We make everyday life safer

MULTIVES

Voice Alarm System

EN

Service Manual

EN 54-16: 2008
1488-CPR-0500/W

CE

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Ambient System Sp. z o.o.
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1. Safety



Danger!
High risk: This symbol indicates an imminently hazardous situation such as "Dangerous Voltage" inside the product. If not avoided, this will result in an electrical shock, serious bodily injury, or death.



Warning!
Medium risk: Indicates a potentially hazardous situation.
If not avoided, this could result in minor or moderate bodily injury.



Caution!
Low risk: Indicates a potentially hazardous situation.
If not avoided, this could result in property damage or risk of damage to the unit.

1 **Read these instructions.** All the safety and operating instructions should be read before the apparatus or system is operated.

2 **Keep these instructions.** The important safety instructions and operating instructions should be retained for future reference.

3 **Heed all warnings.** All warnings on the apparatus and in the operating instructions should be adhered to.

4 **Follow all instructions.** All instructions for installation or use/operating should be followed.

5 **Do no use this apparatus near water.** Do not use this apparatus near water or a moist environment – for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area which is classified as a wet location.

6 **Clean only with dry cloth.** Unplug the apparatus from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners.

7 **Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.** Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the apparatus and to protect it from overheating. These openings must not be blocked or covered. This apparatus should not be placed in a built-in installation unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

8 **Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat or in direct sunlight.**

9 **No naked flame sources, such as lighted candles, should be placed on the apparatus.**

10 **Do not defeat the safety purpose of the polarized or ground-type plug.** A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

11 **Protect the power cord from being walked on or pinched particularly at plug, convenience receptacles, and the point where they exit from the apparatus.**

12 **Only use attachments/accessories specified by the manufacturer.** Any mounting of the apparatus should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

13 **Use only with the cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus.** When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

14 **Unplug this apparatus during lighting storms or when unused for long periods of time.** Not applicable when special functions are to be maintained, such as evacuation systems.

15 **Refer all servicing to qualified service personnel.** Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

16 **Avoid mechanical shocks.** Strong impacts and shocks may damage the device. Transport the device carefully and avoid dropping it.

17 **The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquid, such as vases, shall be placed on the apparatus.**

18 **Batteries (battery pack or batteries installed) shall not be exposed to excessive heat such as sunshine, fire or the like.**



Caution!
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of used batteries according to the environmental law and procedures.

19 **Professional installation only.** Do not use this equipment in residential applications.

20 **Condensation.** In order to avoid condensation; wait a few hours before turning on the equipment when it is transported from a cold to a warm space.

21 **Hearing damage.** For apparatus with audio output, to prevent possible hearing damage, do not listen at high volume levels for long periods.

22 **Do not disassemble the device or attempt to repair or modify it.** The device does not include user replaceable components inside the chassis. Opening the chassis and unauthorized repairs will void the warranty. Unauthorized substitutions may result in fire, electric shock or other hazards.

23 **Safety check.** Upon completion of any service or repairs to this apparatus, ask the service technician to perform safety checks to determine that the apparatus is in proper operating condition.



Danger!
Overloading – do not overload outlets and extension cords as this can result in a risk of fire or electric shock.

24 **Power sources.** This apparatus should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company. For apparatuses intended to operate from battery power, or other sources, refer to the operating instructions.

25 **Power lines.** An outdoor system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outdoor system, extreme care should be taken to keep from touching such power lines or circuits, as contact with them might be fatal.



Danger!
Object and Liquid entry – never push objects of any kind into this apparatus through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the apparatus.

26 **Protective grounding.** An apparatus with class I construction shall be connected to a power outlet socket with a protective grounding connection.

Protective earthing. An apparatus with class I construction shall be connected to a mains socket outlet with a protective earthing connection.

Note for power connections

» For permanently connected equipment, a readily operable mains plug or all-pole mains switch shall be external to the equipment and in accordance with all applicable installation rules.

» For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.







This label may appear on the bottom of the apparatus due to space limitations.



Caution!
To reduce the risk of electrical shock, DO NOT open covers. Refer servicing to qualified service personnel only.



Warning!
To prevent fire or shock hazard, do not expose units to rain or moisture.



Warning!
Installation should be performed by qualified service personnel only in accordance with the National Electrical Code or applicable local codes.



Warning!
Power disconnect: If the apparatus is mains powered and a power supply cord set is provided, the disconnect device is the mains plug of the power cord set.
If an AC DC adapter is provided and the mains plug that is part of the direct plug in device, the AC DC adapter is the disconnect device. The socket outlet shall be near the apparatus and shall be easily accessible.



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.



Only used at altitude not exceeding 2000 m.



Only used in non-tropical climate regions.

MULTIVES
DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH
DECLARATION OF PERFORMANCE

ambient SYSTEM
We make everyday life safer

Deklaracja właściwości użytkowych
Declaration of Performance

Nr/No MULTIVES-20200525

1.	Produkt Product	**Centrala Dźwiękowego Systemu Ostrzegawczego** **Emergency Sound System**
2.	Niepowtarzalny kod identyfikacyjny typu wyrobu Type of construction product	**MULTIVES** **Elementy składowe: / Components:** **ABT-CU-8LCD / ABT-CU-8 / ABT-CU-11LT / ABT-CU-11LCD / ABT-DFMS / ABT-DFMS-A / ABT-DMS / ABT-DMS-LCD / ABT-EKB-20M / ABT-xCPU / ABT-xNET-1Gb-WAN-RS / ABT-xLCD / ABT-xAudI-8 / ABT-xAudIO-4/8-RS / ABT-ISLE / ABT-xCtrLine-2 / ABT-xCtrLine-4 / ABT-xLogOUT-8(c/f) / ABT-xLogIN-8(c/f) / ABT-PA8080B / ABT-PA8160B / ABT-PA4160B / ABT-PA2650B / ABT-PA1650B / ABT-PA4080B / ABT-PA8080BE / ABT-PA8160BE / ABT-PA4160BE / ABT-PA2650BE / ABT-PA1650BE / ABT-PA4080BE / ABT-PS48800 / ABT-PSM48 / ABT-PSM48E / ABT-PF4 / ABT-EOL / ABT-REG1 / ABT-REG2 / ABT-REG BOX / ABT-MWT / ABT-MWH / ABT-TR80 / ABT-TR160 / ABT-TR650 / IFS-803GSM-8PHE24 / IGS-402S-4PHE24 / Netgear Prosafe FS116P / SF-SMS31WD020D-GP / SF-SMS55WD020D-GP / SF-MMS31WD055D-GP / SF-MMS55WD055D-GP / SF-SMS31WD020-GP / SF-SMS55WD020-GP / SF-CP100C-GP / SF-MM31002D-GP / SF-MM31WD055D-GP / SF-MM55WD055D-GP / OPTEC 1.25G S.C. MM 550M / TX=1310 nm / 1550 nm Switch PoE Gigabit Netgear Prosafe series, CTC Union Technologies IGS series, IFS series**
3.	Numer typu, partii lub serii lub jakikolwiek inny element umożliwiający identyfikację wyrobu budowlanego Type, batch or serial numer or any other element allowing identification of the construction product	**Zobacz etykietę znaku CE i oznaczenia na tabliczce** **See CE mark label and marking on boards**
4.	Zamierzone zastosowanie Declared intended use of product	**Bezpieczeństwo pożarowe** **Fire Safety**
5.	Producent Manufacturer	**Ambient System Sp. z o.o.** **ul. Bysewska 27, 80-298 Gdańsk, Polska**
6.	System oceny i weryfikacji stałości użytkowych System of AVCP	**1**
7.	Jednostka notyfikowana Notified body	**Instytut Techniki Budowlanej nr/no. 1488** **1488-CPR-0500/W z dnia/from 16.03.2015,** **zaktualizowany/updated 05.03.2019**

Example of VASCU MULTIVES rating plate

MULTIVES Nr seryjny // Serial Number	
EN 54-16 – Certyfikat zgodności // Certificate of constancy of performance	**1488-CPR-0500/W**
Świadectwo dopuszczenia CNBOP-PIB // Certificate of admission CNBOP-PIB	**3959/2020**
Deklaracja właściwości użytkowych // Declaration of Performance	**Multives-20200525**
Przeznaczenie // Declared intended use of product	**bezpieczeństwo pożarowe // fire safety**
Zgodny z normą // Comply with	**EN 54-16**
Stopień ochrony IP // Ingress Protection Rating	**30**
ZASILACZ UZS EN 54-4: 1488-CPR-0395/W • EN 12101-10: 1488-CPR-0394/W • ŚD CNBOP-PIB: 3959/2020	

CNBOP-PIB

CE 15

Producent // Manufacturer:
Ambient System Sp. z o.o.
Gdańsk 80-298, ul. Bysewska 27

Impact on the environment



This product was marked in accordance with WEEE Directive (2002/96/EC) and further amendments on waste electrical and electronic equipment. Assuring a proper scrapping, you contribute to reduction of risk of negative impact on the environment and people's health, which would occur in the case of improper equipment disposal. The symbol located on the product or attached documents means that our product has not been classified as domestic waste. The equipment must be transported to a suitable waste treatment plant in order to recycle it. To see more details about recycling our product, contact a local authority representative, waste treatment service provider or the store where our product was sold. Pursuant to the act of 29 July 2005 on waste electronic and electrical equipment, it is forbidden to dispose of the waste electronics along with other (municipal) waste because such actions entail criminal penalties. Packaging elements were made of cardboard and polyethylene foam. For this reason, they may be subject to recycling. In so doing, redundant packaging must be sorted out in accordance with their intended use and delivered to the local waste collector.

In the interest of protecting human's health and environment, we assure that our products, subject to RoHS 2011/65/EU directive provisions on the use of hazardous substances in electric and electronic equipment, have been designed and manufactured in accordance with requirements of this directive.

2. Ambient System Presentation

With more than twenty years of experience, Ambient System has quickly established itself as a leading manufacturer of Public Address, Voice Alarm systems and counter intercoms. The constant growth of market share in Europe provides confirmation of the quality of Ambient System commercial and technical approach.

Products:

The company now offers a full range of sound equipment: microphones, preamplifiers, digital processors, digital audio matrixes, loud-speaker monitoring systems, amplifiers, etc. AMBIENT SYSTEM designs and manufactures leading products in the voice alarm systems market which have been certified EN 54-4, EN 54-16, EN 54-24 compliant.

Development:

Thanks to a development team that includes thirty engineers, and to constant investment, we are able to respond rapidly to the demands of our various markets with specific solutions and cutting edge technology. We have distributors in more than fifteen countries in Europe and the Middle East, with whom we have carried out major projects.
In choosing Ambient System, you are guaranteed a trustworthy partner that can be counted on for the long term.

Ambient System Field:

Ambient System's audio systems have been installed in the following markets:

- Railways,
- Subways,
- Airports,
- High rise buildings,
- Hotels,
- Restaurants,
- Shopping malls,
- Theme parks,
- Places of worship,
- Stadiums,
- Museums,
- Industrial buildings,
- Industrial plants,
- Commercial buildings.

3. MULTIVES system presentation

MULTIVES is the latest product promoted by Ambient System, the company specializing in production of reliable and certified voice alarm systems. MULTIVES is a Public Address & Voice Evacuation system based on optical fiber digital transmission of voice, alarm and commercial messages.

MULTIVES VAS central unit has been designed in accordance with the European EN 54-16 norm.

In accordance with the internal regulations of CEN/CENELEC, the organizations for standardization of the following countries are obligated to introduce this European standard:
Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Island, Ireland, Italy, Lithuania, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Slovakia, Slovenia, Sweden, Switzerland and Great Britain.

MULTIVES system includes the following: control devices, multichannel amplifiers, as well as fireman microphone panels and zone microphones. All components are certified (officially approved). The system rests on a modern platform which allows a digital scalable communication between all elements of the system, as well as between other integrated safety systems.

MULTIVES system has been developed with various applications in mind – it is perfect for both decentralized and centralized systems.

The system architecture is based on optical connection between control unit devices and other system elements. It allows creation of highly large facilities, such as airport terminals, oil fields and refineries, shopping centers or office complexes.

At the same time, along with the customized construction of control unit and amplifiers which are multi-channel and network types, we are able to create compact systems for single small and middle-sized facilities, as well as larger groups connected by a digital network.

The following components account for integrated concept of MUTLIVES system VAS central unit:

ABT-CU-8LCD Control Unit
ABT-CU-11LT Control Unit
ABT-CU-11LT-LCD Control Unit
Digital input card for ABT-xLogIN-8f function slot
Digital input card for ABT-xLogOUT-8f function slot
4 audio input card, 8 audio out and RS485 for ABT-xAudIO-4/8-RS function slot
8 audio input card for ABT-xAudI-8 function slot
4 loudspeaker line control card ABT-xCtrLine-4
2 loudspeaker line control card ABT-xCtrLine-2
Digital input card for ABT-xLogIN-8c control slot
Digital output card for ABT-xLogOUT-8c control slot
ABT-PA8080B power amplifier
ABT-PA8160B power amplifier
ABT-PA2650B power amplifier

ABT-PA4160B power amplifier
ABT-PA1650B power amplifier
ABT-ISLE connection isle
ABT-PSM48 power supply manager
ABT-PS48800 Power supply
ABT-DFMS fireman microphone
ABT-DMS zone microphone
ABT-DMS-LCD zone microphone with display
ABT-EKB-20M microphone keyboard extension
ABT-REG1 volume control
DEHNrail DR M 2P 150 loudspeaker line overvoltage limiter

Optional features in accordance with EN 54-16 standard:

Sound signaling	×
Delayed voice alarm introduction	✓
Gradual evacuation	✓
Manual voice alarm dampening	✓
Manual voice alarm cancelling	✓
Fire alarm device exits	✓
Voice alarm exit	✓
Signaling damage related to transmission track to FACIE	✓
Signaling damage related to voice alarm zones	✓
Lock status	✓
Manual control of voice alarm	✓
Digital interface between VASCU and external control devices	✓
Emergency microphones	✓
Back-up power amplifiers	✓

4. Symbols used in the document



Warning!
This symbol means a potentially hazardous situation posing a death or disability hazards



Attention!
This symbol means potentially hazardous situation posing medium or minor injuries and/or material loss hazards.



Warning!
This symbol means that using the above-mentioned products increases the risk of visual impairment.

5. Warranty conditions

Warranty conditions are part of General Terms & Conditions of Delivery available at www.ambientsystem.eu/en.

6. Requirements

Unused devices must be stored in the original packaging, in enclosed rooms with the ambient temperature ranging from -20°C to 70°C and relative humidity – from 5% to 95% (without condensation).

Once the device has been moved from cold to warm environment, there is a risk of water condensation, which has a negative impact on device performance. In such case, it is necessary to leave the device to let it adapt to a new surrounding for about an hour before the operation.

During transport, the devices should be packed in a way assuring reduced risk of mechanical damage and impact of weather conditions.

Recommended RACK cabinet size up to 600×800 (width × depth), use height between 24 [U], 32 [U], 40 [U], 45 [U].
It should be remembered that the height of the cabinet (U) depends on the system that is designed.

The space required between the components to use air circulation is contained in the table below.

RACK cabinet UNIT	UNIT hight [U]	SPACE [U]	TOTAL [U]
ABT-CU-8LCD	2	1	3
ABT-CU-11LT	2	1	3
ABT-CU-11LCD	2	1	3
ABT-PA8080B	2	0	2
ABT-PA8160B	2	0	2
ABT-PA2650B	2	0	2
ABT-PAPSM48	2	0	2
ABT-PF4	2	0	2

The space needed for the batteries may vary depending on the manufacturer. However, always keep a minimum distance of 2 [U] in order to maintain adequate air circulation.

6.1 Unpacking

Please read this service manual to get familiar with relevant details concerning installation, operation, nature and product functions. If it is necessary to return the product to the service point, wrap the device into the original packaging (or identical to the original one).

6.2 Installation requirements

The alarm central unit room, in which VASCU is located, must satisfy the following conditions:

- Fire protection device operation room (FPDOR) should be located on the floor of the structure, close to entrance/exit designed and marked as the entrance for rescue teams.
- The room must be located and marked in a way that allows rescuers to notice it at the entrance. It is advisable to make sure FPDOR access doors are not located farther than 10m from rescue team exit.
- The width of passage leading to the room should be at least 1,5 m.
- The room should be properly marked.
- If FPDOR is located at a distance greater than 10 m from the rescue team exit, additional signs must be used in order to point location and direction to FPDOR.
- The Fire Safety Instructions in graphics and site evacuation procedures should include signs and location of FPDOR.
- Install the Manual Call Point in FPDOR or in its immediate vicinity. FPDOR should be monitored by automatic sensors being part of fire alarm system on the site.
- Access to FPDOR should be given solely to authorized persons and rescue team. It is acceptable to lock the door as long as one key is located in a suitably marked box with breakable glass attached to the wall in immediate vicinity to room doors.
- FPDOR should be a closed room whose walls and ceilings have REI 60 fire resistance rating. The door of FPDOR should have EI30 fire resistance rating.
- The control desk with a fireman microphone should be connected to VASCU via wires assuring circuit continuity in case of fire.
- Natural and artificial lighting should be provided. Lighting intensity in the room must be min. 500 lx.
- The room must be equipped with emergency lighting of an average lighting intensity – min. 10 lx.
- Weather conditions must satisfy the following requirements: temperature from 0°C to +40°C, relative humidity from 25% to 80%, air pressure from 860 hPa to 1060 hPa.
- A suitable amount of space around front VASCU board must be provided in order to allow required manipulations.
- The height of control and indication devices assembly should allow their suitable operation.
- Background noise values in the room, in which the console with the fireman microphone is located, should not exceed 40 dB.
- A table with dimensions big enough to unfold site and system documentations must be located in the room.

6.3 Environmental conditions

Do not place the product in the environment which may affect its performance or shorten its life. Environments which have a negative influence frequently have high temperatures, are dusty, humid and have high level of vibrations. The equipment must be placed in cold and dry area far away from direct sunlight and inflammable and explosive materials.

800 W ABT-PS48800 switch-mode power supply modules are used as a main source of energy distribution. ABT-PSM48 power supply manager may cooperate with max. 4 power supply modules, assuring their safe connection and controlling output parameters of every power supply unit. If the system is used solely as a back-up power system, it is not necessary to use any power supply unit. PSU must be mounted on the dedicated ABT-PF4 frame which then should be attached to the inside of the cabinet via provided bolts. The system elements are designed for RACK 19" cabinet assembly (min. IP30), in which other fire detection system and fire alarm system elements are in-built as well.

Optionally, it is possible to use ABT-PS48800 power supply unit as an independent device and it is not necessary to assembly packs in the ABT-PF4 frame and RACK-type cabinet. Analogically, ABT-PSM48800 power distributor unit may be used as an independent device. Then, make sure that the place of installation has been chosen with acceptable working parameters in mind. The power supply unit should operate at the ambient temperature from -5 to 40°C.

Maximum configuration of one VAS supply system in accordance with EN 54-16 includes as follows:

- Power supply manager 1 × ABT-PSM48,
- Power supply modules 4 × ABT-PS48800,
- Power supply unit frame 1 × ABT-PF4.

7. Device description

This section provides an insight into MULTIVES system components:

- Control units
- Extension cards
- Power amplifiers
- Connection isle
- Power supply manager
- Power supply unit
- Microphones and microphone extensions

7.1 Internal devices

7.1.1 Control units

A control unit is the main element of the system which receives audio signal and sends it to the entire system. This device manages all other elements. This component allows flexible configuration of audio signal from any source of signal to any output. Global audio routing is possible on the basis of the programmable logic system and Ethernet 1G (UDP/IP,TCP/IP) network.

MULTIVES system offers three various control units:

- **ABT-CU-8LCD unit**
  - The unit is factory equipped with a control card xCtrLine-4, audio card XAudio-4/8-RS and 8 logical inputs xLogIN-8f.
  - Primary the basic card ABT-xCPU 100Mb/s does not allow for networking with other units in the system except system microphones. For networking the unit has to be equipped with a network card ABT-XNET-1Gb/WAN/RS (optional).
  - ABT- CU-8LCD was designed for small PAVA systems (standalone). It has 8 control and 4 function slots for increase of supported input / output audio.
- **ABT-CU-11LT unit**
  - The unit is factory equipped with a communication card ABT-XNET-1Gb/WAN/RS, which allows network connection with other units in the system, either by twisted pair CAT5e / 6 cable or the fiber.
  - In addition, CU-11LT has 4 audio inputs, 12 audio outputs and 11 slots for any I/O logic cards and speakers control cards.
- **ABT-CU-11LCD unit**
  - Identical to ABT-CU-11LT unit, additionally equipped with built-in LCD screen.

System elements operate with the following resolution: 48KHz/32 bits/2 channels. The communication between devices at large distances (up to 20 km) is carried out in 1000BASE-X technology (optical fiber), a thanks to 2 ports with SFP modules, connection redundancy occurs. In the case of connecting devices located in one RACK-type cabinet, it is advisable to use ports with RJ45 connectors. Available ports:

- 1000BASE-TX / RJ45 – CAT5E cables – 2 ports available on the rear device panel/communication card,
- 100BASE-TX / RJ45 – CAT5 cables – 1 port available on the rear panel responsible for connecting WAN external network, and PC with installed configuration software.

To create optical fiber connections, SFP modules are used. It creates a possibility of choosing optical fiber system elements independently and lower costs if the system does not use optical fiber connections.

Components of ABT-CU-8LCD control unit:

- 1 × main backplane
- 1 × control backplane,
- 1 × processor card with LAN/WAN 100 Mb/s connection
- 1 × communication card (option)
- 1 × GUI module
- 1 × xCtrLine-4 control card
- 1 × xAudIO-4/8-RS
- 1 × xLogIN-8f

Components of ABT-CU-11LT and ABT-CU-11LCD control units:

- 1 × passive backplane
- 1 × GUI module (optional)
- 1 × communication card with 4 audio inputs and 12 audio outputs
- Control backplane for 11 cards (option)

7.1.1.1 ABT-CU-8LCD unit

ABT-CU-8LCD control unit is equipped with a color LCD screen 4,5" which provides a direct access to management and entire system monitoring functions. ABT-CU-8LCD is a matrix mixer for input signals. It assigns input signals to four internal audio buses 100 V, a 45-channel digital system bus or directly to audio outputs in the unit. ABT-CU-8LCD plays a role of a standalone system controller, which can not be networked with other control units without the use of additional cards xNET-1Gb/WAN/RS.

The unit has two types of slots: function and control located on the rear panel. Function slots in addition to the factory accessories can be equipped with 2 cards – audio input / output or logic:

- ABT-xAudIO-4/8-RS
- ABT-xAudI-8
- ABT-xLogIN-8f
- ABT-xLogOUT-8f

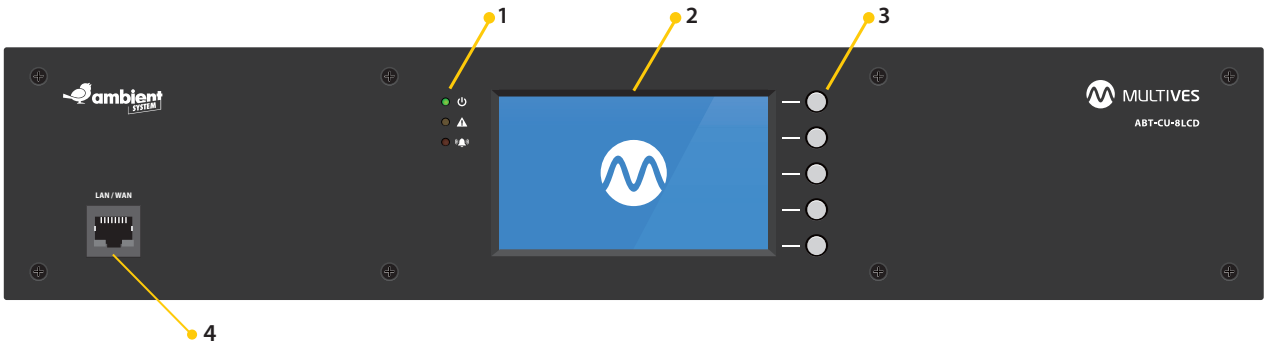
and up to 7 loudspeaker control cards or logic input/outputs:

- ABT-xCtrLine-4
- ABT-xCtrLine-2
- ABT-xLogIN-8c
- ABT-xLogOUT-8c

ABT-CU-8LCD control unit controls audio signal addressing, priorities and external devices. Switching audio tracks is performed on the basis of programmable logic system and Ethernet 1G (UDP/IP, TCP/IP) network. Programming input and output signal settings is possible via the computer (PC). Thanks to ABT-CU-8LCD possibilities which are connected to the software, it is possible to archive the list of up to 100 000 events and failures to read them on PC or print out afterwards.

Table 1. Technical data of ABT-CU-8LCD

Model	ABT-CU-8LCD
Power supply	48 V DC (operating range 40-57 V DC) connector with screw terminals M2.5, the distance between the partitions of 5.08 mm
Power consumption	Up to 60 W (depends on configuration)
Number of slots for function modules	4
Number of slots for control modules	8
Messages	Supported SD card up to 32 GB / The set includes 512 MB SLC SDHC cards which provide more than 20 min of the messages
LCD display	4,5" LCD touch screen
DSP	Implemented 3 band parametric EQ on all inputs on control units, 8 band parametric EQ, audio limiter, feedback eliminator and delay lines on each of the audio output
Data communication	Communication card available on the front panel: › 100BASE-TX / RJ45 for configuration C and system extension by ABT-DFMS, DMS, DMS-LCD Optional card on the rear panel: › 11000BASE-X on the fiber › 2 SFP ports provide a redundant connection › 1000BASE-TX / RJ45 CAT5E cables – 2 ports including 1 port with POE › 100BASE-TX / RJ45 CAT5 cables – LAN/WAN for PC connection
Fiber module – connector type / kind of fiber	Modules type SFC / Connector SC / LC / Multimode or single-mode / E 30 or E 90, OM lub OM2
Communication with PC	PC software: RJ45 connector twisted pair connection TIA/EIA 568-B by the Ethernet protocol
Operating temperature	0°C to +60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C to +70°C
Storage humidity	15% to 80% (non-condensing)
Finish case material	Steel The front panel is made of metal plate painted black
Dimensions	482 (W) × 85 (H) × 325 (D) mm
Mounting	19˝ – rackmount
Weight	Up to 8 kg (depends on configuration)
Accessories	2 brackets and 4 screws for rack mounting, 9 caps for free slots, 48 V DC power and 100 V buses connectors



Drawing 1. Front panel of ABT-CU-8LCD

1. **Indicators:**
   a. Power supply indicator (green LED)
   b. Failure indicator (yellow LED)
   c. Emergency indicator (red LED)

2. **Display** – shows control unit menu

3. **Functional keys**, freely programmable, support auxiliary functions when using menu:
   a. HOME – press to return to first menu
   b. ENTER – press to enter – select item in control unit menu
   c. ↑ - up arrow – press to navigate in control unit menu
   d. ↓ - down arrow – press to navigate in control unit menu
   e. BACK – press to go back – return to previous item in the control unit menu

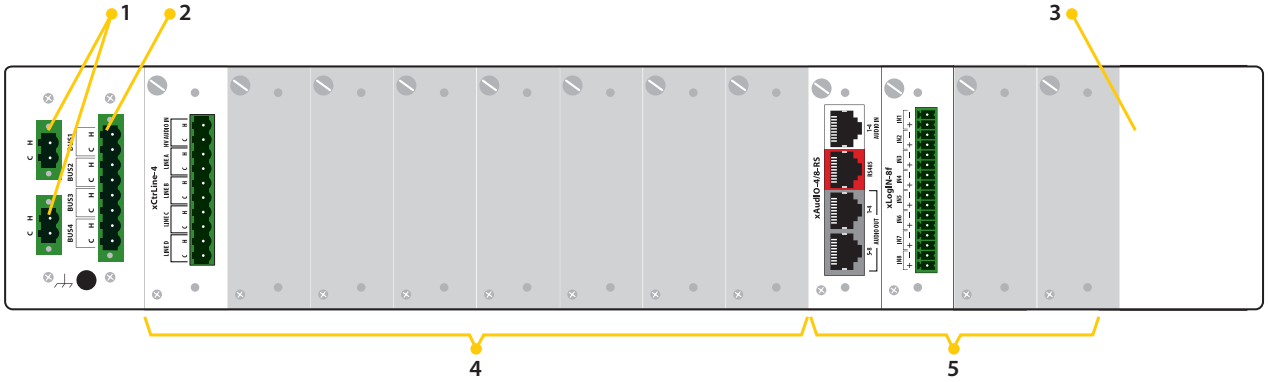
4. To connect and program ABT-CU8-LCD control unit without optional ABT-xNet-1Gb/WAN/RS card connection thru front LAN port is needed.

   Because front port is LAN port with hidden WAN function to establish connection the IP address of PC network card have to be set as follows: (TCP/IPv4 network card settings)
   IP address: 192.18.254.254
   Subnet mask: 255.255.0.0

   Control unit without configuration (clear, factory state) works on 192.18.x.x IP range.
   After system configuration file has been uploaded, IP range will change to 10.10.x.x.

