed on moving trains
- Supports system integration and easy maintenance

## Success Story

### Qatar



- ARS-P3800
- 38" display with 1920 x 540 resolution
- AMD GX-217 GX dual-core processor
- 1 x GbE (M12), 1 x USB 2.0 (M12),
- 1 x RS-232, 1 x VGA/HDMI, and 1 x Audio-In

### Australia



- ARS-2510
- Intel® Core™ i7 dual-core processor
- Dual display (VGA + DVI)
- SSD module

### Chile



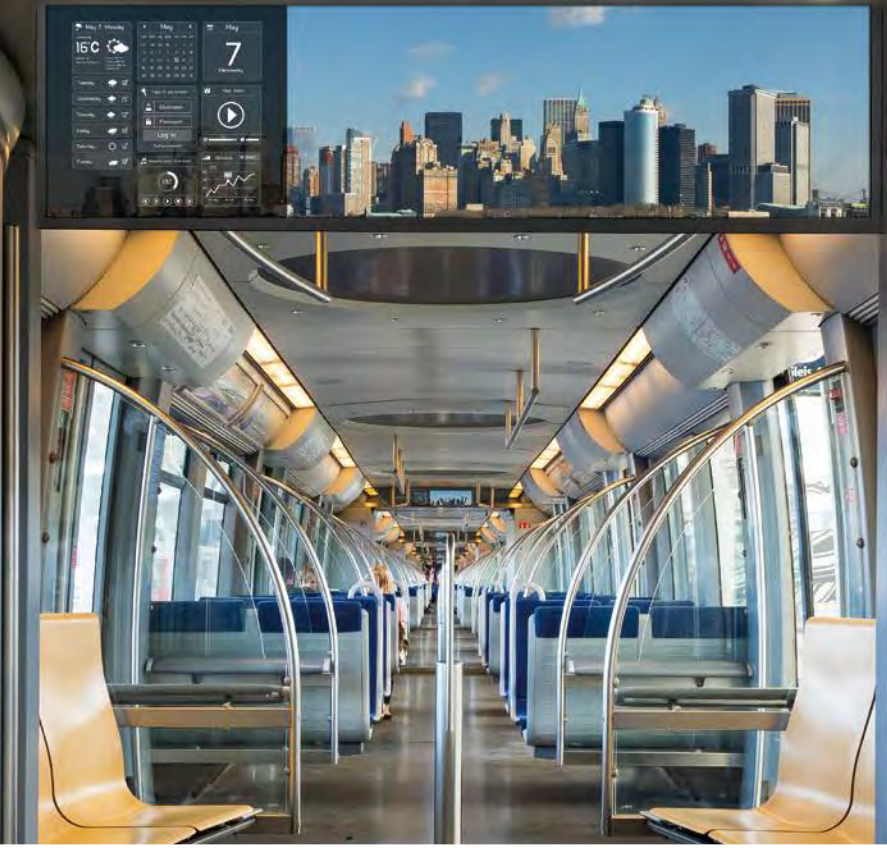
- ARS-2510
- Intel® Core™ i7 dual-core processor
- Dual display (VGA + DVI)
- Serial module



# Solution-Ready Platform

Advantech offers EN 50155 certified switches that function from -40 °C to 75 °C that can also withstand severe shock and vibration. The comprehensive portfolio includes 8-port/12-port/16-port, managed/unmanaged types, optional x-ring support, and different IP protection levels.

With RapidSinage RS-CMS content and central management system, more than 100 ARS-3800 devices can be easily managed to deliver real-time passenger information. This total solution assists railway operators in realizing intelligent environments as well as enhancing passenger experience.



## ARS-2610

- Intel® 6th Generation i7-6600U/i7-7600 processor
- EN 50155 Power input range: 24/48/72/110 VDC (±40%)
- EN 50155 TX temperature level: -40 ~ +70°C (85°C for 10 minutes)
- EN 45545 compliant



