LHN-UC15L-SIP | LHN-UC15W-SIP | AMN-P15-SIP

en   User manual

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1   Safety

1.1   Safety information

1.   Read and keep these safety instructions. Follow all instructions and heed all warnings.
2.   Download the latest version of the applicable installation manual from www.boschsecurity.com for installation instructions.

> **Information**
> Refer to the Installation Manual for instructions.

3.   Follow all installation instructions and observe the following alert signs:

> **Notice!** Containing additional information. Usually, not observing a notice does not result in damage to the equipment or personal injuries.

> **Caution!** The equipment or the property can be damaged, or persons can be injured if the alert is not observed.

> **Warning!** Risk of electric shock.

4.   System installation and servicing by qualified personnel only, in accordance with applicable local codes. No user-serviceable parts inside.
5.   System installation for emergency sound (except for call stations and call station extensions) in a Restricted Access Area only. Children may not get access to the system.
6.   For rack-mounting of system devices, make sure that the equipment rack is of suitable quality to support the weight of the devices. Use caution when moving a rack to avoid injury from tip over.
7.   The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

> **Warning!** To reduce the risk of fire and electric shock, do not expose this apparatus to rain or moisture.

8.   Mains powered equipment shall be connected to a mains power outlet socket with a protective earthing connection. An external, readily operable, mains plug or all-pole mains switch shall be installed.
9.   Only replace the mains fuse of an apparatus with a fuse of the same type.
10.   The protective ground connection of an apparatus shall be connected to protective ground before the apparatus is connected to a power supply.
11.   Amplifier outputs marked with ⚠ may carry audio output voltages up to 120 V_{RMS}. Touching uninsulated terminals or wiring may result in an unpleasant sensation.
      Amplifier outputs marked with ⚡ or ⚡ may carry audio output voltages above 120 V_{RMS}. It requires a skilled person to strip and connect the loudspeaker wires in such a way that the naked conductors are inaccessible.
12.   The system may receive power from multiple mains power outlet sockets and backup batteries.

> **Warning!** To prevent a shock hazard disconnect all power sources prior to system installation.

13.   Only use recommended batteries and observe polarity. Risk of explosion if an incorrect type of battery is used.

14. Fiber optical converters use invisible laser radiation. To prevent injury, avoid eye exposure to the beam.
15. Devices for vertical (wall) mounting supporting a user interface for operation shall only be mounted below 2 m height.
16. Devices installed above 2 m height may cause injury when falling down. Preventive measures must be taken.
17. To prevent hearing damage do not listen at high volume levels for long periods.
18. An apparatus may use a lithium coin battery. Keep away from children. If ingested, high risk of chemical burn hazard. Seek medical attention immediately.

1.2 Disposal instructions

Old electrical and electronic appliances.

Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive).

To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

1.3 FCC statement - Wired Class B digital device (unintentional radiator)

Changes or modifications not expressly approved by Bosch could void the user's authority to operate the equipment.

Class B digital device: FCC

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced radio/TV technician for help.

1.4 FCC suppliers Declaration of Conformity

Product(s):

Material	Commercial code	Material description
F.01U.389.835	LHN-UC15L-SIP	Horn loudspeaker 15W, long throw, SIP
F.01U.389.865	LHN-UC15W-SIP	Horn loudspeaker 15W, wide angle, SIP
F.01U.389.866	AMN-P15-SIP	Amplifier module 15W, SIP

Compliance statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Responsible party

Bosch Security Systems LLC
130 Perinton Parkway
14450 Fairport, NY, USA
www.boschsecurity.us

2 Installation

This chapter shows you the steps necessary to install the IP Horn loudspeaker and the IP Amplifier module.

2.1 LHN-UC15L-SIP or LHN-UC15W-SIP IP Horn loudspeaker

2.1.1 Considerations

Before installing the IP Horn loudspeaker, consider the following:

Mounting location:

The IP Horn loudspeaker must be fixed to a stable and suitable surface to support its weight.
– The mounting surface must be able to support more than the nominal weight of a single loudspeaker.
– Choose the mounting location where there is an unobstructed line-of-sight path between the horn and the intended area of coverage.

Required tools
– M13 wrench (fasten torque: 5-6 Nm)
– T20 Torx screwdriver (fasten torque: 1.3-1.8 Nm)

2.1.2 Mounting

The IP Horn loudspeaker comes with a metal bracket attached. The mounting bracket has one central hole and two slotted holes adjacent to it. The central hole has a diameter of 6.8 mm. The slotted holes are 15 mm x 7 mm.
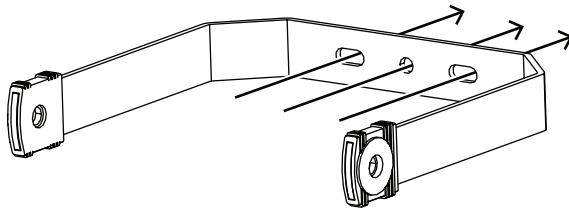
Figure 2.1: Mounting bracket

To mount the IP Horn loudspeaker unit to a wall or any other solid surface, do the following:
1. Using a M13 wrench, remove the side screws and washers that attach the bracket to the IP Horn loudspeaker.
   Remove the bracket from the IP Horn loudspeaker.
2. Fit the bracket in its final position and secure it with one screw in the central hole.
3. Rotate the bracket until you achieve the position you desire.
4. Affix the bracket with two screws in the remaining slotted holes.
5. Reattach the IP Horn loudspeaker to the bracket, inserting the side screws and washers.
6. Make sure the IP Horn loudspeaker is facing the ground in a 10° angle.
7. Fasten the side screws to lock the IP Horn loudspeaker to its final position with a torque of 5-6 Nm.

2.1.3   Connections

To access the cable connections, do the following:

1.   Using a T20 Torx screwdriver, remove the four cover screws.
2.   Lift the cover from the chassis with care.

The back of the IP Horn loudspeaker shows as the reference view bellow.

Reference view
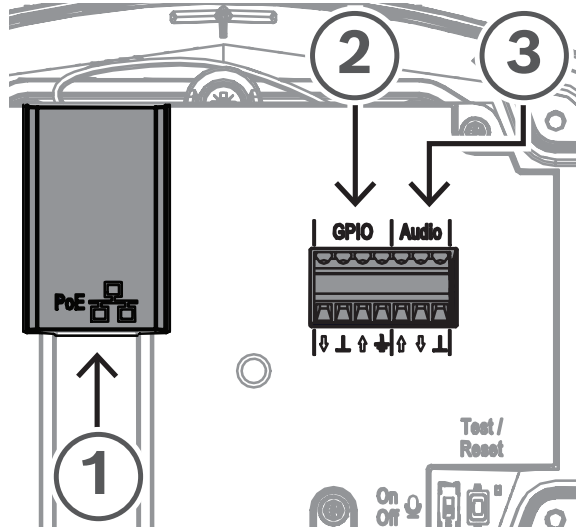
Figure 2.2: Back panel of the IP Horn loudspeaker (without the cover)

Connecting the network (Figure 2.2, callout 1)

The IP Horn loudspeaker supports PoE/PoE+ power supply mode. You need one Ethernet cable to connect to a PoE switch or injector for a convenient installation. For the most reliable operation, always use shielded CAT-5e or higher class cables.

> **Notice!**
> Connect the IP Horn loudspeaker using shielded network cables that are properly grounded.

To connect the network cable:

1.   Cut an Ethernet cable to the desired length.
2.   Thread the Ethernet cable through the cable gland on the bottom left of the cover.
3.   Crimp the RJ45 connector to the cable.
4.   Connect that end of the cable to the network port (Figure 2.2, callout 1).
▸   Verify the network connection:
     The network port LED turns on a few seconds after the network cable is connected, indicating that PoE/PoE+ power has been successfully applied.

There are two lights on the Ethernet jack:

–   A solid green LED (right) indicates the port is operating at 1000 Mbps (1 Gbps). It flickers to indicate network activity.
–   An orange/yellow LED (left) indicates a network link of 100 Mbps. It flickers to indicate network activity.

Connecting the GPIO (Figure 2.2, callout 2)

> **Notice!**
> Connect the IP Horn loudspeaker using shielded cables that are properly grounded.

The GPIO terminal on the device allows you to connect general purpose inputs and outputs.
For example:

GPI used as logical input	GPI used as supervised input	GPO used as direct logical outputs

– Configure the GPIO behavior via *General purpose inputs and outputs, page 38* (GPI active range (V)).
  – For logical input, use < 0.75 V
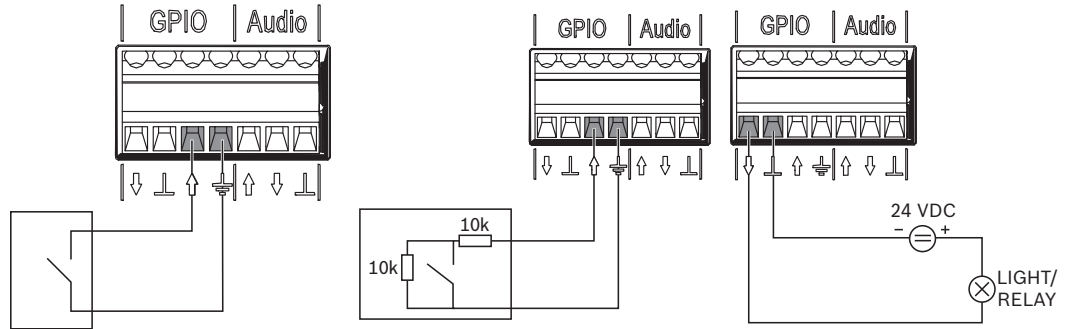 – For supervised input, use 0.75 1.25 V

Connecting the analog Audio (Figure 2.2, callout 3)

> **Notice!**
> Connect the IP Horn loudspeaker using shielded cables that are properly grounded.

The Line-in allows you to route an external analog audio signal into the device. The Line-out allows you to route an audio signal to an external device.

