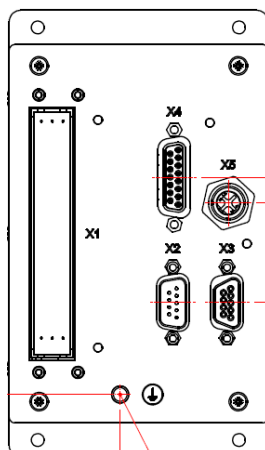


Cab communication unit

Cab Communication Unit (CCU) IP-based



Cab Communication Unit (CCU) IP-based

Application

Interface between driver microphones, control loudspeakers, push buttons as well as train radios and the Ethernet network of the train. The CCU acts as a SIP-IP-telephone on the Ethernet network of the train. Analog fallback lines allow driver announcements in case of network failure.

| Identification | Short description |
|----------------|---------------------------------------|
| 60.0200.0239 | Cab Communication Unit (CCU) IP-based |

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Attention: The color representation does not correspond to the original colors

| Technical Description | | | | | |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------|------|----------|
| Product identification | Cab Communication Unit (CCU) IP-based | | | | |
| Material-No. | 60.0200.0239 | | | | |
| Short description | Communication unit for the driver cab, working as a IP-SIP-telephone. Connects driver microphones, control loudspeakers etc. to the Ethernet network of the train. Audio fallback lines for driver announcements. | | | | |
| Interfaces | | | | | |
| Power supply | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | | 16,8 | 24 | 30 | V |
| Power consumption | | | 5 | 20 | W |
| Address input Address 0 und Address 1 | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Type | | Low-active (to connect with Address GND) | | | |
| Voltage | Open input | | | 3,3 | V |
| Current | connected with Address GND | | 2,5 | | mA |
| Cab digital inputs electrically isolated | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Type | | High-active | | | |
| Voltage | | | 24 | 33,6 | V |
| Input impedance | | | 10k | | Ω |
| Cab digital outputs electrically isolated | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Output type | | Open Collector, switching to 0 V (COM GND Output) | | | |
| Voltage | | | | 33,6 | V |
| Current, maximum allowed | | | | 100 | mA |
| Voltage difference | Load current 50 mA | | 1,6 | 2.0 | V |
| Cab speaker output | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Load impedance | | 8 | 8 | 16 | Ω |
| Voltage | Load 8 Ω | | 4 | 6,5 | Vrms |
| Output power | | | 2 | | W |
| Frequency range | | 300 | | 8k | Hz |

| Cab speaker volume control potentiometer input | | | | | |
|------------------------------------------------|------------------------------------------------------------------------------|------|------|------|----------|
| Parameter | Condition | min. | typ. | max. | Unit |
| Output voltage Pin <i>Poti+</i> | Measured against Pin <i>Poti-GND</i> | | 3 | | V |
| Input voltage Pin <i>Poti-Var</i> | Measured against Pin <i>Poti-GND</i> | 0 | | 3,3 | V |
| Potentiometer resistance | | 1k | 1k | 10k | Ω |
| Assault microphone input | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Input voltage | | | | 10 | mVrms |
| Input impedance | | | 2,2k | | Ω |
| Frequency response | | 300 | | 8k | Hz |
| Voltage for phantom power supply | Switched on by SW | | 3.3 | | V |
| Driver microphone input | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Input Voltage | | | | 100 | mVrms |
| Input impedance | | | 540 | | Ω |
| Frequency response | | 300 | | 8k | Hz |
| Voltage for phantom power supply | <i>Driver microphone code</i> connected to <i>Driver microphone code GND</i> | 11,5 | 12 | 12,5 | V |
| Fallback audio inside vehicle LF | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | | | 2 | 4 | Vrms |
| Frequency range | | 300 | | 12k | Hz |
| Impedance receiver | | 2k | | | Ω |
| Impedance transmitter | | | 50 | | Ω |
| Fallback audio inside vehicle control | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Input „Low“ | | 0 | | 5 | V |
| Input „Mid“ | | 8 | | 12 | V |
| Input „High“ | | 18 | | 26 | V |
| Output voltage | No load | | 21,5 | | V |
| Output voltage | Load 100 mA | 18 | | | V |
| Output current | | | | 100 | mA |
| Input impedance | | | 1600 | | Ω |
| Fallback audio via coupler LF | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | Connected to other CCU via coupling | | 0,7 | | Vrms |
| Voltage | Open loop | | 1,5 | | Vrms |
| Frequency range | | 300 | | 12k | Hz |
| Impedance | | | 600 | | Ω |