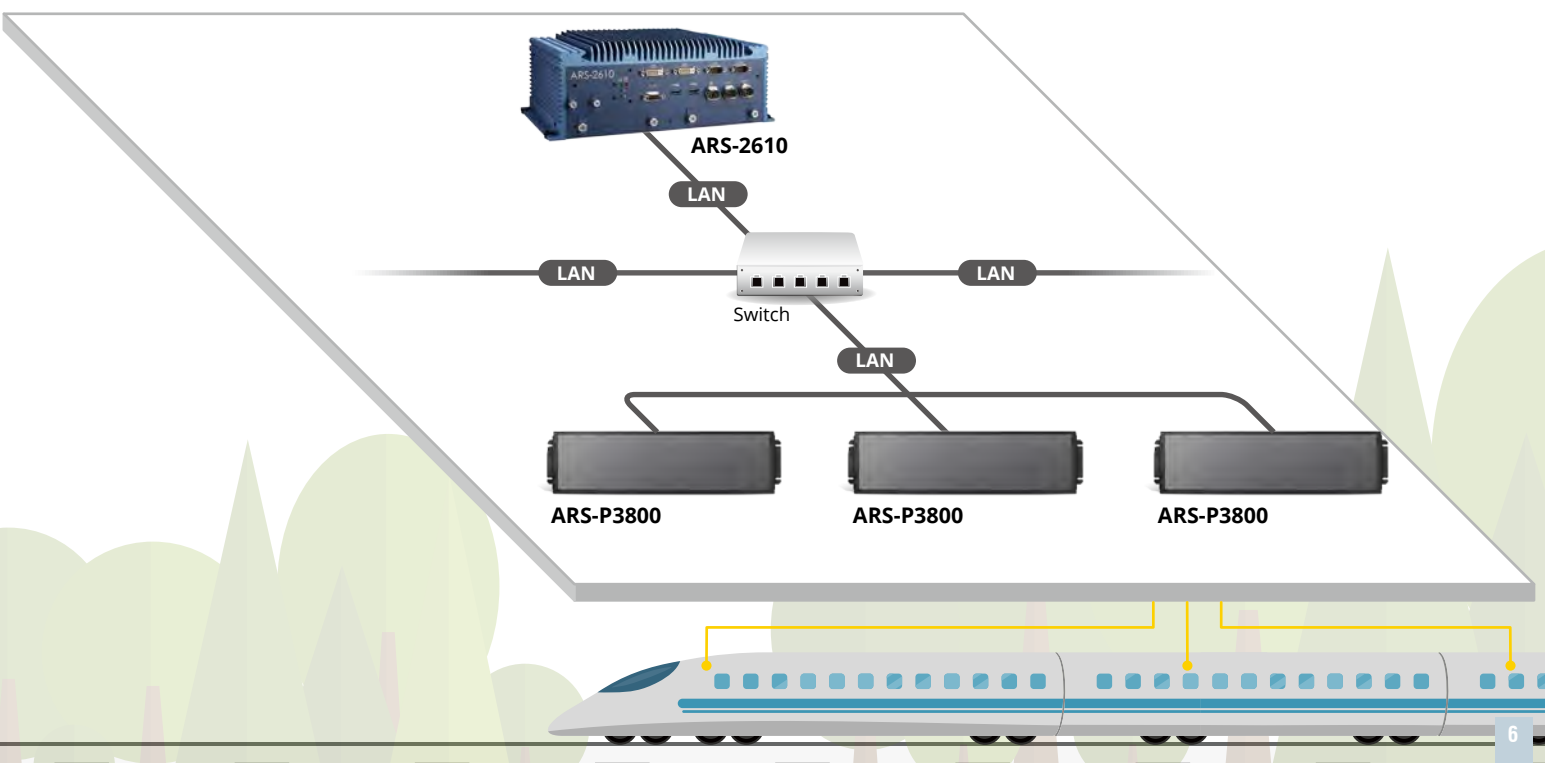
## ARS-P3800

- AMD Embedded G-Series GX-217 GA SOC
- 38" LCD panel with 1920 x 540 resolution
- EN 50155 certified for railway applications
- TI temperature: -25 ~ +55 °C
- EN 45545 compliant



## ARS-P2800

- Intel® Celeron® J1900 processor
- 28" LCD panel with 1920 x 357 resolution
- EN 50155 certified for railway applications
- TI temperature: -25 ~ +55 °C
- EN 45545 compliant



# Closed-Circuit Television (CCTV)

*Integrated CCTV computing platforms and IP cameras improve safety by enabling surveillance of train carriages and driver cab*

Closed-Circuit Television (CCTV) provides a comprehensive in-train surveillance system solution, improving passengers' safety with surveillance in train carriages and driver cabs. The operation of each coach can be recorded through IP cameras and transmitted directly to the box PC for real-time, high-definition display. This allows staff in the driver cab to monitor all train carriages.

## Application Requirements

- Shock and vibration resistance for harsh in-vehicle environments
- High-performance video streams for optimal video surveillance
- Large media storage expansion capability and stable connectivity with IP cameras
- Rugged design supports a wide operating temperature range

## Advantech Solutions

- Compact rugged design with shock and vibration tolerance for easy installation in tight enclosed environments
- 6 x GbE LAN (4 x PoE, 1 x dual LTE for seamless communication, and 1 x GPS for location tracking)
- 2 x 2.5" SSD expansion modules and 4 x IP cameras directly connected to PoE ports provide the ideal surveillance solution
- Certified to EN 50155 TX and S2/C1 standards, the system supports a wide operating temperature range (-40 ~ +70 °C) and continued operation even after a 10-ms power outage

## Success Story

### Spain



- ARS-2110
- Dual display (VGA + LVDS)
- M12 connector for Ethernet and USB interfaces
- SSD and serial modules

### Japan



- ARS-2110
- Intel® Atom™ E3845 processor
- SSD module
- Custom control module

### Russia



- ARS-2560 (ODM)
- Dual display (2 x DVI)
- 4 x LAN (M20)
- 3 x custom SSD trays





# Solution-Ready Platform

VIVOTEK's MD8563-EH is a compact 2-megapixel network camera geared toward transportation applications such as buses, trains, and other vehicles. With full EN 50155 TX compliance and IP67-rated rugged design, each camera can withstand shocks and vibration, humidity, dust, and temperature fluctuations to maintain reliable video recording during vehicle movement. Furthermore, the vandal-proof IK10-rated metal housing provides effective and robust protection from vandalism. This combination of high-resolution imaging and protective housing endows MD8563-EH with the rugged reliability required to maximize passenger safety and optimize mobile surveillance.