   To be able to establish connection with working control unit additional IP range should be added thru advanced options:
   IP address: 10.10.254.254
   Subnet mask: 255.255.0.0

   Then, with both IP ranges active a stable network connection with ABT-CU8-LCD can be obtained.



Drawing 2. Rear panel of ABT-CU-8LCD

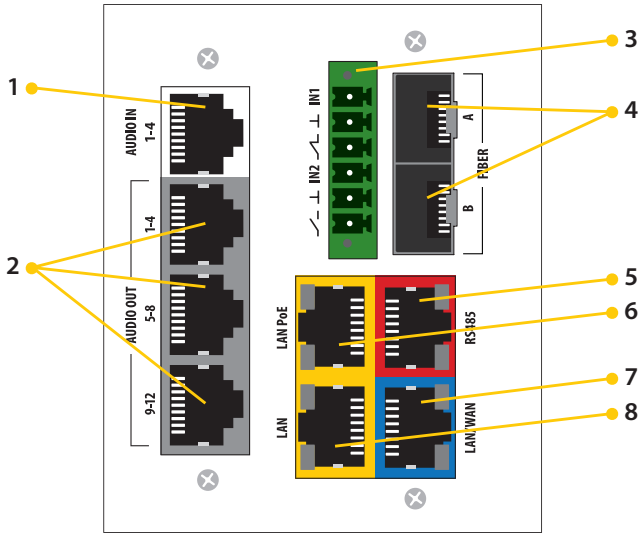
1. **Power supply**, two identical connectors
2. **Connector for 100 V amplifier output** to supply internal BUS available for all control cards
3. **Communication card slot**, 1 item
4. **Control card slot**, 8 items
5. **Function card slot**, 4 items

7.1.1.2 ABT-CU-11LT unit

ABT-CU-11LT control unit was designed to perform minor VAS system or serve as an extension unit in complex systems. In case of lack of connection with a superior unit, thanks to local configuration, it is able to carry out a fire scenario. The device attached to the main system communication "ring" can control amplifiers and power supply managers, as well as receive alarm signals and digital signals and send them to other system devices.

ABT-CU-11LT unit:

- Divides audio signals into particular zones and oversees proper operation of particular zones.
- Controls loudspeaker line and amplifiers.
- Detects and signalizes damage.
- Activates back-up amplifier.
- Is equipped with dedicated communication card (ABT-xCPU-AudIO-4/12) which provides 4 audio inputs and 12 audio output intended to connect amplifier inputs. Its diagram has been presented below.
- Can be an independent unit.



Drawing 3. Diagram of dedicated communication card of ABT-CU-11LT control unit

1. **Audio input**
2. **Audio outputs**
3. **Logic inputs/outputs**
4. **Optical fiber connectors**
5. **RS485 communication port**
6. **LAN PoE port**
7. **LAN/WAN port**
8. **LAN port**

Table 2. Technical data of ABT-CU-11LT

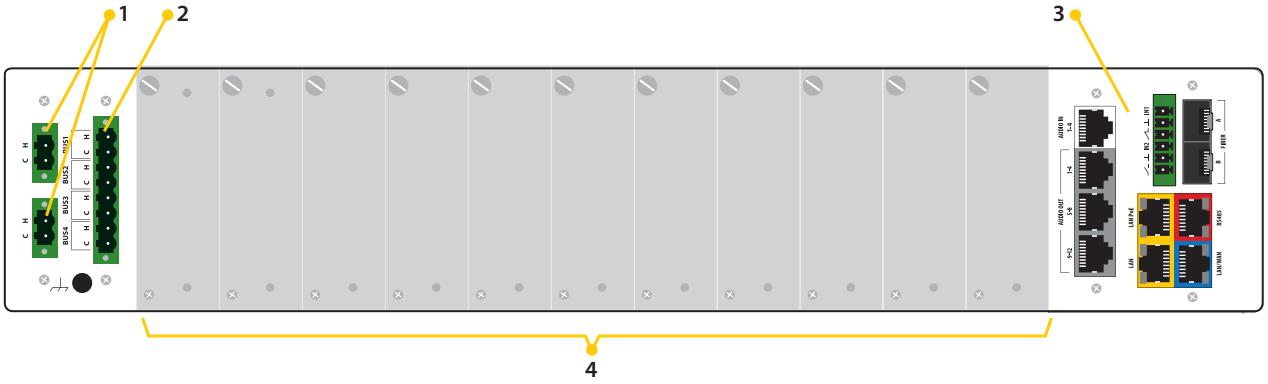
Model	ABT-CU-11LT
Power supply	48 V DC (operating range 40-57 V DC) connector with screw terminals M2.5, the distance between the partitions of 5.08mm
Power consumption	Up to 100 W (depends on configuration)
Number of control slots	11
Number of function slots	0
Messages	Supported SD card up to 32 GB / The set includes 512 MB SLC SDHC cards which provide more than 20 min of the messages
LCD display	none
DSP	Implemented 3 band parametric EQ on all 4 inputs of the control units 8 band parametric EQ, audio limiter, feedback eliminator and delay line on all of the audio outputs

Number of audio inputs	4
Type of audio inputs	Differential
Connector type	1 × RJ45
Input impedance	≥ 10 kΩ
Maximum input voltage	≥ 3 Vrms
Number of outputs	12
Type of outputs	Balanced
Connector type	3 × RJ45
Frequency response	40 Hz… 20 kHz (@1dB) / 400 Hz… 8 kHz (@0,1dB)
Harmonic distortion (THD+IMD)	≤ 0,05%
Headroom	10 dB
SNR	≥ 90 dB
Channel separation	≥ 80 dB
Output impedance	600 Ω
Nominal output level	1 Vrms
Data communication	› 1000BASE-X on the fiber › 2 SFP ports provide a redundant connection › 1000BASE-TX / RJ45 CAT5E cables – 2 ports including 1 port with POE › 100BASE-TX / RJ45 CAT5 cables – LAN/WAN for PC connection
Fiber module – connector type / kind of fiber	Modules type SFP / Connector SC/LC / Multimode or single-mode / E 30 or E 90, OM lub OM2
Communication with PC	PC software: RJ45 connector twisted pair connection TIA / EIA568-B by the Ethernet protocol
Operating temperature	0°C to +60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C to +70°C
Storage humidity	15% to 80% (non-condensing)
Finish case material	Steel The front panel is made of metal plate painted black
Dimensions	482 (W) × 85 (H) × 325 (D) mm
Mounting	19″ – rackmount
Weight	Up to 8,4 kg (depends on configuration)
Accessories	2 brackets and 4 screws for rack mounting, 11 caps for free slots, 48 V DC power and 100 V buses connectors



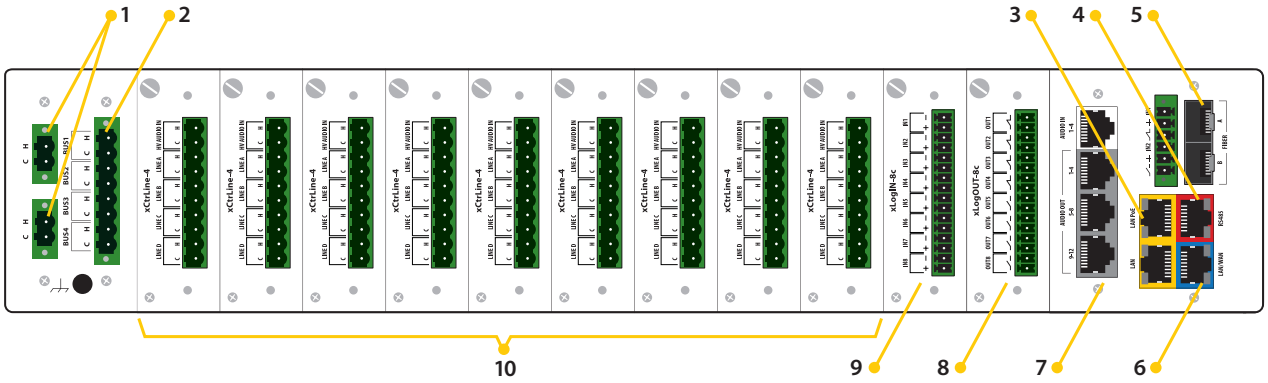
Drawing 4. Front panel of ABT-CU-11LT

1. **Indicators**
   a. Power supply indicator (green LED)
   b. Failure indicator (yellow LED)
   c. Emergency indicator (red LED)



Drawing 5. Rear panel of ABT-CU-11LT

1. **Power supply**, two identical connectors
2. **Connector for 100V amplifier outputs** to supply internal BUS available to all control cards
3. **Built-in communication card and audio input and output card**
4. **Control card slot**, 11 items



Drawing 6. Rear panel of ABT-CU-11LT – example extension card arrangement

1. **48 V DC Power supply**
2. **Connector for 100V amplifier outputs** to supply internal BUS available to all control cards
3. **RJ-45 connectors, LAN with PoE**, 2 items
4. **RJ-45 connector – RS485 signal**
5. **Optical fiber connectors**, marked as A, B

   ⚠ An optical fiber connector is equipped with laser. Be particularly careful and avoid eye contact with laser beam.
6. **RJ-45 connectors, WAN**
7. **ABT-xCPU-AudIO-4/12 card**; 4 audio input channels (upper port) are white, while 12 audio outputs (3 lower ports) – grey
8. **ABT-xLogOUT-8c logic output card**
9. **ABT-xLogIN-8c logic input card**

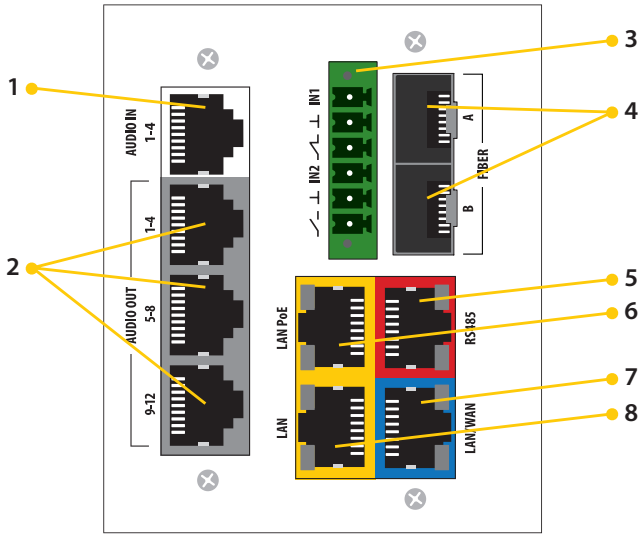
   ⚠ ABT-CU-11LT control unit has integrated communication card and audio input / output card.
10. **ABT-xCtrLine-4 control cards**

7.1.1.3 ABT-CU-11LCD unit

The control unit ABT-CU-11LCD combines the functions of inputs / outputs audio, audio matrix, DSP, speaker line monitoring, network switch in a single device. In case of lack of connection with the superior unit, thanks to local configuration, it is able to carry out fire scenarios. The device attached to the main system communication "ring" can control amplifiers and power supply managers, as well as receive alarm and digital signals and send them to other system devices. In comparison to ABT-CU-11LT control unit, this device is equipped with a 4,5" touch-screen LCD display allowing a direct access to management and entire system monitoring functions.

ABT-CU-11LCD unit:

- Divides audio signals into particular zones and oversees proper operation of particular zones.
- Controls loudspeaker lines and amplifiers.
- Detects and signals damage.
- Activates back-up amplifier.
- Is equipped with a dedicated communication card (ABT-cCPU-AudIO-4/12) which provides 4 audio inputs and 12 audio outputs intended to connect amplifier inputs.



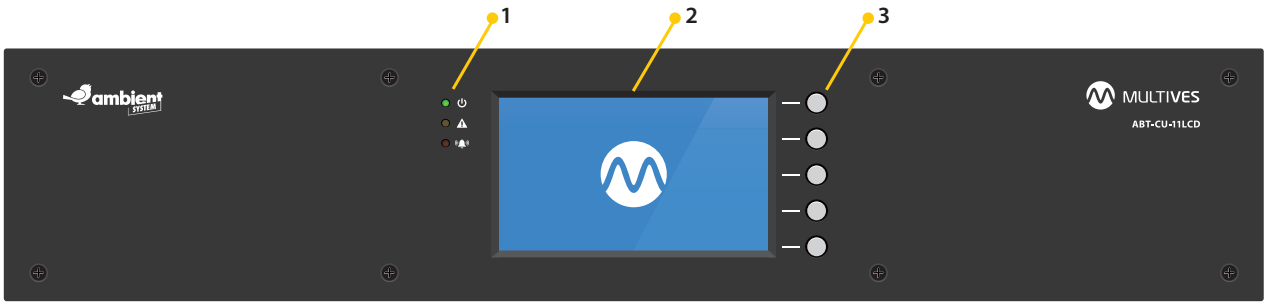
Drawing 7. Diagram of dedicated communication card of ABT-CU-11LCD control unit

1. **Audio input**
2. **Audio outputs**
3. **Logic inputs/outputs**
4. **Optical fiber connectors**
5. **RS485 communication port**
6. **LAN PoE port**
7. **LAN/WAN port**
8. **LAN port**

Table 3. Technical data of ABT-CU-11LCD

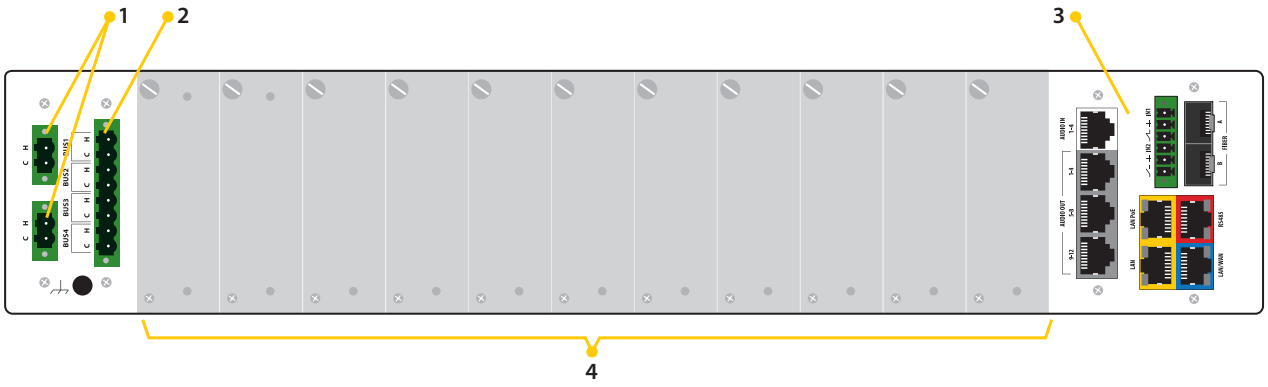
Model	ABT-CU-11LCD
Power supply	48 V DC (operating range 40-57 V DC) connector with screw terminals M2.5, the distance between the partitions of 5.08 mm
Power consumption	Up to 100 W (depends on configuration)
Number of control slots	11
Number of function slots	0
Messages	Supported SD card up to 32 GB / The set includes 512 MB SLC SDHC cards which provide more than 20 min of the messages
LCD display	4,5" LCD touch screen
DSP	Implemented 3 band parametric EQ on all 4 inputs of the control units 8 band parametric EQ, audio limiter, feedback eliminator and delay line on all of the audio outputs
Number of audio inputs	4
Type of audio inputs	Differenial
Connector type	1 × RJ45
Input impedance	≥ 10 kΩ
Maximum input voltage	≥ 3 Vrms
Number of outputs	12
Type of outputs	Balanced
Connector type	3 × RJ45
Frequency response	40 Hz… 20 kHz (@1dB) / 400 Hz… 8 kHz (@0,1dB)
Harmonic distortion (THD+IMD)	≤ 0,05%
Headroom	10 dB
SNR	≥ 90 dB
Channel separation	≥ 80 dB
Output impedance	600 Ω
Nominal output level	1 Vrms
Data communication	› 1000BASE-X on the fiber › 2 SFP ports provide a redundant connection › 1000BASE-TX / RJ45 CAT5E cables – 2 ports including 1 port with POE › 100BASE-TX / RJ45 CAT5 cables – LAN/WAN for PC connection
Fiber module – connector type / kind of fiber	Modules type SFP / Connector SC/LC / Multimode or single-mode / E 30 or E 90, OM lub OM2
Communication with PC	PC software: RJ45 connector twisted pair connection TIA / EIA568-B by the Ethernet protocol
Operating temperature	0°C to +60°C

Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C to +70°C
Storage humidity	15% to 80% (non-condensing)
Finish case material	Steel The front panel is made of metal plate painted black
Dimensions	482 (W) × 85 (H) × 325 (D) mm
Mounting	19″ – rackmount
Weight	Up to 8,4 kg (depends on configuration)
Accessories	2 brackets and 4 screws for rack mounting, 9 caps for free slots, 48 V DC power and 100 V buses connectors



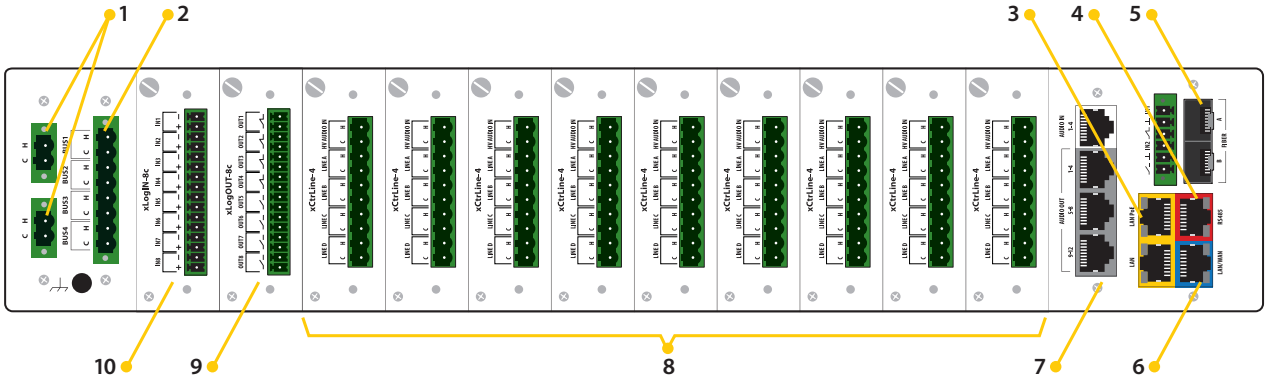
Drawing 8. Front panel of ABT-CU-11LCD

1. **Indicators:**
   a. Power supply indicator (green LED)
   b. Failure indicator (yellow LED)
   c. Emergency indicator (red LED)
2. **Display** – shows control unit menu
3. **Functional keys**, support auxiliary functions when navigating in menu:
   a. HOME – press to return to first menu
   b. ENTER – press to enter – select control unit in menu
   c. ↑ - up arrow – press to navigate in control unit menu
   d. ↓ - down arrow – press to navigate in control unit menu
   e. BACK – press to go back – return to previous item in control unit menu



Drawing 9. Rear panel of ABT-CU-11LCD

1. **Power supply**, two identical connectors
2. **Connector for 100 V amplifier outputs** to supply internal BUS available to all control cards
3. **Built-in communication card and audio input and output card**
4. **Control card slot**, 11 items



Drawing 10. Rear panel of ABT-CU-11LCD – example of extension card arrangement

1. **48 V DC Power supply**
2. **Connector for 100V amplifier outputs** to supply internal BUS available to all control cards
3. **RJ-45 connectors, LAN with PoE**, 2 items
4. **RJ-45 connector – RS485 signal**
5. **Optical fiber connectors**. Marked as A, B

   ⚠ An optical fiber connector is equipped with laser. Be particularly careful and avoid eye contact with laser beam.
6. **RJ-45 connectors, WAN**
7. **ABT-xCPU-AudIO-4/12 card**; 4 audio input channels (upper port) are white, while 12 audio outputs (3 lower ports) – grey
8. **ABT-xCtrLine-4 control cards**
9. **ABT-xLogOUT-8c logic output card**
10. **ABT-xLogIN-8c logic input card**

    ⚠ ABT-CU-11LT control unit has integrated communication card and audio input/output card.

7.1.2 Extension cards

Every individual element of the system has a set of functions related to audio signal transmission, system operation (operation or event reporting), as well as auto-diagnostics.

7.1.2.1 ABT-xCPU – processor card

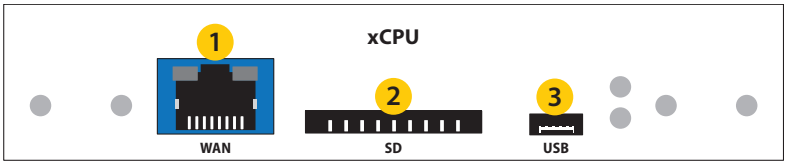
ABT-xCPU processor card is responsible for reproducing audio messages from SD card and sharing them locally or globally. The processor card performs system and control functions. ABT-CU-8LCD control unit can support 1 ABT-xCPU processor card which cam reproduce 8 messages at a time.
ABT-xCPU supports SD cards up to 32 GB for individual messages, as well as event or defect logs or system update files.



Drawing 11. ABT-xCPU processor card

Processor card:

- has SDHC memory slot supporting up to 32 GB,
- keeps configuration of other units and system elements,
- has its own group of alarm messages,
- records events and defects,
- allows system upgrade.



Drawing 12. ABT-xCPU processor card

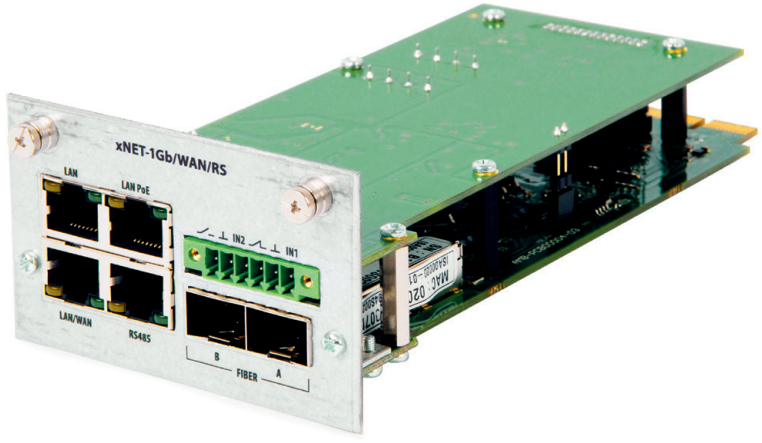
1. LAN/WAN 100 Mb/s port
   (from firmware version 0.750.1, communication via the LAN / WAN port is done using an encrypted protocol)
2. SDHC memory card slot (max 32 GB)
3. Micro USB 2.0 port (unsupported in 1.0.0 version)

Table 4. Technical data of ABT-xCPU

Model	ABT-xCPU
Source of power	ABT-CU-8LCD Control Unit Backplane
Power consumption	+5 V, typically 270 mA, max. 900 mA
Type of seat	RJ45; SDHC to 32 GB, class 10; micro B USB 2.0
Max. message reproduction at a time	8
Max. number of shared channels in LAN	8
Max. number of received channels in LAN	8
Operating temperature	0°C to +60°C
Operating humidity	15% to 80% (without condensation)
Storage temperature	-20°C to 70°C
Storage humidity	5% to 95% (without condensation)

7.1.2.2 *ABT-xNET-1Gb/WAN/RS – communication card*

ABTa-xNET-1Gb/WAN/RS is a communication card consisting of two independent 1 Gbit network switches. The network switch no.1 is intended solely to transmit data related to basic MULTIVES system functions, that is performing tasks of alarm voice system and AVB support. The network switch no. 2 is intended for remote connections. The card supports TCP/UDP/PTP/DHCP protocols and assures audio data exchange in CPU-OFF mode via Ambient System protocol. Additionally, this card is equipped with RS485 port which implements and integrates MULTIVES with any system, e.g. SAP. Another advantage is support of PoE technology to power, e.g. fireman microphone.



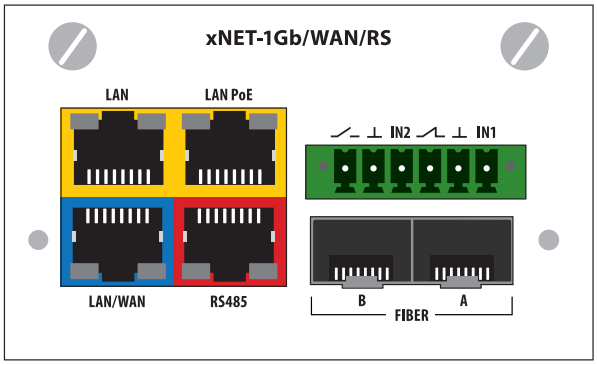
Drawing 13. ABT-xNET-1Gb/WAN/RS communication card

The communication card:

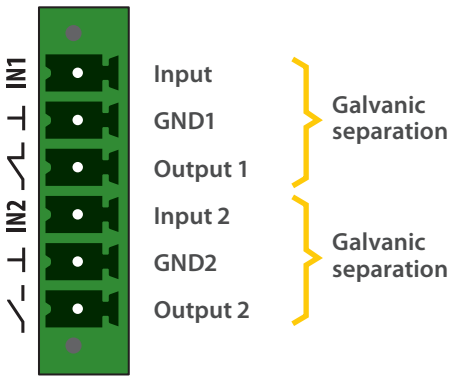
- has two switches (2 LAN 10/100/1000 ports), system (for VAS communication) and for remote connections (disconnected during fire-fighting) (1 LAN/WAN 10/100 port – configurable working mode; from firmware version 0.750.1, communication via the LAN / WAN port is done using an encrypted protocol)
- is equipped with VAS switch with AVB support,
- allows 1Gb/s transmission speed and has optical-fiber interface (2 connectors for SFP modules),
- supports TCP/UDP/PTP/DHCP protocols,
- assigns IP addresses dynamically,
- thanks to replaceable libraries, RS485 port (ModBus) allows implementation of other protocols,
- has PoE active supply feature,
- can support two parametric inputs or two relay outputs (every channels is configured on a case-by-case basis, and by default, both are set as parametric inputs) relay outputs NC/NO,
- in CPU-OFF mode. It transmits audio data via independent protocol,
- in the future it will allow using network infrastructure for other Audio-Video purposes.

To connect communication cards and fireman microphone via an optical cable, it is required to use highly-reliable SFP 1,25 Gbps optical modules.

SFP modules cooperate with single or multimode optical fibers which use LC and SC type of connectors. All information from DDM (Digital diagnostics Monitoring) can be read by MULTIVES Selector software.



Drawing 14. ABT-xNET-1Gb/WAN/RS communication card



Drawing 15. Diagram of logical inputs/outputs of communication card

Table 5. Technical parameters of ABT-xNET-1Gb/WAN/RS communication card

Model	ABT-xNET-1Gb/WAN/RS
Source of power	Control Unit main backplane or main-passive
Power consumption	48 V about 100 mA; Input/output/PoE extension – max. consumption 360 mA, Typical consumption depends on devices connected to the card via RJ45 connector (PoE) max. 15 W
Optical module – type of connector	SFC modules, SC/LC connector, Multi-mode or single-mode optical fiber, E 30 or E 90, OM1, OM2, OM3
Number of logical inputs / outputs	2 independent channels; galvanically separated 1 × NO, 1 × NC output
Switching current (Max.)	1 A peak*
Switching voltage (Max.)	50 V AC /DC peak*
Switching power (Max.)	30 W*
Source of parametric input signal	Passive, standard resistors: 4 kΩ ↔10 kΩ, detection thresholds 0/1/short-circuit/open-circuit set in configuration application
Type of logic input / output seats	Screw terminals PHOENIX 6 pin-type, 3,5 mm
PoE output voltage, load capacity	48 V, 0,3 A of load capacity
Number of RS485 connectors	1 in RJ45
Max. length of RS485 cable	1200 m (according to specifications and characteristics RS485)
Operating temperature	0°C to +60°C
Operating humidity	15% to 80% (without condensation)
Storage temperature	-20°C to +70°C
Storage humidity	15% to 80% (without condensation)
Dimensions	70 × 160 × 30 (mm)
Important	

Any DC combination of V & A not to exceed switching power max value. Not allowed capacitive nor inductive load, because of large inrush current / voltage spike, that can significantly exceed the maximum allowed switching current or voltage.

7.1.2.3 ABT-xLogIN-8f – logic input card for function slot

Logic inputs card has 8 independent programmable potential free contacts that allow to trigger the required action in the MULTIVES.

