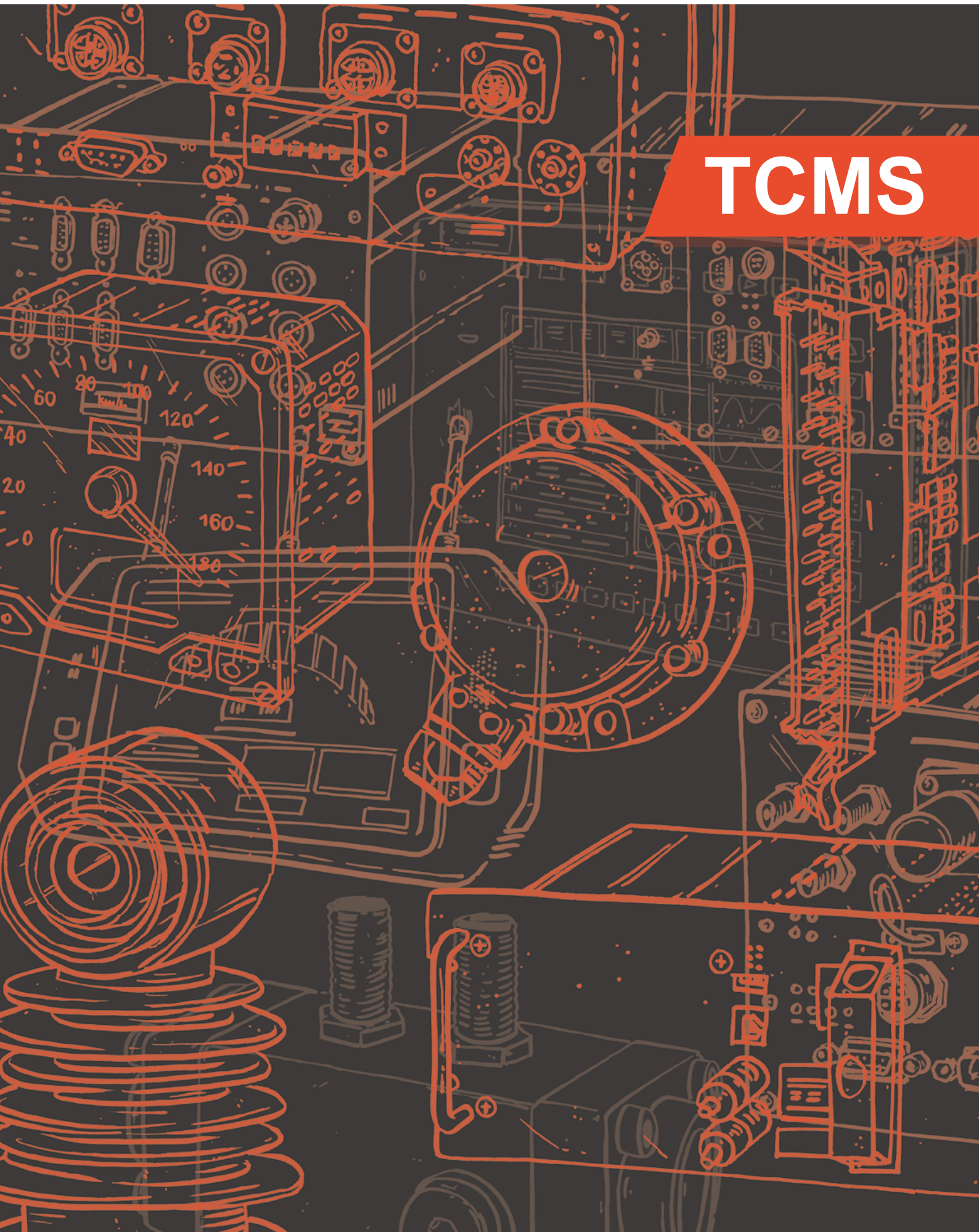# HASLERRail SAIRA ELECTRONICS

TCMS

Train Control and Management System (TCMS)

TCMS, often also called the "brain of the train", controls, monitors and manages different on board train equipment, e.g. doors, traction, HVAC, etc. Some systems also integrate passenger information systems (PIS).