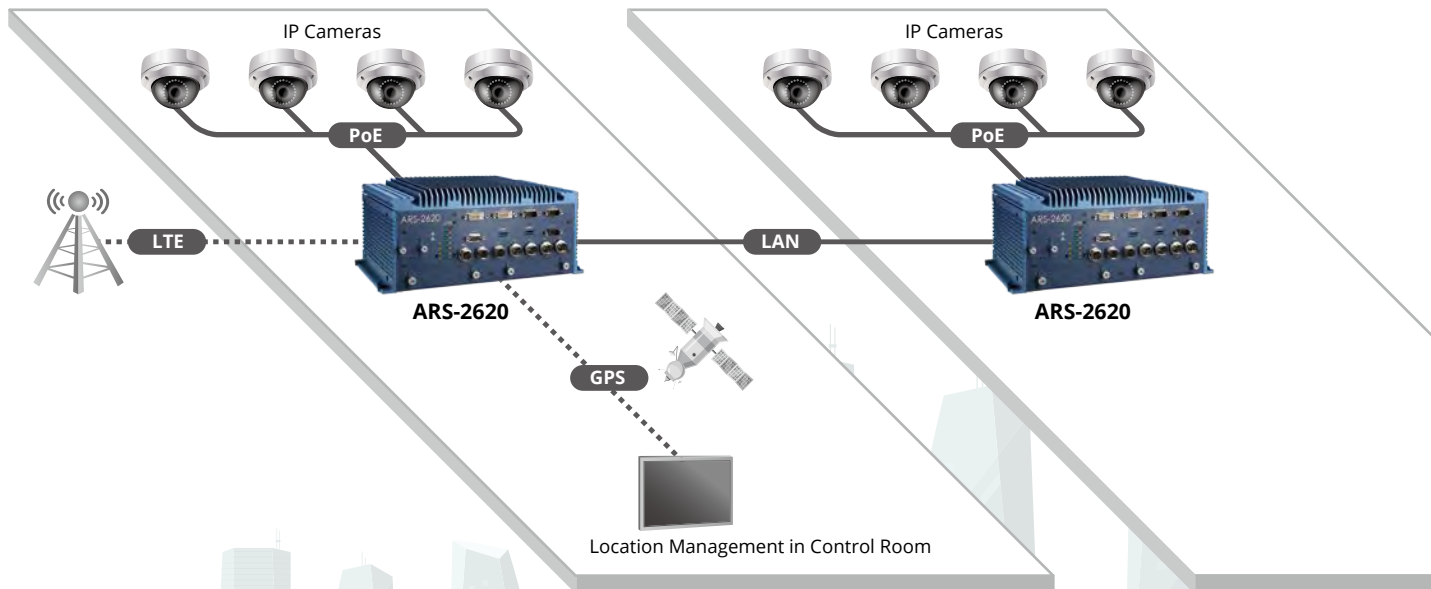
## MD8563-EH

- 30 fps<sup>®</sup> 1920 x 1080 resolution
- EN 50155 TX compliant for professional mobile surveillance
- Wide operating temperature range (-40 ~ +70 °C) for harsh environments



## ARS-2620

- Intel<sup>®</sup> 6th Generation i7-6600U/i7-7600U processor
- EN 50155 Power input range: 24/48/72/110 VDC
- EN 50155 TX temperature level: -40° C ~ 70° C (85° C for 10 minutes)
- EN 45545 compliant



# Driver Machine Interface (DMI)

*Enables data visualization and the transmission of control commands to optimize driver performance*

The driver machine interface (DMI) enables data visualization to ensure the integration and interoperability of all train operations. Advantech's DMI solution not only enhances efficiency and reduces operational downtime, but also increases the accuracy driver-machine interactions, thereby reducing human errors and driver training requirements.