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| Fallback audio via coupler control | | | | | |
|--------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------|------|-------|--------|
| Parameter | Condition | min. | typ. | max. | Unit |
| Input „Low“ | | 0 | | 5 | V |
| Input „High“ | | 18 | | 26 | V |
| Output Voltage | No load | | 21,5 | | V |
| Output voltage | Load 15 mA | 18 | | | V |
| Output current | | | | 20 | mA |
| Input impedance | | | 4700 | | Ω |
| RS485 via coupler | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Data rate | | | | 921,6 | kBit/s |
| The line <i>RS485 GND</i> is internally connected to <i>CTRL</i> with a low impedance resistance | | | | | |
| Train radio LF output | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | Load 600 Ω | | 0,7 | | Vrms |
| Voltage | Open loop | | | 1,8 | Vrms |
| Frequency range | | 300 | | 8k | Hz |
| Output impedance | | | 600 | | Ω |
| Train radio LF input | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | | | 0,7 | 1 | Vrms |
| Frequency range | | 300 | | 8k | Hz |
| Input impedance | at 300 Hz | 3k | | | Ω |
| Train radio electrically isolated digital outputs | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Output type | | Open Collector, switching to 0 V (<i>COM GND Out</i>) | | | |
| Voltage | | | | 33,6 | V |
| Current, maximum allowed | | | | 100 | mA |
| Voltage difference | Load current 50 mA | | 1,6 | 2,0 | V |
| Train radio electrically isolated digital outputs | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Voltage | | | 24 | 33,6 | V |
| Input impedance | | | 10k | | Ω |
| Ethernet | | | | | |
| Parameter | Condition | min. | typ. | max. | Unit |
| Data rate | | | | 100 | MBit/s |

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| Housing | |
|---------------------------------|-------------------------------|
| Dimension enclosure (W x D x H) | 133x91x173mm |
| Enclosure material | Aluminum |
| Colour of enclosure | Colorless chromated |
| Weight | 1 kg |
| Protection class acc. EN60529 | IP40 |
| Earth connection | Ground bolt M6 x 15mm |
| Mountig | On the wall via backplate |
| Operation | |
| Temperature range (Operation) | EN50155 T3 -25°C--+70 °C |
| Storage condition | 1K2 according to EN 60721-3-1 |
| Power supply | 24V |
| Power consumption | Typ. 10W, max. 18W |
| Standard | |
| Certification | EN50155 |
| EMC | EN 50121-3-2:2015 |
| Fire safety | EN 45545-2 A1:2015 |

Blockdiagram:

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Structure:

The CCU (Cab Control Unit) is the driver's cab control unit and provides interfaces to the driver's desk as well as to the radio:

- Driver microphone with preamp and control loudspeaker
- Digital inputs and outputs for pushbuttons and indicator lights in the driver's desk
- Ethernet
- Interface to the radio, consisting of audio input and output as well as digital inputs and outputs
- Not used: Analog Vehicle Bus and Coupling Interfaces

The function of the connected pushbuttons and indicator lights is configured by software. The network address is determined by DHCP.

Connectors:

