Case Study

Passenger Flow Management

Seat occupancy detection in trains for a more satisfying ride

In our daily lives as commuters, you can pretty much expect every subway train to be crowded during rush hour. However, even on a crowded train, not every car is equally crowded. To effectively distribute passengers between subway cars, subway operating companies have turned to passenger flow management solutions to detect the passengers and empty seats, then display the information to help passengers find seats or cars with fewer people, making the commuting experience more comfortable.

Challenges

The customer is a system integrator headquartered in Europe, with a long-time emphasis on providing cutting-edge and user-friendly rolling stock applications. The customer was looking for an embedded system that is EN50155 and EN45545-2 certified to be deployed on trains. Also, it should possess high performance for image processing use cases. The system should be fanless design and the operating temperature should be extended.

Main Requirements

- High performance yet low power consumption Intel® Core™ i7 processor
- EN 50155 and EN 45545-2 certification for railway
- Lockable M-12 type I/O for harsh environments
- Fanless design and noise free
- Extended operating temperature from -40°C to +70°C

Axiomtek's tBOX500-510-FL: High-Performance Embedded System for Rolling Stock with Intel® Core™ Processor, Wide Temperature Range, and Modular I/O

Axiomtek has proposed the tBOX500-510-FL to the customer, which is a high-performance and modular embedded system for rolling stock applications. It is certified with ISO 7637-2, EN 50155, EN 50121, EN 45545-2, and IEC 60945. The tBOX500-510-FL comes with an onboard Intel® Core™ or Intel® Celeron® processor along with two DDR4-1866/2133 SO-DIMM slots supporting up to 32GB system memory.   It supports a wide temperature range from -40°C to +70°C (EN 50155 OT4) and anti-vibration of up to 3 Grms. It features PoE to empower peripheral devices.

The system offers two I/O module slots and a wide selection of value-added modules (VAM) to meet different I/O demands. For system integrators with extensive storage needs, the box computer offers two swappable 2.5" SATA HDDs and one mSATA.

Application
Passenger flow management helps passengers find the least crowded subway cars

The customer deployed several tBOX500-510-FL on trains. More than that, the customer utilized the VAM708 module, which provides four M12-type X-coded 10/100/1000 Mbps LAN. Via switches, the tBOX500-510-FL can acquire images from cars and detect vacant seats. Then, the information would be transmitted to the control center and be shown on the passenger information display systems. As the passengers know if the train is crowded or not, they move to cars with fewer people to enjoy a more comfortable ride.

System Configurations of the tBOX500-510-FL

- Intel® Core™ i7-7600U processor
- Two DDR4-1866/2133 SO-DIMM, system memory of 32GB
- Four USB 3.0 ports
- One RJ-45 10/100/1000 Mbps Ethernet
- One VAM708 module with four M12-type X-coded 10/100/1000 Mbps LAN
- Two swappable 2.5" SATA drive
- One M12-type 24-110VDC

Why Axiomtek

Axiomtek has a wide range of experiences of successful embedded computing deployments in transportation. Certified by the strict railway/vehicle/marine safety and EMC criteria, our wide range of systems, from entry-level gateways to high-performance platforms, meets the demands of smart transportation industry applications.

About Axiomtek Co., Ltd.

Axiomtek has experienced extraordinary growth in the past 30 years because of our people, our years of learning which resulted in our tremendous industry experience, and our desire to deliver well-rounded, easy-to-integrate solutions to our customers. These factors have influenced us to invest in a growing team of engineers including software hardware, firmware, and application engineers. For the next few decades, our success will be determined by our ability to lead with unique technologies for AIoT and serve our key markets with innovatively-designed solution packages of hardware and software – coupled with unmatched engineering and value-added services that will help lessen the challenges faced by our systems integrator, OEM and ODM customers and prospects alike. We will continue to enlist more technology partners and increase collaborations with our growing ecosystem who are leaders in their fields. With such alliances, we will create synergy and better deliver solutions, value, and the expertise our customers need.