

RaPLC-RIO

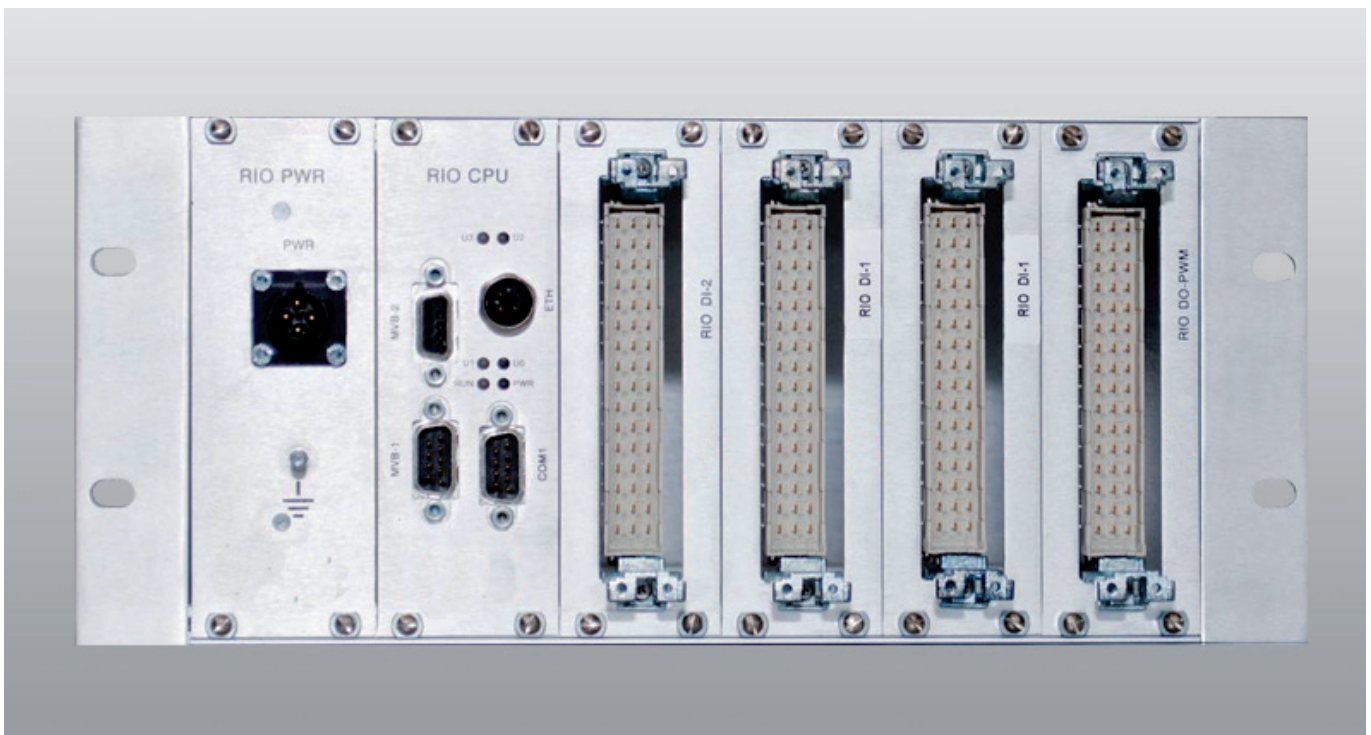
RaPLC-RIO devices are a family of products that can be used in different applications related to the diagnostic and monitoring systems.

RaPLC-RIO are designed to work as remote programmable devices for the data acquisition and conditioning from onboard systems. They act as distributed intelligent devices for the acquisition of direct signals and the commands of digital outputs. For this purpose they have an embedded Soft PLC runtime, programmable by means of the IEC 61131-3 standard set of languages, used to filter the data coming from the inputs and report to the Central Diagnostic only the alarm situations. They can be also programmed to act independently for specific monitoring and control functions.

The application program can be customized by the customer using PRISMA IDE Workbench.

The main features of the RaPLC-RIO device family is the MODULARITY. The family is composed by a series of modules that can be combined to achieve the needs and optimize the on board system connections.

The core of the device consists of a CPU main board that includes up to 2 ETH communication interfaces for the connection to the main vehicle networks. A number of different data interfaces such as MVB, serial RS485 with SYNC HDLC and CANOpen can be attached to the main CPU board to adapt to the various vehicle busses found on trains.