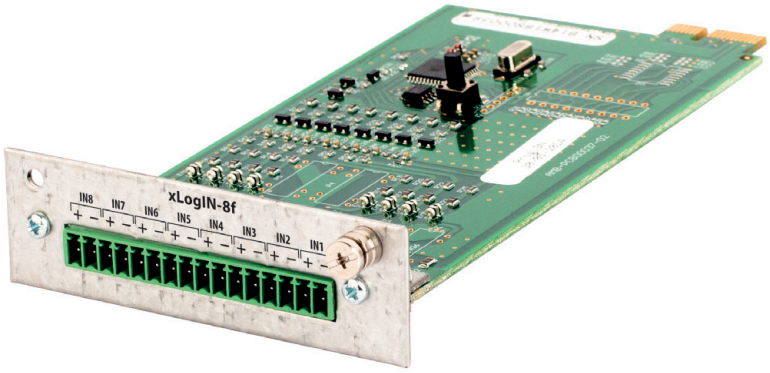
ABT-xLogIN-8f card has two modes: contact, detects a short circuit and opening the contact and monitor mode which detects additionally a short circuit and opening the cable connecting the card with external relay.

Main features of the card:

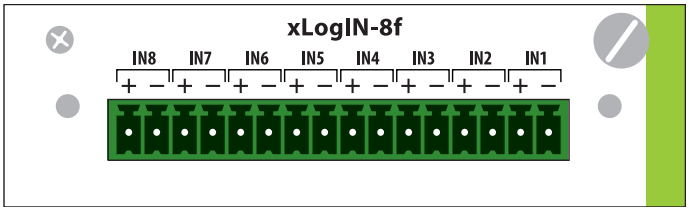
- reporting hardware errors identified on the card,
- reporting incorrect input voltage level (short-circuit, open-circuit); connector monitoring feasible by measuring voltage at parametric resistors; the card detects four statuses: line short-circuit, line open-circuit and input closing and opening,
- calling scenario, action, matrix by any status of any input,
- two possible working modes – NO and NC.

Worth to known:

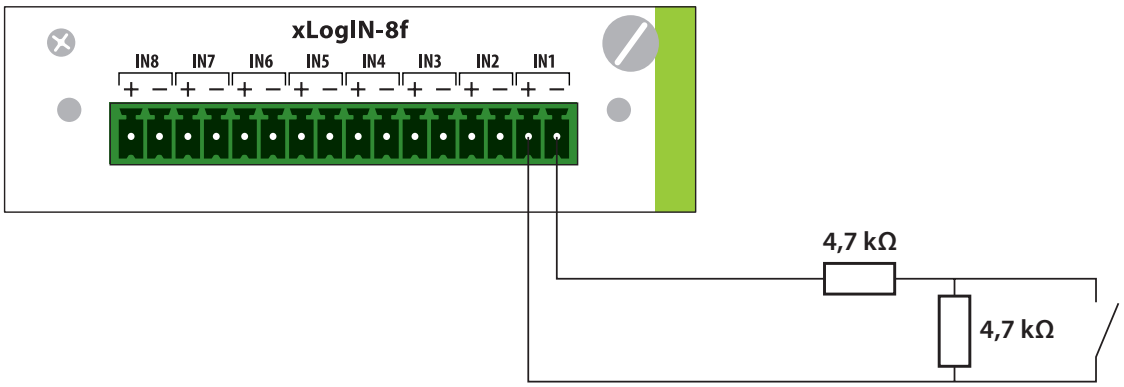
- individual logical inputs in the system are not galvanically isolated from the rest of the elements,
- all logical inputs have common ground.



Drawing 16. Logic input card for function slot



Drawing 17. Front panel of logic input card for function slot



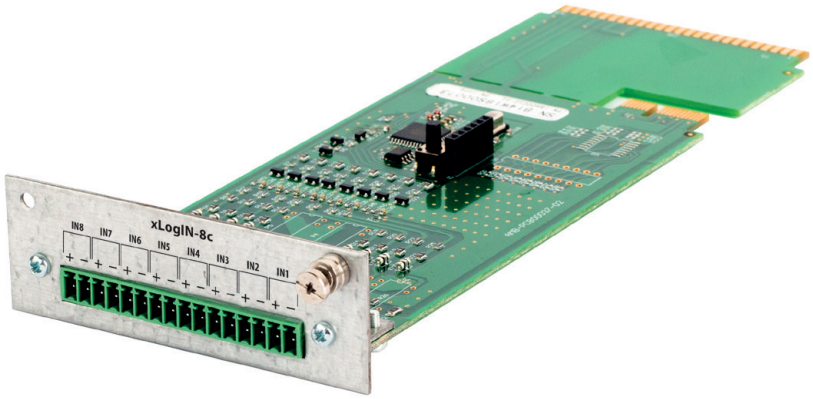
Drawing 18. Example of diagram of connecting resistors on monitored line

Table 6. Technical data of ABT-xLogIN-8f/c

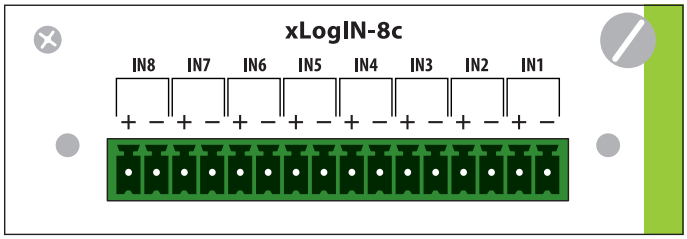
Model	ABT-xLogIN-8c/f
Power supply	Internal from the Control Unit
Current consumption	10 mA at 48 V
Number of logic inputs	8
Voltage source	12 V
Types of control logic	NO / NC
The resistance value interpreted as the opening of the line	RL>20k
The resistance value interpreted as a contact close	RL<5k
The resistance value interpreted as a contact open	RK>10k
Operating temperature	0°C / 60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C / 70°C
Storage humidity	5% to 95% (non-condensing)
Type of connector	16-pin screw terminal type PHOENIX, 3.5 mm
Dimensions	ABT-xLogIN-8c – 70 × 215 × 25 (mm) ABT-xLogIN-8f – 70 × 160 × 25 (mm)
Accessories	Connector with screw terminals 16 pins, the distance between the partitions of 3.5 mm

7.1.2.4 ABT-xLogIN-8c – logic input card for control slot

The card is identical to ABT-xLogIN-8f in terms of functions. The only difference is PCB length and a type of connector dedicated for cards in control slots..



Drawing 19. Logic input card for control slot



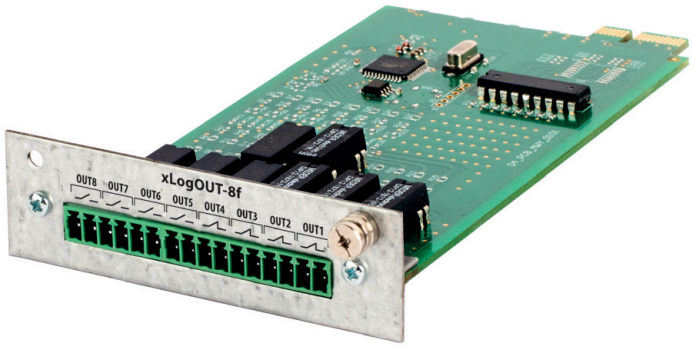
Drawing 20. Front panel of logic input card for control slot

7.1.2.5 ABT-xLogOUT-8f – logic output to function slot card

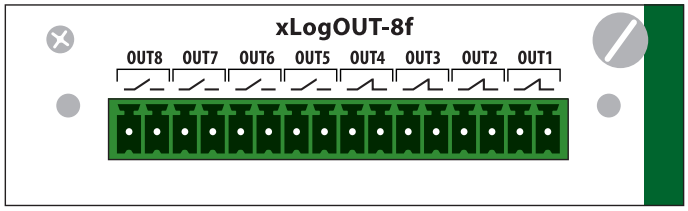
Card is equipped with 8 programmable relay outputs which can be assigned to various kinds of states of the system MULTIVES. Channels 1 to 4 are NC (normally open) relays while the channels 5 to 8 are NO (normally open) relays.

Main system functions:

- two modes of output operation. Normally – open and normally- closed,
- card equipped with 4 NO-type relays and 4 NC-type relays in case power supply is cut off; for normal operation, it is configurator that defines the type,
- assigning any output to any system event.



Drawing 21. Logic output card for function slot



Drawing 22. Front panel of logic output card ABT-xLogOUT-8f

Table 7. Technical data of ABT-xLogOUT-8f

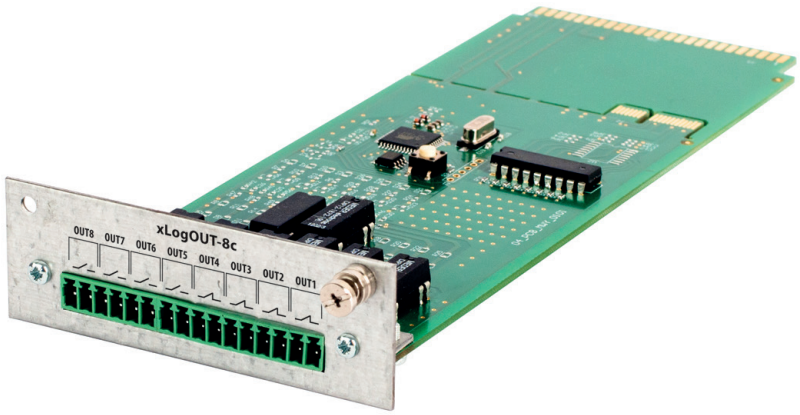
Model	ABT-xLogOUT-8c/f
Power supply	Internal form the Control Unit backplane
Power consumption	10 mA at 48 V
Number of logic outputs	8, each output galvanically isolated
Type of outputs	4× NC 4× NO
Connector type	16 pin screw terminal type PHOENIX, 3.5 mm
Switching current (Max.)	0,5 A peak*
Switching voltage (Max.)	48 V peak*
Switching power (Max.)	10 W*
Operating temperature	0°C to 60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C to 70°C
Storage humidity	5% to 95% (non-condensing)
Dimensions	ABT-xLogOUT-8c – 70 × 215 × 25 (mm) ABT-xLogOUT-8f – 70 × 160 × 25 (mm)
Accessories	Connector with screw terminals 16 pins the distance between the partitions of 3.5 mm

***Important**

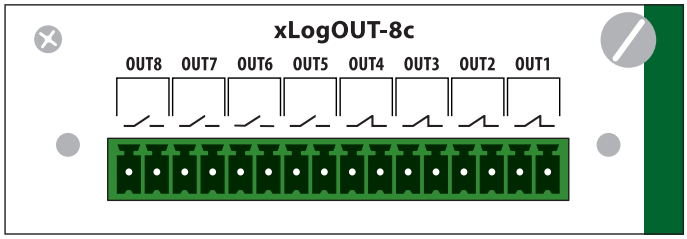
Any DC combination of V & A not to exceed switching power max value. Not allowed capacitive nor inductive load, because of large inrush current / voltage spike, that can significantly exceed the maximum allowed switching current or voltage.

7.1.2.6 ABT-xLogOUT-8c – logic output card for control slot

The card is identical to ABT-xLogOUT-8f in terms of functions. The cards differ in terms of PCB length and a type of connector dedicated for cards in control slots.



Drawing 23. Logic output card for control slot



Drawing 24. Front panel of logic output card ABT-xLogOUT-8c

7.1.2.7 ABT-xAudIO-4/8-RS – audio input/output card with RS485

4 audio inputs and 8 audio outputs card with RS485 port for functional slot.

ABT-xAudIO-4/8-RS card expands the processing audio signals by the ABT-CU-8LCD. Card supports for 4 audio inputs, 8 balanced line outputs and RS485 interface. Each of the audio line inputs is equipped with 3 parametric filters and volume regulation while each output is equipped with Acoustic Feedback Suppressor, limiter, delay lines (available buffer for all outputs 30000 ms), volume regulator and 8 parametric filters. Standard ABT-CU-8LCD consists of one ABT-xAudio-4/8-RS. Maximum unit may have 4 function slots equipped with xAudio-4/8-RS cards which allows to extend the system up to 16 audio inputs and 32 audio outputs (Local output in the unit) While sending and receiving 8 audio channels from the MULTIVES network.



Drawing 25. ABT-xAudIO-4/8-RS card

RS485 First connector

Type : RJ45

Assigning pins in connector:

Pin	Name	Description
1	GND	Ground
2	GND	Ground
3	BUS1_A	Data bus – line A
4	BUS1_B	Data bus – line B
5	BUS2_A	Data bus – line A
6	BUS2_B	Data bus – line B
7	+48 V	Power supply, max 1 A
8	+48 V	Power supply, max 1 A

Audio IN 1-4 connector

Type : RJ45

Assigning pins in connector:

Pin	Name	Description
1	CH1_IN_H	Audio input – hot
2	CH1_ IN_C	Audio input – cold
3	CH2_ IN_H	Audio input – hot
4	CH2_ IN_C	Audio input – cold
5	CH3_ IN_H	Audio input – hot
6	CH3_ IN_C	Audio input – cold
7	CH4_ IN_H	Audio input – hot
8	CH4_ IN_C	Audio input – cold

Audio OUT 1-4 connector

Type : RJ45

Assigning pins in connector:

Pin	Name	Description
1	CH1_OUT_H	Audio output – hot
2	CH1_OUT_C	Audio output – cold
3	CH2_OUT_H	Audio output – hot
4	CH2_OUT_C	Audio output – cold
5	CH3_OUT_H	Audio output – hot
6	CH3_OUT_C	Audio output – cold
7	CH4_OUT_H	Audio output – hot
8	CH4_OUT_C	Audio output – cold

Audio OUT 4-8 connector

Type : RJ45

Assigning pins in connector:

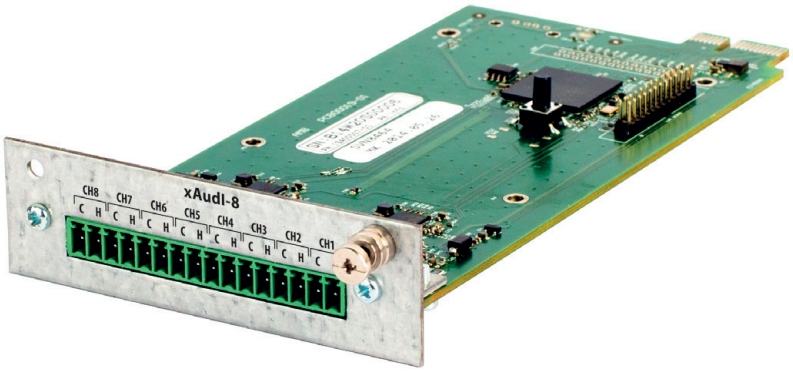
Pin	Name	Description
1	CH5_OUT_H	Audio output – hot
2	CH5_OUT_C	Audio output – cold
3	CH6_OUT_H	Audio output – hot
4	CH6_OUT_C	Audio output – cold
5	CH7_OUT_H	Audio output – hot
6	CH7_OUT_C	Audio output – cold
7	CH8_OUT_H	Audio output – hot
8	CH8_OUT_C	Audio output – cold

Table 8. Technical data of ABT-xAudIO-4/8-RS

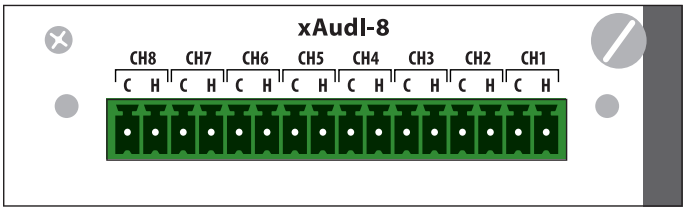
Model	**ABT-xAudIO-4/8-RS**
Source of power	ABT-CU-8LCD Control Unit main backplane
Power consumption	typically 100 mA at 48 V
Audio inputs	
Number of audio inputs	4
Type of audio inputs	Differential
Type of connector of audio inputs	1 × RJ45
Input impedance	≥ 10 kΩ
Max. input voltage	≤ 3 Vrms
Audio outputs	
Number of audio outputs	8
Type of audio outputs	Symmetrical
Type of connector of audio inputs	2 × RJ45
Pass band	20 Hz – 20 kHz (@ 1 dB) 400 Hz – 8kHz (@ 0,1 dB)
Non-linear distortion (THD+IMD)	≤ 0,05%
Reserve output power (headroom)	10 dB
Relation signal/noise	≥ 90 dB
Channel separation	≥ 80 dB
Output impedance	600 Ω
RS485 interface	
Number of seats	RJ45 x1
Transmission speed	≥ 19200 bps
RS485 connector supply	48 V with current efficiency 2 A
Operating temperature	0°C to 70°C
Storage temperature	-20°C to 70°C
Operating humidity	15% to 80% (without condensation)
Storage humidity	5% to 95% (without condensation)
Dimensions	70 × 160 × 25 (mm)

7.1.2.8 ABT-xAudI-8 – 8 AUDIO input card for function slot

ABT-xAudI-8 card has 8 balanced audio inputs (line level) and works with any function slot on ABT-CU-8LCD. Each audio input is equipped with a 3 parametric filters and gain control.



Drawing 26. ABT-xAudI-8 card model – 8 audio inputs



Drawing 27. ABT-xAudI-8 card model

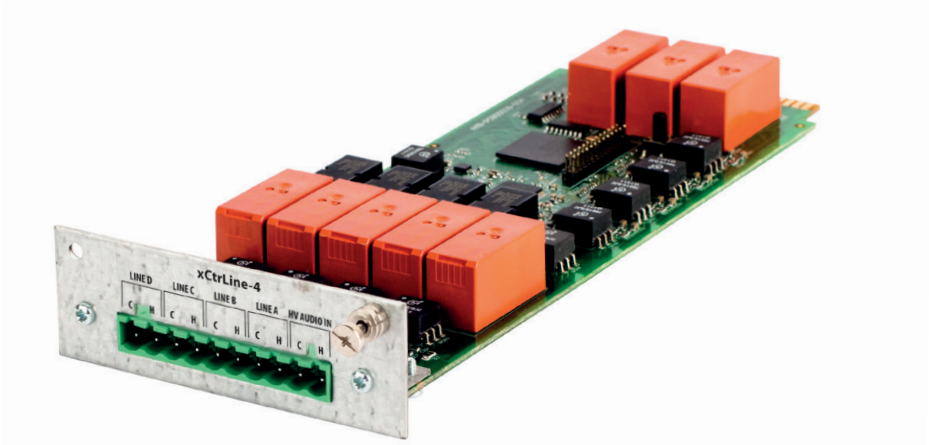
Table 9. Technical data of ABT-xAudI-8

Model	xAudI-8
Source of power	ABT-CU-8LCD Control Unit main backplane
Power consumption	25 mA at 48 V
Number of audio inputs	8
Type of audio inputs	Differential
Type of connector and number of audio inputs	Screw terminals PHOENIX 16 pin -type, 3,5 mm
Input impedance	≥ 10 kΩ
Max. input voltage	≤ 3 Vrms
Operating temperature	0°C to 60°C
Storage temperature	-20°C to 70°C
Operating humidity	15% to 80% (without condensation)
Storage humidity	5% to 95% (without condensation)
Dimensions	70 × 160 × 25 (mm)

7.1.2.9 ABT-xCtrLine-4 – 4 loudspeaker lines control card

Speaker line control card has 4 independent programmable outputs (A, B, C, D). Each output line has an independent measurement. The method of measurement, tolerance, impedance reference values and belonging to the zone is made by dedicated configuration software. The card detects short circuit, open line, ground fault and follows long-term changes of impedance related for example to changes in ambient temperature.

When using the combination of the amplifiers connected to the 100V internal buses it is necessary to use at least one x-CtrLine4 card. This type of card can monitor the presence of both type of amplifiers, connected to the input of the individual card HV Audio IN as well as all the amplifiers connected to the buses.



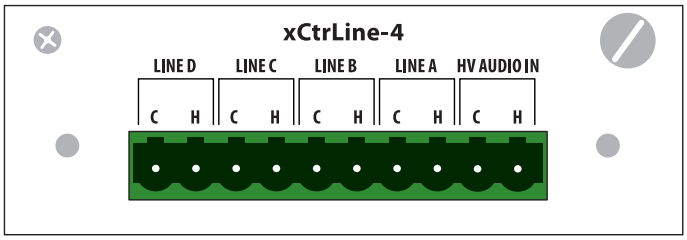
Drawing 28. ABT-xCtrLine-4 loudspeaker lines control card

Line measurements can be performed by means of two various methods:

- impedance,
- loop.

The loop with external fault isolator modules card detects short-circuit, open-circuit and ground fault.

⚠ **Maximum power which ABT-xCtrLine-4 can handle is 800 W for 100 V line. Each output on the card can handle up to 300 W (100 V Line), in the parallel connection of the A-B, C-D maximum load is 450 W. Speaker monitoring does not disturb broadcasting the audio through the speakers.**



Drawing 29. ABT-xCtrLine-4 loudspeaker lines control card

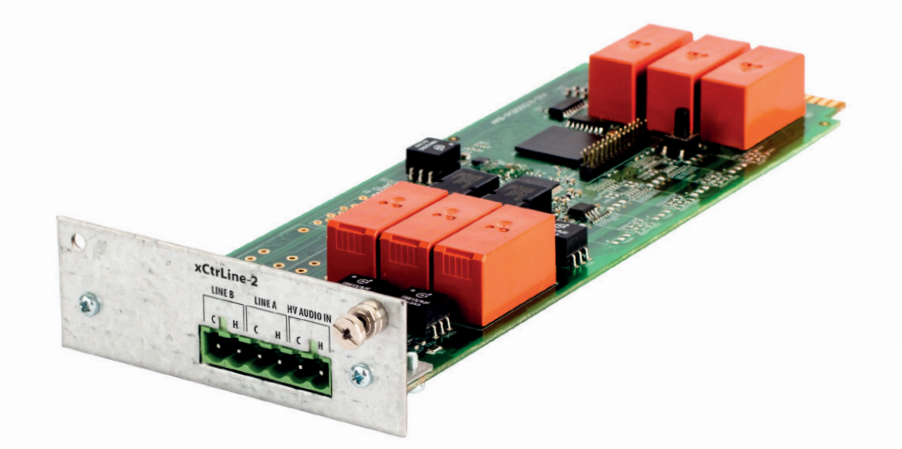
Table 10. Technical data of ABT-xCtrLine-4

Model	ABT-xCtrLine-4
Power supply	Internal form the Control Unit backplane
Maximum current consumption	152 mA at 48 V
Type of connector	10 pin screw terminal type PHOENIX, 5.08 mm
Impedance measurement frequency	1 kHz to 48 kHz
Frequency of the signal for EOL modules	18 kHz to 24 kHz
Maximum measured current	20 A
Maximum measured voltage	200 V
Accuracy of measurement	Up to 5%
Operating temperature	0°C to 60°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C (non-condensing)
Storage humidity	5% to 95% (non-condensing)
Dimensions	70 × 215 × 30 (mm)
Accessories	Screw terminals 10 pins, the distance between the partitions 5.08 mm

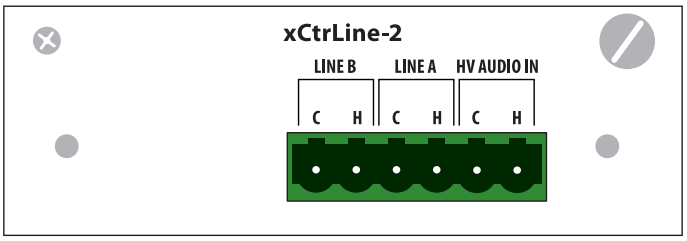
7.1.2.10 ABT-xCtrLine-2 – 2 loudspeaker lines control card

Speaker line control card has 2 independent programmable outputs (A, B). Each output line has an independent measurement. The method of measurement, tolerance, impedance reference values and belonging to the zone is made by dedicated configuration software. The card detects short circuit, open line, ground fault and follows long-term changes of impedance related for example to changes in ambient temperature.

When using the combination of the amplifiers connected to the 100 V internal buses it is necessary to use at least one xCtrLine-2 card. Only xCtrLine-2 card can monitor the presence of both type of amplifiers, connected to the input of the individual card HV Audio IN as well as all the amplifiers connected to the buses.



Drawing 30. ABT-xCtrLine-2 loudspeaker lines control card



Drawing 31. ABT-xCtrLine-2 loudspeaker lines control card

Line measurements can be performed by means of two various methods:

- impedance,
- loop.

The loop with external fault isolator modules card detects short-circuit, open-circuit and ground fault.

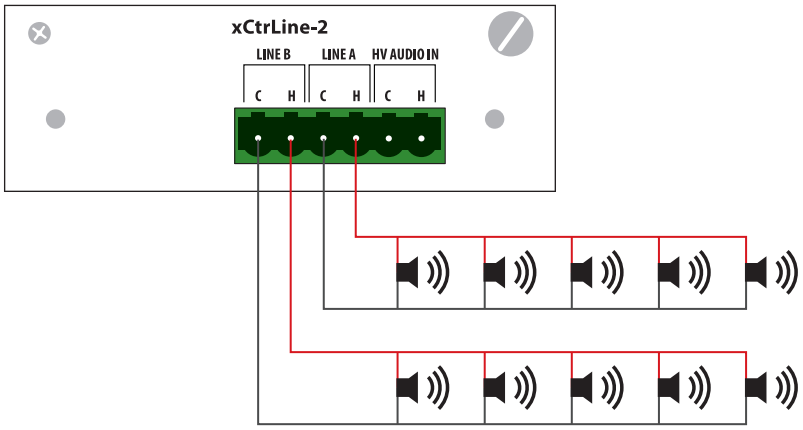
⚠ **Maximum power which ABT-xCtrLine-2 can handle is 600 W for 100 V line. Each output on the card can handle up to 300 W (100 V Line), in the parallel connection of the A-B maximum load is 450 W. Speaker monitoring does not disturb broadcasting the audio through the speakers.**

Table 11. Technical data of ABT-xCtrLine-2

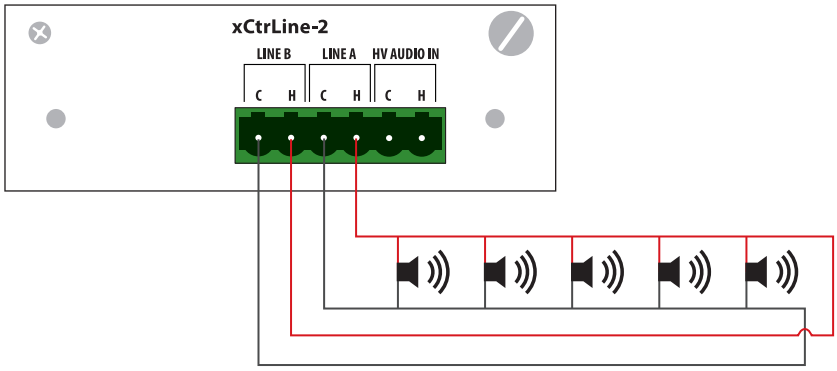
Model	ABT-xCtrLine-2
Power supply	Internal form the Control Unit backplane
Maximum current consumption	121 mA at 48 V
Type of connector	6 pin screw terminal type PHOENIX, 5.08 mm
Impedance measurement frequency	1 kHz to 48 kHz
Frequency of the signal for EOL modules	18 kHz to 24 kHz
Maximum measured current	20 A
Maximum measured voltage	200 V
Accuracy of measurement	Up to 5%
Operating temperature	0°C to 60°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C (non-condensing)
Storage humidity	5% to 95% (non-condensing)
Dimensions	70 × 215 × 30 (mm)
Accessories	Screw terminals 6 pins, the distance between the partitions 5.08 mm

Connecting loudspeaker lines illustrated with an example of xCtrLine-2 card

You can connect loudspeaker lines by means of 2 methods: impedance and loop.



Drawing 32. Impedance connection



Drawing 33. Loop connection

7.1.3 Power Amplifiers

ABT-PAxxxxB power amplifier is used for amplifying and distributing an audio signal supplied by the VACIE system control unit or an external BGM source. ABT-PAxxxxB provides nominal power only when nominal speaker line impedance is kept.

Amplifier unit has a single power supply with 42…57 V DC (nominal voltage: 48 V DC) that shares redundancy via the Ambient System Power Supply Equipment comply to EN 54-4: Power Supply Manager ABT-PSM48 works with ABT-PS48800 Power Supply Units and the 4 × 12 V VRLA battery bank as a back-up power source.

The ABT-PAxxxxB are a 2-U high 19" rack mountable units, dedicated to use with ABT-PSM48 power supply manager and ABT-PS48800 power supply. The amplifiers were specifically developed to maximum availability and durability to meet the requirements of EN 54-16 standard. Optionally there is a possibility to use it as a stand-alone unit.