X1 DIN 41612 F 48 pins male: driver cab components interface

Type Harting 09 06 148 6901

Connector



DIN 41612 Typ F connector, 48-pins, male

Harting 09 06 148 6901

Pin – Signal

| Column d | | Column b | | Column z | |
|----------|-----------------------------|----------|----------------------------|----------|------------------------|
| 2 | +24V DC | 2 | +24V DC | 2 | +24V DC |
| 4 | 0V DC | 4 | 0V DC | 4 | 0V DC |
| 6 | NC | 6 | NC | 6 | NC |
| 8 | Address 0 | 8 | Address GND | 8 | Address 1 |
| 10 | IN 0 Interior announcement | 10 | COM GND IN | 10 | IN 3 Intercom |
| 12 | IN 1 Exterior announcement | 12 | COM GND IN | 12 | IN 4 Intercom Löschen |
| 14 | IN 2 Reserve | 14 | COM GND IN | 14 | IN 5 Reserve |
| 16 | OUT 0 Interior announcement | 16 | COM GND OUT | 16 | OUT 3 Intercom |
| 18 | OUT 1 Exterior announcement | 18 | COM GND OUT | 18 | OUT 4 Reserve |
| 20 | OUT 2 Reserve | 20 | COM GND OUT | 20 | OUT 5 Reserve |
| 22 | RS485 A | 22 | RS485 GND | 22 | RS485 B |
| 24 | OUT Cab speaker LF + | 24 | Cab speaker GND | 24 | OUT Cab speaker LF - |
| 26 | Potentiometer+ | 26 | Potentiometer GND | 26 | Potentiometer Var |
| 28 | Assault microphone LF+ | 28 | Assault microphone GND | 28 | Assault microphone LF- |
| 30 | Driver microphone LF+ | 30 | Driver microphone Code GND | 30 | Driver microphone LF- |
| 32 | Driver microphone Code | 32 | Digi Mic Data IN | 32 | Digi Mic Clock |

Shield is connected to the connector housing.


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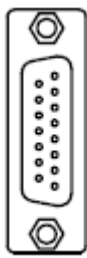
X2 D-Sub 9 pins male: audio fallback line

| Connector | Pin/Signal | | | |
|-------------------------------------------------------------------------------------------------------------|------------|-----------|---|-----------|
|  D-Sub, 9-pin, male, M3 | 1 | Audio + | 6 | Audio - |
| | 2 | NC | 7 | NC |
| | 3 | Control + | 8 | Control - |
| | 4 | NC | 9 | NC |
| | 5 | NC | | |


X3 D-Sub 9 pins female: audio fallback line for coupling

| Connector | Pin/Signal | | | |
|-----------------------------------------------------------------------------------------------------------------|------------|-----------|---|-----------|
|  D-Sub, 9-polig, Buchse, M3 | 1 | Audio + | 6 | Audio - |
| | 2 | NC | 7 | NC |
| | 3 | Control + | 8 | Control - |
| | 4 | RS485 A | 9 | RS485 B |
| | 5 | RS485 GND | | |

X4 D-Sub 15 pins female: train radio interface

| Connector | Pin/Signal | | | |
|--------------------------------------------------------------------------------------------------------------------|------------|------------------------|----|------------------------------------|
|  D-Sub, 15-polig, Buchse, M3 | 1 | COM GND OUT | 9 | D OUT 1 Reserve |
| | 2 | D OUT 0 Reserve | 10 | Schirm |
| | 3 | Audio OUT Funk + | 11 | Audio OUT Funk - |
| | 4 | Audio IN Funk + | 12 | Audio IN Funk - |
| | 5 | NC | 13 | D IN 2 Reserve |
| | 6 | D IN 0 Reserve | 14 | D IN 3 Reserve (Radio to interior) |
| | 7 | D IN 1 Radio to Driver | 15 | D IN 4 Reserve (Assault) |
| | 8 | COM GND IN | | |

X5 M12 D Coding 4 pins female: Ethernet network

| Connector | Pin/Signal | |
|--------------------------------------------------------------------------------------------------------------------|------------|------|
|  M12 D-Coding, 4 pin, female | 1 | TD + |
| | 2 | RD + |
| | 3 | TD - |
| | 4 | RD - |

Counter connectors

| Connector | No. | Description | Manufacturer | Part Nr. |
|-----------|----------|-----------------------------------------------------------------------------------|----------------|--------------------------------------------------------|
| X1 | 1 | DIN 41612 Typ F, female | Harting | 09 06 248 3201 |
| | up to 48 | Crimp contacts, 0.5 bis 1.5 mm ² (Part No. depends on package size) | Harting | 09 06 000 6472 / 09 06 000 7472 / 09 06 000 8472 |
| | 1 | Housing D20 Metal | Harting | 09 06 848 0550 |
| | 1 | Cabel clamp for housing D20 Metal | Harting | 09 06 800 9955 |
| | 3 | Blind bolt for housing D20 Metal | Harting | 09 06 800 9951 |
| X2 | - | D-Sub, 9 pins, female | free selection | |
| | - | Crimp contact, female | free selection | |
| | - | D-Sub Housing, 9 pins, thread M3 | free selection | |
| X3 | - | D-Sub connector 9 pins male | free selection | |
| | - | Crimp contact, male | free selection | |
| | - | D-Sub Housing 9 pins | free selection | |
| X4 | 1 | D-Sub connector 15 pins male | free selection | |
| | 8 | Crimp contact, male | free selection | |
| | 1 | D-Sub Housing, 14 pins | free selection | |
| X5 | 1 | M12 D Coding connector 4 pins male | free selection | |