Both audio connections are analog unbalanced.

For example:
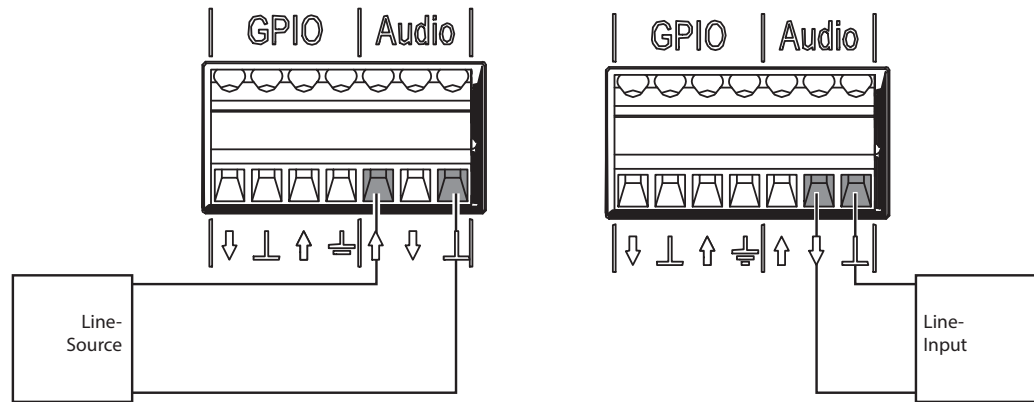
Analog audio used as Line-in   Analog audio used as Line-out

To connect the analog Audio:
1.   Remove the cap on the bottom right of the cover.
2.   Attach the cable gland (supplied) to the bottom right of the cover.
3.   Thread the cable through the cable gland.
4.   Connect the wires to the Audio terminal on the device (Figure 2.2, callout 3).

Reassembling the cover

After you make all the relevant connections to the IP Horn loudspeaker, reassemble the cover.

To reassemble the cover:
1.   Fit the rubber seal on the cover. Make sure that the seal is properly placed.
2.   Align the cover with the screw holes, with the cable glands facing downwards.
3.   Using a T20 Torx screwdriver, tighten the four cover screws with a torque of 1.3 - 1.8 Nm.

2.1.4   Microphone

The integrated microphone provides talkback capability (two-way SIP communication), ambient noise level trigger, and automatic volume control.

It is possible to switch on/off the integrated microphone on the IP Horn loudspeaker via the physical switch inside the IP Horn loudspeaker:
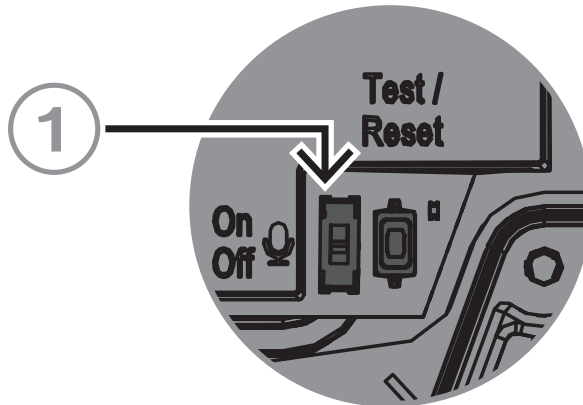
Figure 2.3: Integrated microphone physical switch

On/Off switch

Switches the microphone on and off (Figure 2.3, callout 1).

> **Notice!**
> By default, the microphone is enabled

2.1.5   **Physical reset button**
Reference view
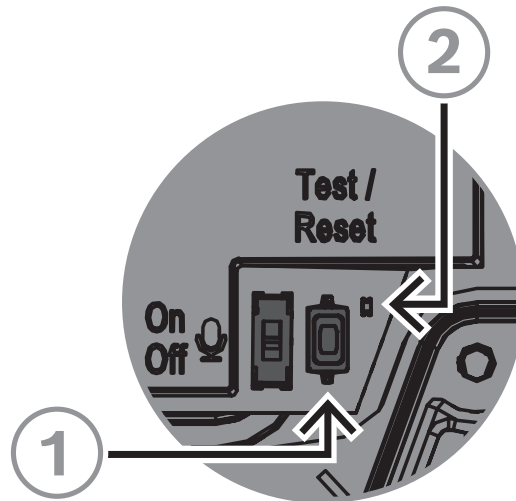
Figure 2.4: Physical reset button and LED

Test/Reset button (Figure 2.4, callout 1)

There is a physical button for test and reset purposes. This button will perform different actions depending on how long you press it:

1.   Press and hold for 1 - 5 seconds: the IP Horn loudspeaker will play a default message to test the loop between the speaker and the microphone. The IP Horn loudspeaker performs a check that the speaker is operating and therefore the microphone is used. When the microphone physical switch is On, the tone lasts around 2 seconds; when it is turned Off, you hear a brief beep (approximately ½ second).
2.   Press and hold for 6 - 10 seconds: the IP address of the IP Horn loudspeaker will reset to factory default (DHCP);
3.   Press and hold for 11 - 20 seconds: the IP Horn loudspeaker will reset to factory default.

Indication LED (Figure 2.4, callout 2)

The LED next to the Test/Reset button serves as a time indicator of how long the Test/reset button is pressed. Once you click the Test/Reset button once, the LED lights up every five seconds for as long as you keep the button pressed, and once more when you let go of the button to indicate the reset is applied.

The LED next to the test button flashes slowly (1 Hz) if the test is successful and quickly (4 Hz) when it is unsuccessful.

2.2   AMN-P15-SIP IP Amplifier Module

2.2.1   Considerations
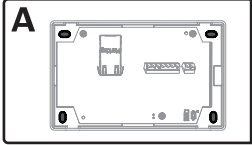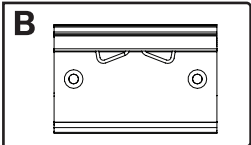
Before installing the IP Amplifier module, consider the following:

Required tools
–   Slotted screwdriver (0.4 x 2.5 mm)
–   4x ≤5 mm Allen head screws
–   T20 Torx screwdriver (fasten torque: 2.0-2.5 Nm)

2.2.2   Mounting

The IP Amplifier module has two installation options:

Fixed to surface	Mounted on a DIN rail
The chassis has 4 pierce-through holes that you can drill for surface mounting. Each hole has a maximum diameter of 5 mm.	The module comes with a DIN rail mounting plate and 2 TX20 screws as part of the components. To mount this into a DIN rail (corresponds to TH 35-7.5 acc. to EN 60715) you must first attach the mounting plate to the IP Amplifier module.

Surface mount (A)

To mount the IP Amplifier module to a solid surface:

1   Remove the cover by pressing the two latches on the top of the cover (1).
The cover disengages from the IP Amplifier module (2).
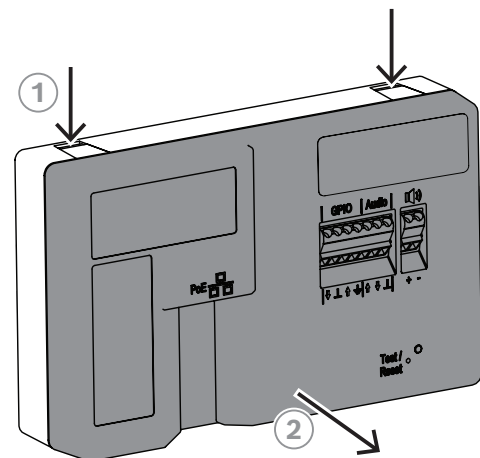
2   Pre-drill the marked holes on the chassis of the IP Amplifier module.
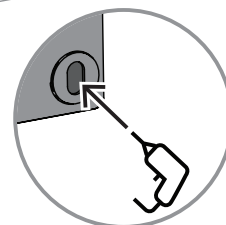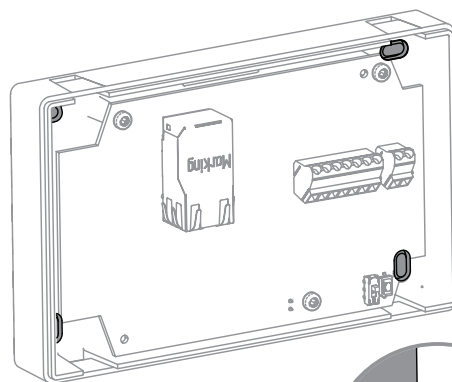
3   Using four screws with less than 5 mm diameter (not supplied), attach the IP Amplifier module to the surface.
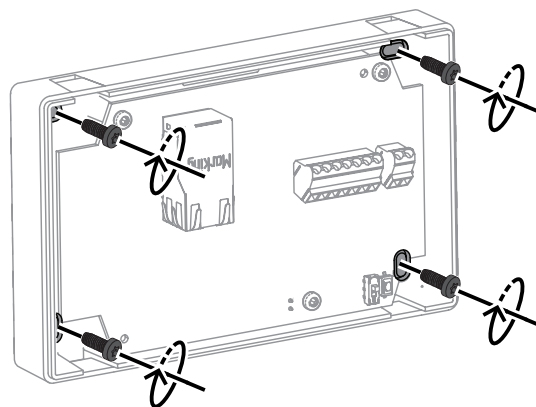
4   Align the cover tabs with the clamp holes on the IP Amplifier module.