This User Manual applies to operation of Power Amplifiers in three basic models:

- **ABT-PA8080B** – 8 audio channels × 80 W
- **ABT-PA8160B** – 8 audio channels × 160 W
- **ABT-PA2650B** – 2 audio channels × 650 W

Two amplifiers in a half output module number versions:

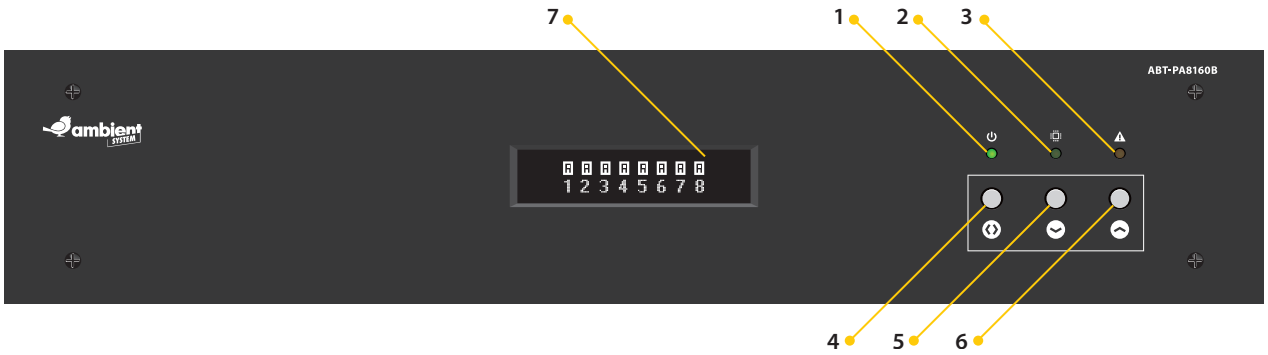
- **ABT-PA4160B** – 4 audio channels 160 W
- **ABT-PA1650B** – 1 audio channel × 650 W

Only ABT-PAxxxxBE amplifiers have additional local BGM inputs.
Ensure that the volume level of audio sources is set to minimum and the loudspeakers and all equipment are connected properly before turning the amplifier on.

CAUTION: The system is activated about 3 seconds after turning the device on. This is the regular operation of the amplifier that results from work of embedded automatic protection of circuits, loudspeakers and other connected components.

7.1.3.1 Front panel

The figure below presents the front panel of Amplifier module, with its most important elements marked.

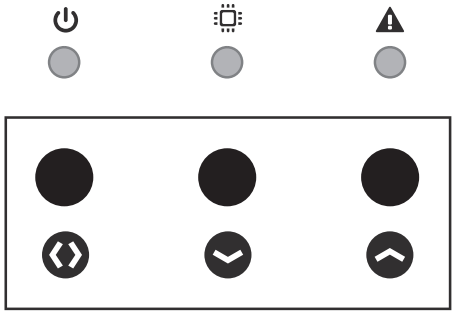


Drawing 34. Front panel of ABT-PAxxxxB Amplifier

1. **Power –** green LED indicates supply connection
2. **Active –** green LED indicates proper operation
3. **Failure –** yellow LED indicates amplifier failure
4. **Entry / exit button –** menu navigation button
5. **Arrow Down button –** menu navigation button
6. **Arrow Up button –** menu navigation button
7. **Display –** alphanumeric LCD Display presents the menu and status of the Amplifier

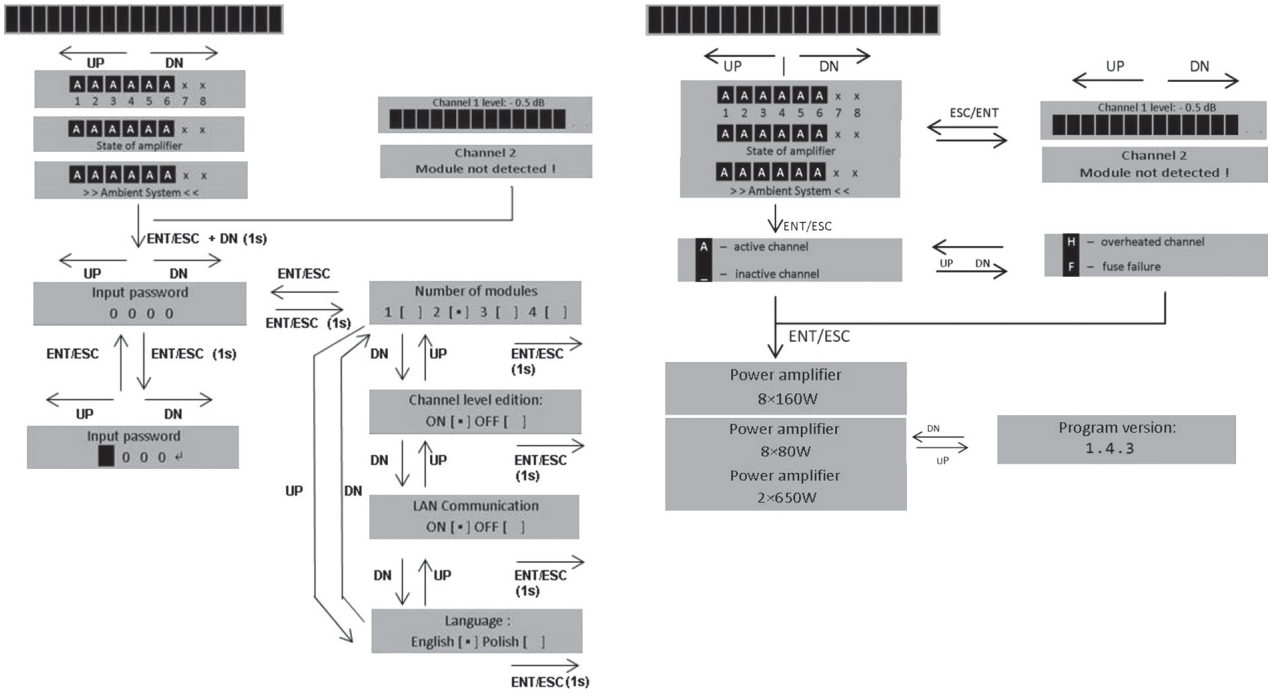
7.1.3.2 *Front panel operation*

The figures below present a part of the amplifier's front panel including buttons and LEDs indicating the condition of the amplifier's module, as well as the menu structure diagram in form of information available on the alphanumeric display.



Drawing 35. Front panel buttons

Front buttons are used to control the amplifier from its menu. The menu enables monitoring the condition of channels (active/not active/over-heated/ fuse failures), edit the level of the output signal of any of the amplifier's channels and number of active amplifier modules. The way of navigating across the menu using buttons is described under the figure 3. Default access password is: "1992".



Drawing 36. Amplifier's menu structure block diagram

ENTRY – click <> button for 1 second

EXIT – click ENTRY / EXIT button

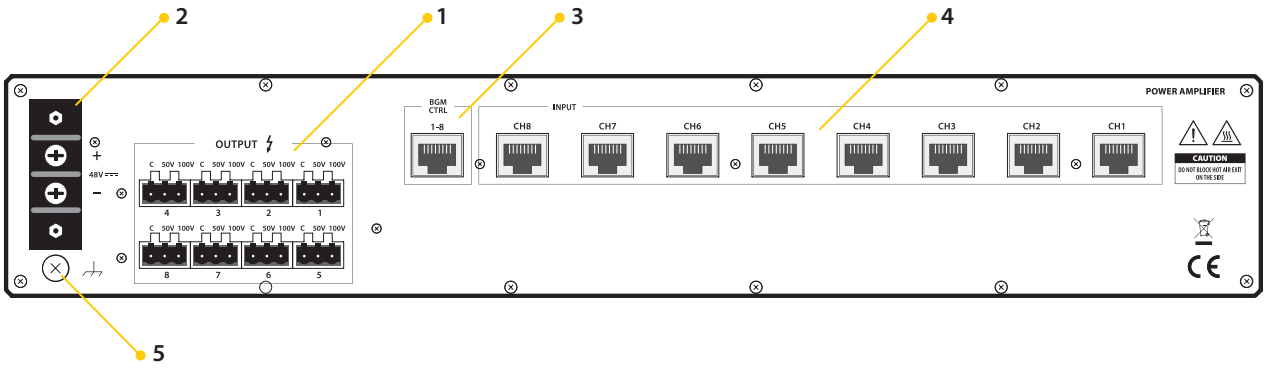
VOLUME CHANGE – select the amplifier channel by arrows, than press "EXIT" button to set a new volume setup. Confirm by "EXIT" button.

ENTER THE SERVICE MODE – press <> button and the arrow down button simultaneously, hold them for 1 s. Use Arrows and Select to enter password. In service mode it is possible to disable visible attenuation edition and activate the ETH connector used for LAN communication. To modify settings, select an option using arrows then press ENTRY / EXIT button and hold for approx. 1 s. To confirm changes click <> button.

Pressing the <> button in the main level of menu results in displaying the key containing the description of symbols occurring on the display. Double clicking the <> button enables to return to the main menu displaying the amplifier's state of operation.

7.1.3.3 *Rear panel*

The figure presents the appearance of the rear panel with the markings of the used connectors



Drawing 37. Rear panel of ABT-PAxxxxB Amplifier

1. **Loudspeakers' lines output**
   Speakers' lines output connectors are used to connect up to eight speaker lines to the unit. The user needs to ensure that connected speakers' lines impedance is equal or higher than the rated value allowed for the amplifier. Channels' numbers are marked with digits form 1 to 8.

2. **DC power supply connector**
   The power supply connector is used to connect the 48 V DC (42 V – 57 V) power supply for rated output parameters.

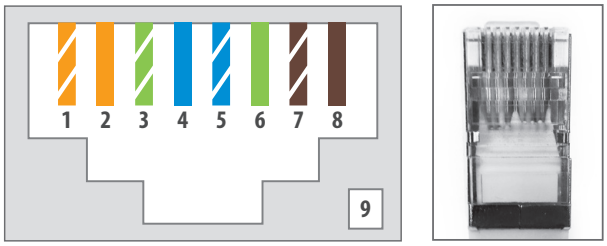
3. **BGM control** – *available only in extended versions like:*
   ABT-PA8080BE / ABT-PA4160BE / ABT-PA8160BE / ABT-PA1650BE / ABT-PA2650BE
   BGM control terminal, described on the amplifier's rear panel as BGM CTRL 1-8 is used for muting of any of the eight BGM signals connected to the amplifier using the control unit. Like in the case of the audio input terminal, the BGM CTRL 1-8 should be connected to the corresponding pins of the control unit using the cable shown in the drawing.

Pin number	Description
1	BMG 1 muting signal
2	BMG 2 muting signal
3	BMG 3 muting signal
4	BMG 4 muting signal
5	BMG 5 muting signal
6	BMG 6 muting signal
7	BMG 7 muting signal
8	BMG 8 muting signal
9	connection of the amplifier's ground with the terminal shield

All signals controlling silencing of BGM modules are implemented in the form of optocoupler inputs, in order to protect the amplifier and the control unit from possible interferences. Supplying low logic state from the control unit on any of BGM CTRL inputs results in muting the corresponding BGM signal.

4. **Audio input**

Symmetrical audio input terminal, described on the rear panel of the device as INPUT CH1-CH8, is used for connecting audio source and control signal. In the general case it is used for connecting the amplifier to the system control unit using the T568B straight-trough cable shown in the figure on the right (view form top). Each of the input connectors is equipped with the ground-lift option (jumper on a board). Fig. 5 presents also the appearance of described 8P8C (RJ-45) terminal with numbers of pins which function is described in the table below.



Drawing 38. Input terminal and the audio cable

Pin number	Description
1	audio input signal HOT (+) – audio signal connected from the control unit
2	audio input signal COLD (–) – audio signal connected from the control unit
3	signal controlling proper functioning of the audio track (+) – detection of the piloting tone by the control unit
4*	signal that informing the control unit about amplifier's overheating and failure
5**	signal that activates the amplifier's channel through the control unit
6	signal controlling proper functioning of the audio track (–) – detection of the piloting tone by the control unit
7*	signal informing the control unit about fuses' failure
8	control unit's ground
9***	connection of the amplifier's ground with the terminal shield

* digital signals informing about overheating of the amplifier and fuses failure are implemented in the form of optocoupler outputs, in order to protect the amplifier and the control unit from possible interferences during data transmission; indication is performed by short circuiting the corresponding signal with the control unit's ground.

** digital signal activating the channel is implemented in the form of the optocoupler inputs; channel activation is performed by supplying a high logic state on the activation input (pin number 5).

*** on the PCB inside a jumper is placed that enables the choice of the way of connecting the terminal shield with the amplifier's ground; there is possibility of a direct connection or through the ground-lift circuit that minimizes possible noise coming from different ground potentials of connected devices.

5. **Signal ground terminal**

7.1.3.4 Detailed descriptions of selected functions

BGM modules control inputs

Controlling input terminal, described on the amplifier's rear panel as BGM CTRL 1-8 is used for muting any of the eight BGM signals connected to the amplifier using the control unit. Like in case of the audio input terminal, the BGM CTRL 1-8 should be connected to corresponding pins of the control unit by T568B cable.

All signals controlling the muting of BGM modules are implemented in the form of optocoupler inputs in order to protect the amplifier and the control unit from possible interferences. Supplying low logic state from the control unit to any of BGM CTRL inputs results in muting the corresponding BGM signal.

BGM modules are available only in ABT-PA8080BE / ABT-PA4160BE / ABT-PA8160BE / ABT-PA1650BE/ ABT-PA2650BE.

"Ground lift" feature

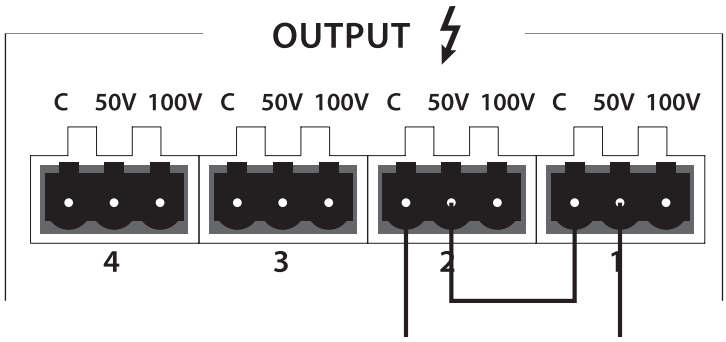
Each of the audio input connectors is equipped with the ground-lift option. There is a jumper on the PCB inside that enables choosing the way of connecting terminal shield with the amplifier's ground; there is a possibility of a direct connection or through the ground-lift circuit that minimizes possible noise coming from different ground potentials of connected devices.

Amplifier's input channel bridging

Two or four channels from one unit can be combined to deliver multiple power.
In need of changing output power configuration for each of amplifier's channels it is possible to bridge input and output signals.

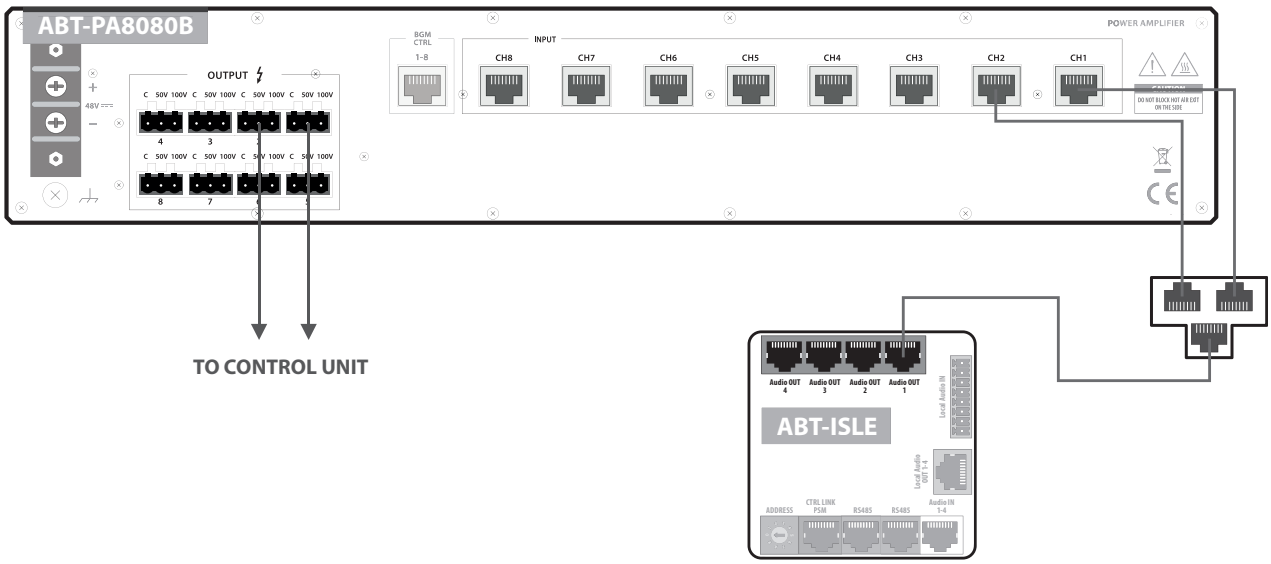
7.1.3.5 Bridging

Keep in mind that it is possible to bridge two or four amplifier's output channels in order to obtain higher power. To do that, connect in series two amplifier output channels taking into account the nominal power of loudspeaker lines to be connected later. To bridge four channels connect parallel two serial bridged sets together. An exemplary bridge connection of output channels is shown in the figure below.



Drawing 39. Bridging of channel 1 & 2 outputs (100 V line)

In need of changing output power configuration for each of amplifier's channels it is possible to bridge input signals. In this case use splitter indicated in the next drawing. To bridge 4 channels use 3 splitters.

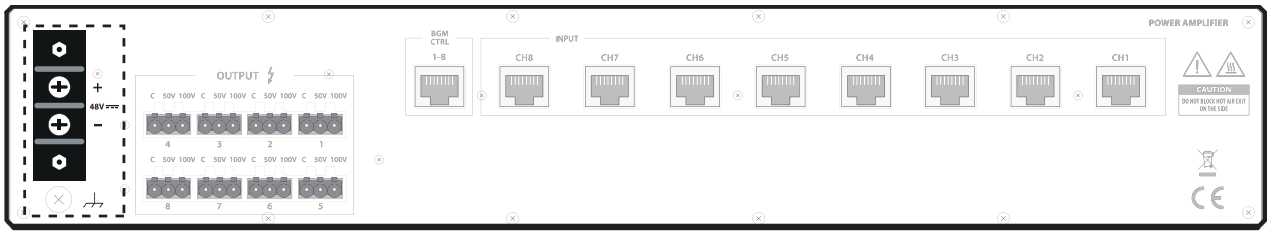


Drawing 40. Way to bridge two channels together

7.1.3.6 First run

As you make sure the input and output connections of audio signal have been made correctly, connect voltage of between 42 and 57 V DC to the amplifier power supply connectors and earth the equipment with the connector available on the rear panel. Be sure that your power supply is suitable for powering the amplifier.

The system is activated approx. 3 seconds after the supply is switched on. This is normal operation of the amplifier, resulting from built-in automatic protection of circuits, loudspeakers and other components connected. Correct start-up of the amplifier module is signalled by lighting diodes “power” and “active” on the amplifier’s front panel.



Drawing 41. 48 V DC supply and signal ground connectors

7.1.3.7 Technical details

Table 12. Technical specification of ABT-PA8080B

Model	ABT-PA8080B
Specifications	
Type	Class D
Audio channels	8
Possible configurations	8 × 80 W 6 × 80 W + 1 × 160 W 4 × 80 W + 2 × 160 W 2 × 80 W + 3 × 160 W 4 × 160 W 2 × 320 W
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	15 kg
Dimensions (W × H × D)	440 mm × 80 mm × 380 mm
Parameters	
Supply voltage	48 V (42-57 VDC)
Rated load (100 V)	125 Ω + 100 nF
Maximum power consumption	1140 W
Nominal Power	20 A
Idle current	0,57 A
Current (channels disabled)	0,15 A
Pass band (-3 dB)	75 Hz – 20 kHz
Channel separation	>70 dB
Signal noise ration SNR	>80 dB (curve A)
Total harmonic distortion THD (rated load/1 kHz)	0,01%
Input impedance	22 kΩ (balanced)
Input sensitiveness adjustment	MUTE, -24 dB … +0,5 dB
Operation conditions	
Ambient temperature	-8°C … 60°C
Ambient relative humidity	10% … 90% (no condensation)

Table 13. Technical specification of ABT-PA8160B

Model	ABT-PA8160B
Specifications	
Type	Class D
Audio channels	8 (4 for ABT-PA8160B Power Amplifier [4CH])
Possible configurations	8× 160 W 6× 160 W + 1× 320 W 4× 160 W + 2× 320 W 2× 160 W + 3× 320 W 4× 320 W 2× 640 W 4× 160 W (for ABT-PA8160B Power Amplifier [4CH]) 2× 320 W (for ABT-PA8160B Power Amplifier [4CH])
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	18,6 kg
Dimensions (W × H × D)	440 mm × 80 mm × 380 mm
Parameters	
Supply voltage	48 V (42-57 VDC)
Rated load (100 V)	62 Ω + 200 nF
Maximum power consumption	2166 W
Nominal Power	38 A
Idle current	0,57 A
Current (channels disabled)	0,15 A
Pass band (-3 dB)	75 Hz – 20 kHz
Channel separation	>70 dB
Signal noise ration SNR	>80 dB (curve A)
Total harmonic distortion THD (rated load/1 kHz)	0,01%
Input impedance	22 kΩ (balanced)
Input sensitiveness adjustment	MUTE, -24 dB … +0,5 dB
Operation conditions	
Ambient temperature	-8°C … 60°C
Ambient relative humidity	10% … 90% (no condensation)

Table 14. Technical specification of ABT-PA2650B

Model	ABT-PA2650B
Specifications	
Type	Class D
Audio channels	2 (1 for ABT-PA2650B Power Amplifier [1CH])
Possible configurations	2 × 650 W 1 × 1300 W 1 × 650 W (for ABT-PA2650B Power Amplifier [1CH])
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	15 kg
Dimensions (W × H × D)	440 mm × 80 mm × 380 mm
Parameters	
Supply voltage	48 V (42-57 VDC)
Rated load (100 V)	15,4 Ω + 200 nF
Maximum power consumption	2166 W
Nominal Power	38 A
Idle current	0,33 A
Current (channels disabled)	0,15 A
Pass band (-3 dB)	75 Hz – 22 kHz
Channel separation	>70 dB
Signal noise ration SNR	>80 dB (curve A)
Total harmonic distortion THD (rated load/1 kHz)	0,01%
Input impedance	22 kΩ (balanced)
Input sensitiveness adjustment	MUTE, -24 dB … +0,5dB
Operation conditions	
Ambient temperature	-8°C … 60°C
Ambient relative humidity	10% … 90% (no condensation)

7.1.3.8 Service

Device maintenance

Because of dangerous voltage inside the operating amplifier, any maintenance may be conducted only after disconnecting the device from power supply. If the amplifier is dusted inside, you are allowed to clean it with compressed air. It is acceptable to clean the device outside with soft cloth.

Service repairs

Any repairs of the equipment are made by the manufacturer or a service centre authorised by the manufacturer. The repair should be requested for through the product manufacturer's contact.

7.1.3.9 User guidelines

Storage and packaging

Store unused equipment in their original packaging, in closed rooms, at ambient temperature of -8°C…60°C and relative humidity 10%…90% (no condensation).

For transport, the amplifier should be each time packed to minimise the effects of possible mechanical damage or weather conditions. Additionally, there should be captions on the package, describing the type of equipment, its manufacturer, weight, year of manufacturing and transport information (CAUTION: FRAGILE, PROTECT AGAINST DAMP, TOP – DO NOT OVERTURN).

Transport

The amplifier should be packed as recommended above and transported by covered means of transport. Protect the equipment against moving, oriented as indicated on the package.

7.1.3.10 Manufacturer's remarks

Manufacturer reserves itself a right to introduce construction of technological modifications into the next versions of the device.

Dealing with packages and worn-out equipment

The equipment packaging elements are made of cardboard and polyethylene foam, so they may be recycled after use. To do that, segregate the packaging and deliver to the nearest waste management point.

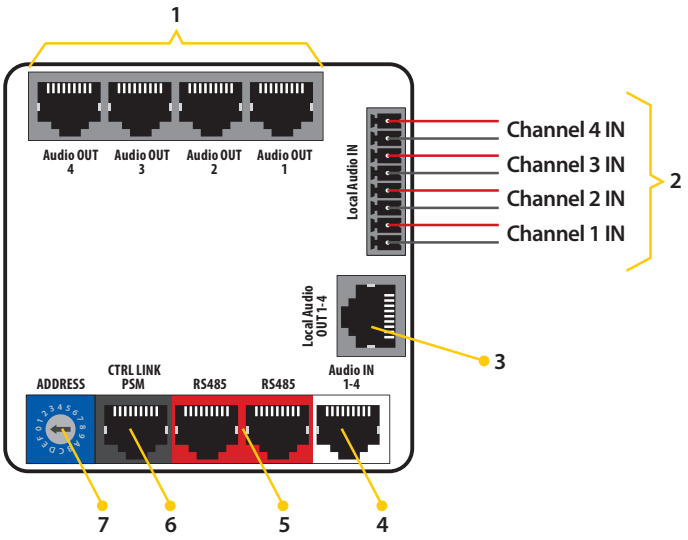
In compliance with the directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), it is inadmissible to dispose the worn-out amplifier together with other (municipal) waste, as there are criminal sanctions provided for it. The owner of the worn-out equipment is obliged to return the amplifier to the subject collecting waste electrical or electronic equipment. Proper disposal of worn-out equipment helps to avoid effects harmful to people's health and natural environment, resulting from improper storing or processing of such equipment.

7.1.4 ABT-ISLE audio/RS interface

Audio/RS interface (connection isle) converts protocols and allows integration with other interfaces and various devices. These isles are mounted in the TH35 bus cabinet.



Drawing 42. ABT-ISLE



Drawing 43. ABT-ISLE connection isle connectors diagram

1. **Amplifier outputs** – RJ-45 connector to connect 4 amplifier channels
2. **Local Audio IN** – 4 input channels on 8 pin connector. In order to connect audio sources easier and faster, you can use Phoenix-type connectors. LOCAL AUDIO IN (8 pin Phoenix connectors) seat is bridged with LOCAL AUDIO OUT (RJ-45).
3. **Local Audio OUT** – RJ-45 connector to connect output signals to function card.
4. **Audio IN (RJ-45)** – input to connect AUDIO IN 1-4 on audio card in VASCU.
5. **RS485** – port for communication with the control unit and connection of further ABT-ISLE modules.
6. **CTRL LINK PSM** – RJ-45 connector to connect power supply manager.
7. **Address settings** – element to assign address to devices. The number of addresses is contained in the range 0-F (16 addresses). Each of the ABT-ISLE connected to one control unit must have its own individual address. The module address, which is connected to PSM must be set to 0. If you wish to connect an external source of sound to the system, you need to connect the signal wire to LOCAL AUDIO IN seat.

⚠ **Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.**

7.1.5 ABT-PSM48 / E Power Supply Manager

ABT-PSM48 / E Power Supply Manager is designed for distribution uninterruptible power supply of guaranteed 40…57,6 VDC and 24 VDC of total maximum power up to 3,2 kW.

⚠ **The only difference between ABT-PSM48 and ABT-PSM48E is the lack of 6 × 24VDC outputs in ABT-PSM48.**

As a source of energy distribution, the Manager uses external modules of 800 W ABT-PS48800 Switch Mode Power Supply Units; as a source of back-up power supply, it uses the VRLA battery bank of capacity up to 4x200 Ah. Use of 12 V batteries with a capacity of less than 40 Ah can be used only for public address. ABT-PSM48 co-operates with maximum 4 modules of ABT-PS48800 Units, ensuring safe connection for the purpose of parallel operations and monitors the output parameters of each Power Supply Unit. ABT-PSM48 co-operates with the 4× 12 V VRLA battery bank; it maintains the bank in charged condition, ensures temperature compensation of charging parameters and monitors series resistance of the battery and its wiring in compliance with Exhibit No. A2 to the EN 54-4 Standard. Power Supply Manager and Power Supply Units are designed for assembling in a 19" IP30 Rack with other Fire detection and fire alarm systems elements.

ABT-PSM48 ensures uninterruptible switching to back-up power supply in case of mains power decay or failure of ABT-PS48800 Power Supply external modules. The Power Supply Manager is intended for systems requiring back-up power supply, including those compliant to EN 54-16. Voice alarm control and indicating equipment.

The maximum configuration of the 54-4 compliant Power Supply Equipment includes:

- **1 × ABT-PSM48** – Power Supply Manager
- **4 × ABT-PS48800** – Power Supply Unit
- **1 × ABT-PF4** – Power Supply Unit Frame

7.1.5.1 Unpacking the equipment

We ask to read this documentation in order to be familiar with important information concerning installation, operation and characteristic features and functions of the product. When needed, the product should be shipped to the service station in the original packaging (or identical with the original), like in the case of most of the electronic devices.

Typical set includes:

- ABT-PSM48 power supply manager module / ABT-PS48800 power supply module / ABT-PF4 power frame module;
- users manual;
- cables type IEC 60320 C13;
- technical documentation;
- a plastic bag with output connectors and fuses.

7.1.5.2 Installation

External conditions

Don't place the product in the environment that can negatively influence the functioning of the device or shorten the period of its proper operation. Environments that negatively influence the device are characterized usually by high levels of temperature, dust, humidity and vibrations.

