

# An Advertising, Voice and Passenger Information System for Helsinki's Metro Trains

## Passenger Information System

### At a Glance

#### Company:

Helsinki City Transport (HKL)

#### Location:

Helsinki, Finland

#### Application:

- Passenger information and entertainment system in subway cars
- Remote car maintenance and surveillance



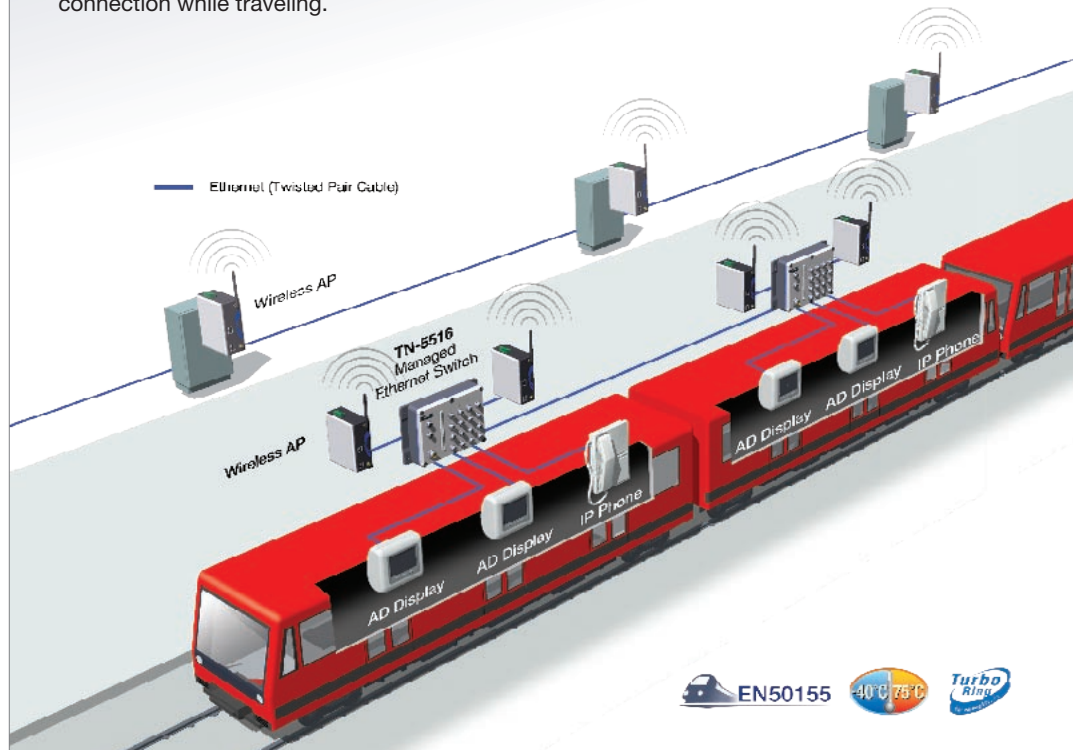
## TN-5516 series

### 16-port EN 50155 Ethernet Switches

- VLAN to simplify network planning
- Enough ports to cover all devices
- Power inputs ranges perfectly matches power system of the train cars

## Project Introduction

Helsinki City Transport (HKL), Helsinki's subway operator, contracted advertising space in their train cars to Clear Channel. Clear Channel's goal was to provide real-time advertising and entertainment for metro passengers. Naturally, IP was the technology of choice for content delivery, and IP became the basis for the design and deployment of all necessary equipment and services in HKL's underground trains. HKL decided to show advertisement spots on screens in the subways. The ads are fed over the network to the subways in real time. This required the deployment of a new communication network for the subway system. The network infrastructure is also used for maintenance scheduling, access to the train diagnosis system, and real-time access to general train information. Before, these functions had to be carried out on board the train. Thanks to the new network, they can be done remotely. The same network can be used to offer passengers a free WLAN connection while traveling.



## Application Requirements

- Real-time transmission of advertising and entertainment content to metro passengers
- Seamless wireless connection from the track to the subway cars
- Rugged industrial networking products with IP54 housing protection or higher reliability and rail certification
- Rail approved EN 50155 Ethernet switches that offer VLAN capability and redundancy inside the train
- Products that are easy to integrate with legacy devices
- High number of ports to connect all equipment in each car to a single Ethernet switch

## System Description

Delivering IP based content to moving vehicles such as underground trains posed several challenges to the HKL engineers. After surveying the available options, HKL made two key decisions: the 802.11 wireless protocol will be used for train to ground communication, and industrial Ethernet will be used on board the trains as the communication infrastructure. HKL needed highly reliable performance from both the wireless and industrial Ethernet components of their network. In addition, all devices must comply with EN-50155:2007 certifications for rolling stock and offer a high degree of protection against environmental hazards, and be rated at least IP54 or higher.

The communication from the trackside to inside the underground car is achieved using an existing redundant WLAN system. The system is always connected to two access points. As soon as one access point is dropped, the system immediately connects to the next one. This way, there is no roaming time at all. Communications inside the train is established using Moxa TN-5516 EN50155 16-port managed Ethernet switches. Two Ethernet switches, with two independent power inputs on two voltage levels (24 VDC, 72 VDC) are mounted in every two subway cars. The switches are connected through Moxa's redundant Turbo Ring protocol, for 20 ms fast recovery times. All other communication devices are connected to the Ethernet switches and separated into different VLANs. The network provides the customers with both an information system and a free WLAN connection while travelling with the subway.



## Products Used

### TN-5516 series 16-port EN 50155 Ethernet Switches

- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to simplify network planning
- Wide power input range from 12 to 110 VDC
- Isolated redundant power inputs with universal 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC power supply range
- EN 50155 and EN 50121-4 compliant
- -40 to 75°C operating temperature range
- Turbo Ring, Turbo Chain (recovery time < 20 ms) or RSTP/STP for reliable network connections

## Moxa's Advantage

- Moxa was able to provide a train approved switch solution with VLAN support and enough ports to cover all devices in the network
- TN-5516 managed Ethernet switches provide a stable, reliable, easy to deploy solution for redundant networks using Moxa's redundant Turbo Ring structure
- Moxa's products have an extended operating temperature range of -40 to 75°C and are ideal for rugged environments
- Three rotary switches on the TN switch allows the maintenance engineer to quickly set the last 3 digits of the IP address without using any software at all.
- The two independent power inputs, 24 VDC and 72 VDC, perfectly matched the available power system in the cars

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