Advantages of a TCMS are:
– distributed functionality
– simplified cabling
– redundancy
– modularity

The use of industry standard protocols for communication and data exchange provide the system with the capability to integrate third party devices or modules.

Safety

TCMS can also include safety-relevant functions for the vehicle control.

According to current EU legislation, new or modified devices with safety relevant functions have to be designed according to the EN 50126 standard in order to receive a defined Safety Integrity Level (SIL) certification.

System Overview

TCMS is mainly composed of PLC devices (programmable logic controller), remote I/O modules, communication gateways and user interfaces.
TCMS components are connected through a bus link. The TCN (train communication network), in accordance with International Standard IEC 61375, uses different topologies, protocols and bandwidths (WTB, MVB, ETH, CAN, RS485).
The customer can self-build or adapt the application of the TCMS System with a software tool.

Antenna

ETH-Switch

HMI

Mobile Gateway

WTB / MVB / ETH Gateway
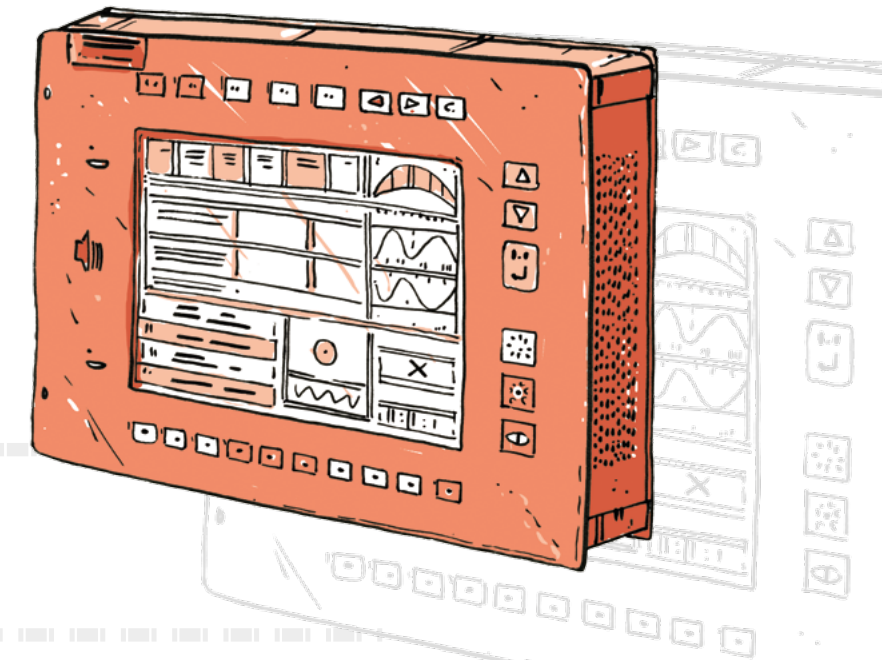
Vehicle Control Unit
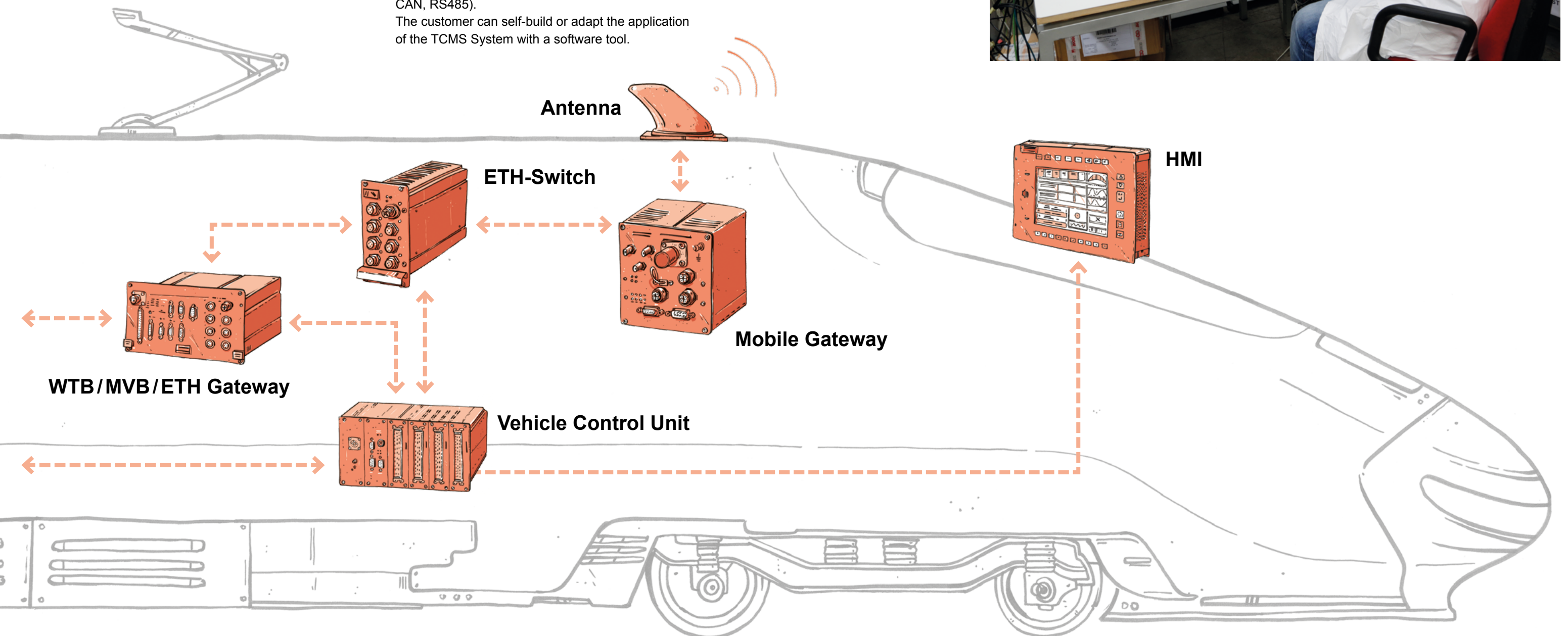
Vehicle Control Unit and Remote I/O