5   Gently push the cover until you hear
       a click.
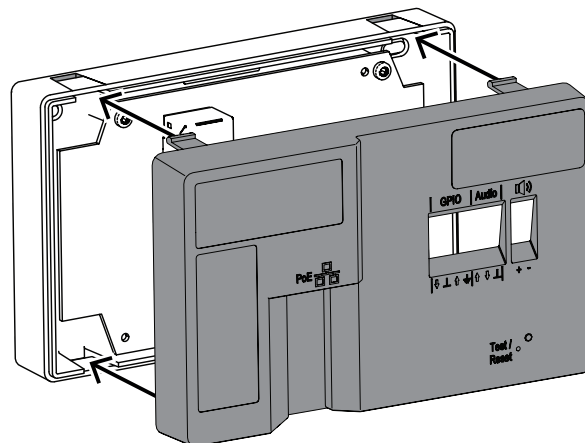
DIN rail mount (B)

To mount the IP Amplifier module in a DIN rail:

1   Using the two TX20 screws
       (supplied), attach the DIN rail
       mounting plate to the back of the
       IP Amplifier module with a torque
       of 2.0 - 2.5 Nm.
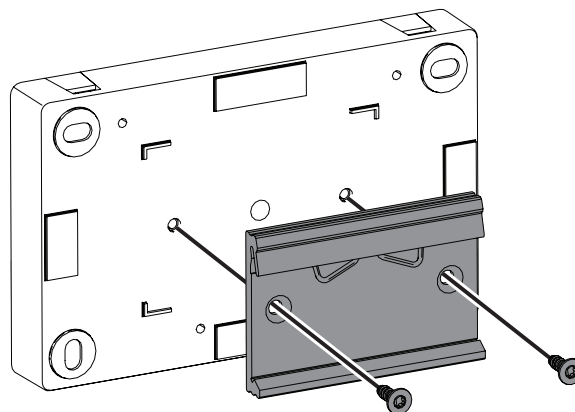
2   After the mounting plate is secured
       in place, clip the IP Amplifier
       module to the DIN rail.
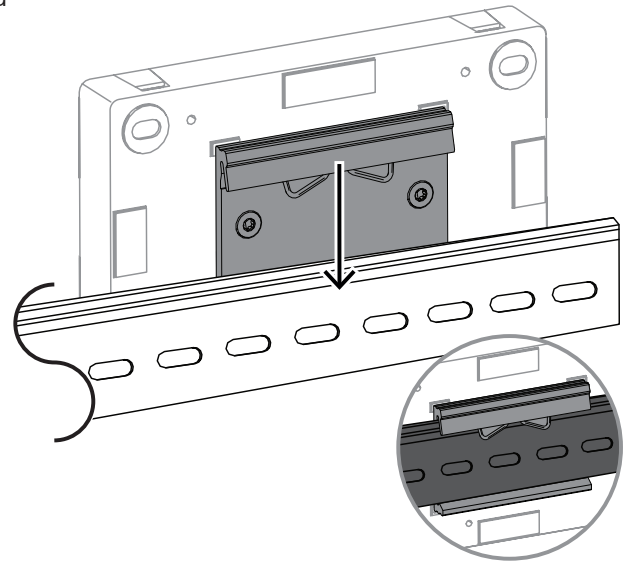
NOTE: To remove the IP Amplifier module, push it downward until the bottom slot disengages
from the rail.

2.2.3   Connections

Once the IP Amplifier module is mounted, you can proceed making the cable connections.
The interior of the IP Amplifier module shows as the reference view bellow.

Reference view
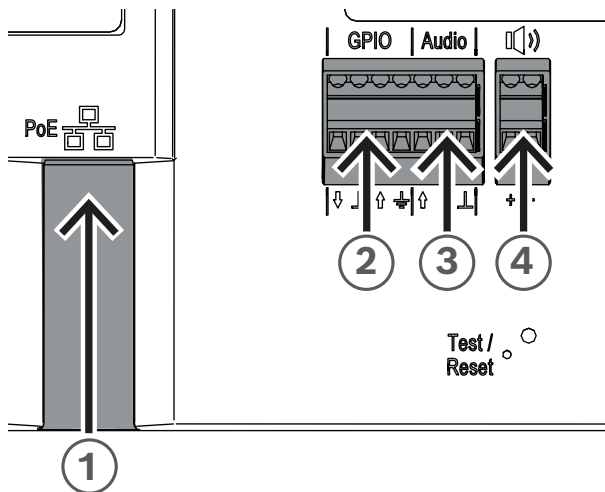
Figure 2.5: Front panel of the IP Amplifier module

Connecting to the network (Figure 2.5, callout 1)

The IP Amplifier module supports PoE/PoE+ power supply mode. You need one Ethernet cable
to connect to a PoE switch for a convenient installation. For the most reliable operation,
always use shielded CAT-5e or higher class cables.

> **Notice!**
> The IP Amplifier module shall be connected using shielded network cables that are properly
> grounded.

To connect the network cable:
1.   Using an Ethernet cable, connect one end of the cable to the PoE/PoE+ port (Figure 2.5, callout 1).
2.   Connect the other end of the Ethernet cable to the switch or the injector.
     The network port light turns on a few seconds after the network cable is connected, indicating that PoE/PoE+ power has been successfully applied.

There are two lights on the Ethernet jack:
–   A solid green LED (right) indicates the port is operating at 1000 Mbps (1 Gbps). It flickers to indicate network activity.
–   A orange/yellow LED (left) indicates a network link of 100 Mbps. It flickers to indicate network activity.

Connecting the GPIO (Figure 2.5, callout 2)

> **(i) Notice!**
> The IP Amplifier module shall be connected using shielded cables that are properly grounded.

The GPIO terminal on the device allows you to connect general purpose inputs and outputs. For example:
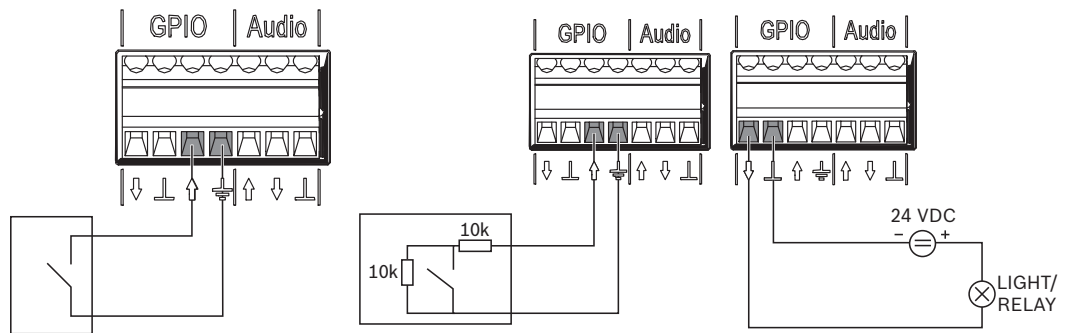
GPI used as logical input   GPI used as supervised input   GPO used as direct logical outputs

–   Configure the GPIO behavior via *General purpose inputs and outputs, page 38* (GPI active range (V)).
     –   For logical input, use < 0.75 V
     –   For supervised input, use 0.75 1.25 V

Connecting the analog Audio (Figure 2.5, callout 3)

> **(i) Notice!**
> The IP Amplifier module shall be connected using shielded cables that are properly grounded.

The Line-in allows you to route an external analog audio signal into the device. The Line-out allows you to route an audio signal to an external device.

Both audio connections are analog unbalanced.

For example:
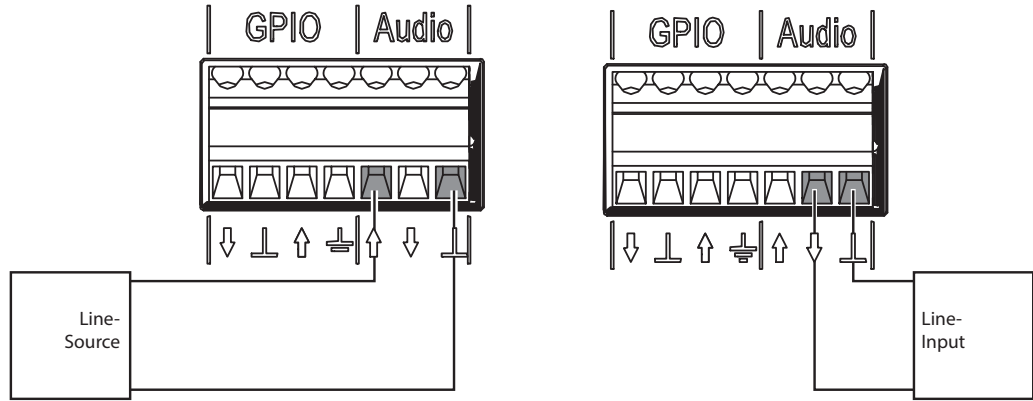
Analog audio used as Line-in

Analog audio used as Line-out

To connect the analog Audio:

–   Connect the wires to the Audio terminal on the device (Figure 2.5, callout 3).

Connecting the passive loudspeaker (Figure 2.5, callout 4)

The IP Amplifier module allows you to connect passive loudspeakers from an impedance of 4 Ohms to an impedance of 8 Ohms.

For example:
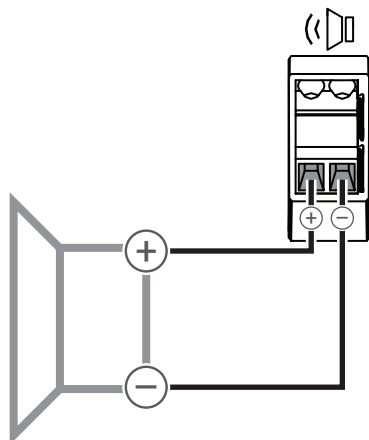
Passive loudspeaker basic connection

2.2.4   Physical reset button
Reference view
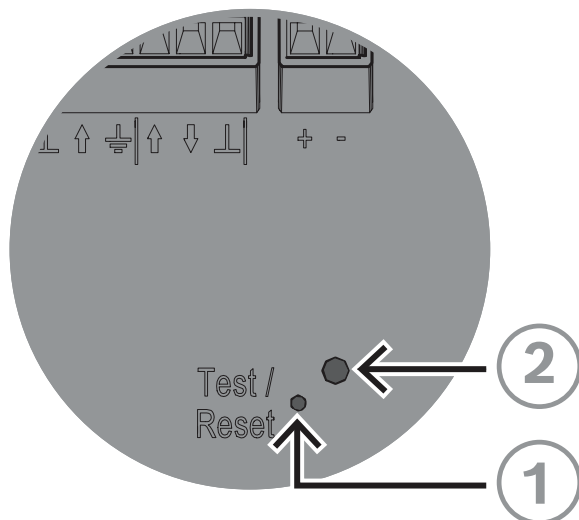
Figure 2.6: Test/Reset button and LED

Test/Reset button (Figure 2.6, callout 1)
There is a physical button for test and reset purposes (Figure 2.6, callout 1). Use a paper clip or similar object to press and hold the Test/Reset button. This button will perform different actions depending on how long you press it:
1. Press and hold for 6 - 10 seconds: the IP address of the IP Amplifier module will reset to factory default;
2. Press and hold for 11 - 20 seconds: the IP Amplifier module will reset to factory default.

