



# Computing Intelligence for Rail & Public Transport

## ModuSio

Our IP-based Modular Smart Input/Output modules for rail and public transport smartly fill the gap between any data source and the control computer. IP-based connections (LAN, Wi-Fi) grant independence and abstraction – EN50155 compliant.



# ModuSio – THE CONCEPT

The **Modular Smart Input / Output** modules help to expand existing systems with missing interfaces and sensors, simply by adding them to IP-based networks. The growing ModuSio portfolio includes interface extensions, non-retroactive listen-only modules as well as sensors and actors. Beside the functional aspects, all ModuSio components offer:

- Integrated intelligence for data acquisition and conversion
- IP-based host connectivity; Ethernet & Wi-Fi
- Power supply via PoE or local 24V VDC
- Simple provisioning via USB console
- Support of zeroconf protocols to allow automatic IP assignment and detection of the devices in the network
- IT secure firmware update, hardware/firmware identification and device restart via network

ModuSio modules easily complete any Embedded Computer with any Operation System.

ModuSio products easily integrate into applications by standardized, platform and programming-language agnostic protocols (protobuf and TCP), supported by open-source client libraries offering APIs for popular programming languages.

API functions include:

- Interface configuration, such as setting the CAN baud rate
- Immediate interaction with the interface (e.g., get/set current values of a binary I/O)
- Define and receive one or multiple streams of timestamped samples



# THE PORTFOLIO

## MIO01

4x Binary I/O (110V), 2x Analog Input

- 2 x 2 digital inputs / outputs via 2x 4-pin terminal connector; 24..110 V (nom), common ground or common supply
- 2 x 1 analog input via 2x 4-pin terminal connector; voltage (+/-10 V) or current (4..20 mA) type
  - 24V supply to external sensor
- Usable as real time I/O or datalogger

## MIO04

2x RS232/RS485, CAN

- 2 x Serial Interface RS232/422/485; up to 230 kB; Linux tty device support via RFC2217 protocol
- 1 x CAN Interface, up to 1 MBit/s; useable as direct I/O or datalogger function with multiple time stamped data streams
- SW configurable listen only mode (CAN)

## MIO07

16x Binary I/O (24V)

- 4 x 4 digital inputs / outputs via 4x 6-pin terminal connector; 24 VDC (nom)
- Integrated diagnosis: Output watchdog, protection for overcurrent & reverse polarity, short circuit proof
- Real time date or datalogger function
- IEC 61131-2 compliant

## MIO11

4x PT100/PT1000 Temperature Inputs

- 4 PT100 / PT1000 2-wire, 3-wire or 4-wire inputs via 4x 6-pin terminal connector
- Integrated SINC3 + SINC1 digital filters ensure excellent noise suppression.
- Configurable modes for usage as real time input or data logger
- -100..650 °C measurement range with 0.1 °C resolution and +/- 2 °C precision

## MIO03

MVB, CAN, RS485 Sniffer, non-retroactive

- 1 x MVB listen only via 2x 9-pin D-Sub (male/female)
- 1 x CAN listen only via 1x 9-pin D-Sub (male)
- 1 x RS485 listen only (shared with CAN interface connector)
- Non-reactive datalogger function: multiple time stamped data streams

## MIO06

IBIS Master, CAN, RS485, 2x Binary Out (24V)

- 1 x IBIS Master via 1 x 9-pin D-Sub, 24V, 100mA
- 1 x CAN via 1 x 9-pin D-Sub\*
- 1 x RS422/485 via 1 x 9-pin D-Sub\*
- 2 x 24 V Binary Output

\*shared D-Sub for CAN and RS4xx

## MIO09

8x Analog Inputs

- 4 x 2 analog inputs input via 4x 6-pin terminal connector; voltage (+/-10 V) or current (4..20 mA)
- Provides 4 x 24 V / 40 mA for supplying 8 intelligent sensors
- Configurable modes for usage as real time input or data logger
- Sampling rates of up to 64 kHz and resolutions of up to 19 bit

## MIO12

8x Relay Output

- 8 relay outputs with changeover contacts via 4 x 6-pin terminal connector
- Switching voltage 220 V DC, 125 V AC – also for 110V railways
- Max. switching capacity (ohmic) 30 W (DC), 62.5 VA (AC)



# THE COMPANY

We increase the competitiveness of transport operators through computer-aided solutions using latest technologies such as machine learning and IT security for condition-based and predictive maintenance.

Ci4Rail offers computer and service solutions that support mobility operators, vehicle manufacturers and manufacturers of subsystems in their digital transformation.



## Our Mission:

*Driving the digitalization of rail and public transport with game changing technologies*

## Our Vision:

*A world in which everyone likes to use public transport because it is faster, cheaper and more environmentally friendly than other forms of transport.*

Our focus is both on new equipment and retrofit for:

- Long distance passenger transport
- Freight rail transport
- Rail-bound local public transport
- Road-bound local public transport