The Vehicle Control Unit (VCU) is the main computer in the TCMS architecture.

It supervises the vehicle management applications, manages the communications, converts protocols and provides format adaptation for information to be exchanged among all connected sub-systems.

Additionally, the VCU provides data logging for maintenance and diagnostic purposes.

Slots are available for integration of I/O boards of different configurations (digital, analogue, etc.)

Additional, remote I/O modules (RIOM) can be added for huge I/O handling and cabling simplification.

The interfacing capability includes MVB, Ethernet, RS232/RS422, CAN and USB.

The VCU is EN 50155 compliant.

Power supply: 24/36/72/110 VDC.
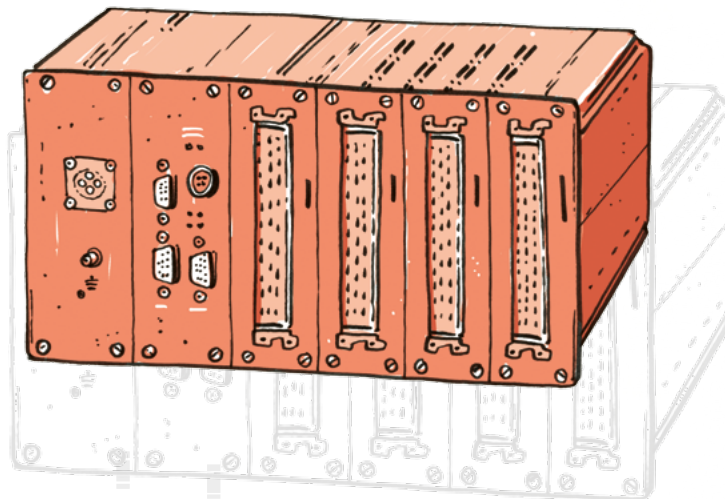
Human Machine Interface (HMI)