Important safety instructions

1. Read this instruction.
2. Retain this instruction.
3. Heed warnings.
4. Follow all instructions.
5. The product should not be used near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves ,or other apparatus that produce heat (i.e. amplifiers).
9. Do not connect the device to the outlet without the grounding pin.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with a cart, stand, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug the device from the power outlet during the storm or when left unused for a long period of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

⚠ **AVOID EXCESSIVE TEMPERATURE, HUMIDITY, DUST AND VIBRATIONS**
Keep the device far form places exposed to high temperature and humidity (heaters, furnaces, sinks, etc.) and places exposed to excessive amounts of dust and vibrations.

⚠ **AVOID MECHANICAL SHOCK**
Strong impacts and shock can damage the apparatus. Grab and carry the equipment carefully, avoiding dropping.

⚠ **DO NOT OPEN THE ENCLOSURE, DO NOT INDEPENDENTLY ATTEMPT TO MODIFY OR SERVICE THE DEVICE**
The device does not contain parts designed for independent de-installation or service by the user. Issues Independent opening of the enclosure of the device or interference with the inner components invalidates warranty.

⚠ **ALWAYS UNPLUG THE POWER SUPPLY BEFORE CONNECTING OTHER DEVICES**
To avoid damaging of the device and accessories connected to it absolutely switch off the power supply with the main switch of the device before connecting or un-connecting any cords.

⚠ **CAREFULLY HOLD THE CORDS**
Hold the plug and not the cord while connecting or un-connecting any of the cords (including the power-supply cord.

⚠ **FOR CLEANING PURPOSES USE A DRY AND SOFT FABRIC**
Never use any solvents such as petrol or thinner for cleaning. Clean the device with a dry and soft fabric.

7.1.5.3 Installation and connecting

General remarks

For installation, connecting and configuration of the equipment, follow this Technical Documentation. Connecting pay special attention to the cables polarity, as improper connection may result in damaging the equipment. Before connecting devices it is absolutely necessary to check correctness of all the connections made.

Installation

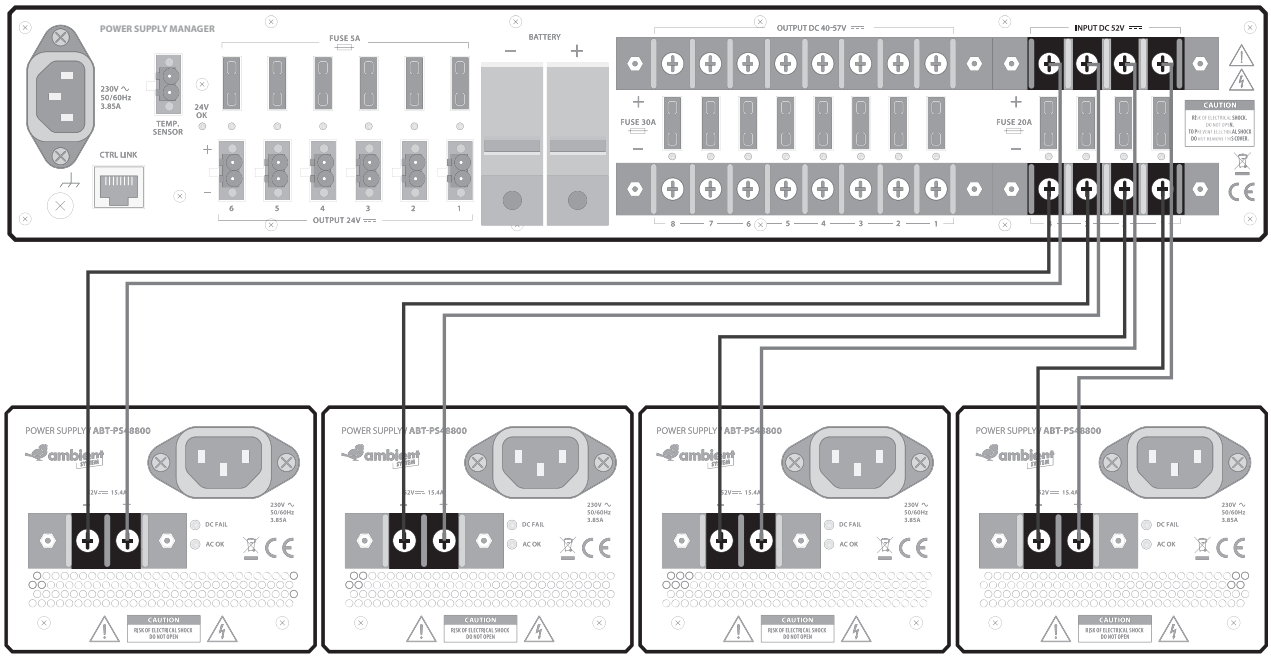
Power supply manager unit will mount in the rack 19'' IP30. Power supply units ABT-PS48800 are placed in the dedicated ABT-PF4 power frame which provides easy and stable mounting in the rack.

The maximum configuration of the 54-4 compliant Power Supply Equipment includes:

- 1× ABT-PSM48 – Power Supply Manager
- 4× ABT-PS48800 – Power Supply Unit
- 1× ABT-PF4 – Power Supply Unit Frame

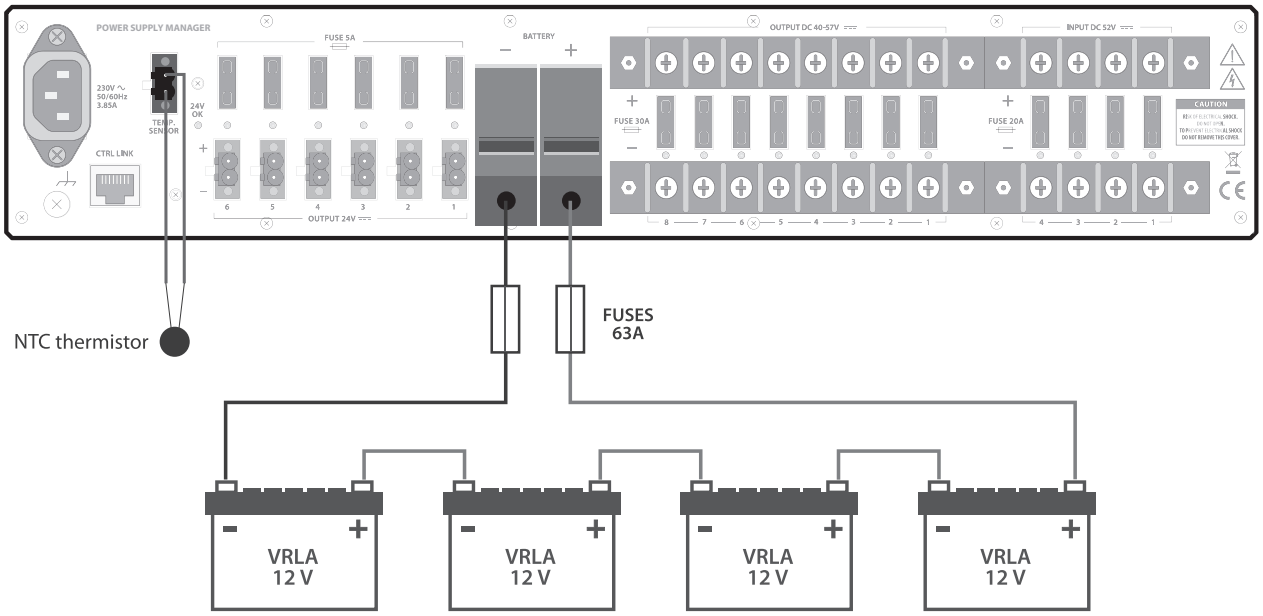
Connecting

First, connect the earth of power manager via terminal available on the rear panel. Next, connect desired number of power supply units to inputs labeled "INPUT DC 52 V". The inputs are placed on a rear panel of ABT-PSM48. Be sure to connect all units properly, taking special care of cables polarity. Fig. 4 illustrates full configuration of power supply system, containing four connected power supply units.



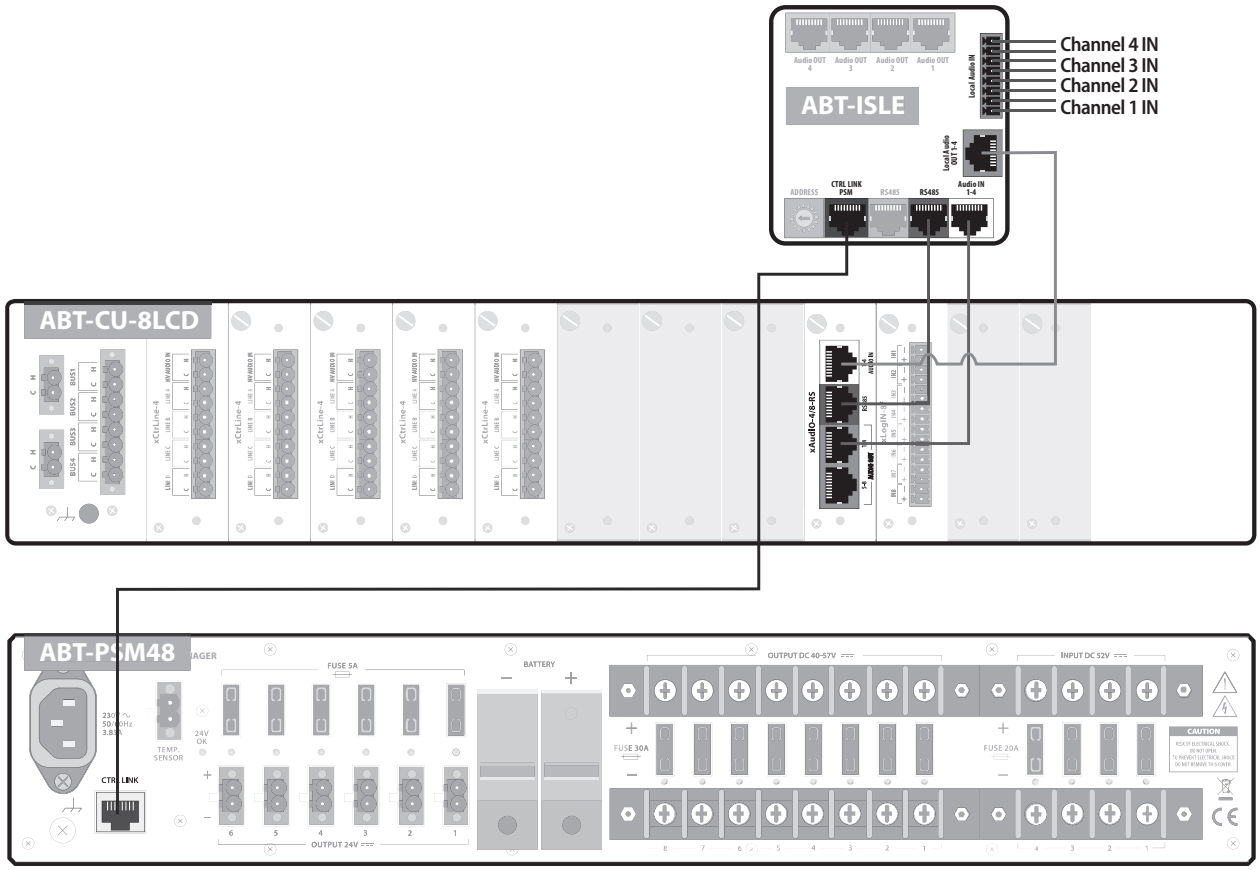
Drawing 44. Connection between 4 power supply units ABT-PS48800 and Power Supply Manager ABT-PSM48

Your next step is to connect in series four VRLA 12 V batteries with fuses to terminals placed on the rear panel of ABT-PSM48, as shown in the drawing below. Be sure of proper connection (polarity) between batteries and terminals. Connect also a thermistor temperature sensor to a “TEMP. SENSOR” terminal and place it near installed batteries. Only new or unused type-like batteries (same manufacturer, equivalent capacity and voltage, same manufacturing date) may be connected.



Drawing 45. Connection between VRLA batteries, temp. sensor and Power Supply Manager ABT-PSM48

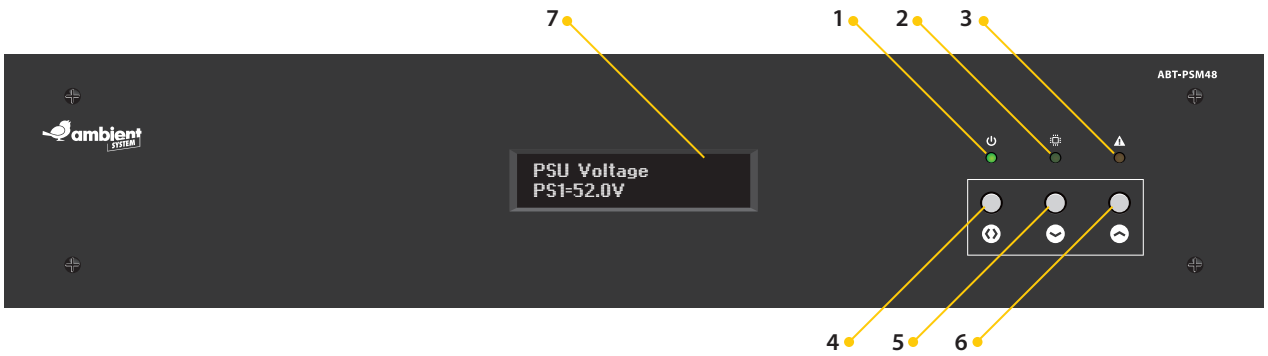
Use battery circuit protection: 2× screwed fuse 63 A DIN splint ø15 mm, ø A 15,9 mm L=36 mm (positive and negative cord).



Drawing 46. Connection between Power Supply Manager ABT-PSM48 and Control Unit by audio/RS interface ABT-ISLE

7.1.5.4 Front panel

The figure presents the front panel of Power Supply Manager module, with its most important elements marked.



Drawing 47. Front panel of ABT-PSM48 Power Supply Manager

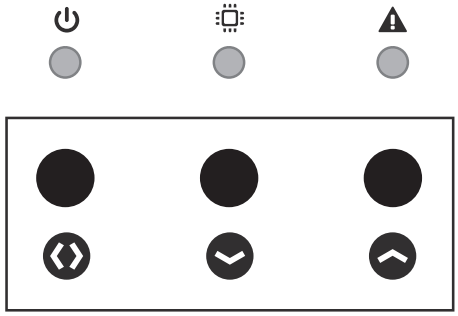
1. **Power**
   Green LED indicates supply connection.
2. **Active**
   Green LED indicates proper operation and indicates long-press button.
3. **Fault**
   Yellow LED indicates a system failure.

4. **Entry / Exit button**
   Menu operation button.
5. **Arrow Down button**
   Menu navigation button.
6. **Arrow Up button**
   Menu navigation button.
7. **Display**
   Alphanumeric LCD Display presents the status of the Power Supply Equipment and Power Supply Manager menu.

Menu navigation with the use of buttons available at the front panel is presented in the following subsection.

7.1.5.5 Front panel operation

Typical operation of the power supply system is limited to defining the number of Power Supply Units and adjusting parameters of batteries bank attached. The drawnings below presents a part of the Power Supply Manager front panel including buttons and LEDs indicating the condition of the module, as well as the menu structure diagram in form of information available on the alphanumeric display.

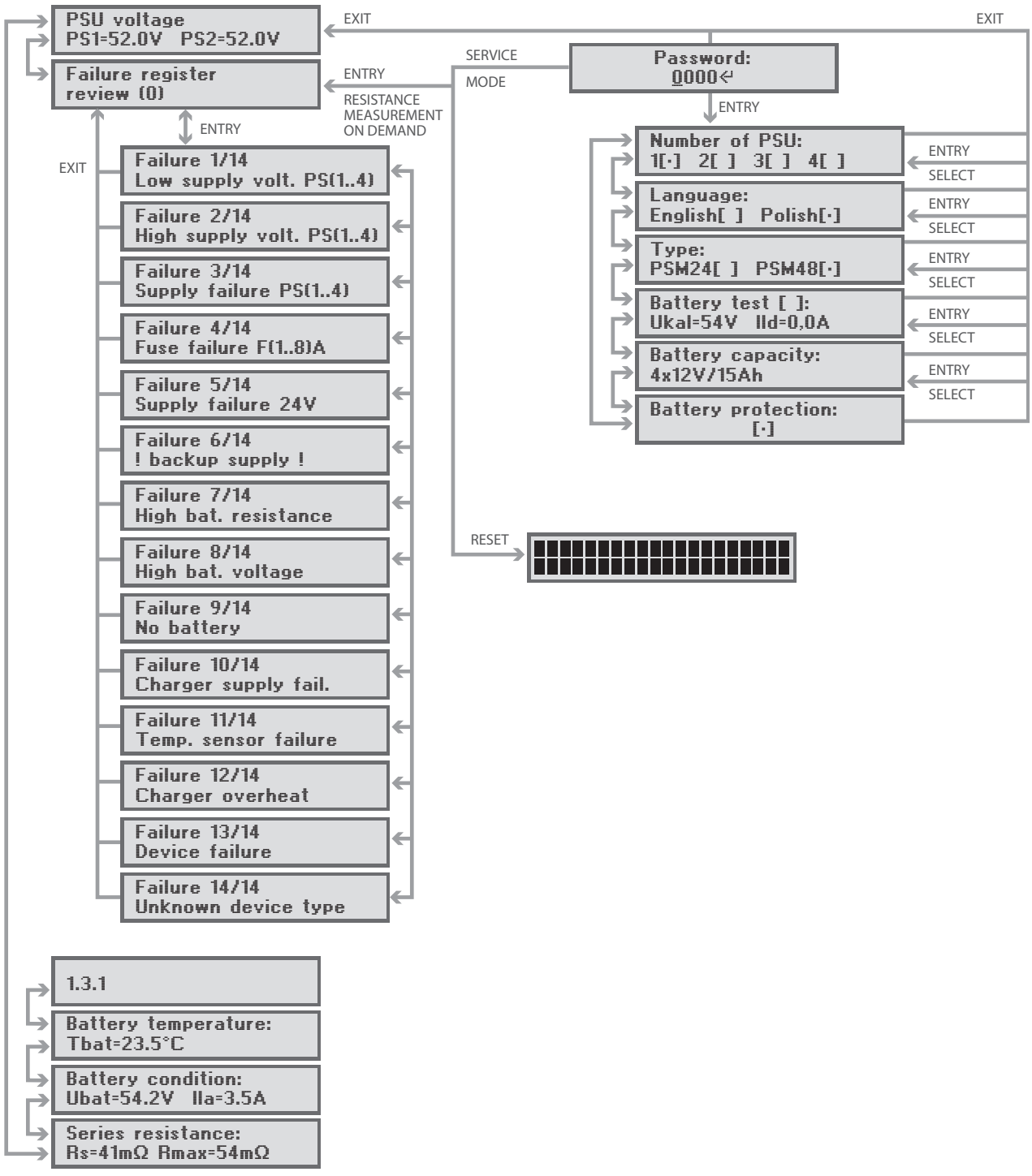


Drawing 48. Front panel buttons

The front panel buttons are used to control the equipment from its menu. To use the second function of button, press it longer (>1s). Confirmation of this is to deactivate the LED Active. The menu enables monitoring the condition of Power Supply Units, condition of an internal Charger, measuring series resistance of batteries and its connections, checking battery temperature and previewing a list of registered equipment failures and check the Power Supply Manager's firmware version. It is also possible to enter service mode, in order to choose the number of Power Supply Units, disable the battery protection system, adjust battery capacity. Navigating menu by using buttons is described below.

ENTRY – click ENTRY / EXIT button for more than 1 sec.
EXIT – click ENTRY / EXIT button
SELECT – press ENTRY / EXIT button and hold for approx. 1 s
POWER SUPPLY UNITS CONDITIONS – from the main level of menu, using arrows, choose option "PSU voltage" to display parameters of the connected Power Supply Units.
BATTERY SERIES RESISTANCE MONITOR – from the main level of menu, using arrows, choose option "Series resistance" to display the periodically measured value of the series resistance of batteries and its connections. There are two values visible on the screen: Rs – measurement results, Rmax – parameter depending on the battery capacity selected in the service mode menu. Rs value should not exceed Rmax, (when Rs goes above Rmax the alarm will be indicated).
RESISTANCE MEASUREMENT ON DEMAND – from the main level of menu, using arrows, choose option "Series resistance" and click the ENTRY/EXIT button, then wait for the Rs measurement result.
BATTERY CONDITIONS – from the main level of menu, using arrows, choose option "Battery conditions" to display conditions of connected battery bank.
CHARGING PARAMETERS – from the main level of menu, using arrows, choose option "Battery conditions" to display parameters of charging connected battery bank.
BATTERY TEMPERATURE – from the main level of menu, using arrows, choose option "Battery temp." to display ambient temperature around the battery bank.

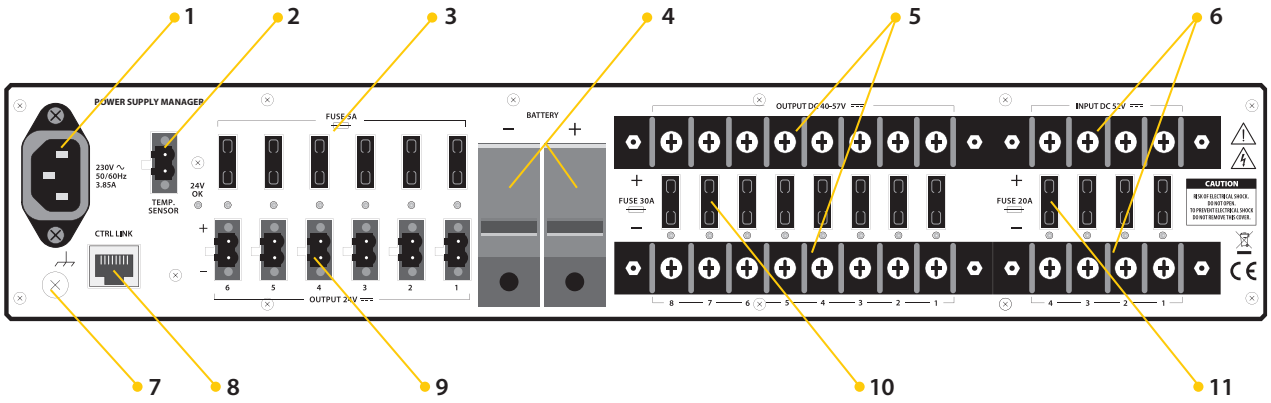
PREVIEWING FAILURE REGISTER – from the main menu position, using arrows, choose a suitable option and click the ENTRY / EXIT button. Browse next failure using arrows or click the ENTRY / EXIT to return to the main menu.
ENTER THE SERVICE MODE – press ENTRY / EXIT button and Arrow Down button simultaneously, hold them for 1 s. Use Arrows and Select to enter password. Service password is 1992. In service mode, it is possible to edit the number of Power Supply Units connected, disable battery protection or define capacity of battery bank connected. To modify settings, select an option using arrows, press ENTRY/EXIT button and hold for approx. 1 s to change the option and click ENTRY / EXIT button to confirm changes.
EQUIPMENT RESET – press Arrow Up and Arrow Down buttons simultaneously and hold for approx. 3 s. The system will reset and indicators tested.



Drawing 49. Power Supply Manager menu structure block diagram

7.1.5.6 *Rear panel*

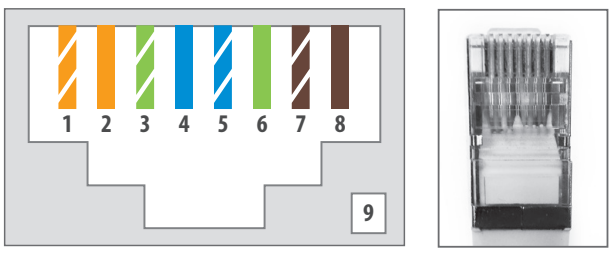
The figure below presents rear panel with markings of the terminals used.



Drawing 50. Rear panel of ABT-PSM48/E Power Supply Manager

1. **Mains terminal**
   This terminal is used to connect the mains cable. This is supply for charging unit inside. Power consumption is 885 W max. Use typical power cord IEC 60320 C13.
2. **Temperature sensor terminal**
   The temperature sensor terminal is used to connect the NTC sensor placed around the battery bank. Use attached temperature sensor only.
3. **24 V DC output fuses (5 A, 32 V DC)** – *available only in the version with extended functionality ABT-PSM48E*
   The fuses are used for overcurrent and short circuit protection of 24 V DC outputs. Replace only with same type and rating of fuse. At each fuse are placed red controls, indicating the absence of, or damage to the fuse.
4. **Battery terminals**
   Battery terminals are used to connect the 48V VRLA battery bank working as the back-up power supply. Use battery circuit protection: 2× screwed fuse 63 A DIN splint ø15 mm, øA 15,9 mm L=36 mm (positive and negative cord).
5. **48 V DC output terminals**
   The output terminals provide output voltage of between 40 and 57 V DC with 30 A fuse on each connector.
6. **Power Supply Unit input terminals**
   The input terminals are used for connecting the 52 V DC from ABT-PS48800 Units.
7. **Earth terminal**
   This terminal is used to earth the equipment.
8. **Control link**
   Control link terminal, described on the amplifier's rear panel as CTRL LINK provides failure signals (DC FAIL, AC FAIL, BATTERY FAIL, CHARGING FAIL, RESISTANCE EXCEEDED).

   CTRL LINK should be connected to the corresponding pins of the control unit using the T568B straight-trough cable shown in the figure on the right (view from top). Figure on the left presents the appearance of described 8P8C (RJ-45) terminal with numbers of pins which function is described in the table on the next page.



Drawing 51. CTRL LINK pinout

Pin number	Cable colours	Description
1	white-orange	Control unit's ground
2*	orange	BATTERY FAULT signal
3*	white-green	GENERAL FAULT signal
4*	blue	AC supply mode signal
5*	white-blue	AC supply FAULT signal
6	green	+3,3 V out
7	white-brown	NC
8**	brown	Battery series resistance on demand
9	shield	Grounding conductor to the connector housing

* digital signals are implemented in the form of optocoupler outputs, in order to protect the PSM unit and the control unit from possible interferences during data transmission; indication is performed by short circuiting the corresponding signal with the control unit's ground.
** digital signal activating the batteries series resistance measure is implemented in the form of the optocoupler inputs; activation is performed by supplying a high logic state on the activation input.

9. **24 V DC output terminals** – *available only in the version with extended functionality ABT-PSM48E*
The output terminals provide output voltage of 24 V DC.

10. **48 V DC output fuses (30 A, 80 V DC)**
The fuses are used for overcurrent and short circuit protection of 48V DC outputs. Replace only with same type and rating of fuse. At each fuse are placed red controls, indicating the absence of, or damage to the fuse.

11. **Power Supply Unit input fuses (20 A, 80 V DC)**
The fuses are used for protection Power Supply Units inputs. Replace only with same type and rating of fuse. At each fuse are placed red controls, indicating the absence of, or damage to the fuse. These controls also shine in the absence of connection power supply or its failure.

