

PRA-IM2A2 Audio interface module, 2x2 PRAESENSA



The PRA-IM2A2 Audio interface module adds two balanced analog audio inputs and outputs to the PRAESENSA system, combined with two configurable and supervised control inputs and voltage-free control outputs. The audio input signals can be used for calls and background music channels, activated through one of the control inputs. The audio output signals can be routed to zones for amplification by external amplifiers with analog inputs, or for recording purposes.

The PRA-IM2A2 enclosure allows for DIN rail installation near to the auxiliary equipment for short interconnections. The module only requires a connection to an OMNEO IP-network with Power over Ethernet (PoE) for communication and for power supply combined.

Functions

IP-network connection

- Direct connection to the IP-network. One shielded Ethernet cable is sufficient for Power over Ethernet and data exchange.
- Connect a second shielded Ethernet cable for dual redundancy of network and of power connection.
- Integrated network switch with two OMNEO ports allows for loop-through connections to adjacent devices that provide PoE. Rapid Spanning Tree Protocol (RSTP) is supported to enable recovery from failing network links.

Inputs and outputs

The audio interface module supports an analog mode and a digital mode, configurable in the software. The audio inputs and outputs depend on the mode.

- ▶ Two microphone or line level audio inputs for calls or background music
- ▶ Two general purpose, supervised, inputs for control actions from external switches
- ▶ Two balanced line level audio outputs that can be assigned to zones
- ▶ Two general purpose relay outputs to activate external control circuits
- ▶ PoE powered device with dual redundant Gigabit network interface

In analog mode:

- Two audio inputs, electronically balanced, can be set as either line or microphone inputs with optional 48 V phantom power. Each input accommodates various signal sources, including single-ended ones.
- Two electronically balanced line-level audio outputs can function as zone outputs for amplifiers with analog inputs or interface with other systems. These outputs are also compatible with single-ended connections.

In digital mode:

- Two virtual audio channels support the configuration to convert one Dante input stream into an encrypted OMNEO channel and conversely.

The control inputs and outputs and the LEDs behavior are the same regardless of the mode:

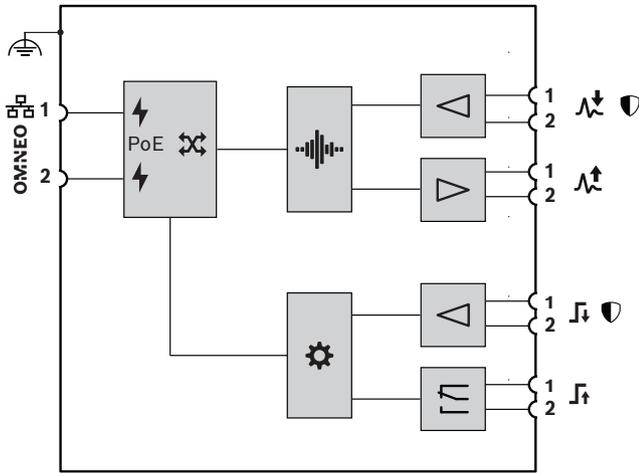
- Two control inputs capture contact closure information from external systems, offering configurable connection supervision.
- Two control outputs provide voltage-free SPDT relay contacts, enabling activation of external devices.
- Control input and output functions are configurable in the software.
- LEDs indicate the operational status and the fault status of all inputs and outputs.

Installation

- The compact enclosure for DIN-rail mounting allows for easy installation in most applications and environments.
- Pluggable spring-cage terminal blocks for easy wire connection.

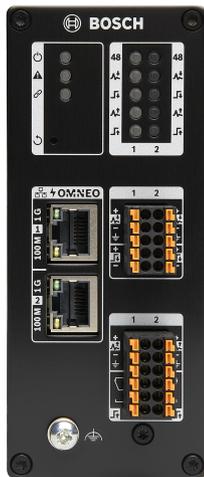
- Connection supervision of control inputs and network connections.
- Optional supervision of line-level audio connections based on pilot tone signals.