10.4" SVGA LCD Display.
Resistive touch screen.
2 x USB and 2 x Ethernet interfaces.
Windows CE / Linux OS support
for customer application.
The VDU is EN 50155 compliant.
Power supply: 24/36/72/110 VDC.
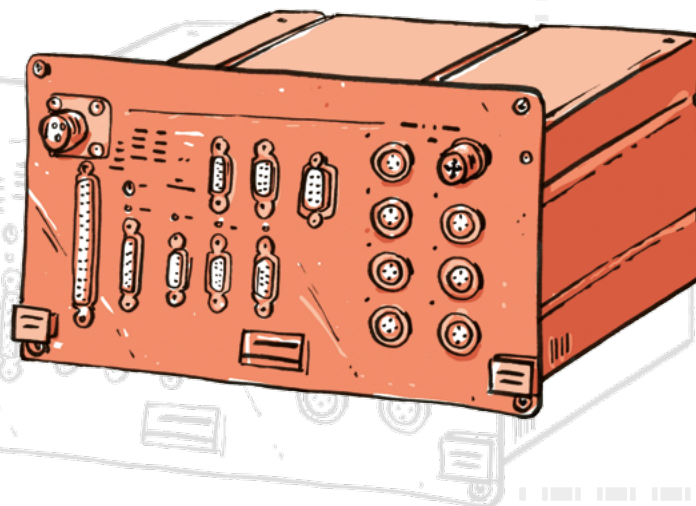
IGW: WTB/MVB/ETH Gateway

IGW is a family of devices targeted for the inter-connection of several train and vehicle bus systems (WTB, MVB, CAN, Ethernet).

Train bus is managed according to the IEC 61375 standard; redundancy is implemented by means of 2 WTB nodes per vehicle.

It is possible to implement a sniffing function on the MVB, non-intrusive and with conversion to an Ethernet protocol.

The VDU is EN 50155 compliant.

Power supply: 24 to 110 VDC.
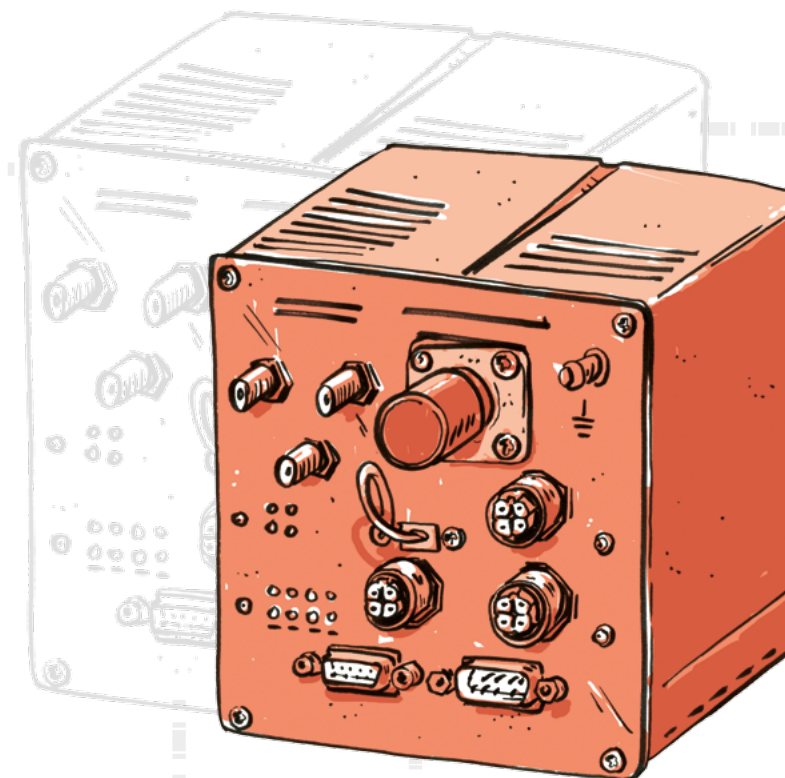
## Mobile Communication Gateway (MCG)

Communication gateway between on-board train devices and ground stations/servers.

Equipped with different communication interfaces:
– Ethernet/ MVB ports for on-board systems
– GSM/GPRS/EDGE
– UMTS/HSDPA
– Wi-Fi for hot-spot depot links
– GPS

Services: FTP, SSH, SNMP agent, SMS alert.