## Application Requirements

- Shock and vibration resistance for harsh in-vehicle environments
- Rugged design supports a wide operating temperature range

## Advantech Solutions

- ARS-2110 is compliant with relevant industry standards (EN 50155/50121/45545 and IEC 61373) and supports a wide operating temperature range (-40 ~ +70 °C)
- Designed to be deployed in harsh environments where temperatures fluctuate, ITA-8120 and ITA-8101 support a wide operating temperature range (-25 ~ +70 °C), are compliant with EN 50155 and EN 45545 railway regulations, and comply with strict safety standards for EMC, shock, and vibration



### ARS-2110

- Intel® Atom™ E3845 processor
- EN 50155 TX temperature level: -40° C ~ +70° C (85° C for 10 minutes)
- EN 50121 EMC Standards



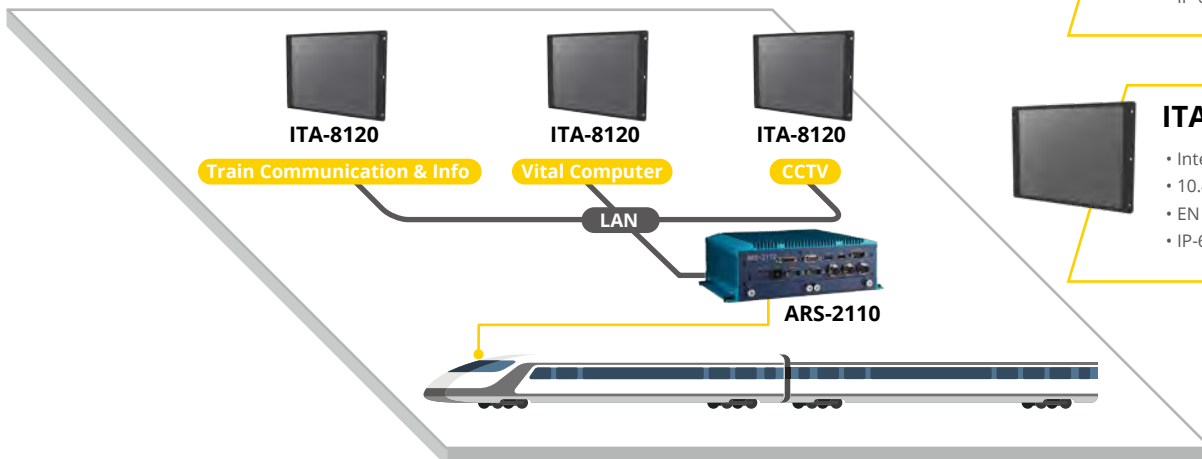
### ITA-8120

- Intel® Atom™ x7-E3950 quad-core processor
- 12.1" panel with 1024 x 768 resolution
- EN 50155 T3 compliant
- IP-65 front cover



### ITA-8101

- Intel® Atom™ x7-E3950 quad-core processor
- 10.4" panel with 1024 x 768 resolution
- EN 50155 T3 compliant
- IP-65 front cover



## Success Story

Hong Kong



- ARS-2510
- Intel® Core™ i7 dual-core processor
- Dual display (2 x DVI)

- M12 connector for Ethernet and USB interfaces
- LAN-bypass mode
- Custom protocol module

# Media and Entertainment Systems (MES)

*Supports the provision of interactive digital media for an enhanced passenger experience*

Media entertainment systems (MES) improve the passenger experience by providing interactive multimedia content and constant wireless Internet access. The provision of real-time information and entertainment by collaborating content providers will keep passengers well informed and entertained while in transit.



## Application Requirements

- Shock and vibration resistance for harsh in-vehicle environments
- Rugged design supports a wide operating temperature range

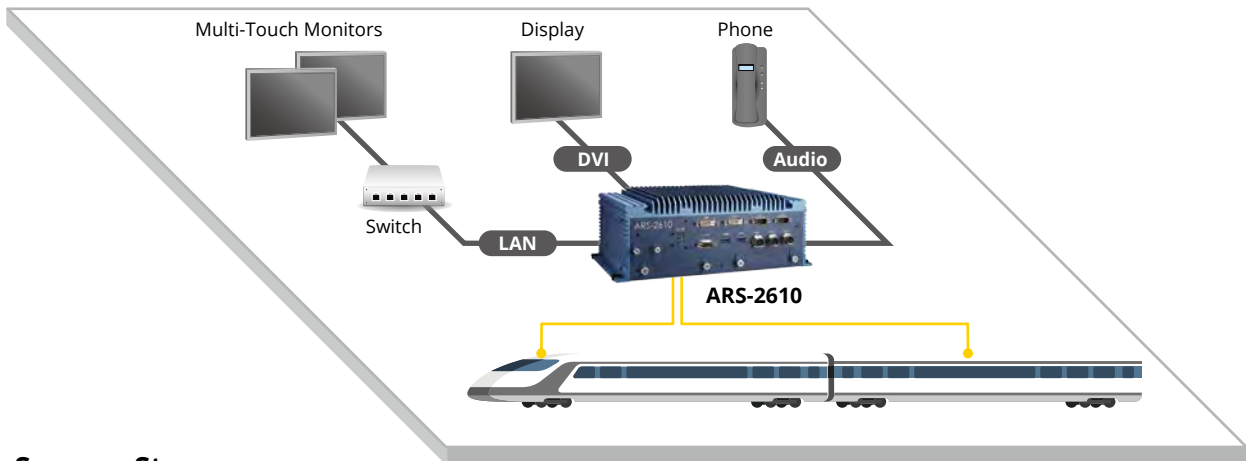
## Advantech Solutions

- The rugged design is equipped with shock and vibration tolerance and complies with all relevant industry standards
- Certified to EN 50155 TX standards, the system supports a wide operating temperature range (-40 ~ +70 °C) to ensure reliable operation in harsh environments
- Customized TERA LAN connectors for uninterrupted data transmissions