The RaPLC-RIO device can be expanded by means of various I/Os modules:

- A DI1 board, with 24 digital input lines, each with wetting current and self test to check input functionality; the 24 digital inputs are insulated by 4 galvanic groups of 6 inputs each
- A DI2 board, with 16 digital input lines, each with wetting current and self test to check input functionality: the 16 digital inputs are all insulated from each other
- A DIOPWM board equipped with 16 High Side Switch output lines and one PWM input line
- A DIO board with 8 digital input lines and 8 digital outputs, all galvanically insulated from each other
- An AUX board with 4 analogic inputs configurable by factory in current or in voltage, used for to interface field sensors and 2 frequency inputs used to interface speed sensors and/or odometers.
- An AIO board with 8 Analog Inputs hardware configurable by factory in current/voltage and 4 Analog Outputs hardware configurable in current/voltage, grouped in galvanic islands of 4 outputs.

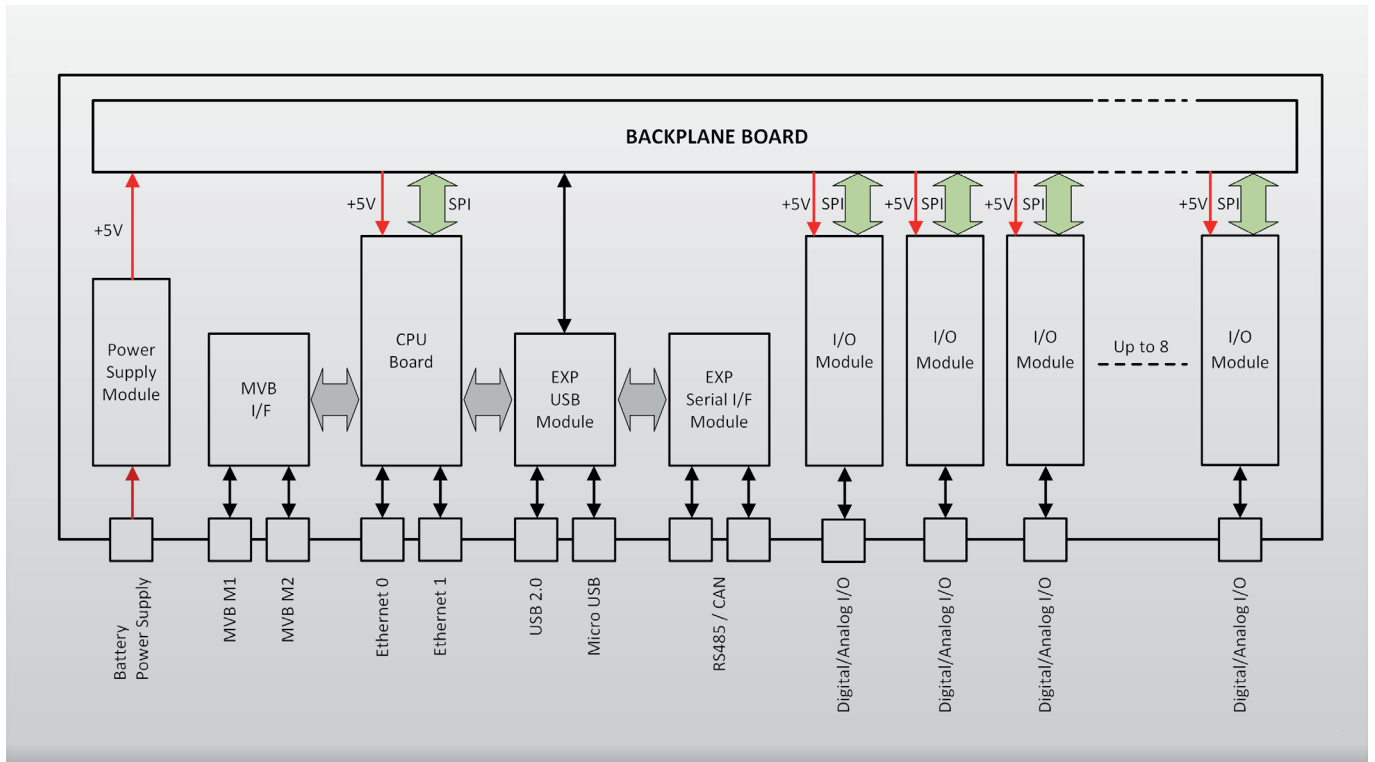
Each I/O module has a self-diagnostic system that can identify and signal possible malfunctioning of the interfaces.

