ModuSio MIO01

IP based remote binary & analogue input/output module for edge applications in railway systems

Features

- Modular Smart Input/Output (ModuSio) Module
- Ethernet & WLAN communication
- Power supply via PoE or 12/24V (DC)
- 2x2 digital inputs / outputs (selectable) via 4-pin spring terminal; 0..110V (nom)
- 2x1 analogue input via 4-pin spring terminal; Selectable voltage (+/-10V) or current (4..20mA) type
- 24V supply to external sensor
- Configurable modes for usage as direct I/O or data logger with multiple data streams.
- Galvanic isolation of all inputs and outputs

Introduction

The binary and analogue I/O module *MIO01* extends the functionality of any embedded computer through simplest IP based remote I/O functionality. MIO01 provides four cost sensitive binary inputs / outputs as well as two analogue inputs and is designed to control actors locally or acquire data exactly where it is generated even when the embedded computer is installed hundreds of meters away. This lowers not only cabling effort and cost but also eases up software integration dramatically.

In any case, only one cable is necessary for powering and communication. Used as an Ethernet module, MIO01 is powered simple through Power-over-Ethernet. When used as a WLAN connected device, the module is powered through the same M12 connector with 12/24V DC.

For easiest SW integration, MIO01 supports zeroconf protocols to allow automatic IP assignment and detection of the devices in the network.

Rounded up by secure firmware update, hardware/ firmware identification and device restart via network, MIO01 is well suited to extend easily any embedded system.

Applications

- Condition-based monitoring
- Predictive maintenance
- Data logger
- Fleet optimization
- Process & Control

Software

ModuSio products are easily integrated into applications through standardized, platform and programming language independent protocols (Protobuf and TCP).

They are supported by open source client libraries that provide APIs for common programming languages.

API functions include:
- Interface configuration, e.g. setting the sampling frequency.
- Direct interaction with the interface, e.g., retrieving/setting current values of a binary I/O
- Defining and receiving one or more streams of time-stamped samples

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Specifications

Input/Output	S103-MIO01-
Binary Input/Output	2x2 IN/OUT via 4p spring terminal
Binary I/O characteristics	0..110V DC (nom) - high side or low side switching Max. input frequency: 50 Hz Max. output frequency: 50 Hz Max. capacitive load on output: 470 µF
Binary I/O configuration	Operation mode configurable by software
Analogue Input	2x1 AI via 4p spring terminal
Analogue In characteristics	voltage (+/-10V) or current (4..20mA) type Input sample rate: 300 Hz … 4000 Hz* Resolution: 15 bit (300 Hz); 13 bit (1000 Hz); 11.5 bit (2000 Hz); 8.8 bit (4000 Hz) Accuracy: better than 0,5% (at 300 Hz)
Analogue In configuration	Operation mode configurable by software
Analogue In external supply	24V DC, (TBD mA)
Galvanic isolation	1500V DC / 5 Groups
Host Interface	
Ethernet	10/100 Mbit/s Ethernet via 8-pin M12 x-coded
WLAN	WLAN IEEE 802.11b/g/n
Power Supply	Power-over-Ethernet (PoE— PD) class 1 Alternative: 12/24V DC
Service Interface	USB 2.0 via USB-C
Mechanics	
Dimensions	Height: 151 mm; Width: 42 mm; Depth: 51 mm
Environmental	
Operating Temperature	–40…+70°C / 85°C (10min) (EN 50155:2017 - OT4 + ST1)
Storage Temperature	–40…+85°C (EN 50155:2017)
Humidity	95% (EN 50125-1:2014)
Altitude	3000 m max. above sea level (EN 50125-1:2014, class AX)
Shock / Vibration	EN 61373:2010; Cat. 1; Class B
EMC Emission / Immunity	Rail Applications EN 50121-3-2:2016;
Safety	EN 50155:2017; EN 50153:2014+A1:2017; EN 50124-1:2017; EN ISO 13732-1:2008
Fire&Smoke	EN 45545-2:2013 + A1:2015; HL3
Useful Life	20 years (EN 50155:2017, class L4)
Pollution Degree	PD2 (EN 50124-1:2017)
Certifications	CE

* Analogue Input sampling rate: 300 Hz .. 1500 Hz with guaranteed timing jitter less than 150µs

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Order Information

Article number	Short	Configuration*	Power Input	Bin I/O	An In	Host IF	Service IF	FW update
S103-MIO01-	ModuSio Rail I/O	as Ethernet	PoE (PD) class 1	2x2 Binary In / Out	2x1 Ana-logue In	10/100 Mbit/s Ethernet	USB 2.0	Via USB / Ethernet
		as WLAN	12/24V DC			WLAN IEEE 802.11b/g/n		Via USB / WLAN

* Configuration by means of software during provisioning process

Please contact us for your specific requirements.

Accessories

N/A

Application Context — *ModuSio*

IP-based Modular Smart Input/Output modules for rail and public transport intelligently close the gap between any data source and the control computer. IP-based connections (LAN, WLAN) guarantee independence, abstraction and easy integration.