The VDU is EN 50155 and IEC 61375-2-6 compliant.
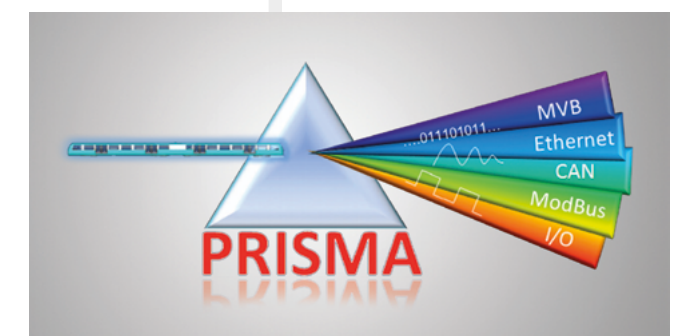
Power supply: 24/36/72/110 VDC.

Ethernet Switch

We offer a range of devices covering both ethernet train backbone and vehicle operation.

Layer3 / Layer 2 routing switching.
Ethernet switch with 10/100 Base-Tx ports.
M12 rugged physical connectors.
Maximum Cable Length: 100 m, (Cat 5. cabling).
Redundant topologies supported.
The VDU is EN 50155 compliant.
Power supply: 24 VDC.
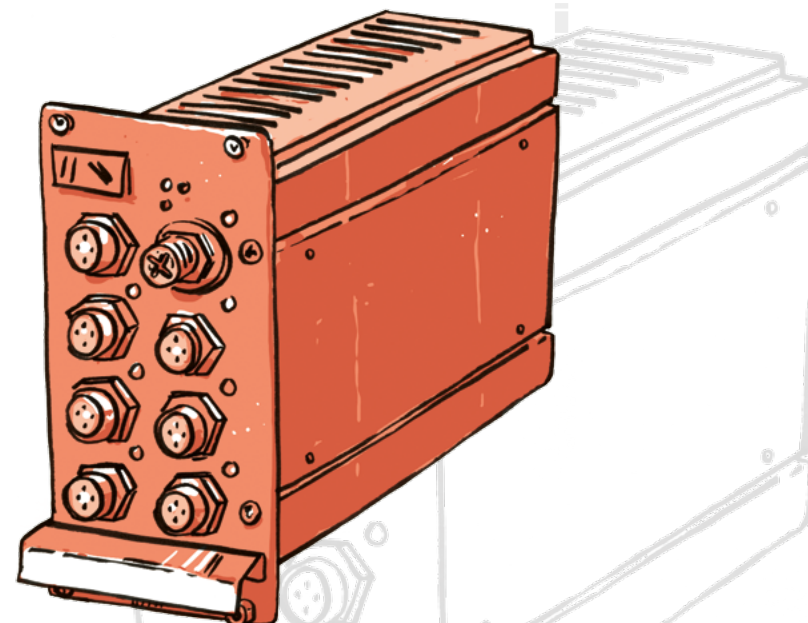
SoftPLC for TCMS

The RaPLC family provides devices and I/O modules for the implementation of trainborne automation solutions.

Saira Electronics proposes a common SoftPLC Engine, with its development tool, training and support.

SoftPLC PRISMA T5 Runtime allows full access to all communication interfaces and I/O modules.

PRISMA IDE is the software tool to develop specific applications; it is based on a standardized programming language and runs on a laptop PC.

IEC 61131-3 compliant (Programming Languages for PLC).

PRISMA

MVB
Ethernet
CAN
ModBus
I/O

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Washington Metro WMATA Comm. Package – TOSHIBA

Kawasaki is delivering the next generation of cars to Washington Metropolitan Area Transit Authority (WMATA). The 528 cars being delivered will issue in a new era of increased safety and comfort to residents, commuters and visitors to the State of Maryland and the Washington D.C. region.