Indication LED (Figure 2.6, callout 2)
The LED (Figure 2.6, callout 2) next to the Test/reset button serves as a time indicator of how long the Test/reset button is pressed. Once you click the Test/Reset button once, the LED lights up every five seconds for as long as you keep the button pressed, and once more when you let go of the button to indicate the reset is applied.

3   Getting started

The configuration of the IP Horn loudspeaker and the IP Amplifier module is done via WEB based GUI.

Before starting the configuration and operation of the IP Horn loudspeaker and the IP Amplifier module, it is advised to do the following:

1.   *Download and update firmware, page 21*
2.   *IP address detection, page 22*
3.   *Logon with the web browser, page 23*

3.1   Download and update firmware

You perform firmware updates via the Firmware Upload Tool (FWUT) version 9.0 or above
You can get the latest firmware and required Firmware Upload Tool (FWUT) from the product page on www.boschsecurity.com.

> **Notice!**
> The Firmware Upload Toll is available in 32-bit and 64-bit. Download the version 9.0 or latest and install the software on your computer.

The firmware is available to you as a digitally signed installer. After that, the firmware file is placed centrally and shows up in the FWUT.

To update the firmware of the device, do the following:

1.   Open the **OMNEO Firmware Upload Tool**.
2.   From the File menu, select **Options**.
       Make sure the checkbox **Use secure connection** is unchecked.
3.   Click the **Change** button.
4.   Click **OK**, again.
5.   On the tab **Devices**, select the device to update.
6.   Click the **Upload** button.
7.   From the list of firmware, select the firmware to download.
8.   Click the **Start** button.
       When the upload is complete, the **State** tab displays **Finished** and your device is ready to use.

> **Notice!**
> Do not disconnect the device while the update is running. If the update fails, disconnect the device and connect it again. Repeat the update process.

> **Notice!**
> Performing a firmware update keeps the device's configuration.

3.2   IP address detection

You need the IP address of the device to be able to do its configuration via a web browser.
There are different ways to obtain the IP address.
Below are two options on how you can get the IP address of the device.

With the Bosch Configuration Manager

▸   You can quickly discover the IP address of your device using the Bosch Configuration
    Manager. You can download this software from https://
    downloadstore.boschsecurity.com.

To discover the IP address using Bosch Configuration Manager:
1.   Connect your device to the same network of your configuration PC.
2.   In the navigation bar, select the Network Scan tab.
     The Network Scan screen appears.
     –   Every network device that is supported and detected on the network appears in the
         screen.

The information about a device is shown in bold if the device is newly detected since the last
network scan.
The information about a device is shown in red if the device has an IP address or a MAC
address that is already used by another device in the system. This might be the case, for
example, if several devices that have not yet been configured are connected directly after one
another.

With the Firmware Upload Tool
Another form of discovering the IP address of the device is via the Firmware upload tool.
To discover the IP address of the device using FWUT:
1.   Connect your device to the same network of your configuration PC.
2.   Launch the FWUT.
     The FWUT discovers the device and its IP address appears in the IP address tab.

ⓘ   **Notice!**
         Make sure the IP address column shows up in the FWUT window. To add the IP address
         column on the FWUT go to **View, Select columns...** and check the box of IP address.

3.3   Logon with the web browser

The device is configurable via a web browser. Launch your web browser and type the string "https://" followed by the IP address, e.g. "https://169.254.100.180".
To log on with the web browser, do the following:

1.   Open a browser and enter the IP address (https://[ip address]) or host name (https:// [hostname]) of the device. Accept the risk for the self-signed certificate.
     If you access the device for the first time, you will get a register setup screen. This requires you to register the administrative account for the device:
     –   Enter a unique username. The username must be 4 - 64 characters long.
     –   Enter a unique strong password for the user. The password must be 8 - 64 characters long.
     –   Choose the language of the interface. Later you can change your preference in *Generic settings, page 25*.
     –   Register the administrative account.
2.   Enter your username and password.
3.   Login to the web interface.

You can also access the web-GUI of the device via the Bosch Configuration Manager. To do so:
1.   On the navigation bar, click the **Network Scan** button.
2.   Right-click the selected device, then click **Show in Web Browser…**.
     The web-GUI of the device opens in your default browser.

There is no default password; it is required to set a user and a password to logon to the device the first time during the register account setup.

Supported browsers
–   Chrome
–   Safari
–   Firefox
–   Microsoft Edge.

Notice!
Avoid using the same password for multiple devices. Setting multiple devices with the same password poses a high security risk.

Password creation tips
–   Contain a combination of uppercase letters, lowercase letters, special characters and digits.
–   Avoid trivial character strings (e.g., 1234567890, ABCDEFGHIJ, QWERT).
–   Avoid manufacturer-related names, general names, brand names, words from a dictionary or word combinations, including foreign words.
–   Avoid public or easily identifiable personal information (e.g., telephone number, date of birth, ID number).
–   Any combinations with incremental counters (e.g., month, year).

4   Web-GUI configuration

4.1   Overview

Use the Overview page to view four functions (Users, SIP, Messages and Rules) of the web interface and to navigate to those functions in the system using the informative graphical tiles. Each tile displays configuration data and real-time status information of the device. Navigate directly to these functions by clicking on the tile. To access all the functions of the device, use the left navigation menu.

Identify device button
Use the Identify device button to play a default message with a priority of 1 (further information on priority in *Rules, page 31*), in order to identify the device.

Left Navigation Overview	
Users, page 25	To manage user account and permissions.
SIP, page 26	To manage SIP settings and accounts.
Audio, page 28	To configure and manage audio settings.
Messages, page 31	To manage and configure messages.
Rules, page 31	To manage and configure rules.
Certificates, page 36	To manage certifications for the device.
Security, page 36	To manage security for the device.
Maintenance, page 37	To manage and maintain the device.
Logging, page 39	To view and manage logging events.
Logout, page 39	To log out of the web application.

4.2   Generic settings

The Generic settings page contains information about general settings, time settings, network preferences and the hostname of the device.

From this page, you can:
– Change the device name
– Change the language of the GUI
– Select the time zone
– Define an NTP (Network Time Protocol) server address (where to obtain clock synchronization). The NTP address can be an IP address or domain name.

Notice!
In many cases, IP devices such as routers or switches provide NTP by DHCP. Changing the NTP Address overrides the NTP given by the DHCP.

– Define the IP and DNS settings of the device. By default, both IP and DNS settings are configured by the DHCP. If you require a static DNS and IP address, clear this check box and fill in the fields accordingly.

Notice!
In order to apply all changes performed in this menu, you need to reboot the device.

4.3   Users

The User page displays a list of current users in the system.
From this page, you can
– Create a user account
– Modify a user account
– Delete a user account

User accounts include a username (4 - 64 characters), a password (8 - 64 characters), and a user group.
There are two user groups available:
– API: grants read/write access to other devices via http or https. Create login credentials for accessing things like the virtual GPIOs using this group. The user can also access further services. The API is described on https://<IP_Address>/build/api/index.html.
– ADMIN: grants access to configuration and control options in the web interface.

Notice!
Once the user account is created, you can only modify the password. It is not possible to change the user group. If the user needs to have a different user group, delete the account and create a new profile with the new user group assignment.

4.4   SIP

Use the SIP page to configure the system for SIP operations. By default, the SIP is active using a pre-configured P2P SIP account.

From this page you can access:
–   SIP settings
–   SIP accounts

4.4.1   SIP settings

Use the SIP settings page to view, modify, enable and disable SIP service settings.

SIP service enabled check box

The SIP service enabled check box determines whether the SIP client should be running or not.

The type of transport protocols the SIP client is allowed to use is set in the dropdown menu upon account creation.

By default, SIP supports TCP, UDP and TLS protocols.

Server certificate

Server certificates are digital authorizations that allow secure transmissions between the SIP server and the IP Horn loudspeaker/IP Amplifier module. When you select the Verify server certification check box, the device verifies the SIP server is authorized to transmit and receive audio and data by checking the digital certificate. Select the proper certificate from the Certificate for this device drop down menu.

Manage the available certificates on the *Certificates, page 36*.

Advanced SIP configuration settings

Further configuration settings can be adapted to match the SIP server requirements.

Notice!

The device is unable to establish a direct connection with an online SIP proxy. Use SIP trunking to connect to the public telephone network via a SIP provider.

4.4.2   SIP accounts

Use the SIP accounts page to provide information on the current existing accounts for this device. From this page, you can enable and disable existing SIP accounts and add, modify, or delete accounts.

You can create two type of accounts:
–   P2P account - applicable for direct SIP phone to SIP device (softphone, USB phone, SIP-based telephone hardware, ATA phone adaptors, etc.) communication. To set up a P2P account, two parameters are mandatory: Username (Label) and the Transport protocol.
–   Registrar account - applicable if the device connects to a SIP server.
     To set up a Registrar account:
     –   The Username and Password need to match to the SIP server's dedicated account for the device.
     –   You must select the Transport protocol.
     –   You must assign an IP address of the SIP server in the Registrar.