**ARS-2610**

- Intel® 6th Generation i7-6600U/i7-7600U processor
- DDR4 SODIMM 1600/1866 Mhz (up to 16 GB)
- EN 50155 Power input range: 24/48/72/110 VDC (±40%)
- EN 50155 TX temperature level: -40 ~ +70° C (85° C for 10 Minutes)
- IP-50+ rating with conformal coating protection
- EN 45545 compliant



## Success Story

Italy



- ARS-2510
- Intel® Core™ i7 dual-core processor
- Dual display (VGA + LVDS)
- M12 connector for Ethernet and USB interfaces



# Wayside Control Systems

*Wayside control systems manage the operation of rolling stock and infrastructure to enhance inter-city and long-distance traffic*

Railway wayside control networks need stable, integrated wayside control systems that conform to all relevant industry standards regarding signaling and track condition, and are capable of minimizing potential interferences in transmission to ensure constant, reliable communication.



## Application Requirements

- Suitable for harsh industrial environments with extremely low and extremely high temperatures
- Certified for shock and vibration tolerance to withstand rough handling
- Seamless communication via LAN and WLAN connectivity

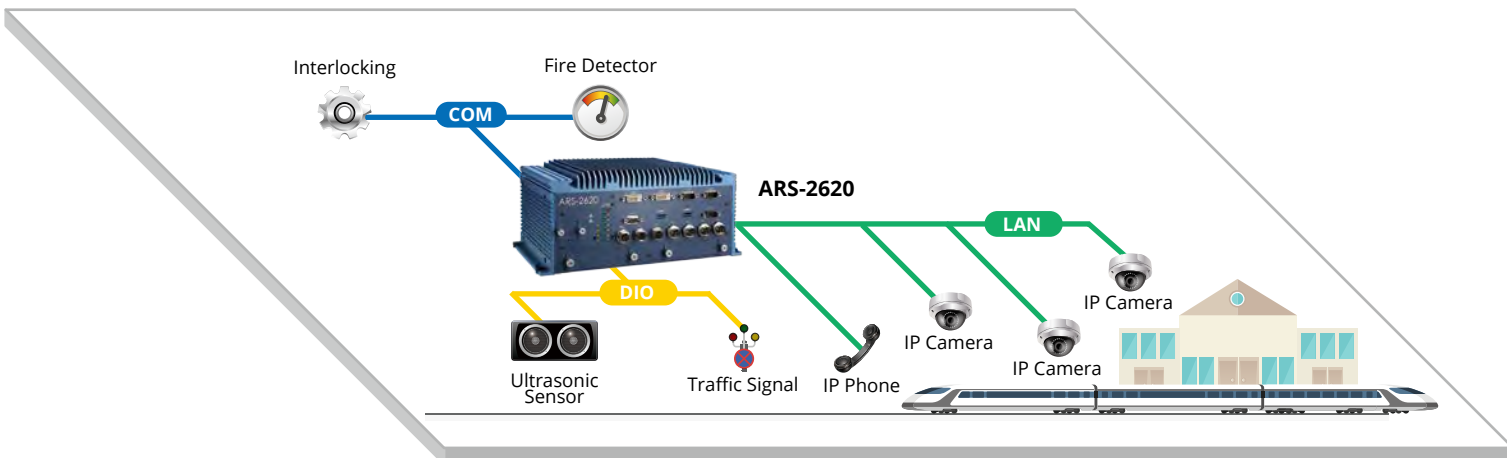
## Advantech Solutions

- Compliant with EN 50121-4 specifications
- Wide operating temperature range (-40 ~ +70 °C)
- Supports easy-swap expansion modules
- Extensive I/O for high connectivity



**ARS-2620**

- Intel® 6th Generation i7-6600U/i7-7600U processor
- EN 50155 Power input range: 24/48/72/110 VDC (±40%)
- EN 50155 TX temperature level: -40 ~ +70° C (85°C for 10 Minutes)
- EN 45545 compliant



## Success Story

USA



- ARS-2620
- Connectivity with legacy devices
- Reliable and flexible network expansion
- Easy deployment, integration, and maintenance

# Mobile Solution for Railway Applications

*Empowering train conductors and ground support staff with the latest mobile technology for efficient operations*

Advantech provides industrial tablet PCs that are designed for high reliability and durability in harsh working environments. These industrial tablet PCs are IP-65 or IP-67 rated and fully meet standards for wide temperature range, vibration, dust/water ingress, humidity, and drop tests.