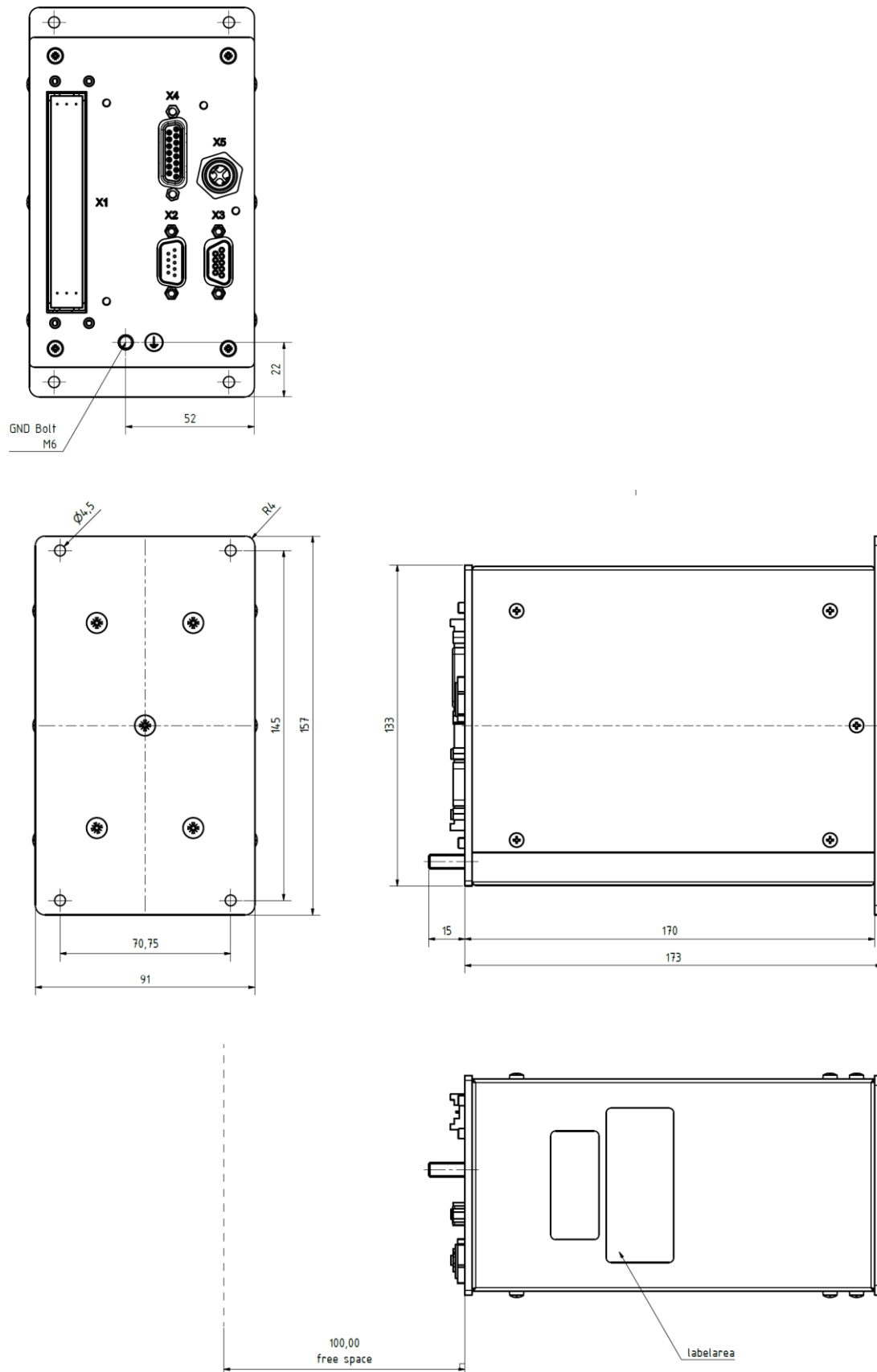
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Drawing



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