



## Application Story

### The GOT710-837 Railway Touch Panel PC for Train Control



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The railway sector is always the focus when it comes to public transportation improvement, and today's train travel has become safer and more enjoyable thanks to a multitude of new technologies brought into the railway infrastructure. The implementation of touch panel PCs to facilitate train control and management presents an excellent example of this trend.

## Panel PC – Desirable Railway Rolling Stock HMI

An industrial panel PC is an all-in-one computer consisting of an LCD panel display with an embedded industrial computer built into the same enclosure, also commonly referred to as Human-Machine Interface (HMI). The HMI typically utilizes a touchscreen for ease of use and can be panel mounted, providing a graphics-based communication interface that allows interaction between humans and machines in an electronic control system. When deployed inside a modern locomotive cabin, the HMI is used as a Driver-Machine Interface (DMI) unit that assists or substitutes for traditional consoles on a control stand, through which the driver can operate and communicate with the entire train. The railway industry is increasingly favoring high-performance panel PCs as ideal HMIs for Train Control and Management System (TCMS) because of their usability, visualization and versatility.



### Intuitive controls

With built-in touchscreen displays, panel PCs offer a remarkably intuitive and user-friendly onscreen interface that significantly simplifies complex train controls, allowing operators to manipulate a visualized console simply by tapping or touching the screen, rather than having to use a number of extraneous switches and knobs typical of conventional dashboards.

### Visualized data

As screen resolutions and wide-screen formats continue to evolve, high-performance panel PCs can deliver greater visual or graphical representation of train conditions and real-time data acquisition. Display of visualized information enables operators to grasp train conditions at a glance.

### Computing power and storage capacity

Panel PCs can store data locally and deliver powerful computing performance to help manage complex tasks more easily.

## Impeccable Train Control HMI – Axiomtek's GOT710-837 Touch Panel PC

Axiomtek's industry-leading GOT710-837 is a rugged 10.4" fanless touch panel computer built specifically to optimize train operation and user experience for railway transportation. It can be integrated as an HMI PC inside a locomotive cab to show vehicle status and execute control functions, or as a control panel for the passenger information system, covering applications across train communications, monitoring and controlling of speed and temperature, surveillance, as well as fleet information management. Designed to tackle the most challenging rolling stock tasks, this multifunctional, heavy-duty touch panel PC is capable of surviving some of the worst conditions seen in harsh outdoor operations, making it particularly suited for demanding railway work.



The GOT710-837 excels at the following aspects crucial to railway applications:

### Railway EN50155-certified durability & reliability

The GOT710-837 panel PC is EN 50155 certified and has passed all safety-critical tests required for electronic equipment used on railway vehicles. Its ruggedized design, including an IP65 / NEMA 4 rated aluminum front bezel to keep out dust, liquid spillage and contaminants, makes it tough enough to withstand the severe conditions typical of the railway environment. The fanless structure and adoption of a low-power consumption Intel® Atom® processor allow it to operate in temperatures as low as -25°C and as high as 70°C. Certifications earned by the GOT710-837 also include EN 61373 (shock/vibration), EN 45545 (fire), as well as EN 50121-3-2 for Electromagnetic Compatibility (EMC) conformity, which ensures that different devices can operate in close proximity without experiencing mutual interference.

### Anti-shock M12-type connectors

Keeping all I/O connections and power input firmly secure at all times is essential to any system installed on a jolting train. The GOT710-837's IP65-rated M12-type I/O connectors are designed to protect its serial, USB, Gigabit LAN and DC power input connections against strong shock and vibration, making the panel PC a perfect HMI choice for on-train operation.

## Sunlight readable LCD panel

The screen of a railway-use HMI computer needs to be bright enough to be comfortably viewed in full sunlight. To achieve optimum visibility, the GOT710-837 has a 10.4-inch ultra-bright, sunlight readable SVGA TFT LCD display, with LED backlight of 1,000-nit brightness and a wide 160°/160° viewing angle, allowing train operators to easily read any operational status messages – even in the glaring sun. The LCD panel also features resistive touchscreen and is capable of auto-dimming by adjusting backlight brightness based on surrounding lighting conditions.

## Alternative front-bezel keypad

HMI PCs installed in vertical panels or cabinets rely on touchscreen controls to navigate and interact. For some actions that aren't quite intuitive or convenient on a touch screen, physical buttons still offer the best user experience. The GOT710-837's IP65-rated front bezel can be customized to integrate a UIC612-01 standard keypad, which provides hotkeys and shortcuts for quick access to frequently used functions. Conforming to the UIC612-01 standard, the technical specifications of this front bezel keypad are universally defined via a friendly user interface, offering drivers a worldwide coherent HMI command across different types of locomotives.

## Powerful computing – Intel® Atom® processor E3845 and more

The GOT710-837 adopts an Intel® Atom® processor E3845 (2M Cache, 1.91 GHz) built to handle multi-tasking applications, allowing it to deliver consistently reliable performance on railway work. The panel computer supports up to 8GB of onboard DDR3 memory and has 16GB of built-in flash storage. An mSATA slot is also available for additional storage needs.