## Ground Support

Ground support staff in rail transport must stay safe and on-schedule to maintain efficient cargo traffic levels. By choosing Advantech's MIT-W101 industrial tablet PC as the primary mobile solution for railway ground support applications, support staff can easily manage critical scheduling including maintenance, repair, inspections, and diagnostics, as well as analyze cargo data regardless of shock and vibration.



High Durability & Reliability



Built-In Peripherals



Portable Functionality



USB & Micro HDMI



Sunlight Readability and Gloved Touch Control



Wi-Fi, BT, NFC, 3G/LTE (Optional)



### MIT-W101

- Intel® Celeron® N2930 quad-core processor with Windows 8/10 OS
- 10.1" WXGA display with multi-touch PCAP control
- Industrial-grade design with wide operating temperature (-20 ~ +60 °C), IP-65, MIL-STD 810G certification, and 4-ft drop tolerance
- Can be integrated with additional expansion modules such as a 1D/2D barcode scanner, magnetic stripe reader, and smart card reader
- Optional accessories, including a 6-ft drop bumper, docking station, hand strap, and multifunctional cover

## Train Conductors

AIM-65 provides train conductors with real-time access to information regarding scheduling, weather conditions, and delays, and allows this information to be easily broadcast from the back-end control center. The 8" sunlight-readable display ensures flexible and convenient operation, as well as more accurate data input. Additionally, AIM-65 can be integrated with optional data collection modules, such as a 1D/2D barcode scanner, to streamline and optimize payment processing and ticket checking operations.



Easy Expansion with Diverse Peripherals



Swappable Battery



Thin and Lightweight



High Durability and Reliability



Wi-Fi, BT, NFC, 3G/LTE (Optional)



Touch and Stylus Input



### AIM-65

- Intel® Atom™ processor with Windows 10 IoT/Android 6.0 OS
- 8" WUXGA display with Corning® Gorilla® Glass 3 and multi-touch PCAP control
- Industrial-grade design with wide operating temperature (-10 ~ +50 °C), IP-65, and 4-ft drop tolerance
- Diverse extension modules, such as a 1D/2D barcode scanner and UHF RFID reader, for easy customization
- Optional accessories, including a stylus, carry strap, and vehicle/office/VESA docking stations

# Product Selection Guide



Model Name		ARS-2620	ARS-2610	ARS-2110
Computing System	CPU	Intel® Core™ i7-6600U/i7-7600U dual-core (3.40/3.90 GHz)	Intel® Core™ i7-6600U/i7-7600U dual-core (3.40/3.90 GHz)	Intel® Atom™ E3845 quad-core (1.91 GHz)
	Memory	260-pin DDR4 SODIMM 1600/1866 MHz (up to 16 GB)	260-pin DDR4 SODIMM 1600/1866 MHz (up to 16 GB)	204-pin DDR3L SODIMM 1333 MHz (up to 4 GB)
Storage	mSATA	1 x mSATA	1 x mSATA	1 x mSATA
	SSD	2.5" SSD expansion module (optional)	2.5" SSD expansion module (optional)	2.5" SSD expansion module (optional)
Graphics	Dual Display	2 x DVI-D	2 x DVI-D	1 x VGA, 1 x DVI
Ethernet		LAN 1, 2: 10/100/1000 Mbps, Intel® 210IT Ethernet controller (M12 X-coded connector) LAN 3 ~ 6: 10/100/1000 Mbps, Intel® 210IT Ethernet controller with POE 802.3 af (M12 X-coded connector)	LAN 1, 2: 10/100/1000 Mbps, Intel® 210IT Ethernet controller (M12 X-coded connector)	LAN 1, 2: 10/100/1000 Mbps, Intel® 210IT Ethernet controller (M12 X-coded connector)
Expansion Function	Communication	GPS, Wi-Fi, LTE, GSM-R (optional)	GPS, Wi-Fi, LTE, GSM-R (optional)	GPS, Wi-Fi, LTE, GSM-R (optional)
I/O Interface	Serial Port	2 x RS-232/422/485, with auto-flow control	2 x RS-232/422/485, with auto-flow control	2 x RS-232/422/485, with auto-flow control
Digital I/O	USB	2 x USB 3.0 (Type A), 1 x USB 2.0 (M12)	2 x USB 3.0 (Type A)	1 x USB 3.0 (Type A), 2 x USB 2.0 (1 x M12 A-coded, 1 x Type A)
	Input/ Output	4 x isolated digital input, 4 x isolated digital output channels (DB9)	N/A	N/A
Software		Windows 8.1, Windows 8 Embedded, Windows 10, Linux 3.x	Windows 8.1, Windows 8 Embedded, Windows 10, Linux 3.x	Windows 7, Windows 7 Embedded, Linux 2.6.xx
Power	Power Input Voltage	24/48/72/110 VDC (±40%, selectable), 4-pole M12 connector	24/48/72/110 VDC (±40%, selectable), 4-pole M12 connector	24/72/110 VDC (±40%, selectable), 4-pole M12 connector
Environment	Operating Temperature	EN 50155 TX: -40 ~ +70°C (85°C for 10 minutes)	EN 50155 TX: -40 ~ +70°C (85°C for 10 minutes)	EN 50155 TX: -40 ~ +70°C (85°C for 10 minutes)
	Vibration. Shock	MIL-STD-810G, EN 50155	MIL-STD-810G, EN 50155	MIL-STD-810G, EN 50155
Physical Characteristics	Dimensions (W x H x D)	313 x 127 x 180 mm (12.3 x 5 x 7 in)	313 x 107 x 180 mm (12.3 x 4.2 x 7.1 in)	267 x 87.5 x 175 mm (10.5 x 3.5 x 6.9 in)
	Weight	7 kg (15.4 lb)	6 kg (13.2 lb)	4.3 kg (9.5 lb)
Certifications	Railway Related	EN 50155, EN 50121, IEC 61373, IEC 60571, (EN 45545, JIS E 5006 compliant)	EN 50155, EN 50121, IEC 61373, IEC 60571, (EN 45545, JIS E 5006 compliant)	EN 50155, EN 50121, IEC 61373, (EN 45545 compliant)
	EMC. Safety	CE/FCC Class A, UL	CE/FCC Class A, UL	CE/FCC Class A, UL



