

Simplify Train Coupling

With Auto Wireless Inter-carriage Links

Inter-carriage Coupling Challenges

For retrofit applications, rail operators face several challenges when trying to build complete, train-length IP-based backbone networks while also keeping installation efforts and wiring to a minimum. Wiring networks between carriages can be particularly difficult in refurbished trains with limited space, in addition to substantially increasing maintenance time and costs.

Wi-Fi offers a highly efficient alternative for building an onboard backbone that eliminates the need for additional cabling. However, Wi-Fi presents its own set of challenges. Most importantly, the wireless connections should only be allowed to interface between directly opposite carriages to prevent any unwanted links to other, nearby carriages.

Scenario

- Limited upgrade options when retrofitting the train network
 - √ Hardwiring space-constrained carriages is difficult
 - √ Rewiring older trains can become very costly
- Current WLAN solutions often create unwanted connections to neighboring trains
- Devices sustain heavy vibration during transit

Retrofitting IP-based Train Backbones with ACC

Moxa's Auto Carriage Connection (ACC) technology enables intelligent wireless bridging between carriages to streamline train coupling. ACC automatically forms adaptive inter-carriage Wi-Fi bridges whenever the train composition changes, eliminating the need for additional carriage wiring. Each AP only needs to be configured once, meaning operators no longer need to manually reconfigure devices each time the train is recomposed. A timeout mechanism and directional antenna avoid incorrect associations with neighboring train networks, especially in areas with a lot of carriages, such as a depot. With these features, Moxa's ACC significantly reduces installation complexity and maintenance costs.

Solution Highlights

- Automatic coupling and decoupling for any type of train
- Supports high-speed 802.11n Wi-Fi up to 300 Mbps
- Accurate carriage association during coupling
- Easy to install with minimal maintenance
- Ideal for short-range connections

Auto Carriage-to-carriage Connections



Inter-carriage AP AWK-3131A-RCC

- Designed specifically for inter-carriage wireless backbone networks
- 802.11n high-bandwidth
- Anti-vibration M12 connectors
- Complies with all EN 50155 mandatory test items