In-house / on premise

SIP device   In-house IP-PBX System   IP Horn
                    (local SIP Server)   loudspeaker

SIP Trunk

VoIP Provider   Internet   In-house IP-PBX System   IP Horn
                               (local SIP Server)   loudspeaker

VOIP   SIP Trunking
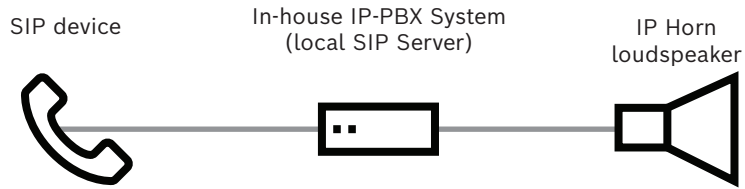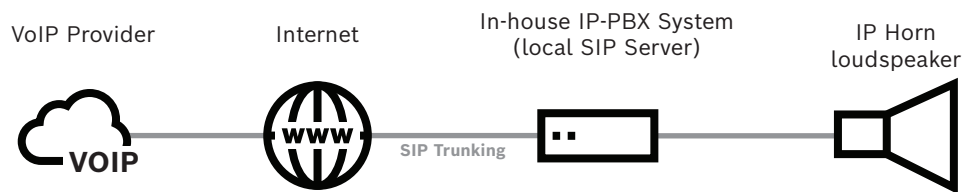
Figure 4.1: Connection to IP-PBX system

Notice!

For a correct functionality, every SIP account requires at least one rule referencing the account. For more information, see *Rules, page 31*.

4.5   Audio

Use the Audio page to adjust and configure audio preferences. Different tabs are shown depending on the type of device connected (IP Horn loudspeaker or IP Amplifier module). There are basic audio settings and advanced audio settings.

By default, the device comes with the Advanced view disabled. Only the basic audio settings are displayed unless you enable the Advance view.

Basic audio settings:
–   Audio
–   User Equalizer
–   Microphone Equalizer

Advanced audio settings:
–   Noise gate
–   Speaker equalization
–   ANC (Ambient Noise Control for automatic volume adaption)
–   Sine generator
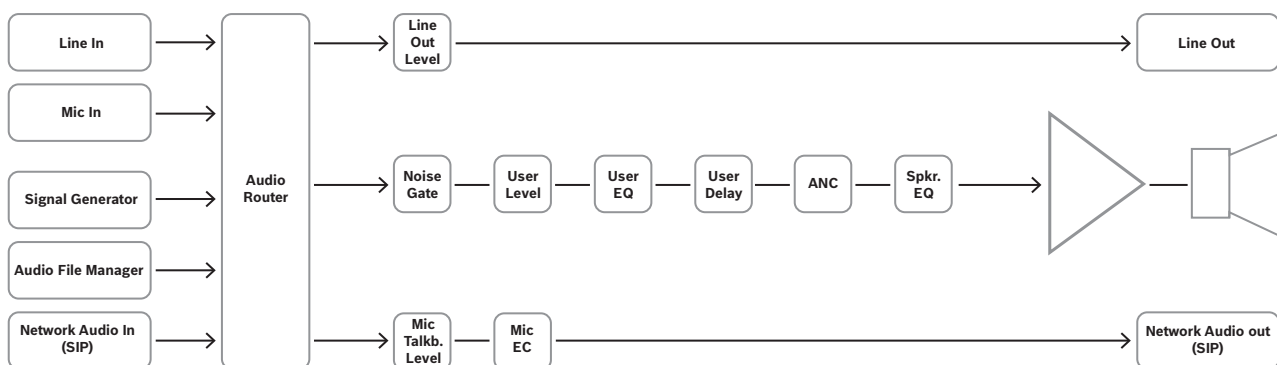
Figure 4.2: DSP signal flow diagram for IP Horn loudspeaker
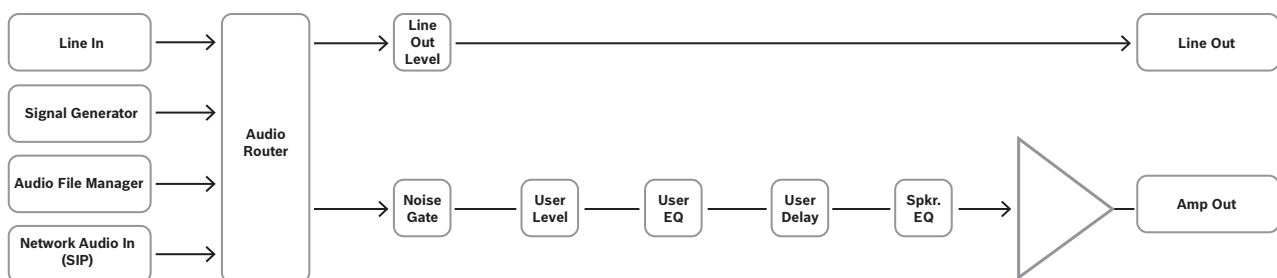
Figure 4.3: DSP signal flow diagram for IP Amplifier module

To display the advanced audio settings, enable the Advanced view on *Maintenance, page 37*.

4.5.1   **Basic audio settings**

Audio page

There are different audio settings available according to the type of device you are configuring.

User level	The User level field controls the amount of gain, in dB, for the loudspeaker (IP Horn loudspeaker) or for the amplifier output (IP Amplifier module).
Line out level	The Line out level field controls the amount of gain, in dB, of the analog line output.
Mic talkback level (IP Horn loudspeaker only)	The Mic talkback level field controls the gain, in dB, of the integrated microphone.
User delay	The User delay field allows you to delay the amplifier output up to 170 ms.
Noise trigger threshold (IP Horn loudspeaker only)	The Noise trigger threshold field sets the noise level threshold before triggering an action. For more information, see *Rules, page 31*.
Noise trigger RMS time (IP Horn loudspeaker only)	The Noise trigger RMS time field defines the amount of time, in milliseconds, to evaluate a noise before triggering an action. For example, if a specific noise level occurs for a set amount of time, then a message plays. Having a short RMS value triggers an action for a quick noise, such as a clap of thunder. Having a longer RMS value needs to have a longer noise before triggering an action, such as footsteps, conversations, etc.). For more information, refer to *Rules, page 31*.

User equalizer page

The User equalizer page allows you to configure the Type, Gain, Frequency, Quality, and Bypass of the output from the IP Horn loudspeaker or the IP Amplifier module.

Use the 3-band PEQ (parametric equalizer) to set parameters by entering values in the specific fields, using the + or - to increase or decrease the values, or by moving a point in the plot graph.

A Reset to default button, located at the top of the page resets the values to the default settings.

Microphone equalizer page (IP Horn loudspeaker only)

The Microphone equalizer page allows you to configure the Type, Gain, Frequency, Quality, and determine the Bypass status for the talkback microphone audio.

Use the 3-band PEQ (parametric equalizer) to set parameters by entering values in the specific fields, using the + or - to increase or decrease the values, or by moving a point in the plot graph.

A Reset to default button, located at the top of the page resets the values to the default settings.

4.5.2 Advanced audio settings

Advanced audio settings, when active, allow the user to set parameters for noise gate, speaker equalization, ANC (automatic volume control) and to configure sine wave generator for measurement testing.

To display the advanced audio settings, enable Advanced mode on *Maintenance, page 37*.

Noise gate page

Use the Noise gate page to configure the point at which noise suppression activates.
This means you can:
– configure the audio level of activation (Threshold)
– configure the speed at which the device gets to the activation threshold (Attack)
– configure how long suppression is active (Hold) after the threshold met
– configure the speed at which the gain transitions to silence during release (Release)
– configure the depth of the audio when noise gate is active (Depth)

Set these parameters by entering values in the specific fields or by using the + or - to increase or decrease the values.

Speaker equalizer page

The Speaker equalizer page allows you to configure the Type, Gain, Frequency, Quality, and Bypass of the output from the IP Horn loudspeaker or the IP Amplifier module.
Use the 6-band PEQ (parametric equalizer) to set parameters by entering values in the specific fields, using the + or - to increase or decrease the values, or by moving a point in the plot graph.
A Reset to default button, located at the top of the page resets the values to the default settings.
Alternatively, it is possible to pick from a set of factory presets made especially for the IP Horn loudspeakers.

ANC page (IP Horn loudspeaker only)

Use the Ambient Noise Control (ANC) page to configure when using an automatic adaption of the volume depending of background noise. The integrated microphone measures the audio level. You can set a threshold that automatically adjusts the volume of the device depending on the amount of ambient noise.
This means you can:
– configure the audio level at which adjustments start (Threshold),
– configure the amount of time, in milliseconds, to evaluate a noise before triggering the adjustment (RMS time)
– configure ratio of adjustment increases (Ratio)
– configure the maximum level of gain in adjustments (Gain max)

Set these parameters by entering values in the specific fields or by using the + or - to increase or decrease the values.
When the sine generator is activated, the value Calculated gain (dB) indicates the current volume adaption.
– Practical example: Starting at a noise of -40 dBFS, the adaption shall raise the volume equally to the noise getting louder, not more than 20 dB.
    – Set Threshold to -40 dBFS.
    – Keep Ratio at 1.0.
    – Set Gain max (dB) to 20.

Sine generator page

Use the Sine generator page to configure a test signal that tests the signal strength of the device.

Set the Frequency and Gain fields to the desired parameters for the environment.

4.6   Messages

The Messages page displays the current user messages and default factory messages in the system.

The system comes with a set of factory messages. You cannot edit, download, or delete these messages, and they are hidden by default. Click the Show factory messages button, located in the top right corner of the window, to make the factory messages visible.

Also located in the top right corner of the messages page is the available storage space field. This field displays the amount of storage left for user generated messages.

You can add messages by either uploading a file or pointing to a url (audio streams and audio files delivered by http).

Acceptable file types for new messages include .wav, .mp3, .ogg, and .opus.

To find specific messages quickly, use the search field at the top of the page. Simply enter the name of the message and click the 🔍 button.