The hardware is designed to be compliant to EN50155 specifications, accepting different operating supply voltage, from 24V, 37,5V up to 110V according to the model.

RaPLC-RIO mechanical dimensions are based on the standard 3U rack. Depending on how many expansion modules are foreseen, its width can vary up to a maximum of 482 mm (19").

The frontal expansion modules' connector, unless otherwise specified, is a 48 Pin DIN 41612 Type F (Male connector).

The RaPLC-RIO system can also support two identical devices for redundancy.



Properties

Main Processing Unit	<ul style="list-style-type: none"> • Freescale PowerPC
Main Memory	<ul style="list-style-type: none"> • Main CPU ROM: 32 MByte Flash chip • Main CPU RAM: 8MByte SRAM
Main Interfaces	<ul style="list-style-type: none"> • 2 Ethernet 10/100Mbps M12 connectors • LEDs for visual diagnostic (status and alarms)
Optional Interfaces	<ul style="list-style-type: none"> • IEC61375 MVB, EMD Class 1 with 2 connections • CAN 2.0 with DB9 connector • Serial insulated RS485 on DB9 with SYNC HDLC up to 115,2kbps baud rate
Expansion Modules	<p>I/O modules available up to 8 slots</p> <ul style="list-style-type: none"> • DI-1: 24 digital inputs (four isolated sections of six digital inputs per section) battery referenced with polarity and over-voltage protection • DI-2: 16 fully insulated each other digital inputs battery referenced with polarity and over-voltage protection • DOPWM: 16 High Side Switch Outputs, and a 1 PWM input, 486 Hz and 5-95% Duty Cycle • DIO: 8 digital inputs Battery referenced and 8 digital outputs (all galvanically insulated) Solid State - Source (High Side) Type • AUX: 4 galvanically insulated Voltage/Current (hardware-configurable 4-20mA, 0-10V, -10+10V) analog inputs for sensors, with power supply to the sensor +15V ±20%; 2 frequency insulated input signals 4-20mA Square waved input signal, DC-3kHz BW 50% duty cycle; 3 relay type Outputs. • AIO: 8 Analog Inputs hardware configurable in current/voltage (4-20mA,0-10V, PT100 3 wire), 2 isolated groups with 4 analog inputs each, with isolated power supply output 15V ±20%, for sensors; 4 Analog Outputs hardware configurable in current/voltage, grouped in galvanic islands of 4 outputs (0-20mA, 4-20mA or 0-5V, 1-5V, 0-10V, hardware selectable)
Power Supply	<ul style="list-style-type: none"> • Nominal Voltage: 24VDC, 37.5VDC up to 110VDC • Power consumption <ul style="list-style-type: none"> • 2 I/Os 16 W • 4 I/Os 24 W • 8 I/Os 40 W • Power supply specification according to EN50155
Environmental conditions	<p>EN50155 Class Tx</p> <ul style="list-style-type: none"> • Operating temperature: -40°C to +70°C • Storage temperature: -40°C+85°C • Relative humidity: <ul style="list-style-type: none"> • ≤ 75 % average • ≤ 95 % for 30 consecutive days in the year

Dimensions	<ul style="list-style-type: none"> The mechanical dimensions of RaPLC-RIO devices are based on a 3U rack mountable module. The final dimensions are dependent on the final configuration of the RaPLC-RIO device. <p>Configuration 2 I/Os</p> <ul style="list-style-type: none"> W x H x D: 288.7 x 132.5 x 256.5 mm Weight: about 4 Kg Typ <p>Configuration 4 I/Os</p> <ul style="list-style-type: none"> W x H x D: 310.0 x 132.5 x 256.5 mm Weight: about 5 Kg Typ <p>Configuration 8 I/Os</p> <ul style="list-style-type: none"> W x H x D: 482.6 x 132.5x 298.5 mm Weight: about 8 Kg Typ
On board Maintenance Web interface	<ul style="list-style-type: none"> HTTP-based interface (web manager) Different level of access, password protected Detailed information about status of device and network interfaces Application Software and firmware update
Software and Libraries	<ul style="list-style-type: none"> Linux 2.6 Operating System PRISMA® T5 Runtime embedded
Application Software Tools	<ul style="list-style-type: none"> PRISMA® IDE – IEC 61131 SW tool development

Standards

EN 50155	Railway Application Electronic Equipment used on Rolling Stock
EN45545	Fire testing of materials and components for trains, 2013
ISO9002	