AIO-SSD120-00A1E	AIO-COM220-00A1E	AIO-CAN220-00A1E	AIO-MVB120-00A1E
Single SSD Carrier with D/I/O	Dual COM Module with Port Isolation	Dual CAN Module with Port Isolation	MVB Module with Port Isolation
Type: 2.5" SSD Channels: 3 x input, 3 x output Isolation: 2.5 KV digital	FIFO: 256 bytes Isolation: 2 KV digital Flow Control: RTX/CTS, XON/XOFF	Interface: CAN 2.0 A/B Signals: CAN-H, CAN-L Isolation: 2 KV digital	Interface: 4096 process data ports Bus Type: MVB bus administrator Connector Type: DB9 male and female





Model Name		ARS-P3800	ARS-P2800	ITA-8120	ITA-8101
Computing System	CPU	AMD® Embedded G-Series GX-217GA dual-core (1.65 GHz) SoC	Intel® Celeron® J1900 quad-core (2.00 GHz)	Intel® Atom™ x7-E3950 quad-core (2.00 GHz)	Intel® Atom™ x7-E3950 quad-core (2.00 GHz)
	Memory	204-pin DDR3 SODIMM 1600 MHz (up to 8 GB)	204-pin DDR3L SODIMM 1333 MHz (up to 4 GB)	DDR3L SODIMM 1600 MHz (up to 8 GB)	DDR3L SODIMM 1600 MHz (up to 8 GB)
Storage	mSATA	1 x mSATA SSD (64 GB default)	1 x mSATA SSD (64 GB default)	1 x mSATA SSD (64 GB default)	1 x mSATA SSD (64 GB default)
Graphics	Chipset	Radeon™ HD8280E, max. 450 MHz	Intel® HD Graphics, max. 688 MHz	Intel® HD Graphics, max. 900 MHz	Intel® HD Graphics, max. 900 MHz
Display	Display Type	38" TFT LCD panel, max. resolution 1920 x 540	28" TFT LCD panel, max. resolution 1920 x 357	12.1" TFT LCD panel, max. resolution 1024 x 768	10.4" TFT LCD panel, max. resolution 1024 x 768
	Brightness	800 nits	1000 nits	500 nits	400 nits
	Contrast Ratio	5000:1	6500:1	700:1	500:1
Ethernet	LAN	10/100/1000 Mbps (M12 A-coded)	10/100/1000 Mbps (M12 A-coded)	10/100/1000 Mbps (M12 X-coded)	10/100/1000 Mbps (M12 X-coded)
Touch Panel	Touch Type	N/A	N/A	Projected capacitive touchscreen with support for two-finger multi-touch control	Projected capacitive touchscreen with support for two-finger multi-touch control
	Function Keys	N/A	N/A	32 front-facing keys with tactile feedback that comply with IUC612-01 requirements	32 front-facing keys with tactile feedback that comply with IUC612-01 requirements
I/O	USB	1 x USB 2.0 (M12 A-coded), 1 x USB 2.0 (Type A)	1 x USB 2.0 (M12 A-coded), 1 x USB 2.0 (Type A)	1 x USB 2.0 (M12 A-coded)	1 x USB 2.0 (M12 A-coded)
	Video Output	1 x HDMI	1 x DVI-D	2 x RS-422/485 (M12 A-coded)	2 x RS-422/485 (M12 A-coded)
Software	Operating System	Ubuntu 16.04	Ubuntu 16.04	Ubuntu 16.04, Windows 10	Ubuntu 16.04, Windows 10
Power	Input Voltage	110 VDC (±40%, selectable), 4-pole M12 connector	24/48/72/110 VDC (±40%), 4-pole M12 connector	24/48/72/110 VDC (±40%), 4-pole M12 connector	24/48/72/110 VDC (±40%), 4-pole M12 connector
Environment	Operating Temperature	EN 50155 T1: -25 ~ +55°C	EN 50155 T1: -25 ~ +55°C	EN 50155 T3: -40 ~ +70°C (85°C for 10 minutes)	EN 50155 T3: -40 ~ +70°C (85°C for 10 minutes)
	Vibration. Shock	EN 50155	EN 50155	EN 50155	EN 50155
	Ingress Protection	IP-54	IP-54	IP-65 front cover	IP-65 front cover
Physical Characteristics	Dimensions (W x H x D)	1065 x 342 x 63 mm (42.0 x 13.5 x 2.5 in)	814 x 178 x 56 mm (32.0 x 7.0 x 2.2 in)	350 x 260 x 75 mm (13.8 x 10.2 x 3 in)	310 x 214 x 60 mm (12.2 x 8.4 x 2.4 in)
	Weight	11 kg (24.3 lb)	8.3 kg (18.3 lb)	5 kg (11 lb)	4.5 kg (9.9 lb)
Certifications	Railway Related	EN 50155, EN 50121, IEC 61373, (EN 45545 compliant)	EN 50155, EN 50121, IEC 61373, IEC 60571, (EN 45545 compliant)	EN 50155, EN 50121, IEC 61373, IEC 60571, (EN 45545 compliant)	EN 50155, EN 50121, IEC 61373, IEC 60571, (EN 45545 compliant)
	EMC. Safety	CE/FCC Class A, UL	CE/FCC Class A, UL	CE/FCC Class A, UL	CE/FCC Class A, UL