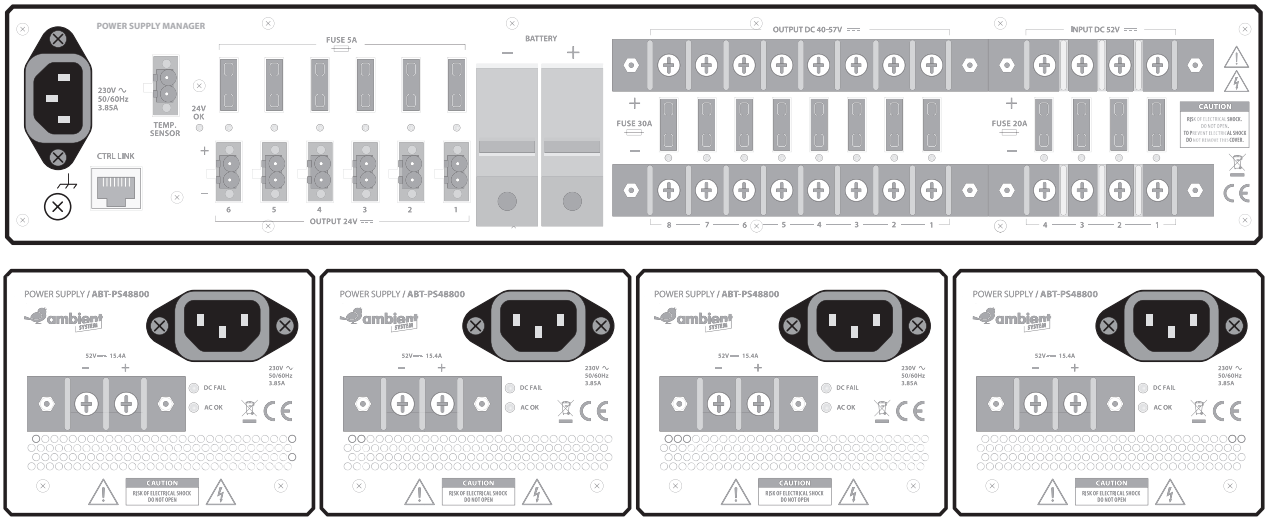
Table 15. Technical specification of ABT-PSM48

Model	ABT-PSM48
Electrical	
AC power supply	230 V AC +10% -15%, 50/60 Hz, 3,85 A wire with IEC 60320 C13 3 × 0,75 mm² coupling (supplied with the unit)
Power consumption	885 W
Efficiency at rated load	> 90%
AC input protection	T6,3 A / 250 V 5 × 20 mm slow-blow fuse (accessed when casing is open)
Protection from electric shock	Class I (EN 60065)
Current consumption (surveillance DC)	120 mA
DC inputs	4, M4 bolted terminal DEGSON, 13 mm raster, dedicated power supply unit (ABT-PS48800)
DC input protection	4 × slow-blow protection 20 A 80 V DC

DC outputs	8× 48 V, M4 bolted terminals DEGSON, 13 mm raster, each output 40…57,6 V DC (depending of battery charging process), 30 A max. values dependent on the voltages existing on batteries during operation) 6× 24 V, Phoenix 2 pin-type couplings, 5,08 mm raster, each output 24 V, 5 A max. (maximum total load of all 6 outputs shouldn't exceed 6 A – 144 W) *(only for ABT-PSM48E)*
DC output protection	48 V outputs: 8× 30 A 80 V DC fuse 24 V outputs: 6× 5 A 32 V DC fuse *(only for ABT-PSM48E)*
Summary maximum DC output load (24 V and 40…57,6 V)	Total output DC load shouldn't exceed above 60 A
Backup Power Supply	
Battery (type)	4 pcs., VRLA 12 V 15-200 Ah
Charging method	Constant voltage or multi-stage
Charging current	14 A max.
Charging voltage	54,6 V ± 0,6 V (at 25°C)
Temperature correction coefficient	-80 mV/ °C
Battery circuit protection	2 bolted terminals (positive, negative) used AWG6 – AWG1/0 connection cord 4× 12 V batteries connected serially
Charging circuit protection	20 A, 80 V
Battery circuit protection	2× screwed fuse 63 A DIN splint ø15 mm, øA 15,9 mm L=36 mm (positive and negative cord)
Maximum resistance of wiring and fuses	10 mΩ
Maximum total serial resistance of wiring, fuses and batteries	28 - 60 mΩ (fault trigger threshold set in the manager setup)
Temperature	
Temperature sensor	thermistor 5k
Operating temperature	-5°C to +40°C
Mechanical	
Finish	Steel front panel, powder painted, black half-matt
Dimensions	482 (W) × 85 (H) × 443 (D) mm
Weight	7,2 kg
Accessories	Power supply cord IEC 60320 C13 1,5 m Temperature sensor

7.1.5.7 First run

When you are sure that the connections are made correctly (in accordance with Chapter 5) then connect all mains cables 230 V AC to mains connectors marked in the figure below. The power supply manager ABT-PSM48 needs to be grounded by using ground terminal, also marked in the figure. The power supply system is ready to run.



Drawing 52. Mains connectors 230 V AC and ground terminal

Checking ability to back up output voltage

Use a breaker in the electrical installation before the power supply to cut off the mains power. The power supply should switch to the battery mode, keeping voltage on its both outputs. Check it by whatever probe, e.g. a voltmeter.

In this case the LED Fault diode is highlighted on the front of the power supply manager (details are described in relevant User Manual). The Fault signal should be transmitted to Control Unit of Voice Evacuation System.

Checking the battery circuit

When the power supply operates from the mains, please, break the battery circuit by disconnecting one of the fuses. This state shall be detected during the first next test. It could last up to 10 minutes.

In this case the LED Fault diode is highlighted on the front of the power supply manager (details are described in relevant User Manual). The Fault signal should be transmitted to Control Unit of Voice Evacuation System.

Similarly, after removing the break in the battery circuit, the fault indication will be cancelled automatically, but after the next correctly conducted test – i.e. after the time of 10 min.

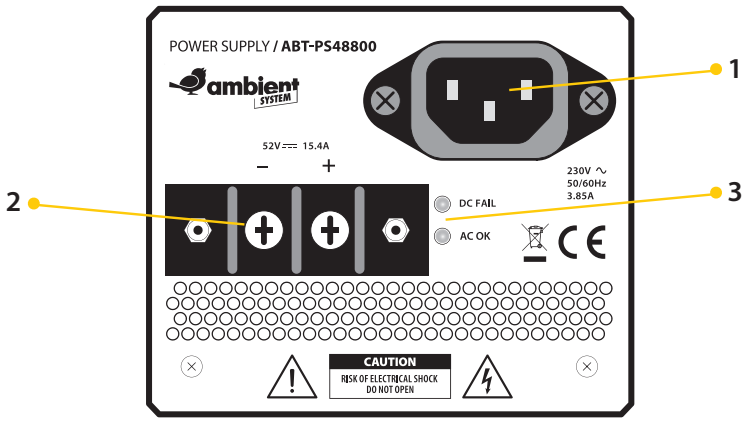
7.1.6 ABT-PS48800 Power Supply Unit

ABT-PS48800 power supply unit is a new generation power supply made in impulse technology. The output power is 800 W and voltage 48 V.

Optionally, it is possible to use the ABT-PS48800 power supply unit as an independent device and it is not necessary to mount it in ABT-PF4 frames and rack cabinets.

7.1.6.1 Rear panel

Figure presents the rear panel of ABT-PS48800 Power Supply Unit module.



Drawing 53. Rear panel of ABT-PS48800 Power Supply Unit module

1. **Mains terminal 230 V, 3,85 A**
   This terminal is used to connect the mains cable.
2. **52 V DC power supply output terminal, 15,4 A**
   The output terminal provides stabilized output voltage of 52 V DC.
3. **Working condition indicator lights**
   The working condition indicator lights signal the Power Supply Unit condition – each diode is described in the table below.

DC FAIL	lights red if output voltage is not available (e.g. overload)
AC OK	lights green if AC voltage is enough for proper operation

Table 16. Technical specification of ABT-PS48800

Model	ABT-PS48800
Electrical	
AC power supply	230 V AC +10% -15%, 50/60 Hz, 3,85 A Wire with IEC 60320 C13 3 × 0,75 mm² coupling (supplied with the unit)
Power consumption	885 W
Efficiency at rated load	> 90%
AC input protection	T6,3 A / 250 V 5 × 20 mm slow-blow fuse (accessed when casing is open)
Protection from electric shock	Class I (EN 60065)
DC output	M4 bolted terminals DEGSON, 13 mm raster, 52 V DC, 15,4 A
Mechanical	
Dimensions	85 (W) × 95 (H) × 395 (L) mm
Weight	2,6 kg
Accessories	Power cord IEC 60320 C13 1,5 m

7.1.7 ABT-PF4 Power Supply Unit Frame module

The Power Supply Unit Frame module is designed for mounting the Power Supply Units a 19" IP30 Rack. Four independent ABT-PS48800 may be mounted in the frame, with the use attached bolts.



Drawing 54. Front panel of ABT-PF4 Power Supply Unit Frame

7.2 External devices

7.2.1 ABT-DFMS fireman microphone

The fireman microphone is intended to do the following:

- » transmit voice messages or system warning and evacuation messages to selected zones during fire-fighting,
- » activate emergency messages,
- » call general-purpose messages,
- » select particular zones,
- » send voice messages "live".

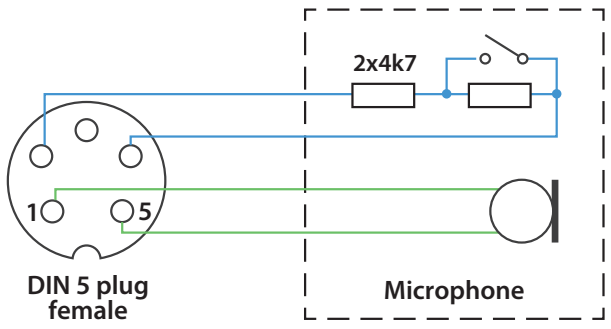
The microphone power is supplied locally by a certified fire cord (48 V) or remotely by PoE.

The device has programmable function buttons which can be assigned given functions. It is also possible to connect up to 5 supervised ABT-EKB-20M extensions with an additional 20 function buttons each. Up to 253 fireman microphones can operate in a single system. The microphone communicates with control units either through an ethernet network or via an optical fiber connection (1000BASE-X).

Another system function is the “CPU OFF” function. The entire system enters a state allowing transmission of voice messages from the unit on which this function is activated to all alarm zones without the use of the control unit. This enables the system to transmit to all zones even during central processor failure.

The microphone automatically detects and indicates failures such as function button damage and audio signal track damage.

It is possible to connect keyboard extension by a dedicated 10 pin female connector on the right side wall. The microphone is equipped with 2 slots for SFP modules, 2 LAN 10/100/1000 ports, 1 LAN 10/100 port, 1 RS485 port.



Drawing 55. Microphone pins diagram

Main features:

- Built-in 2 contact inputs and 2 relay outputs
- Powered using PoE or external PSU
- Black-box function – recording all announcements played back during an alarm
- Built-in SFP modules and CAT5e for flexibility in topology choice (either loop or star)
- RS 485 for communication with external systems
- Intercom function between all fireman and zone microphones

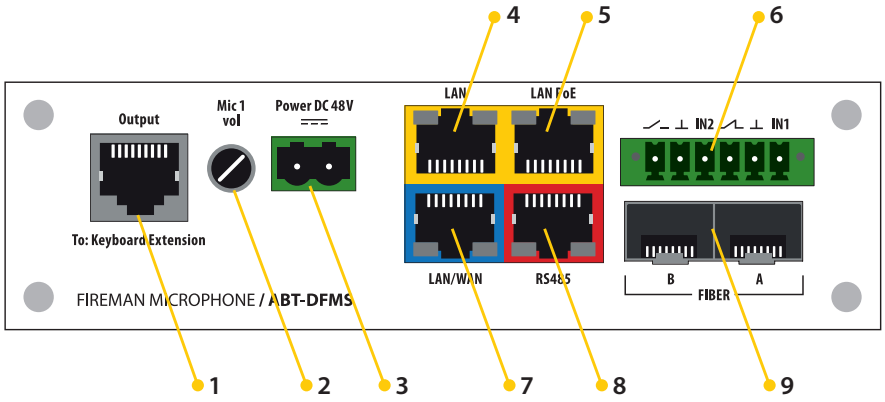
Main system functions:

- Reporting equipment errors detected on cards
- Reporting incorrect input voltage level (short-circuit/open-circuit)
- Defining short-circuit/open-circuit/high/low level statuses for every output
- Controlling any logic output via any system module which supports scripts
- Using values/status of any output via any system module which supports scripts
- Calling scenarios, actions by any input status
- Assigning any output to any system event
- Defining NC/NO inputs



Drawing 56. ABT-DFMS fireman microphone

1. **Built-in loudspeaker**
2. **Microphone with "Push to talk" button**
3. **LED indicators** for: Power [green], Failure [yellow], Evacuation [red] (EVAC)
4. **"Activate Evacuation" button**
5. **Functional button** – can be programmed in any way, most frequently as "Evacuation"
6. **Functional button** – can be programmed in any way, most frequently as "Warning"
7. **Functional button** – can be programmed in any way, most frequently as "Cancel alarm"
8. **LED indicators for functional buttons**
9. **CPU OFF switch –** green LED indicates the CPU-OFF active mode
10. **Broadcasting readiness indicator** – flashing green LED after pressing the PTT signals readiness to broadcast a message.
11. Button description card slot



Drawing 57. Upper panel of fireman microphone

1. **RJ45 socket** to connect microphone extension ABT-EKB-20M
2. **Microphone gain level adjustment** from -6 dB to +6 dB
3. **2-pin socket to connect power supply** in accordance with EN54-4
4. **RJ45 socket to support LAN connections**
5. **RJ45 socket to support LAN with PoE connections** – it is possible to power the microphone directly from the Control Unit via one CAT5 cable (data + voltage)
6. **Phoenix-type connector, two logic inputs or two relay outputs** (every channel is configured on a case-by-case basis, and by default, both are set as parametric inputs)
7. **RJ45 socket to support LAN/WAN connections** (from firmware version 0.750.1, communication via the LAN / WAN port is done using an encrypted protocol)
8. **RJ45 socket** in accordance with RS485 transmission standard
9. **Two SFC module slots**

ABT-DFMS fireman microphone consists of the ABT-xNET-1Gb/WAN/RS communication card coupled with the fireman microphone keyboard module, extension support module and power supply module.

Table 17. Technical data of ABT-DFMS fireman microphone

Model	ABT-DFMS
Power source	via LAN PoE or local power supply compliant with EN 54-4
Input voltage	48 V connector 2 pin screw 5.08 mm
Power consumption	max 266 mA for 48 V DC / 5 keyboard extensions
Protection rating	31
Transmission medium	fiber, UTP Cat. 5e
Number of logic inputs	2
Number of relay outputs	2
Connector type for logic input/output	screw 3.5 mm, 6 pin
Type of fiber optic	modules type SFP / connector SC / LC / multimode or single-mode / E 30 or E 90, OM lub OM2

Listening speaker	
Output	0,5 W
SPL	78 dBA (@1 m, 1 W)
Frequency response (3 dB)	450 Hz … 8 kHz
Audio input	
Frequency response	400 Hz – 6 kHz (@3dB)
Impedance	500 Ω
Signal	-40 to 30 dBu
Sensitivity	-66 dB
Cable type, length	spiral – 1,5 m
Microphone connector	5 pin DIN
Keyboard and controls	
Number of buttons	3
Number of control panel buttons	2 LED / button
Dimensions of the buttons description	15 × 25 mm
Three normative LED controls	color LEDs: power – green / failure – yellow / alarm – red
Logic Input / Output	
Number of I / O logic	2 independent channels; galvanically isolated; each channel has 1 fully programmable input and output (NO / NC)
Switching current (Max.)	1 A peak*
Switching voltage (Max.)	50 V AC / DC peak*
Switching power (Max.)	30 W*
Parametric input source for monitor mode	passive; standard resistors 10 k || 10 kΩ or 4,7 kΩ - - 4,7 kΩ detection thresholds 0/1 / open / set in the application configuration
Type of socket I / O logic	6-pin screw terminal type PHOENIX, 3.5 mm
CPU-OFF switch	slide switch, two position, signaling LED color: yellow
Other parameters	
Operating temperature	0°C to 60°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C
Storage humidity	5% to 95%
Dimensions	150 (W) × 55 (H) × 210 (D) mm
Accessories	connector with screw terminals 6 pins, the distance between the partitions 5.08 mm

***Important**

Any DC combination of V & A not to exceed switching power max value. Not allowed capacitive nor inductive load, because of large inrush current / voltage spike, that can signficantly exceed the maximum allowed switching current or voltage.

7.2.2 ABT-DMS zone microphone

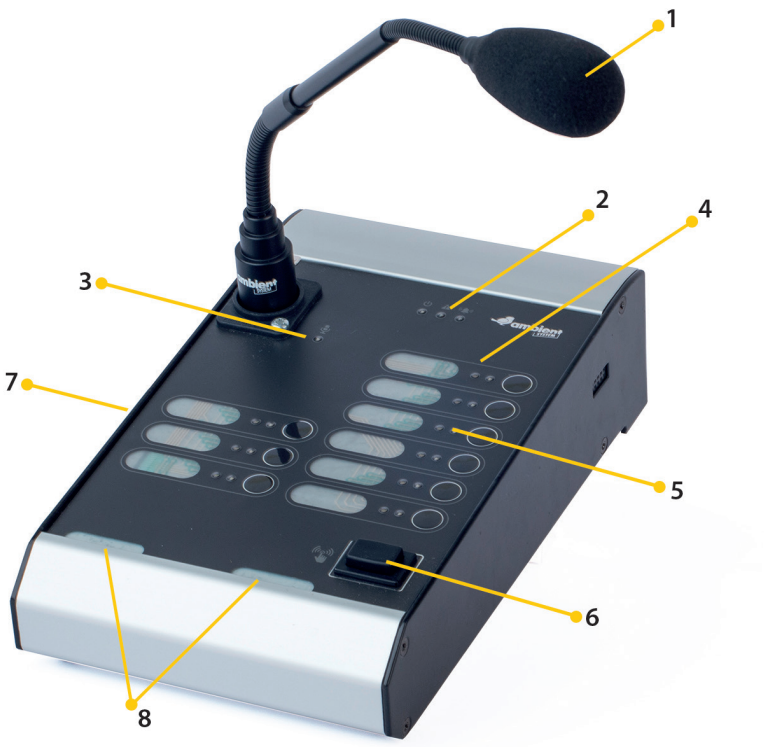
Zone microphone is used to:

- » call general-purpose messages,
- » select particular zones,
- » send voice messages “live”.

This zone microphone is used to activate general public announcements, to choose individual zones and to broadcast live voice messages. It can be connected directly to a selected Control Unit or via an additional Ethernet switch. A zone microphone can be powered locally (48 V) or from a Control Unit via POE.
It is equipped with programmable function keys which can be used to assign functions as required. All operational parameters can be programmed e.g. assignment of zones to various keys, naming of zones and zone groups, determining priorities, setting up access rights to announcements, volume controls, ‘push to talk’ key, music on/off and music routing. Furthermore, LEDs on the ABT-DMS provide information about existing fault on the system, any faults in a specific speaker zone, evacuation mode on and type of announcement in the zone (BGM, PA, EVAC, Warning, fireman microphone).
Up to 5 ABT-EKB-20M keyboard extensions with additional function keys can be attached to a zone microphone.
Similarly to a fireman microphone, it is also equipped with an intercom function and is able to communicate with other microphones in the system.

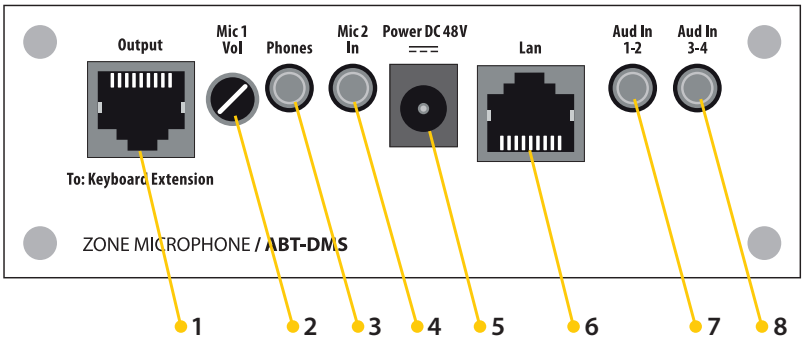
Main features:

- » Monitored connection of the unit to the system
- » 9 fully-programmable keys with a possibility of connecting up to five 20-key extensions
- » 4 non-symmetrical audio inputs, (1/8”) stereo jack connector
- » Built-in speaker
- » Stereo jack sockets for a headset use
- » Implemented intercom function
- » Power supply via POE



Drawing 58. ABT-DMS zone microphone

1. **Microphone**
2. **LED indicators** for: Power [green] (Power), Failure [yellow] (Fault), Evacuation [red] (EVAC)
3. **Active microphone LED** – the LED signals that the device is ready to transmit a voice message, if a gong is programmed, the microphone activates shortly after the sound is emitted
4. **Functional buttons** – freely programmable
5. **LED indicators for functional buttons**
6. **"Push to talk" button** – the button is programmed in order to activate microphone
7. **Built-in loudspeaker**
8. Buton description card slot



Drawing 59. ABT-DMS zone microphone connectors diagram

1. **RJ45 socket to connect microphone extension ABT-EKB-20M**
2. **Digital potentiometer**
3. **Headset 1/8" jack socket**
4. **Headset mic 1/8" jack socket**
5. **Power point 48 V**
6. **Communication port** providing connection with the control unit with the possibility to recieve PoE when connected to the ABT-xNET_mini series cards
7. **2 Audio inputs**
8. **2 Audio inputs**

Table 18. Technical data of ABT-DMS zone microphone

Model	ABT-DMS
Power supply	via PoE (RJ45) or by additional 48 V power supply / 15 W DC connector 5,5 / 2,1 mm
Protection rating	IP 31
LCD	N/A
Number of outputs	2 channel audio (monitor speaker, headset)
Number of inputs	4 channels (single-ended input bgm)
Listening speaker	
Output	0,5 W
SPL	78 dBA (@1 m, 1 W)
Frequency response (3 dB)	450 Hz … 8 kHz
Output for headphones (headset)	mini-jack 3,5 mm
Audio Inputs	
Input type	single-ended, 4× bgm
Frequency response	50 Hz … 18 kHz (@3 dB)
ADC resolution	32 bit
Sampling frequency	48 kHz
Connector	2× mini-jack 3,5 mm
Microphone input	
Input, connector type	balanced inputs, XLR
Condenser microphone, gooseneck	
Frequency response	100 Hz … 10 kHz
Sensitivity	-45 dB
Keyboard and controls	
Number of keys	9 + PTT
Additional three normative controls	power – green / failure – yellow / activity – green
LED colors	RGB (red, green, yellow, blue)
Other parameters	
Operating temperature	-8°C to 60°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C
Storage humidity	5% to 95%
Dimensions	120 (W) × 55 (H) × 210 (D) mm
Weight	1,4 kg

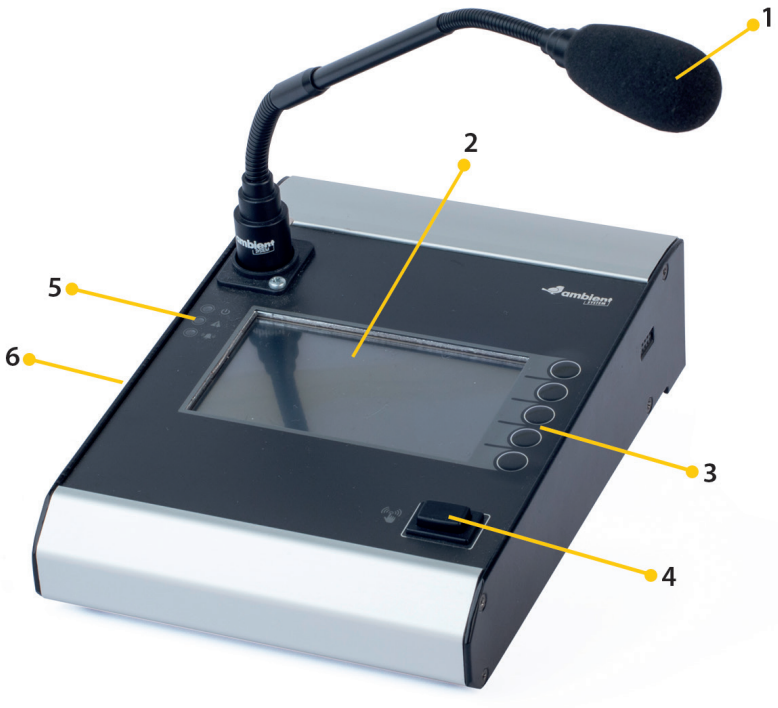
7.2.3 ABT-DMS-LCD – zone microphone with LCD

For intuitive and easier operation, ABT-DMS-LCD has been equipped with a touch-screen display. Navigation in the menu and change of settings is possible by means of both control buttons located next to LCD display, and touch-screen display. ABT-DMS-LCD can only be used for purposes not related to evacuation/ alarm.

Zone microphone is equipped with intercom function which provides two-way communication between the zone microphones. ABT-DMS-LCD has 4 local audio inputs on board and 1 audio output which allows for further system extension. Communication with control units takes place via Ethernet 10/100BASE -TX, 1 LAN port.

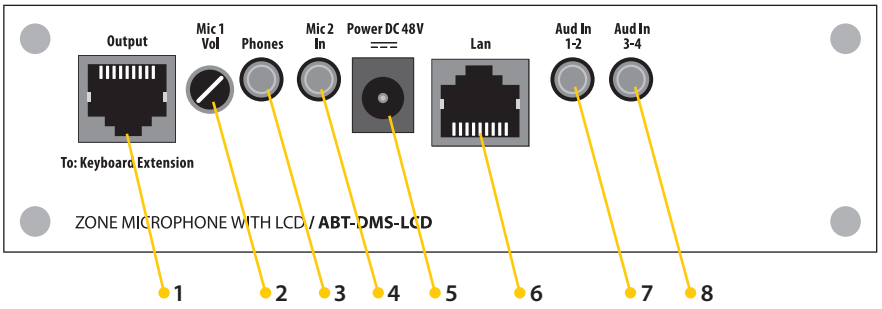
Main features:

- 4,5" LCD touch screen for fast and clear matricing and system management
- Four non-symmetrical audio inputs, (1/8") stereo jack connector
- Built-in speaker
- Stereo jack sockets for Headset / Audio out
- Implemented intercom function
- Extension up to five 20-button modules
- Power supply via POE or locally 48 VDC



Drawing 60. Zone microphone with ABT-DMS-LCD display

1. **Microphone**
2. **Display**
3. **Functional buttons** – by default they support auxiliary functions when navigating in the menu:
   a. HOME – press to return to first menu page
   b. ENTER – ENTRANCE button– press to select in the microphone menu
   c. ↑ – up-arrow button – press to navigate in the microphone menu
   d. ↓ – down-arrow button – press to navigate in the microphone menu
   e. BACK – BACK button – press to return to previous microphone menu item
4. **"Push to Talk" button** – program this button to activate microphone
5. **LED indicators** for power [green], failure [yellow], evacuation [red] (EVAC)
6. **Built-in speaker**



Drawing 61. ABT-DMS-LCD zone microphone connectors diagram

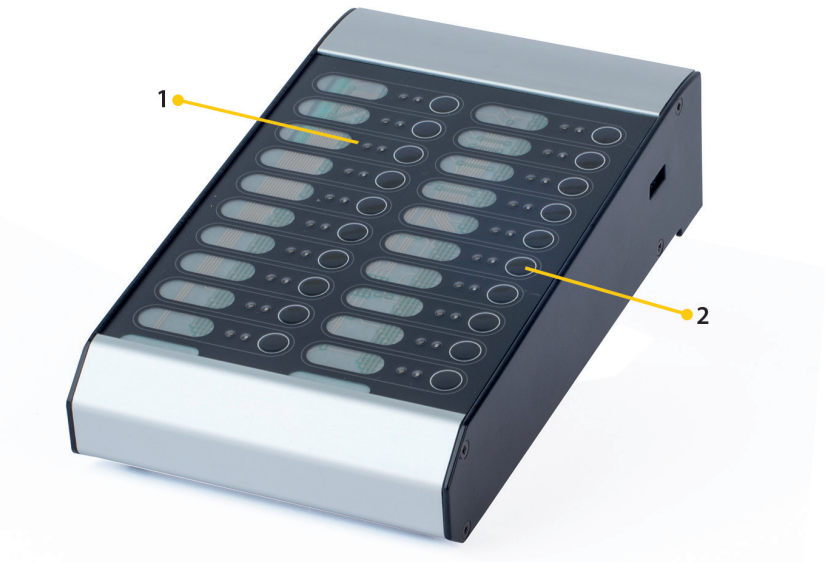
1. **RJ45 socket to connect microphone extension ABT-EKB-20M**
2. **Digital potentiometer**
3. **Headset 1/8" jack socket**
4. **Headset mic 1/8" jack socket**
5. **Power point 48 V**
6. **Communication port** with control unit and possibility of supplying microphone via LAN PoE port (works only when ABT-xNET-1Gb/WAN/RS communication card has been supplied with PoE support)
7. **2 Audio inputs**
8. **2 Audio inputs**

Table 19. Technical data of ABT-DMS-LCD zone microphone

Model	ABT-DMS-LCD
Power supply	via PoE (RJ45) or by additional 48 V power supply / 15 W DC connector 5,5 / 2,1 mm
Protection rating	IP 31
LCD	LCD, 272x480 resolution, 4.5 "resistive touchscreen
Number of outputs	2 channel audio (monitor speaker, headset)
Number of inputs	4 channels (single-ended input bgm)
Listening speaker	
Output	0,5 W
SPL	78 dBA (@1 m, 1 W)
Frequency response (3dB)	450 Hz … 8 kHz
Diameter	50 mm
Output for headphones	mini-jack 3,5 mm
Audio Inputs	
Input type	single-ended, 4× bgm
Frequency response	50 Hz … 18 kHz (@3 dB)
ADC resolution	32 bit
Sampling frequency	48 kHz
Connector	2× mini-jack 3,5 mm
Microphone input	
Input, connector type	balanced inputs, XLR
Condenser microphone, gooseneck	
Frequency response	100 Hz … 10 kHz
Sensitivity	-45 dB
Keyboard and controls	
Number of keys	5 + PushToTalk
Additional three normative controls	power – green / failure – yellow / activity – green
Other parameters	
Operating temperature	-8°C to 60°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C
Storage humidity	5% to 95%
Dimensions	150 (W) × 55 (H) × 210 (D) mm
Weight	1,4 kg

7.2.4 ABT-EKB-20M – microphone keyboard extension

Every extension added to fireman microphone or zone microphone provides additional 20 functional buttons. The extension has two I2S interfaces to connect another extension. In accordance with EN54-16, one of the buttons should be assigned to a visual and sound signal test of the microphone unit.
The extensions connected to the ABT-DFMS fireman's microphone are supervised – disconnection of any will be signaled in the system as a fault (functionality active from FW version 0.750.1).