From this page, you can:
–   Add new messages
–   Play existing messages
–   Download existing messages
–   Edit existing messages
–   Delete messages

4.7   Rules

Use the Rules page to configure triggers that initiate actions within the system. The primary component around which the system should be set up is its set of Rules.

Using the + button, you may add new rules. You can also edit or delete existing ones.

There are three sections on the rules page:
–   Name and priority
–   Trigger settings
–   Action settings

To find an existing rule quickly, use the search field at the top of the page. Simply enter the name of the rule and click the 🔍 button.

4.7.1   Name and priority

Label Field

Use the Label field to enter a unique name for the rule.

Enabled check box

Use the Enabled check box to activate or deactivate a rule. You can also use the slider button on the main Rules page to activate and deactivate a rule.

Priority field

Use the Priority field to define the importance of the rule. Enter the priority in the field or use the + and - to increase or decrease the value.

The range for this field is 1 (lowest) to 100 (highest).

The rule with the highest priority will start if there are active triggers on both rules. If a rule with a lower priority is already in effect, it is stopped.

4.7.2   Trigger settings

Trigger settings define the event that starts an action. You can initiate actions by a schedule, by ambient noise, by an incoming SIP call, by a physical GPI, or by using a virtual GPI.

Schedule only

Use the Schedule only trigger type when an action is time-controlled. For example, an alarm sounds at the same time every day. You can schedule actions to perform minutely, hourly, daily, weekly, monthly, yearly. Select the option Always to bypass or take out the time-controlled settings.

SIP

Use the SIP trigger type to configure an action to start when a call comes into the system. The most common application of the SIP trigger type is using a SIP call (Action type - Route call). Another possibility for the SIP trigger type is to initiate an action using DTMF (Dual Tone Multi-Frequency).

You can combine this trigger type with a schedule via Schedule type, if applicable. Otherwise, keep the default setting of Always.

There are two additional parameters needed when using the SIP trigger type:

– You must select the appropriate SIP account. For more information on SIP account configuration, see the SIP page.
– You must select the appropriate DTMF code, if applicable.

GPI

Use the GPI trigger type to initiate an action via a physical GPI (General Purpose Input). The device offers one physical GPI. For information on installing the GPI, see *Installation, page 8*. You can combine this trigger type with a schedule via Schedule type, if applicable. Otherwise, keep the default setting of Always.

Configure the physical GPI on *Maintenance, page 37*, using the GPI active range parameter.

VGPI (Virtual GPI)

Use the VGPI trigger type to initiate an action via a virtual GPI. The device offers 16 virtual GPIs. You can manually configure these GPIs from the user interface via *Maintenance, page 37*, under Virtual GPIs or by using the API.

You can combine this trigger type with a schedule via Schedule type, if applicable. Otherwise, keep the default setting of Always.

Noise trigger (IP Horn loudspeakers only)

Use the Noise trigger type when an action starts after an ambient noise reaches a specific level or the noise level exceeds a specified limit.

You can combine this trigger type with a schedule via Schedule type, if applicable. Otherwise, keep the default setting of Always.

There are two noise parameters necessary for operation. You can find these parameters on the Audio page:

–   Noise trigger threshold
–   Noise trigger RMS time

Trigger starts but does not stop the action check box

If enabled, the Trigger starts but does not stop the action check box allows an action to run completely, even when the trigger is no longer present. For example, a message plays to the end. The repetition count setting affects the message play behavior, see Figure 4.4.

If disabled, the action stops immediately when the trigger finishes.

(i)	**Notice!** The scheduled types only work properly if the device is synchronized with an NTP server.

4.7.3   Action settings

Triggers start actions, such as playing a message, testing the device, accepting and routing an incoming SIP call, or configuring the predefined audio routes.

Start message

Use Start message to define a message, which is either a device default message or a custom-made message, which plays when a trigger condition is present. For more information, see *Messages, page 31*.

You must use Repeat Count in combination with the Trigger starts but does not stop the action check box to ensure the message plays to the end.

Use the Repeat Count option to define the number of times the message plays. For example, if the repeat count is set to 2, and the trigger condition is only present for a short time, the message plays 2 times. If the trigger condition is still present after the message cycle finishes playing, the message cycle begins again. This cycle continues until the trigger condition is no longer present. A zero value repeats the message indefinitely.
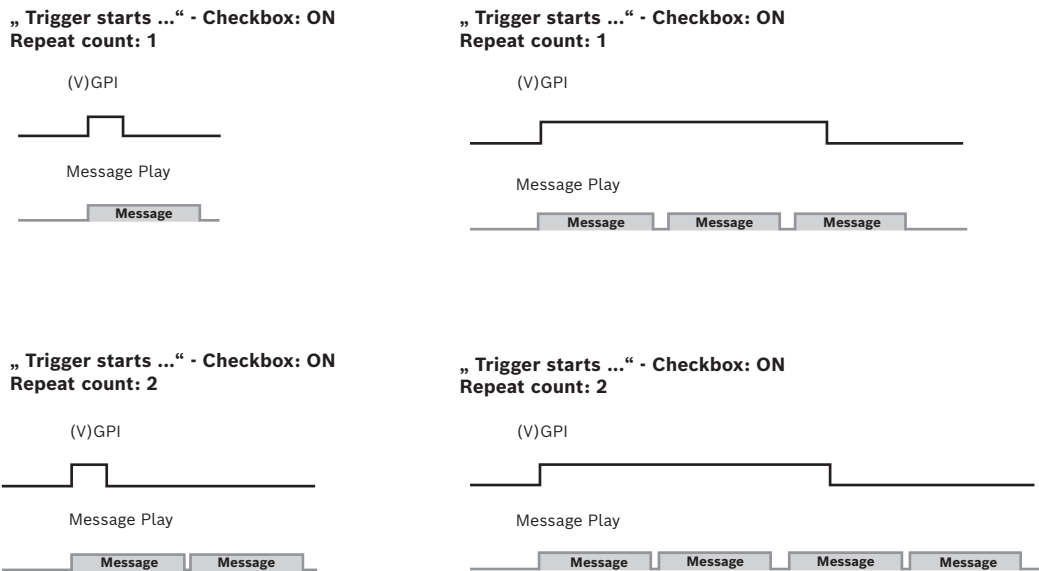
Figure 4.4: Message play behavior with "Trigger starts..." checkbox enabled

You can manually adjust the gain of individual messages via the Gain (dB) field.

You can also define a GPO Action that runs when the trigger action is present.

Device test

Use the Device test action to define a test to see if the device is performing correctly. Select the type of device test to run when a trigger initiates.

NOTE: The Loopback horn mic is only applicable when using the IP Horn loudspeaker.

You can also define a GPO Action that runs when the trigger action is present.

Notice!

Device tests run to completion no matter what state the Trigger starts but does not stop the action check box shows.

The results of the device test can be provided via the API. The result can be read out via <ip>/api/ext/v1/status - value "speakertest" (TRUE = passed, FALSE = failed).

Route call

Use the Route call action type for the device to accept and route an incoming SIP call (this setting works only if the trigger is a SIP call). You can define the call routing to be full duplex (audio goes both ways) or speaker only (audio goes one-way).

Full duplex audio mode (IP Horn loudspeaker only) utilizes the integrated microphone of the device establishing a two-way audio connection with the SIP caller. This means that a person standing near the device can converse with the person at the other end of the SIP call.

Speaker only audio mode means the SIP call is the only audio heard over the device. Speaker only is a one-way call/announcement to the device.

You can also define a GPO Action that runs when the trigger action is present.

Notice!

There is no possibility to initiate a SIP call from the device to another SIP device.

Set routing

Use the Set routing action type to configure the device's audio output. There are two audio output channels: line out and speaker out. You can configure each channel independently with its own input source which gives greater flexibility in routing audio.

Available input source: no audio (silence), audio line input, and sine generator. If using the sine generator, you may adjust the sine signal in the Audio page.

SIP calls and playing messages are automatically routed to both line out and speaker out.

GPO Action

In addition to a running action, you can configure an additional physical GPO or virtual GPO to occur. For example, every time a live call or message is transmitted, a GPO is used to activate a separate light (an optical signal).

The device has 1 physical GPO which may be connected using a separate cable and 16 virtual GPOs, which can been seen on *Maintenance, page 37*, under API interface.

4.8   Certificates

Use the Certificates page to create and manage the certificates the device uses for secure transmissions within the system. Certificates are digital authorizations that allow devices to communicate with each other over secure communication lines.

(i)   **Notice!**
Certificates must be Base64-encoded X.509.

There are two types of certificates available:

Server client certificate
The Server client certificate allows secure data transmission between the IP Horn loudspeaker/IP Amplifier module and the PC or mobile device browser. Selection of this certificate is done from the *Security, page 36*.
To add this certificate, select the Server client certification; enter a public key and upload the certificate file via the select file button. Add the private key file via the Select private key file button.

CA cert
The CA certificate allows secure SIP communication (transport protocol TLS) between a SIP server and the IP Horn loudspeaker/IP Amplifier module, including authorization. This certificate has to be identical to the one on the SIP server. For more information, see the SIP page.
To add this certificate, select CA cert and upload the certificate file via the select file button.

To find specific certificates quickly, use the search field at the top of the page. Simply enter the name of the certificate and click the 🔍 button.

4.9   Security

Use the Security page to configure the settings for the secure transmission of data between the IP Horn loudspeaker/IP Amplifier module and a browser on a PC or mobile device.
To provide higher security levels, this page allows you to select specific ciphers suites.

Connection policy
By default, the connection policy is set to HTTPS (a secure data transmission policy). If you prefer using an unsecure transmission, select one of the other options available: HTTP or HTTP and HTTPS**.**

HTTPS certificate
The HTTPS certificate allows you to select a specific certificate to increase the security of data transmission. To select from the certificates available, first generate them in *Certificates, page 36*.
Click Save to save and apply your preferences.