## Real-time monitoring & communication

The GOT710-837 makes real-time monitoring of train operation possible by providing instant access to sensor data. It shows mission-critical information about the train as well as alarms and faults, based on which operators are able to respond to emergency quickly and perform timely diagnosis to avoid danger or prevent equipment failure. Via Power over Ethernet (PoE), the panel computer can carry out remote surveillance by connecting to onboard IP cameras to display live video views from the inside and outside of a passenger cabin. Besides, wireless connectivity to cellular networks like 3G enables the GOT710-837 to communicate with monitoring centers to exchange data in real time.



## GOT710-837 10.4" Fanless Railway Touch Panel PC Key Features

- ▶ EN 50155 certified for railway applications
- ▶ 1,000-nit brightness, sunlight readable 10.4" SVGA TFT LCD with auto-dimming
- ▶ Fanless cooling system
- ▶ Low-powered Intel® Atom® processor E3845 1.91 GHz
- ▶ Standard 4GB DDR3 memory onboard; supports up to 8GB
- ▶ Wide operating temperature range from -25°C to +70°C
- ▶ 5-wire resistive touchscreen
- ▶ IP65 rated, NEMA 4 rugged protection aluminum front bezel; optional built-in UIC 612-01 compliant keypad
- ▶ Lockable M12-type connectors
- ▶ Comprehensive I/O outlets: two isolated RS-232/422/485 serial ports, one isolated CAN bus; two isolated Gigabit LAN; two USB 2.0 ports; one isolated DIO (6-IN/2OUT); an isolated DC power input
- ▶ Two PCI Express Mini Card slots for wireless network connections and storage expansion

\*For detailed specifications, visit [www.axiomtek.com](http://www.axiomtek.com) and go to: [Products > Industrial Panel PCs > Transportation Computing > Transportation Panel PC > GOT710-837](#).

## Use Case 1: GOT710-837 as Train Control Management System for Locomotives

The customer, a national railway company, was seeking an EN 50155 certified touch panel PC to serve as a train control management system for its locomotives. The desirable panel PC must have a LCD display with ultra-brightness LED backlight in order to ensure high visibility in surroundings with varying light intensity. Meanwhile, the ability to bear extreme temperatures was essential for operation.

### Main requirements

- EN 50155 certified for railway applications
- LCD brightness of 800 nits or above
- Wide operating temperature range from -25°C to +70°C
- Rugged design and affordable price

### Solution and application

Axiomtek proposed the EN 50155 certified GOT710-837 railway touch panel PC, with an alternative keypad control built on the front bezel, to meet customer demands. Running on a low power Intel® Atom® processor E3845, the GOT710-837 can deliver high performance at competitive prices.

The customer has integrated the GOT710-837 into its locomotive dashboard as a train control system, which allows drivers to control and monitor the real-time state of the train, so they can take prompt measures such as adjusting train speed or stopping trains to avert dangers. The ultra-bright LCD display with 1,000-nit LED backlight makes it easy for train operators to read onscreen information even under direct sunlight, and its waterproof M12-type connectors protect all connections from fierce vibration. In addition, the system can communicate over 3G networks with monitoring centers, which in turn provide instructions pertaining to train location, routes, planning and scheduling.

## Use Case 2: GOT710-837 as Train Control Management System for City Metro

The customer, a system integrator designing and manufacturing electronic systems used in a wide array of activities, was expecting a 10.4" EN 50155 certified touch panel PC for its city metro project. The ideal all-in-one industrial touch panel PC must support Linux OS and feature a sunlight readable LCD display with high brightness LED backlight. A wide range temperature design for operation in extreme environments was crucial as well.

### Main requirements

- EN 50155 certified for railway applications
- Wide operating temperature range from -25°C to +70°C
- Supports sunlight readable LCD
- Supports Linux OS

### Solution and application

Axiomtek proposed the 10.4-inch EN 50155 certified GOT710-837 railway touch panel PC, featuring a high brightness LCD of 1,000 nits and an alternative keypad control on the front panel. Powered by the energy-efficient Intel® Atom® processor E3845, the panel computer can reduce energy costs while maintaining full functionality and performance.

The customer has integrated the GOT710-837 into the metro train as a standard control, communications, and train management system to coordinate control and monitoring operations across disparate systems. The waterproof M12-type connectors ensure tight, robust connections for use in railway environments subject to heavy vibration. Via network connectivity, the touch panel PC can communicate with monitoring centers and exchange real-time information on train status, route planning and running schedules. In addition, this 10.4" railway panel PC supports Linux OS, which gives the customer the flexibility to develop software for individual applications or for optimized management needs.

## About Axiomtek Co., Ltd.

As one of the world's leading designers and manufacturers of PC-based industrial computer products, Axiomtek specializes in data acquisitions and control systems of rich diversity and modularization. With the upmost enthusiasm in serving their customers, Axiomtek has mirrored PC evolutions in various industries by shifting its focus toward the design and manufacture of PC-based industrial automation solutions, standing as a trustworthy long-term provider of industrial computers.

Established in 1990, Axiomtek has partnered with more than 60 distributors globally, offering more than 400 products through product lines of Industrial PCs (IPCs), Single Board Computers (SBCs), System on Modules (SoMs), Fanless and Rugged Embedded Systems (eBOX and rBOX), Intelligent Transportation Systems (tBOX and UST), Industrial IoT Gateway, Touch Panel Computers (TPCs), Medical Panel Computers (MPCs), Digital Signage Solutions (DSSs) and Network Appliances (NAs).

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