Drawing 62. ABT-EKB-20M microphone extension

1. **LED indicators** – freely programmable; RGB left LED, green right LED
2. **Functional buttons** – freely programmable

Table 20. Technical data of ABT-EKB-20M microphone extension

Model	ABT-EKB-20M
Power supply	RJ45 from DFMS or DMS
Protection rating	IP 31
Keyboard and controls	
Number of keys	20
Number of LED	20 × RGB + 20 × green
LED color	RGB (red, green, blue) + separate LED green
Other parameters	
Operating temperature	0°C to 60°C
Storage temperature	-20°C to 70°C
Operating humidity	15% to 80%
Storage humidity	5% to 95%
Weight	1,4 kg
Dimensions of the space for the description of the buttons	15 × 25 mm
Dimensions	120 (W) × 55 (H) × 210 (D) mm

7.2.4.1 *Functional buttons performance*

Every functional button can be associated with any VAS function possible to perform by a button push. The button function is set by program, during VAS system configuration. Depending on the function assigned to the functional button, the meaning of visual indicator signaling changes.

Detailed description of the functions that can be assigned to buttons is given in section 12.10.1 - Functions.

Functions related to alarming and sending messages via microphone:

- Alarm mode
- Failure Accept
- Failure Delete

7.2.4.2 *Functional buttons signaling*

Function button LED signaling is dependent on the function which is presently assigned to the button.

When the button serves to select a zone, the signaling is as follows:

- **Message sending indicator:**
  - Green flashing – when verbal message is sent via fireman microphone "live" in the given zone.
  - Green constant light – when in the given zone the following is reproduced:
    - In normal mode – verbal message from zone microphone, music background or alarm cancelling.
  - Red flashing – when in the given zone a warning message informing about danger is reproduced.
  - Red constant light – when in the given zone an automatic evacuation message forcing persons in this zone to leave the plant immediately is reproduced.
  - Yellow flashing – in case of system failure.
  - Yellow constant light – when failure was accepted or when one of the zones has been locked (optional function from EN 54-16 norm).
  - Blue flashing – when intercom communication is requested.
  - Blue constant light – when intercom communication is activated.
  - Red flashing – when microphone message is being recorded.
  - LED steady light – when recorded message is played out.
  - Cyan flashing – when audio monitoring from the given zone is active.
  - Magenta flashing – when voice alarm status is delayed (optional EN 54-16 norm, point 7.4).
- **Availability/zone selection indicator** – green LED lights once the button corresponding to a given zone has been pushed. This indicates that the zone is ready to receive either microphone input or a message saved in system memory.

When the button is associated with failure signaling, the indication is as follows:

- **Failure indicators:**
  - Flashing of the microphone extension LED and steady yellow light of the collective failure LED – signals system failure.
  - Sound signal is generated at the same time (on microphones and Control units with LED displays.
  - Failure must be confirmed by pressing button next to flashing diode.
  - Once it has been pressed, the LED light is constant until the failure has been eliminated.

Detailed information can be found in section 8. Operation modes – LED colors.

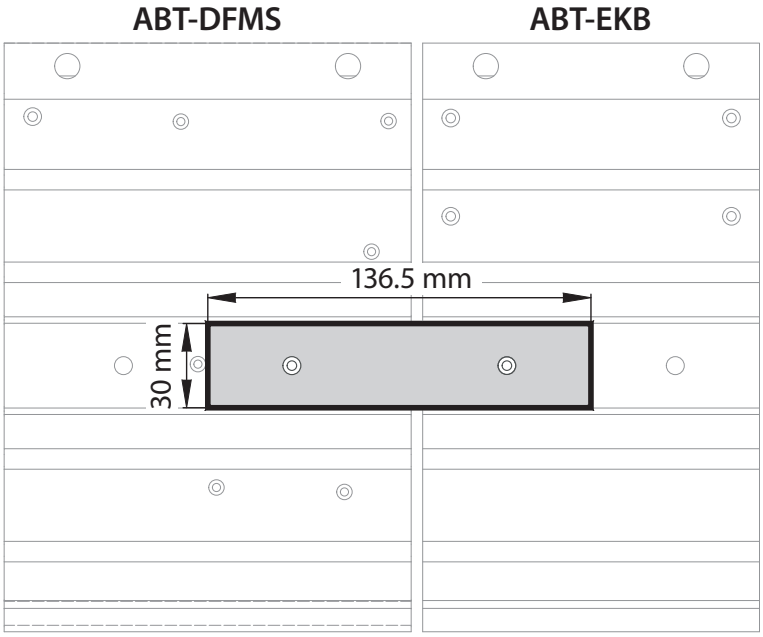
7.2.4.3 Extension connector

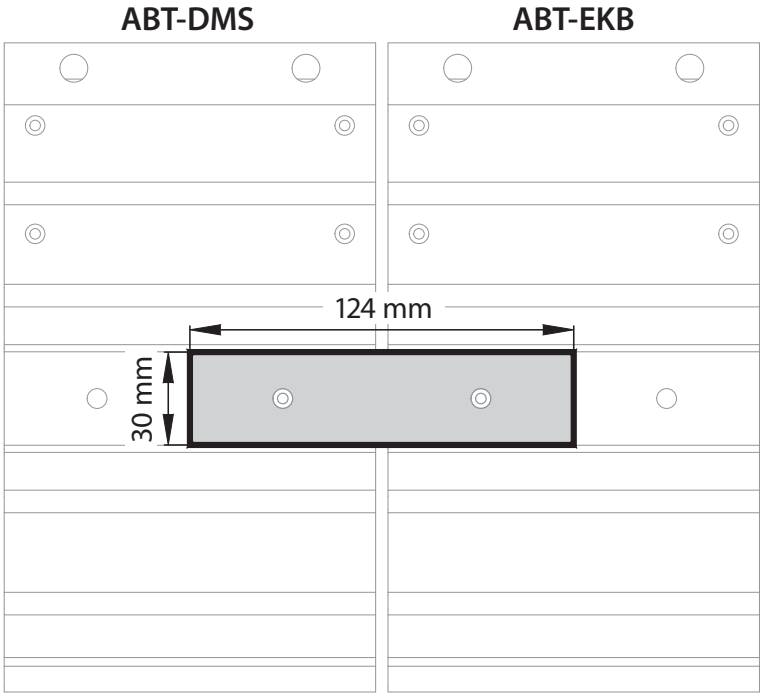
Microphones and microphone extensions are supplied with an aluminium connector.

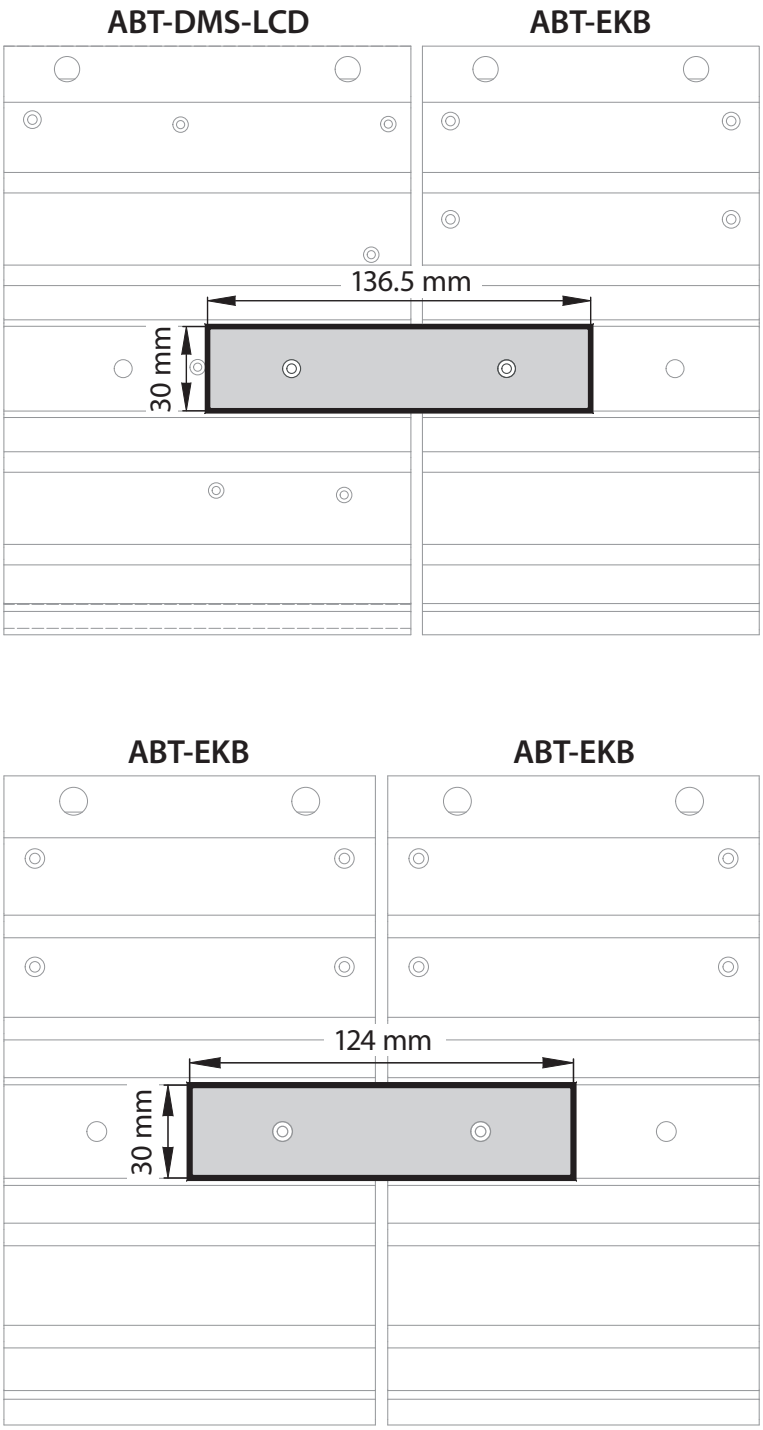
The ABT-DFMS microphone and the ABT-DMS-LCD microphone should be combined with the ABT-EKB extension with an aluminium connector with the dimensions 136.5×30×3 mm using two M3×8 screws.

The ABT-DMS microphone and the ABT-EKB extension should be combined with the ABT-EKB extension with an aluminium connector with dimensions 124×30×3 mm using two M3×8 screws.

The assembly method is shown in the figures below:







Drawing 63. The way of connecting microphone and extension using an aluminium connector

7.2.5 Noise sensing controller – ABT-NSC6

The background microphone controller is used to:

- receiving measured signals from 6 ABT-NSM microphones,
- background noise level measurement and automatic adjustment of emitted audio signal.



Drawing 64. ABT-NSC6 noise sensing controller

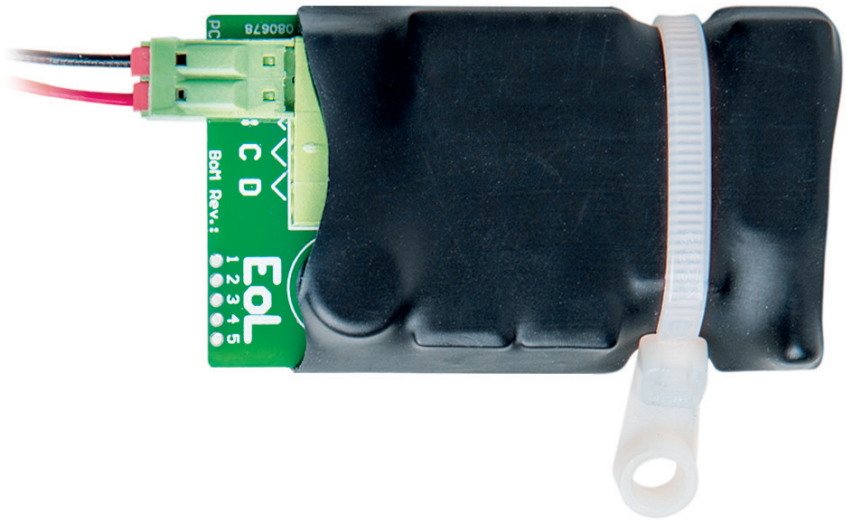
ABT-NSC6 is a TCP/IP controller specially designed for the use with MULTIVES and miniVES systems. The main roll of the device is collecting audio data from 6 measurement microphones and automatic volume control of background music and announcements in assigned speaker zones. It's adapted to cooperate with ABT-NSM microphones (in speaker housing).

Table 21. Technical data of ABT-NSC6 noise sensing controller

Model	ABT-NSC6
Power source	PoE (RJ45), or by the connector 2-pin Phoenix MSTBVA – 5,08 mm
Number of audio inputs	6 differential channels, connector type 3-pin 15EDGVC-3.5
Power Consumption (typical / maximum)	3,5 W / 6 W
Input voltage range	36 V – 57V
Sampling frequency	24 kHz
Frequency measurement band	200 Hz – 9 kHz @ 3 dB
Differential input impedance	6500 Ω @ 1 kHz
Range of measured values (for input voltages)	57 dBS_{PL} (250 μV_{RMS}) – 115 dB_{SPL} (200 mV_{RMS})
Phantom power	30 VDC
Temperature (operating)	-5°C to + 60°C
Ingress protection	54 // 66 – with additional packing glands
Enclosure	Aluminium
Weight	1,2 kg
Purpose of use	Ambient noise microphone controller

7.2.6 End of line supervision module ABT-EOL

ABT-EOL monitors the integrity of a loudspeaker line and all of its branches. Supervision of branched lines requires EOL module for each branch. ABT-EOL provides a filtered load exclusively at the pilot tone frequency and increases reliability of loudspeaker surveillance method based on impedance measurement. Module connects in parallel to the last loudspeaker on a line. It has a 4 different modes which has to be selected according to the results calculated by the EOL calculator.



Drawing 65. ABT-EOL end of line supervision module

Table 22. Technical data of ABT-EOL end of line supervision module

Model	ABT-EOL
Type	End of line module for speaker lines
Connector	Phoenix contact type 3,5 mm; 5 pins
Voltage	100 V loudspeaker line
Load	10 W – 480 W *
Operating temperature	-10°C to 55°C
Storage temperature	-40°C to 70°C
Relative humidity	< 95%
Dimensions	65 (W) × 16 (H) × 37 (D) mm
Mounting	Internally in the loudspeaker / Optional installation box is available
Weight	Approx. 46 g / Set of 10 modules – 500 g

* *Use EOL calculator to choose optimal load settings*

8. System hardware installation

NOTE! The manufacturer reserves a right to change parameters and method of operation without further notification. Due to a regular modification and improvements, certain functions specified in this manual may differ insignificantly.

As a rule, VAS central unit is located in one cabinet or several connected cabinets with max. height of 48U for max. configuration. It is dependent upon the height of the building and system complexity. If several subordinate devices are required to supply large number of loudspeakers supporting a large multi-zone area, another cabinet must be added. This will facilitate further system development.

Particular components must be tightened with proper strength and care.

The location of components in the cabinet is dependent upon system complexity. Further in the manual, you can see requirements, notes and guidelines concerning the equipment assembly. In the first stage, you must create empty space for storage batteries in the lower part of the cabinet. Next, cover this area from the front with cover panels. A perforated panel is used to carry away heat around batteries.

Another step is to put the power supply manager and attach it to the casing frame tightly. There should be a gap between a storage battery and supply manager, which will be covered with a panel as well. This space is of paramount importance. The storage batteries will be placed and connected as last VASCU elements.

Then, use a cover panel with min. height of 1U above the power supply manager. The recommended value is 2U.

Another element which must be put and tighten is ABT-PF4 power supply unit frame which can take up to 4 ABT-PS48800 power supply units. There must be empty space, min. 1U, above the frame as well. The recommended height is 2U.

Other components which must be put are control units. Once they have been mounted in the cabinet, function cards and control cards of loudspeaker line must be placed. Afterwards, a cover panel must be applied above the control unit. The minimum height is 1U, the recommended value is 2U.

Another stage is related to amplifiers assembly. Considering a significant weight of amplifiers, structural elements in rack-type cabinet must be used to assure a suitable structural strength. Maximally, as many as 3 amplifiers can be mounted (one on the other), after which a gap of 2U must be maintained. Perforated panels are recommended to cover empty spaces. An amplifier with a reserve channel should be mounted at the top. There must be a space amounting to min. 1U of height above it. The recommended value is 2U.

It is required to mount a ventilation panel at the top position in the RACK cabinet to assure effective heat discharge.

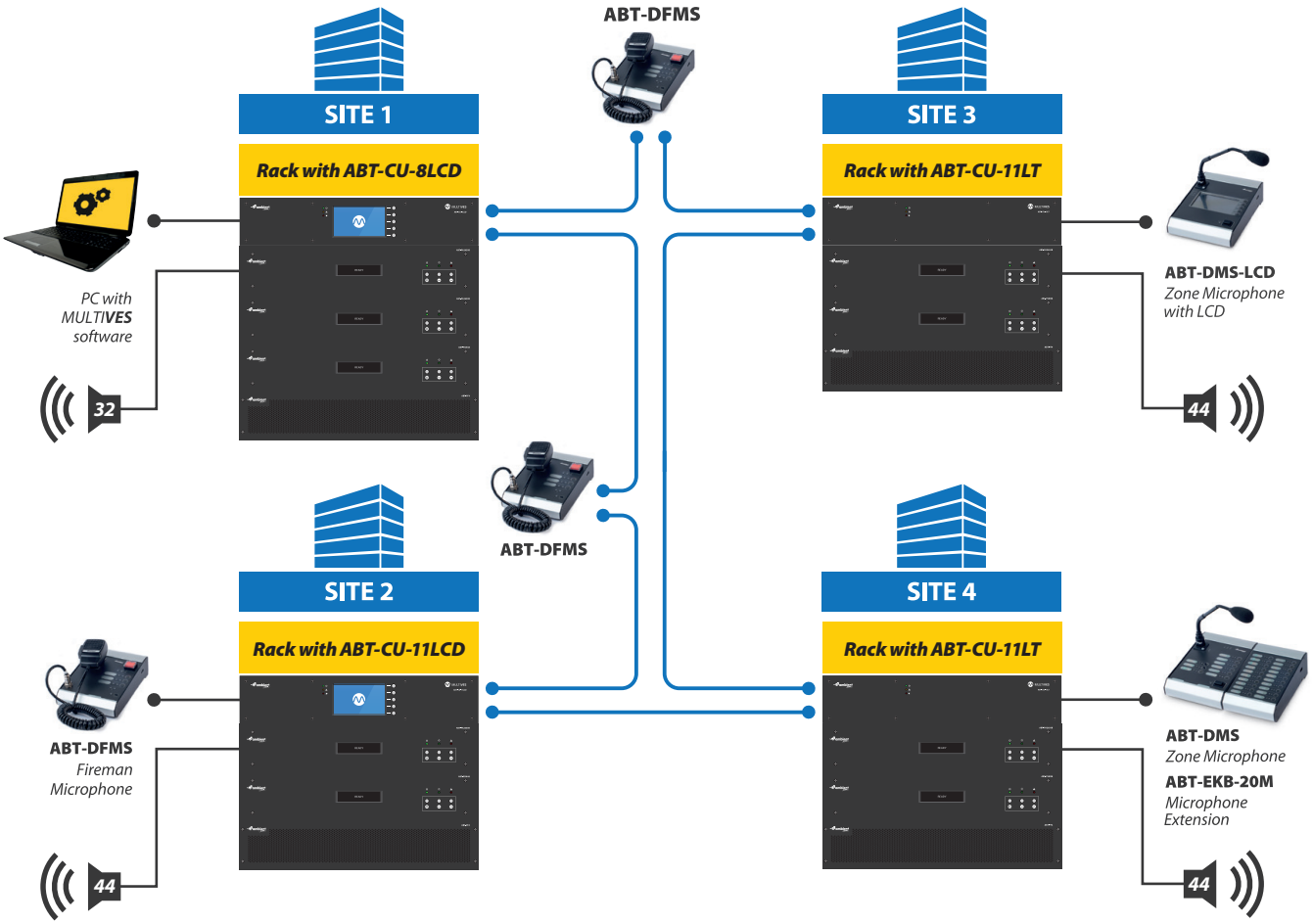
8.1 Information on limiting damage consequences

In order to avoid problems with Voice Alarm System Central Unit, it is advisable to get familiar with the contents of this manual before the first use of the central unit.

VASCU is equipped with a set of automatic functions which are responsible for testing system efficiency. FAILURE diode signals abnormalities. In such case, it is necessary to take prompt actions and, if necessary, consult a person in charge of VAS efficiency.

8.2 General connection diagram

Network connection of separated central units and fireman microphones by means of a fiber optic loop:



Drawing 66. General connection diagram

8.3 Connecting devices

VAS central unit should be located in the cabinet with a protection class IP30 (in accordance with EN 54-2) with supply ventilation.

In order to assure compliance of VAS central unit with norms, connections:

- with fire signaling central unit,
- sources of power,
- fireman microphones,
- network infrastructure,
- other VASCU elements,

must be carried out by suitably-trained and qualified personnel in accordance with relevant directives for electric devices.

Assembling devices in RACK cabinet, the following order is recommended (starting from the top):

- back-up amplifiers,
- amplifiers,
- control units,
- power supply units,
- power supply manager,
- storage batteries.

After installing all devices inside the RACK cabinet, another step is to connect components to the power supply manager. This process is presented on page 93.

⚠ **NOTE: It is crucial to connect the batteries to the system before startup.**

Once the power supply has been provided, connect signal tracks and audio tracks. Next, connect loudspeaker lines, logic inputs and outputs, network devices.

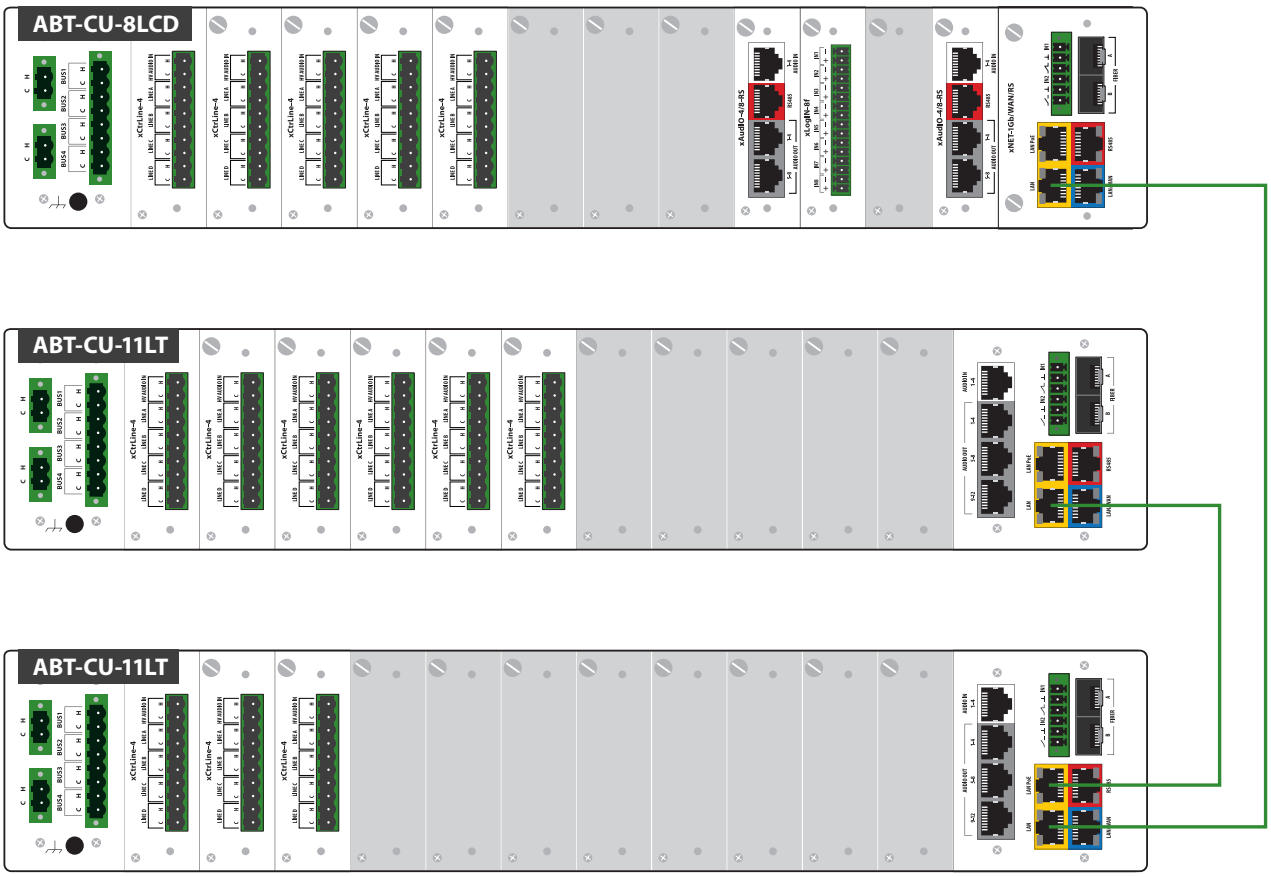
When you make sure all connections have been carried out properly, you can power up the system.

8.3.1 Control units

This section presents examples of control units connection diagrams.

8.3.1.1 Daisy chain topology

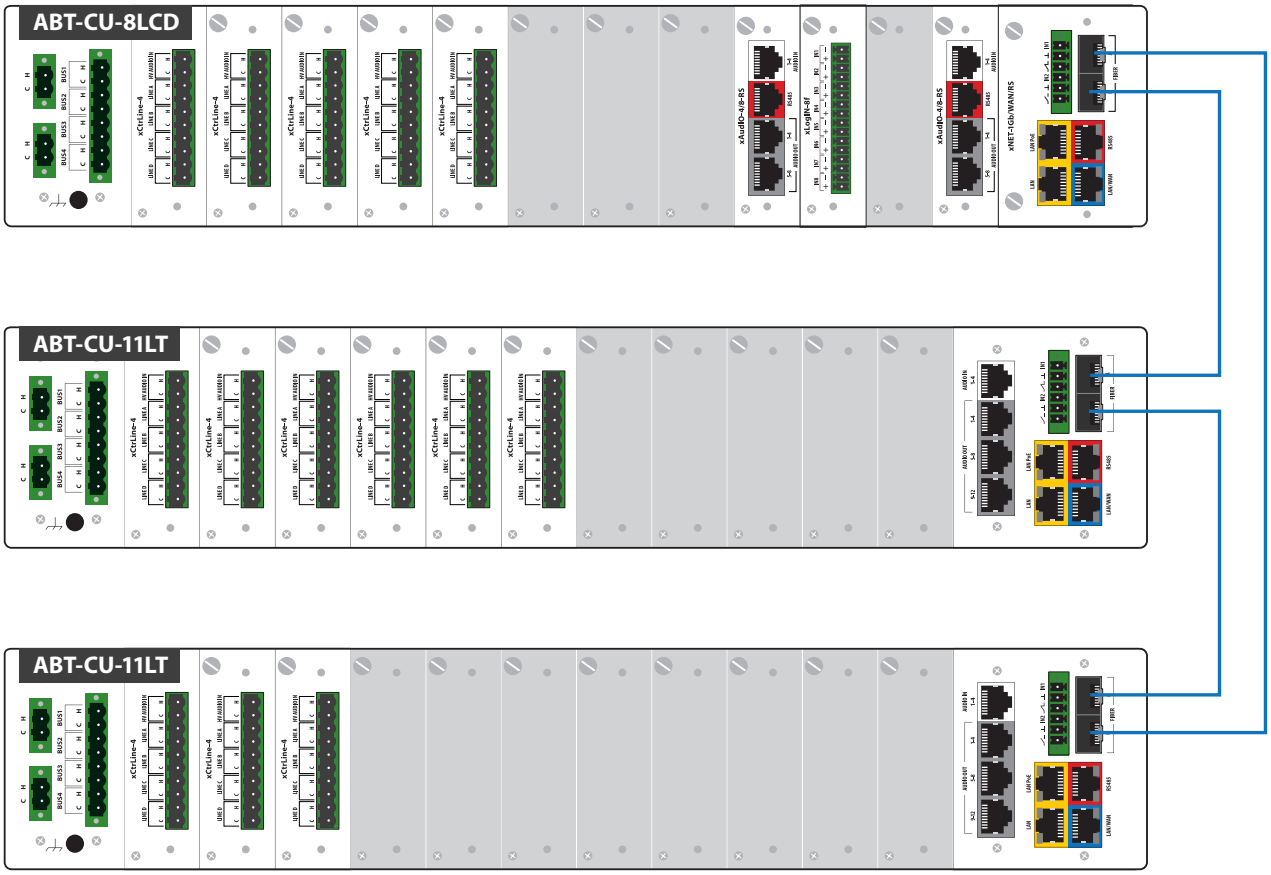
In daisy chain topology, the connection is not redundant. Connecting units in this system does not guarantee operation of the system in the event of communication cable damage. According to EN 54-16 norm, connections between VAS control units in a large scale system must be redundant. Connections in CHAIN topology are applied locally, and in the systems not responsible for sending evacuation messages.