Saira Electronics delivers a complete communication package with TCN gateways and remote I/Os to support traction control and diagnostics, as well as event recorders to the sub-contractor Toshiba.
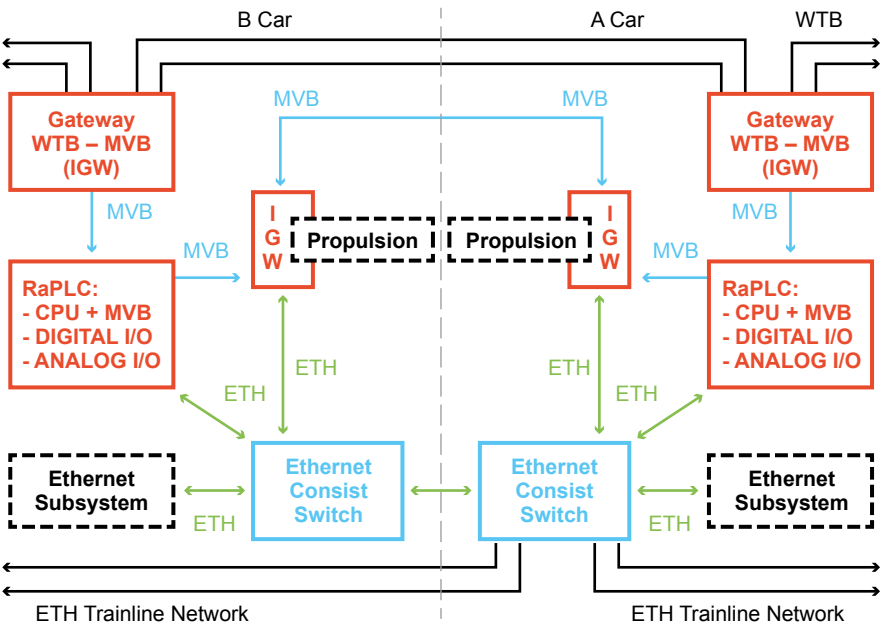The deliverables are compliant with Buy America provision.
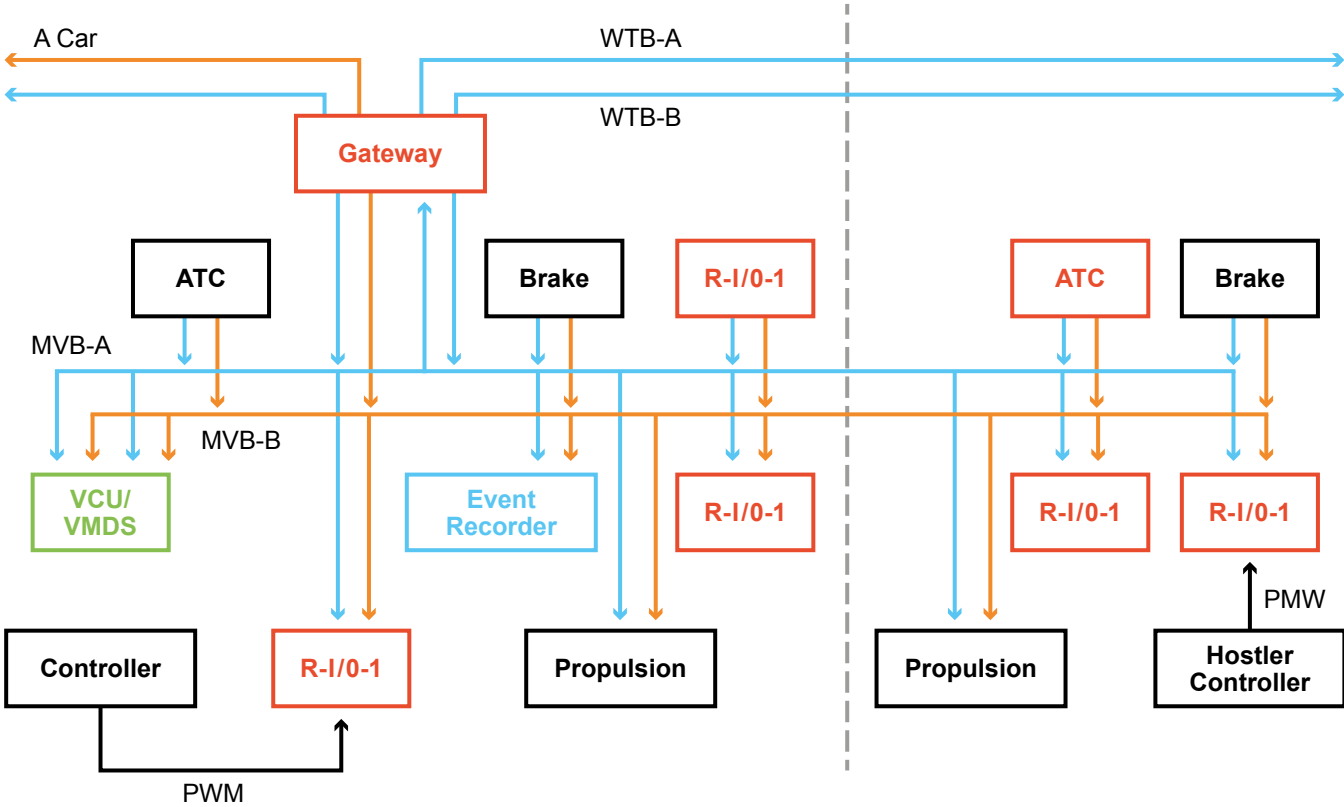
Los Angeles LACMTA P-3010 – KINKISHARYO