(i)   **Notice!**
This can lead to a restart of the User interface

4.10   Maintenance

Use the Maintenance page to access detailed device settings. There is an overview of the product and various options for the device configuration, including:

– Device tests
– User interface settings
– General purpose inputs and outputs
– Miscellaneous

At the top of the Maintenance page are four buttons with different functions:

Project save

The Project save button allows you to save a file with your current project settings (project.yapf file) into your local downloads folder. This will save all your current configurations including all the messages.

Project load

The Project load button allows you to upload a file with existing project settings (.yapf file) from your local PC.

i **Notice!**
Uploading a project file overwrites your current settings and requests a new login.

Reboot device

The Reboot device button allows you to restart the device. This action does not affect any of the current settings.

Factory reset

The Factory reset button allows you to return all settings to the factory default settings and values.

4.10.1   Device tests

The Device tests field allows you to perform three different types of tests to your device:

– Power supply - tests the actual power supply consumption
– Ethernet - tests the speed of the Ethernet
– Loopback (IP Horn loudspeaker only) - tests the speaker and the microphone (IP Horn loudspeaker only)

To run any of these tests, click the button Start test.
The table displays the results.

i **Notice!**
You can only run the tests if all device rules are inactive.

4.10.2 User interface settings

The User interface settings page allows you to set user preferences such as display mode and the interface language.
– Select Dark mode turns the user interface to black and the text to white.
– Use the Language dropdown menu to select the language you want to use in the user interface.

4.10.3 General purpose inputs and outputs

Use the General purpose inputs and outputs page to
– Verify the microphone's state. You cannot change the microphone settings from this page. Turning the microphone on or off is done from the physical switch on the device. For more information, see *Microphone, page 12*.
– Control and indication of GPI and VGPI status.
– Indication of GPO status.

Use the Hardware interface settings see the status of GPIs, GPOs and if the Microphone is connected.
– Configure the GPI behavior depending on the external wiring (GPI active Range (V)).
    – For logical input, use < 0.75 V
    – For supervised input, use 0.75 — 1.25 V
– Enable/disable the GPO by toggling the GPO button.
– Verify the microphone's enabled/disabled status.

Virtual GPIs

The Virtual GPIs page allows you to verify the status and enable/disable the virtual GPI triggers.

Virtual GPOs

The Virtual GPOs page allows you to verify which of the virtual GPOs are currently triggered.

4.10.4 Miscellaneous

Use the Miscellaneous page to enable or disable the Advanced view. Advanced view opens access to advanced audio settings. For more information, see *Advanced audio settings, page 30*.
When you enable Advanced view, the Download system logs and Download firmware license buttons become visible.

Download system logs button

The Download system logs button downloads and saves system log files (syslogs.tar.gz) to your computer.

Download firmware licenses button

The Download firmware licenses button saves a file containing the open source licenses (opensourcelicenses.tar.gz file) to your computer.

4.11   Logging

Use the Logging page to access the list of events logged by the device. The logs appear with the most recent logging event at the top of the list.

Logging is an important tool for debugging and monitoring your device. You can view the type/level of the event, the time and date of the occurrence and the message displayed.

To find a specific log entry quickly, use the search field at the top of the page. Simply enter the log entry and click the ⚲ button.

Notice!
A time control either via NTP by DHCP or via a separate NTP server is required to properly use the Logging function. Otherwise the logs may display random timestamps.

4.12   Logout

Click the Logout button to log out of the current session.

5   HTTPS REST API

In a system with many devices, an operator may want to centrally supervise all devices and start actions. A quick and easy way to do this is to share system states over an HTTPS API. An HTTPS API communicates between the devices in a system via the Hypertext Transport Protocol. This provides an easy way to collect and process requests.

There is a complete list of states and services available via the HTTP API documented on https://<IP_Address>/api/index.html.
The HTTP API provides states for:
– Getting and setting virtual GPIOs;
– Getting systems states;
– Getting and setting gains.

(i)   **Notice!**
To gain access to the API, you need to authenticate the according program with the user credentials of an API user.

The IP Horn loudspeaker/IP Amplifier module provides status information to be read using the GET command.
– 16 virtual GPOs - to display the status information for VGPO 4 use the command: GET https://<IP_Address>/api/ext/v1/vgpos/4
– 16 virtual GPIs - to display the status information for VGPI 16 use the command: GET https://<IP_Address>/api/ext/v1/vgpis/16
– An overview of system states (BOOLEAN), such as message playing, power states, memory usage, etc, use the command: GET https://<IP_Address>/api/ext/v1/status

The IP Horn loudspeaker/IP Amplifier module provides the following information to be written (e.g. via PUSH command):
– 16 virtual GPIs - use the command: PUT TRUE https://<IP_Address>/api/ext/v1/vgpis/16)

Notes:
– You must have a configured API user profile for access to the APIs. For more information, see the Users page.
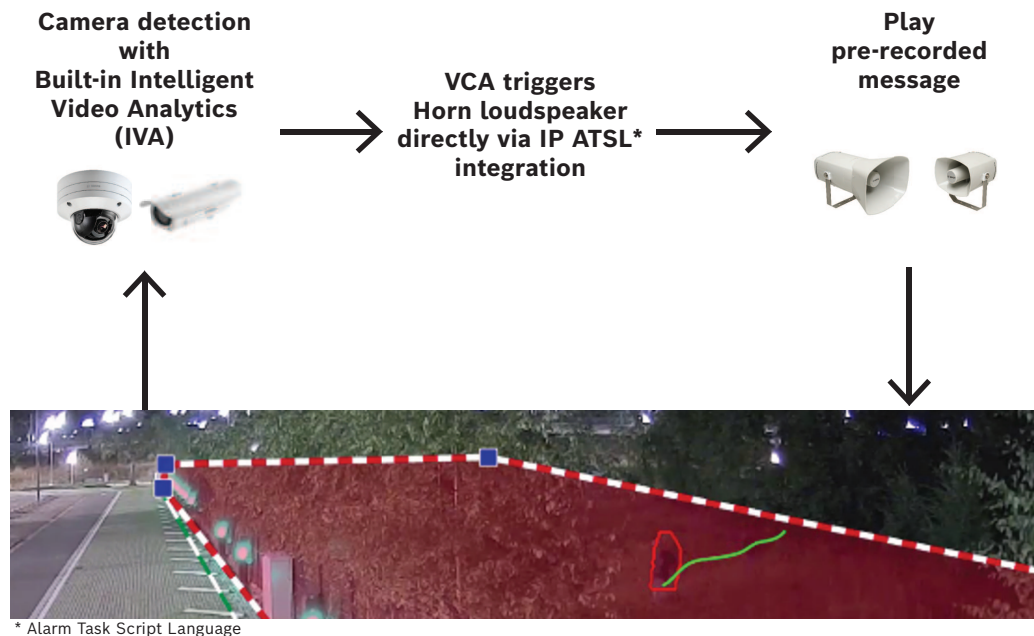– Set the physical GPO to follow any actions defined on the Rules page.
You can obtain more information on GPIs, GPOs, and further parameters in detail on https://<IP_Address>/build/api/index.html.

6   Direct Bosch camera integration via ATSL

Using the camera's Alarm Task Scripting Language (ATSL) you can create a direct integration between a Bosch camera and an IP Horn loudspeaker or IP amplifier module. The VGPI of the IP Horn loudspeaker/Amplifier module controls the action, often a message playback, starting or stopping it using this scripting.

To trigger an action on the IP Horn loudspeaker or the IP amplifier module, the scripting can leverage the Alarm output and/or the VCA task alarms of the camera.

Camera detection with Built-in Intelligent Video Analytics (IVA)

VCA triggers Horn loudspeaker directly via IP ATSL* integration

Play pre-recorded message

* Alarm Task Script Language

Figure 6.1: Direct camera integration principle

To link a camera with the IP Horn loudspeaker/IP Amplifier module, the following steps are necessary:

At the IP Horn loudspeaker/IP Amplifier module:

–   Create an API account or use an existing one.
–   Create a Rule or use an existing one with VGPI trigger type to start an action, such as an activation of a message.

NOTE: It is a good practice to enable the Trigger starts but does not stop the action check box. This ensures the message plays entirely. For more information, see *Trigger settings, page 32*.

At the camera:

–   Add a script at the Alarm Task Editor.

ⓘ   **Notice!**
The username and password for both the Alarm Task Editor Script (camera) and the API user account (IP Horn loudspeaker/IP Amplifier module) must match.