Connection and functional diagram



	Power over Ethernet		Controller
	OMNEO network switch		Input amplifier / converter
	Supervision		Output amplifier / converter
	Audio processing (DSP)		Control output relay

Front panel indicators and controls



	Power on	Green
	Device fault present	Yellow
	Network link to system controller present Network link lost	Green Yellow

	Device reset to factory default	Button
	100 Mbps network 1Gbps network	Yellow Green
48	Phantom power enabled	Green
	Audio input signal present 1-2 Audio input overload or connection fault 1-2	Green Yellow
	Control input contact closed 1-2 Control input connection fault 1-2	Green Yellow
	Audio output signal present 1-2 Audio output limiter activated 1-2	Green Yellow
	Control output contact activated 1-2	Green
	Identification mode / Indicator test	All LEDs blink

Front panel connections

	Network port 1-2 (PoE PD)	
	Audio input 1-2	
	Control input 1-2	
	Audio output 1-2	
	Control output 1-2	
	Functional ground	

Architects' and Engineers' Specifications

The audio interface module shall be designed exclusively for use with Bosch PRAESENSA systems. The module shall provide an interface to receive control actions from external switches and to trigger external control circuits. The control and audio data communication shall use OMNEO with dual Ethernet ports for redundant network connection, supporting RSTP and loop-through cabling. It shall be capable of receiving Power over Ethernet (PoE) through either one or both network connections. The DIN rail

housing provides removable terminal blocks to connect 2 configurable general-purpose control inputs with connection supervision, 2 voltage-free, single-pole double-throw (SPDT) relay contacts. This module shall offer the flexibility to operate in either analog or digital mode. In analog mode, it shall feature two balanced audio inputs for microphone and line, with optional phantom power, as well as two balanced audio line outputs. In digital mode, it shall supports a total of 2 virtual audio connections, each capable of functioning as an input (Dante to OMNEO) or output (OMNEO to DANTE), enabling seamless integration with digital audio networks. The audio interface module shall be certified for EN 54-16 and ISO 7240-16, marked for CE and be compliant with the RoHS directive. The warranty shall be three years minimum. The audio interface module shall be a Bosch PRA-IM2A2.

Regulatory information

Emergency standard certifications

Europe	EN 54-16 (0560-CPR-182190000)
International	ISO 7240-16

Regulatory areas

Safety	IEC/CSA/UL 62368-1
Immunity	EN 55035 EN 50130-4
Emissions	EN 55032 EN 61000-6-3 ICES-003 FCC-47 part 15B class A
Environment	EN/IEC 63000

Installation/configuration notes

This is a professional product that should be installed, used and maintained by trained professionals only.

Parts included

Quantity	Component
1	Audio interface module, 2x2
1	DIN rail mounting bracket (pre-assembled)
1	Set of connectors
4	Supervision resistors, 10 kohm
1	Safety and security information booklet

Quantity	Component
1	Quick installation guide

Technical specifications

Audio inputs

Number of audio inputs	2
Frequency response (Hz) (+/-0.5 dB at 0 dB gain)	20 Hz – 20,000 Hz
Frequency response (Hz) (+0.5 dB / -3.0 dB at 54 dB gain)	20 Hz – 20,000 Hz
Minimum signal-to-noise ratio (dB) (A-weighted at 0 dB gain)	114 dB
Minimum signal-to-noise ratio (dB) (A-weighted at 54 dB gain)	91 dB
Input level (dBu)	-36 dBu – 18 dBu
Input impedance (Ω) (balanced)	3,300 Ω (minimum)
Input impedance (Ω) (unbalanced)	2,500 Ω (minimum)
Maximum distortion (%)	< 0.01% @ -3 dBFS / 1 kHz