Kinkisharyo is delivering P3010 Light Rail Vehicles to The Los Angeles County Metropolitan Transportation Authority (Metro). The base order was 78 vehicles and delivery of a further 157 vehicles starts in 2017.

Saira delivers a complete communication package with TCN gateways and remote I/Os to support traction control and diagnostics, as well as event recorders. Delivery includes a gateway to the propulsion system from Toyo Denki.

The deliverables are compliant with Buy America provision.

Baltimore MTA LRV Overhaul – ALSTOM

Alstom has been awarded a contract by the Maryland Transit Administration (MTA) to overhaul Baltimore's entire fleet of 53 light rail vehicles (LRV).

Saira Electronics delivers a communication and automation package with ETH/MVB train bus to support traction control and diagnostics, as well as event recorders. Delivery includes the Alerter functionality developed according to safety standards. The deliverables are compliant with Buy America provision.
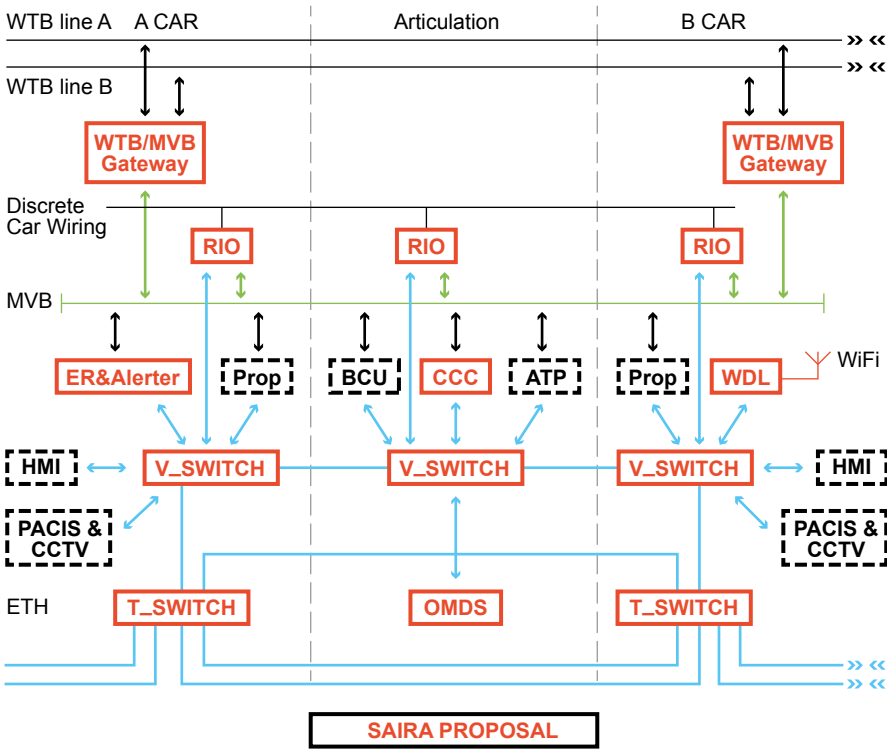
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● Agencies

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