Example Script

In the example, the camera defines two areas that activate two different messages via VGPIs at the IP Horn loudspeaker/IP Amplifier module.

```
HttpCommand sendHttpOn:={
Command("api/ext/v1/vgpis/1")SSL(true)Port(443)IP("10.30.201.236")
Password("pwd12345")UserName("API_username")Method(POST)ForceBasicAuth(true)
ContentType("application/json")
Payload("true")
Name("Http Command 1")
};

HttpCommand sendHttpOff:={
Command("api/ext/v1/vgpis/1")SSL(true)Port(443)IP("10.30.201.236")
Password("pwd12345")UserName("API_username")Method(POST)ForceBasicAuth(true)
ContentType("application/json")
Payload("false")
Name("Http Command 1")
};

HttpCommand sendHttp_2On:={
Command("api/ext/v1/vgpis/2")SSL(true)Port(443)IP("10.30.201.236")
Password("pwd12345")UserName("API_username")Method(POST)ForceBasicAuth(true)
ContentType("application/json")
Payload("true")
Name("Http Command 2")
};

HttpCommand sendHttp_2Off:={
Command("api/ext/v1/vgpis/2")SSL(true)Port(443)IP("10.30.201.236")
Password("pwd12345")UserName("API_username")Method(POST)ForceBasicAuth(true)
ContentType("application/json")
Payload("false")
Name("Http Command 2")
};
if(VCARule(1,2)) then sendHttpOn else sendHttpOff;
if(VCARule(1,1)) then sendHttp_2On else sendHttp_2Off;
```

●   Number of VGPI

●   IP address of the device

●   Username and Password of the API user

7 Technical data

7.1 LHN-UC15W-SIP Horn loudspeaker 15W, wide angle, SIP

Electrical

Power transfer		
Power over Ethernet	PoE IEEE 802.3af Class 3 PoE+ IEEE 802.3at Class 4	
Power consumption	PoE	<5 W in Idle <7 W at 1/8th of rated power <13 W at rated power
	PoE+	<6 W in Idle <9 W at 1/8th of rated power <26 W at rated power

Speaker*	
Rated power	7 W with PoE 15 W with PoE+
Maximum sound pressure level (500 Hz — 8 kHz, 1 m)	115 dB with PoE 118 dB with PoE+
Effective frequency range (-10 dB)	370 Hz — 11 kHz
Coverage angle HxV (-6 dB, 1 kHz)	140°x180°
Coverage angle HxV (-6 dB, 4 kHz)	40°x40°

*Technical performance data acc. to IEC 60268-21

Amplifier	
Type	15 W class D amplifier

Microphone	
Type	Integrated Electret Condenser Microphone (can be disabled via hardware switch)

Network	
Ethernet	100BASE-TX, 1000BASE-T
Protocols	IPv4, SIP, NTP, TCP, UDP, HTTP, HTTPS, ONVIF (Discovery)
SIP audio codecs	G.711 (u-law and a-law), G.722, Opus
Ports	1x RJ45

Analog audio input/output	
Type	1 line-level input, 1 line-level output; unbalanced
Connector	3-pin screw terminals
Wire gauge	AWG 28 — AWG 14

Analog audio input/output	
Maximum level line input	1 V
Maximum level line output	1 V
Input impedance	>10 kΩ
Output impedance	<100 Ω

GPIO	
Type	Terminal block with screw terminals
Connector	3-pin screw terminals
Wire gauge	AWG 28 — AWG 14
Ports and operating modes	1x supervised GPI, 1x GPO
Digital inputs	Open: >2 V Off: 1.25 V — 2 V On: 0.75 V — 1.25 V Short: < 0.75 V Maximum: 48 V
Digital outputs	On: Output switched to GND, max. 48 V/500 mA Off: Open collector (>10 MΩ to GND)

Stored messages	
Uploadable	Via web-GUI
Capacity	300 MB
Supported file formats	WAV, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz MP3, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz Ogg Vorbis, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz Opus, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz

Mechanical

Horn	
Material	Acrylonitrile Styrene Acrylate (ASA)
Dimension (HxWxD) (mm)	144 mm x 188 mm x 207 mm
Dimension (HxWXD) (in)	5.67 in x 7.40 in x 8.15 in
Weight (kg)	1.6 kg
Weight (lb)	3.53 lb
IP rating	IP66
Color in RAL	RAL 7035 Light gray

Horn	
Cable gland (standard supplied)	M20 Polyamide (Nylon)
Cable diameter (mm)	5 mm — 12 mm
Cable diameter (in)	0.20 in — 0.47 in

Bracket	
Material	Stainless steel (grade 316)

Environmental

Climatic conditions	
Operating temperature (°C)	-40 °C — 55 °C
Operating temperature (°F)	-40 °F — 131 °F
Storage temperature (°C)	-40 °C — 70 °C
Storage temperature (°F)	-40 °F — 158 °F
Operating relative humidity, non-condensing (%)	5% — 95%

7.2 LHN-UC15L-SIP Horn loudspeaker 15W, long throw, SIP

Electrical

Power transfer		
Power over Ethernet	PoE IEEE 802.3af Class 3 PoE+ IEEE 802.3at Class 4	
Power consumption	PoE	<5 W in Idle <7 W at 1/8th of rated power <13 W at rated power
	PoE+	<6 W in Idle <9 W at 1/8th of rated power <26 W at rated power

Speaker*	
Rated power	7 W with PoE 15 W with PoE+
Maximum sound pressure level (500 Hz — 8 kHz, 1 m)	119 dB with PoE 122 dB with PoE+
Effective frequency range (-10 dB)	380 Hz — 11 kHz
Coverage angle HxV (-6 dB, 1 kHz)	100°x130°
Coverage angle HxV (-6 dB, 4 kHz)	30°x30°

*Technical performance data acc. to IEC 60268-21

Amplifier	
Type	15 W class D amplifier

Microphone	
Type	Integrated Electret Condenser Microphone (can be disabled via hardware switch)

Network	
Ethernet	100BASE-TX, 1000BASE-T
Protocols	IPv4, SIP, NTP, TCP, UDP, HTTP, HTTPS, ONVIF (Discovery)
SIP audio codecs	G.711 (u-law and a-law), G.722, Opus
Ports	1x RJ45

Analog audio input/output	
Type	1 line-level input, 1 line-level output; unbalanced
Connector	3-pin screw terminals
Wire gauge	AWG 28 — AWG 14
Maximum level line input	1 V
Maximum level line output	1 V
Input impedance	>10 kΩ
Output impedance	<100 Ω

GPIO	
Type	Terminal block with screw terminals
Connector	3-pin screw terminals
Wire gauge	AWG 28 — AWG 14
Ports and operating modes	1x supervised GPI, 1x GPO
Digital inputs	Open: >2 V Off: 1.25 V — 2 V On: 0.75 V — 1.25 V Short: < 0.75 V Maximum: 48 V
Digital outputs	On: Output switched to GND, max. 48 V/500 mA Off: Open collector (>10 MΩ to GND)

Stored messages	
Uploadable	Via web-GUI
Capacity	300 MB
Supported file formats	WAV, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz MP3, channels: mono, stereo; sampling rates:

Stored messages	
	44.1 kHz, 48 kHz
	Ogg Vorbis, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz
	Opus, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz

Mechanical

Horn	
Material	Acrylonitrile Styrene Acrylate (ASA)
Dimension (HxWxD) (mm)	200 mm x 274 mm x 348 mm
Dimension (HxWXD) (in)	7.87 in x 10.79 in x 13.70 in
Weight (kg)	2 kg
Weight (lb)	4.41 lb
Ingress Protection (IP)	IP66
Color in RAL	RAL 7035 Light gray
Cable gland (standard supplied)	M20 Polyamide (Nylon)
Cable diameter (mm)	5 mm — 12 mm
Cable diameter (in)	0.20 in — 0.47 in

Bracket	
Material	Stainless steel (grade 316)

Environmental

Climatic conditions	
Operating temperature (°C)	-40 °C — 55 °C
Operating temperature (°F)	-40 °F — 131 °F
Storage temperature (°C)	-40 °C — 70 °C
Storage temperature (°F)	-40 °F — 158 °F
Operating relative humidity, non-condensing (%)	5% — 95%

7.3 AMN-P15-SIP Amplifier module 15W, SIP

Electrical

Power transfer		
Power over Ethernet	PoE IEEE 802.3af Class 3 PoE+ IEEE 802.3at Class 4	
Power consumption	PoE	<5 W in Idle <7 W at $1/8^{th}$ of rated power <13 W at rated power

Power transfer		
	PoE+	<6 W in Idle <9 W at 1/8th of rated power <26 W at rated power

Network	
Ethernet	100BASE-TX, 1000BASE-T
Protocols	IPv4, SIP, NTP, TCP, UDP, HTTP, HTTPS, ONVIF (Discovery)
SIP audio codecs	G.711 (u-law and a-law), G.722, Opus
Ports	1x RJ45

Amplifier	
Type	Class D amplifier
Rated power (W)	7 W with PoE (4-8 Ω) 15 W with PoE+ (4-8 Ω)
Maximum output level	10.95 V
THD+N (3 dB below max., @1 kHz)	<0.03%
Signal to Noise Ratio (A-weighted)	>95 dB

Analog audio input/output	
Type	1 line-level input, 1 line-level output; unbalanced
Connector	3-pin screw terminals
Accepted Wire gauge	AWG 28 — AWG 14
Maximum level line input	1 V
Maximum level line output	1 V
Line input impedance	>10 kΩ
Line output impedance	<100 Ω

Digital signal processing (DSP)	
Sample rate	48 kHz
Signal latency	<45 ms
Processing	User PEQ (3 bands), Speaker PEQ (6 bands), Compressor, Autogain, Noisegate, Dynamic EQ, RMS-limiter, Peak limiter, Level, Mute, Delay

GPIO	
Type	Terminal block with screw terminals
Connector	3-pin screw terminals

GPIO	
Wire gauge	AWG 28 — AWG 14
Ports and operating modes	1x supervised GPI, 1x GPO
Digital inputs	Open: >2 V Off: 1.25 V — 2 V On: 0.75 V — 1.25 V Short: < 0.75 V Maximum: 48 V
Digital outputs	On: Output switched to GND, max. 48 V/500 mA Off: Open collector (>10 MΩ to GND)

Stored messages	
Uploadable	Via web-GUI
Capacity	300 MB
Supported file formats	WAV, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz MP3, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz Ogg Vorbis, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz Opus, channels: mono, stereo; sampling rates: 44.1 kHz, 48 kHz

Mechanical

Enclosure	
Material	Acrylonitrile Butadiene Styrene (ABS)
Dimension (HxWxD) (mm)	92 mm x 146 mm x 40 mm
Dimension (HxWXD) (in)	3.62 in x 5.75 in x 1.57 in
Weight (g)	215 g
Weight (lb)	0.474 lb
Ingress Protection (IP)	IP30
Color	Black

DIN rail adapter	
Material	Aluminum

Environmental

Climatic conditions	
Operating temperature (°C)	-40 °C — 55 °C
Operating temperature (°F)	-40 °F — 131 °F

Climatic conditions	
Storage temperature (°C)	-40 °C — 70 °C
Storage temperature (°F)	-40 °F — 158 °F
Operating relative humidity, non-condensing (%)	5% — 95%

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