

IEEE Standard for Communications Protocol Aboard Trains

Sponsor

**Rail Transit Vehicle Interface Standards Committee
of the
IEEE Vehicular Technology Society**

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Abstract: Communications protocols to be used for intercar and intracar serial data communications between subsystems aboard passenger trains are defined by this standard. Minimum acceptable parameters for a network that can simultaneously handle monitoring and control traffic from multiple systems are set forth. While the network is not vital, it is intended to be capable of carrying vital messages.

Keywords: communications networks, communications protocol, commuter rail transit, light rail transit, rail transit, train bus, vehicle bus

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Introduction

(This introduction is not part of IEEE Std 1473-1999, IEEE Standard for Communications Protocol Aboard Trains.)

Rail vehicles are increasingly being built using pre-assembled modules that perform many different functions. More and more, these modules are communicating over serial data communication links for purposes such as traction control, diagnostics, and passenger information. Interoperability and interchangeability of these modules require adherence to standard communication protocols and common network management procedures.

Rail vehicles may be coupled during operation to form trains. Trains typically consist of one or more basic operating units coupled in combinations of varying length. Train length may be changed frequently to suit service requirements. The serial data communications network is expected to maintain operation without manual intervention when two or more vehicles are coupled or when uncoupling takes place. To this purpose, the network needs sequential numbering, orientation, and self-identification of vehicles.

Rail vehicles may be semipermanently coupled into groups of vehicles not normally or readily separable during normal operation, i.e., a basic operating unit. In these cases, the network may be preconfigured to care for sequential numbering, orientation, and self-identification.

The IEEE Rail Transit Vehicle Interface Standards Committee established the Working Group on Communications Protocol Aboard Trains in 1996. It was chartered to specify the protocols for intercar and intracar serial data communications aboard passenger trains.

The working group has decided to reference two complementary technologies specified by other entities and to define the corresponding profiles for all vehicles and trains:

- The Type L protocol, a general-purpose control networking protocol used for connecting equipment with its sensors and actuators, is defined in EIA 709.1-1998 and EIA 709.3-1998.
- The Type T protocol, which addresses the real-time, availability, and integrity requirements of critical on-board train control functions and consists of a train and a vehicle bus, is as defined in IEC 61375-1: 1999.

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