Audio outputs

Number of audio outputs	2
Frequency response (Hz) (+/-0.5 dB, both maximum output levels)	20 Hz – 20,000 Hz
Minimum signal-to-noise ratio (dB) (A-weighted at maximum output level +12 dBu)	111 dB
Minimum signal-to-noise ratio (dB) (A-weighted at maximum output level 0 dBu)	103 dB
Maximum output level, adjustable	0 dBu / +12 dBu
Output impedance (Ω) (balanced / unbalanced)	150 Ω (maximum)
Maximum distortion (%)	< 0.01% @ -3 dBFS / 1 kHz

Audio

Maximum crosstalk 1 dB below maximum at 1 kHz (dB)	< -80 dB
Phantom power (switchable per analog input)	+48 V / 10 mA
Sample rate (kHz)	48 kHz

Signal processing per channel	
Master EQ	7-band
Level control (dB)	0 – -60 dB, mute
Level control resolution (dB)	1 dB
Dynamics	Compressor

Electrical

Power transfer	
Power over Ethernet (PD)	PoE IEEE 802.3af, Class 3
Nominal voltage (VDC) (input)	48 VDC
Input voltage (VDC) (tolerance)	37 VDC – 57 VDC
Power consumption (W) (evacuation)	5.70 W
Power consumption (W) (maximum)	7.0 W

Network interface	
Ethernet type	100BASE-TX; 1000BASE-T
Ethernet protocol	TCP/IP
Redundancy	RSTP
Control protocol	OMNEO (OCA/AES70); Dante
Security	TLS
Number of PoE ports	2

Control interface	
Number of control inputs	2
Principle	Contact closure
Galvanic isolation	No
Supervision	Resistance measurement
Contact closed (kohm)	8 kohm – 12 kohm
Contact open (kohm)	18 kohm – 22 kohm
Cable fault detection (kohm)	<2.5 kohm / >50 kohm
Minimum hold time (ms)	100 ms
Maximum voltage to ground (V)	24 V

Number of control outputs	2
Principle	Contact switch over (Relay SPDT)
Galvanic isolation	Yes
Maximum contact voltage (V)	24 V
Maximum contact current (A)	1 A
Maximum voltage to ground (V)	500 V

Supervision	
Control input connections	Open / short
Controller continuity	Watchdog
Network interface	Link presence
Pilot tone generation (outputs) / Pilot tone detection (inputs)	
Pilot tone frequency (kHz)	18 kHz – 21 kHz
Pilot tone level (dBFS)	-10 dBFS – -30 dBFS
PoE 1-2	Voltage

Reliability	
Mean time between failures (MTBF) (h) (Telcordia SR-332 Issue 3)	1,700,000 h

Environmental	
Operating temperature (°C)	5 °C – 50 °C
Operating temperature (°F)	23 °F – 113 °F
Storage temperature (°C)	-30 °C – 70 °C
Storage temperature (°F)	-22 °F – 158 °F
Operating relative humidity, non-condensing (%)	5% – 95%
Air pressure (hPa)	560 hPa – 1,070 hPa
Installation altitude (m)	-500 m – 5,000 m
Installation altitude (ft)	1,640 ft – 16,404 ft
Operating vibration	
Amplitude (mm)	< 0.35 mm
Acceleration (G)	< 2 G
Bump (transport) (G)	< 10 G (IEC 60068-2-27)

Mechanical

Dimensions (H x W x D) (mm)	131 mm x 55 mm x 114 mm
Dimensions (H x W x D) (in)	5.2 in x 2.2 in x 4.5 in
IP rating	IP30
Material	Aluminum
Color (RAL)	RAL 9017 Traffic black
Weight (kg)	0.46 kg
Weight (lb)	1 lb

Ordering information

PRA-IM2A2 Audio interface module, 2x2

Network connected, PoE powered, general purpose audio interface module.

Order number **PRA-IM2A2 | F.01U.389.019**

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