Model Name		MIT-W101	AIM-65
Computing System	CPU	Intel® Celeron® N2930 quad-core (1.83 GHz)	Intel® Atom™ x5-Z8350 quad-core (1.44 GHz)
	Memory	4 GB DDR3L SODIMM 1600 MHz (up to 8 GB)	2 GB default (up to 4 GB)
Storage	SSD	1 x mSATA SSD, 64 GB (up to 128 GB)	N/A
	Onboard eMMC	N/A	32 GB default (up to 64 GB)
	Micro SD	N/A	1 x Micro SD card slot for storage expansion
Display	Display Type	10.1" WXGA TFT LCD panel, max. resolution 1280 x 800	8" WUXGA TFT IPS LCD panel, max. resolution 1200 x 1920
	Brightness	400 nits	400 nits
Communication	Connectivity	Wi-Fi 802.11a/b/g/n, Bluetooth v 4.0 Class II, NFC read/write device compatible with ISO15693, ISO14443A, ISO14443B, FeliCa	Wi-Fi 802.11b/g/n, Bluetooth v 4.0 Class II, WWAN EU & NA (w/o voice call), micro SIM slot, AGPS (optional), GNSS (GPS/GLONASS), NFC read/write device compatible with ISO15693, ISO14443A, ISO14443B, FeliCa
Camera	Embedded I/O Devices	2.0-megapixel fixed-focus camera (at front) 5.0-megapixel auto-focus camera with LED flash (at rear)	2.0-megapixel fixed-focus camera (at front) 5.0-megapixel auto-focus camera with LED flash (at rear)
Environment	Ingress Protection	IP-65	IP-65
	Temperature	Operating: -10 ~ 50 °C (14 ~ 122 °F) Storage: -30 ~ 70 °C (-22 ~ 158 °F)	Operating: -10 ~ 50 °C (14 ~ 122 °F) Storage: -20 ~ 60 °C (-4 ~ 140 °F)
	Humidity	Operating: 5 ~ 95% @ 40 °C/104 °F (non-condensing)	Operating: 5 ~ 95% @ 40 °C/104 °F (non-condensing)
	Handling Drop	4-ft/6-ft with add-on bumper protection (MIL-810G compliant)	4-ft with add-on bumper protection
Physical Characteristics	Dimensions (W x H x D)	292 x 196 x 20 mm (11.5 x 7.7 x 0.79 in)	142 x 240 x 14.5 mm (5.59 x 9.44 x 0.57 in)
	Weight	1.1 kg (2.42 lb) barebone unit	600 g (1.32 lb) barebone unit
Operating System		WES8 (default)/WES7/Windows 10 IOT Enterprise LTSB	Windows 10 IoT Enterprise LTSB, Android 6.0
Certifications		FCC Class B, CE, CB, UL 60950-1, C1D2 Groups A, B, C, D	CE/FCC/CCC Class B, UL 60950/CB/LVD/CCC/BSMI, RF (R & TT, PTCRB/FCC ID), PTCRB/R & TTE (optional), ANS/ISA 12.12.01-2015 (optional)

For sales inquiries and further information, please contact: Rail@advantech.com.tw

## Regional Service & Customization Centers

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Taichung	886-4-2329-0371
Kaohsiung	886-7-229-3600

### Middle East and Africa

Israel	072-2410527
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<b>Ireland</b>	
Oranmore	353-91-792444

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São Paulo	55-11-5592-5355

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Mexico City	52-55-6275-2727

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