Drawing 67. Example of daisy CHAIN topology control units connection

8.3.1.2 *RING topology*

In RING topology, the connection between system elements is redundant. The cables form a single continuous pathway for signals through each node – a ring. In the event of cable / communication optic fiber damage, the system still functions by using the remaining part of the ring.

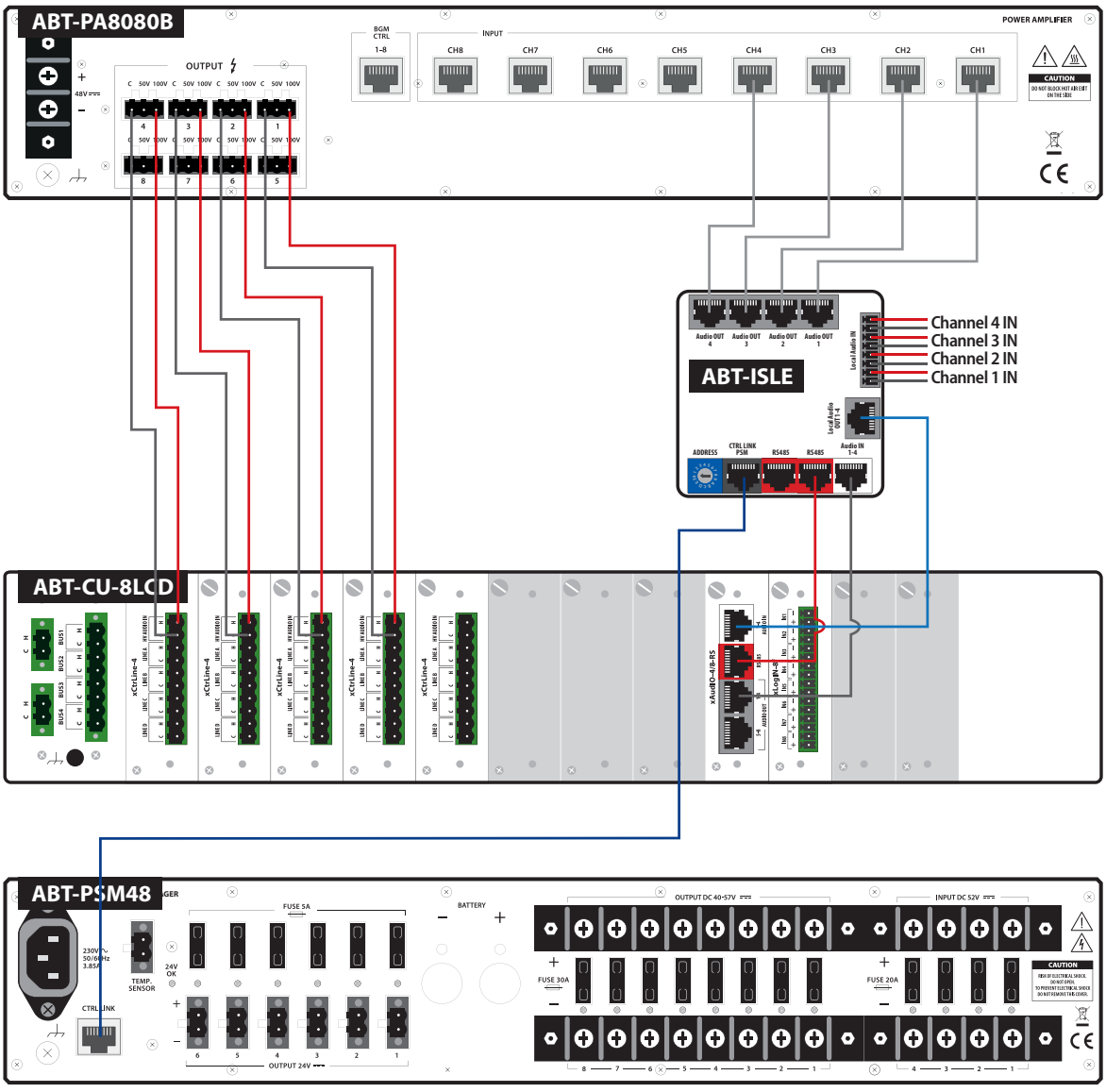


Drawing 68. RING topology control units connection (fiber connection)

8.3.2 Amplifiers

8.3.2.1 Individual connection without backup amplifier using ABT-CU-8LCD

Individual connection of each of the amplifier channels with control cards without backup amplifier.

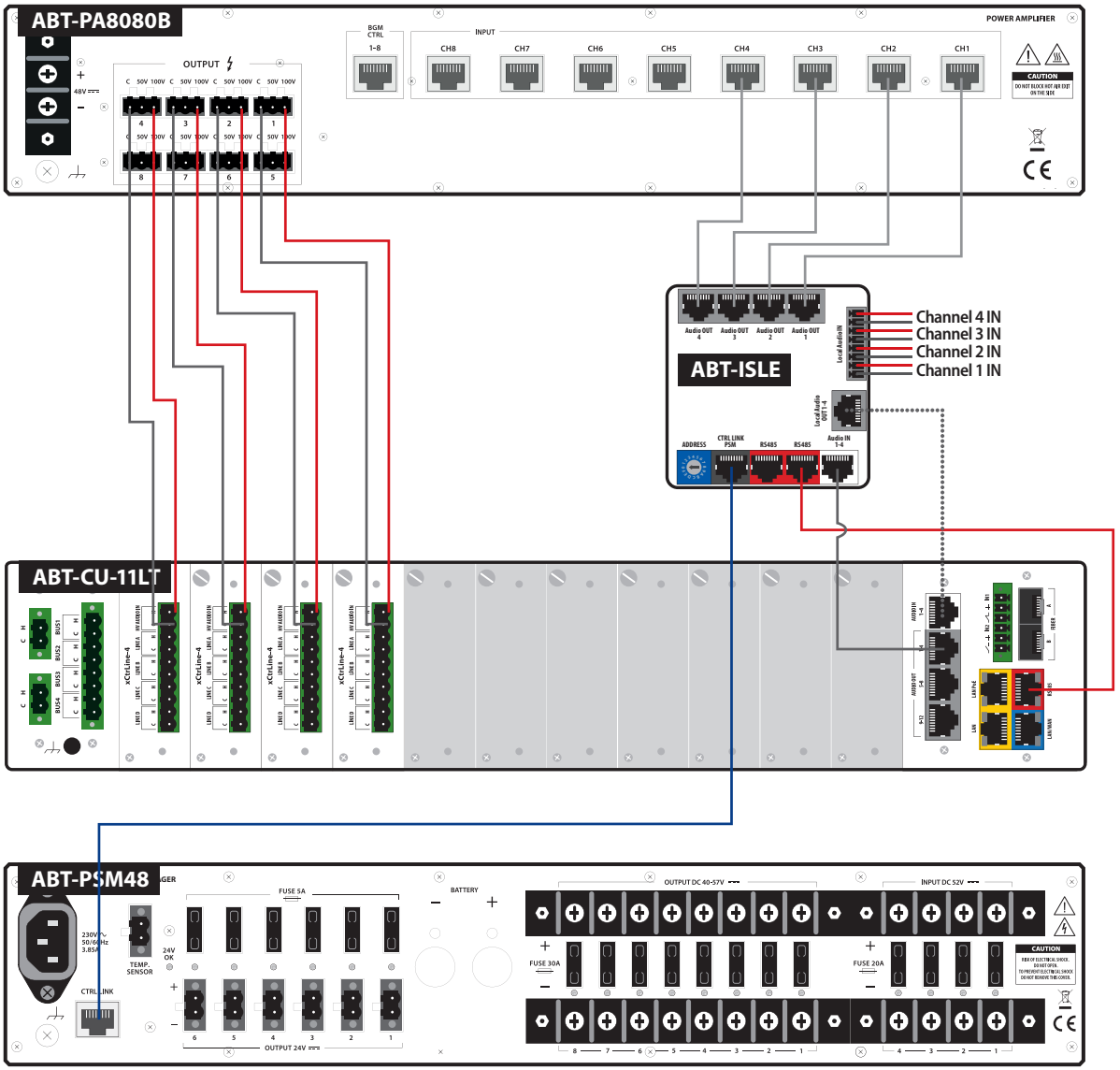


Drawing 69. Amplifier individual connection with ABT-CU-8LCD

Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.

8.3.2.2 *Individual connection without backup amplifier using ABT-CU-11LT / ABT-CU-11LCD*

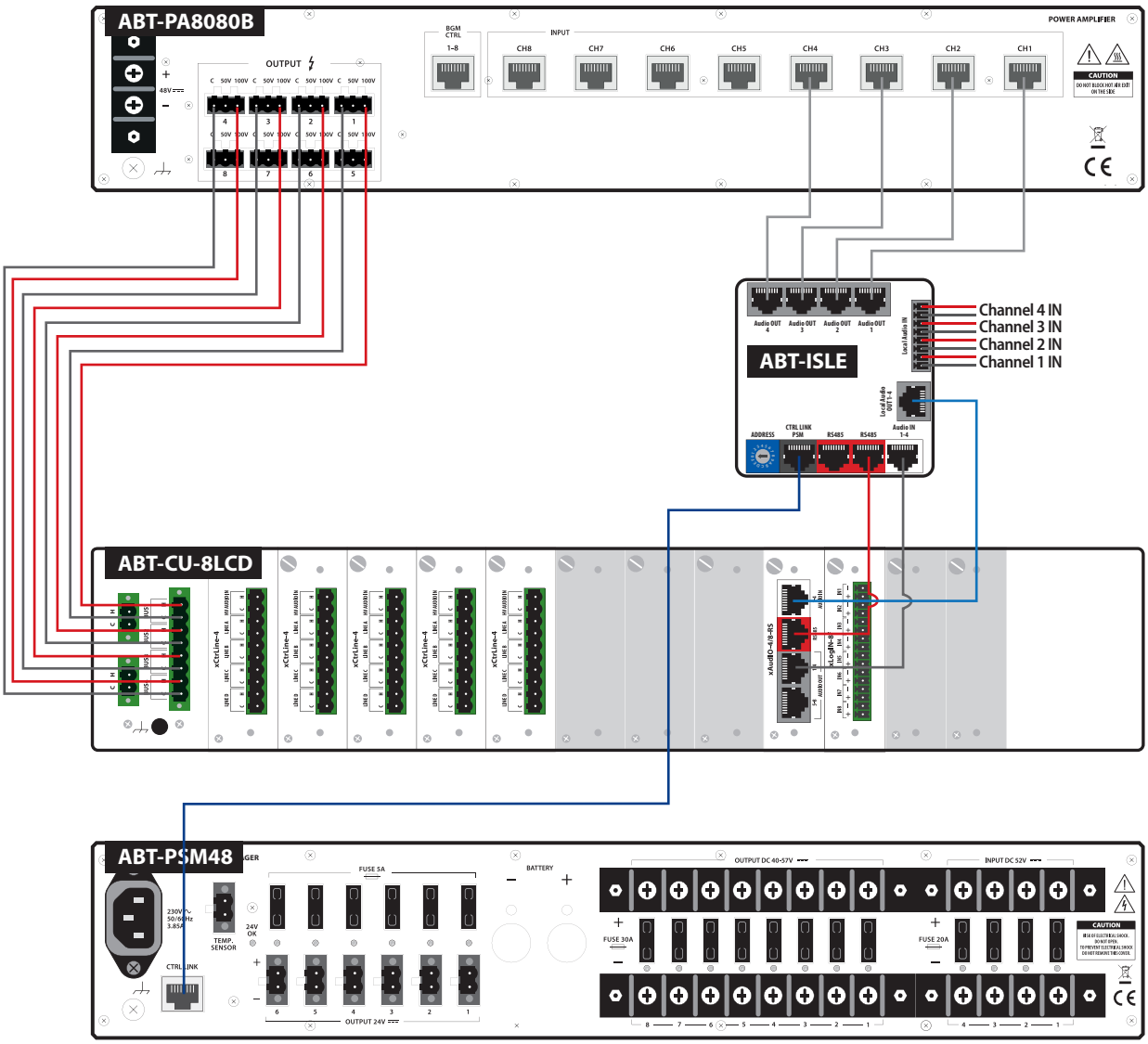
Individual connection of each of the amplifier channels with control cards without backup amplifier.



Drawing 70. Amplifier individual connection with ABT-CU-11LT / ABT-CU-11LCD

⚠ **Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.**

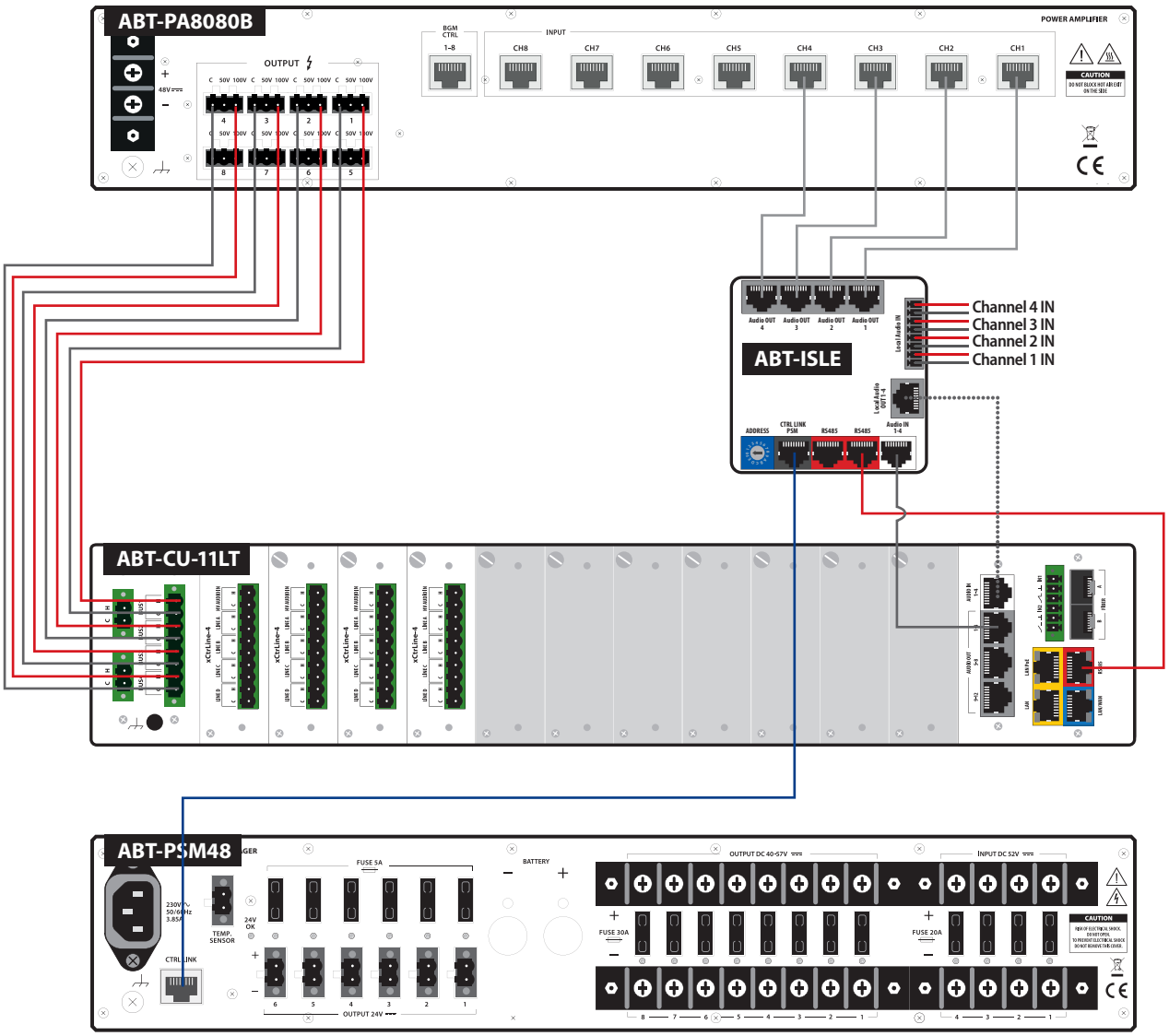
8.3.2.3 Connection with 100 V internal buses using ABT-CU-8LCD



Drawing 71. Connection with amplifier redundant channels using ABT-CU-8LCD

Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.

8.3.2.4 *Connection with 100 V internal buses using ABT-CU-11LT / ABT-CU-11LCD*

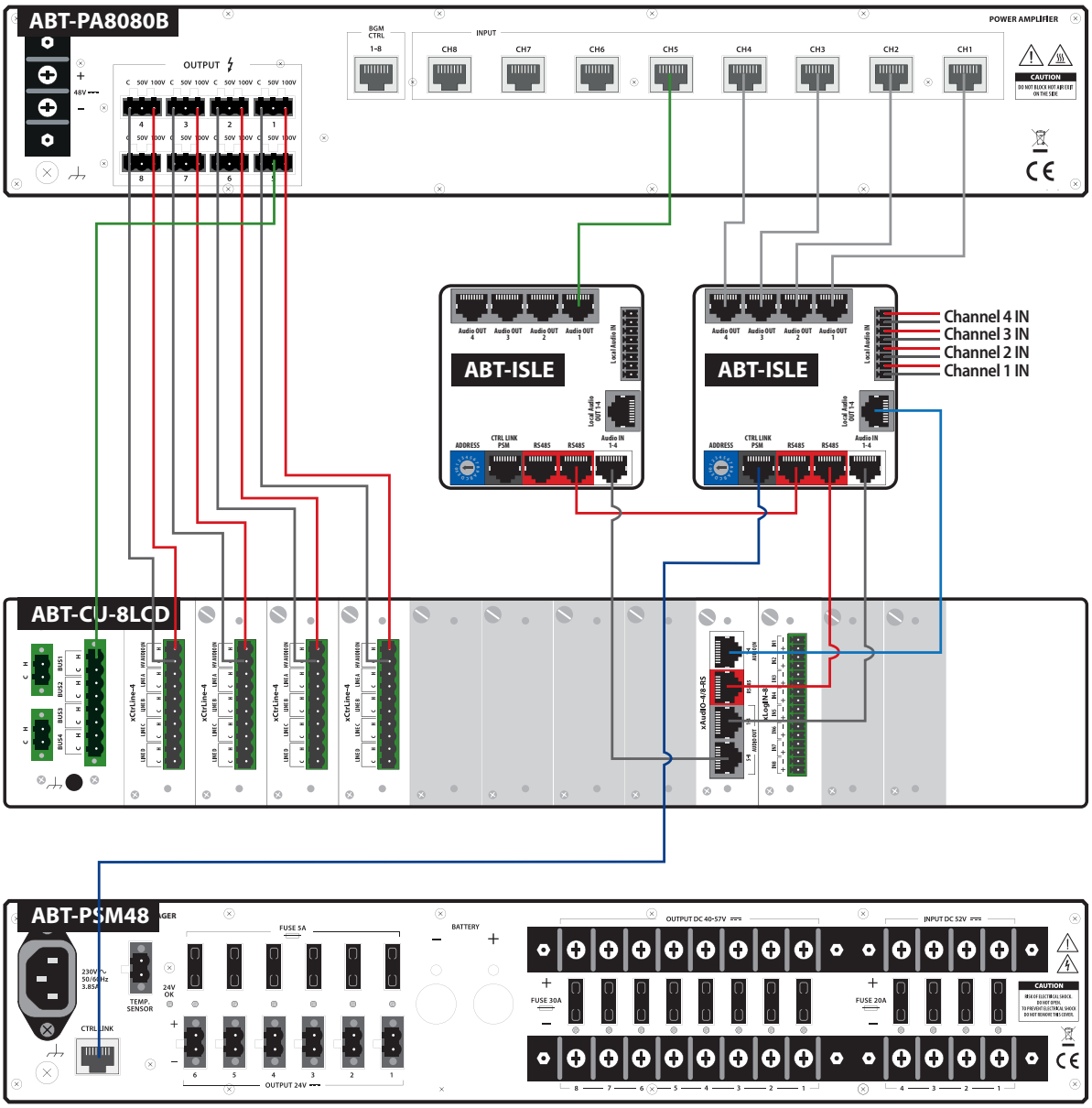


Drawing 72. Connection with amplifier redundant channels using ABT-CU-11LT / ABT-CU-11LCD

⚠ **Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.**

8.3.2.5 *Individual connection with backup amplifier using ABT-CU-8LCD*

Individual connection of each of the amplifier channels with control cards with backup amplifier (possible to connect up to 4 backup channels/amplifiers).

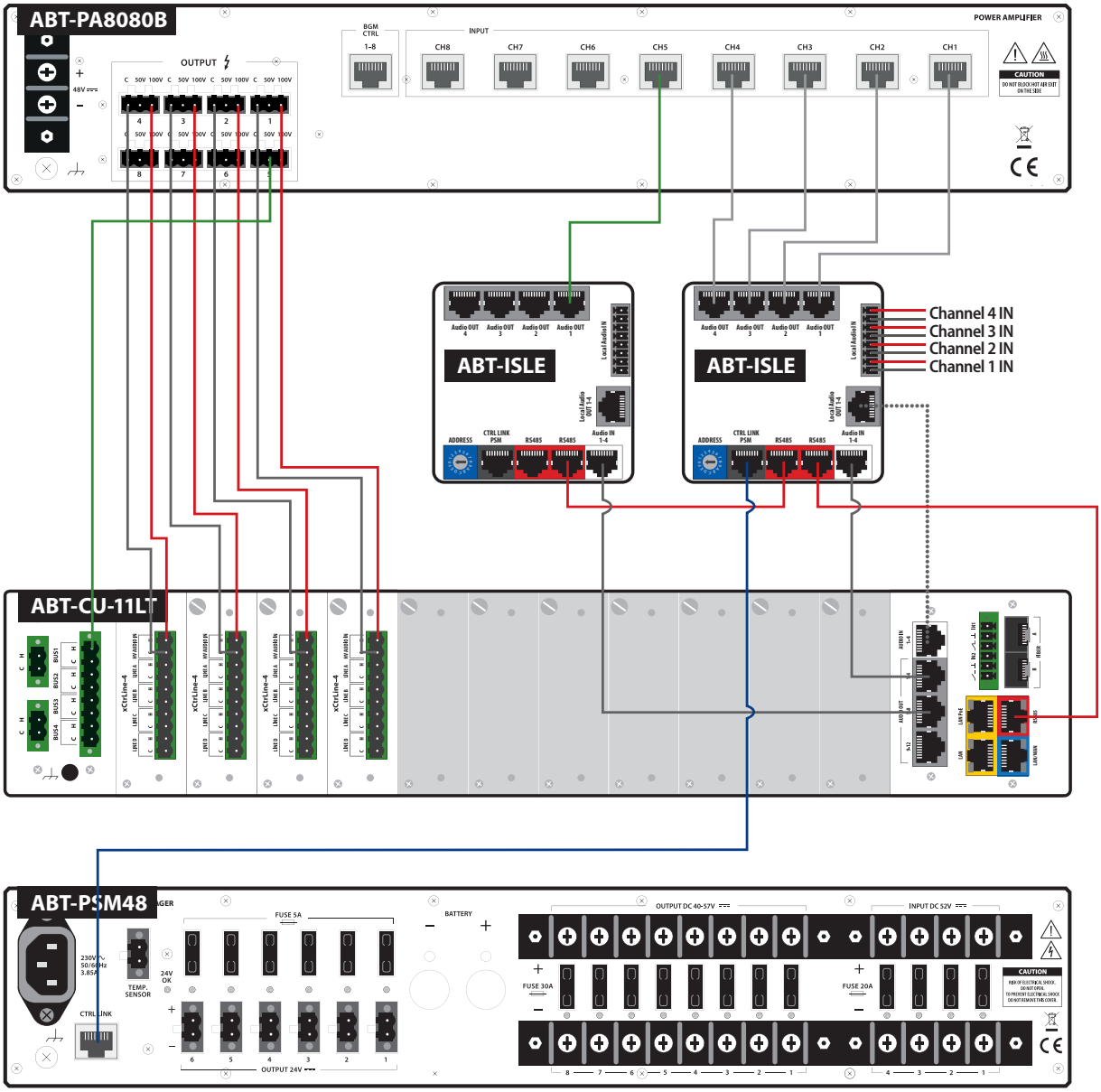


Drawing 73. Connecting back-up amplifier

Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.

8.3.2.6 *Individual connection with backup amplifier using ABT-CU-11LT / ABT-CU-11LCD*

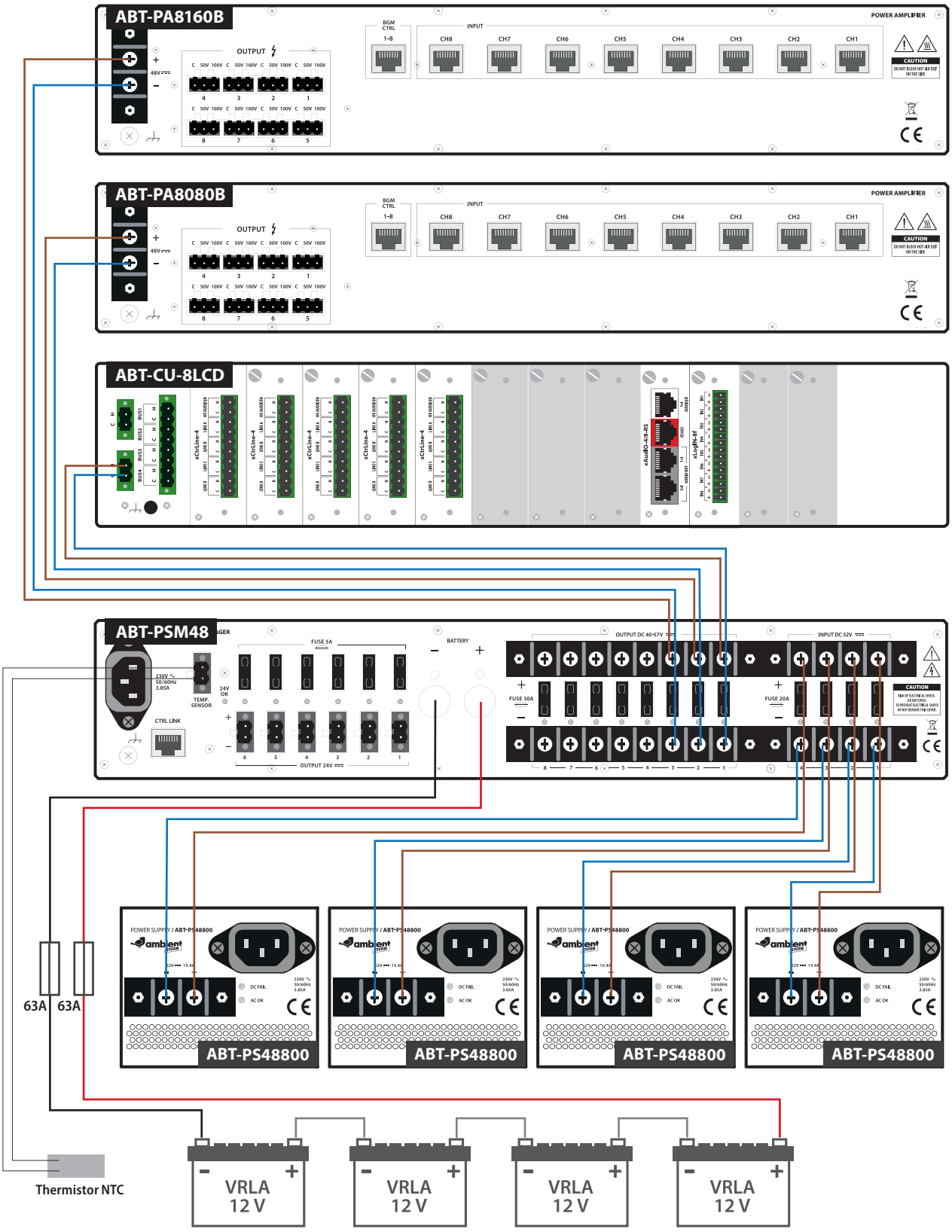
Individual connection of each of the amplifier channels with control cards with backup amplifier (possible to connect up to 4 backup channels/amplifiers).



Drawing 74. Connecting back-up amplifier

⚠ **Warning! All cables used to connect the ABT-ISLE modules must comply with the standard T568B. The use of cables of other standards (eg. T568A – T568B) may result in damage to system components.**

8.3.3 Power supply



Drawing 75. Power supply diagram

8.3.3.1 Storage batteries

It is necessary to protect batteries from short-circuit while connecting wires. Short-circuit may lead to system failure. Follow this manual to assure safety while connecting.

Make sure the system power supply has been switched off before battery is connected.

Once the batteries have been connected, make sure all terminals of all batteries have been protected against short-circuit.

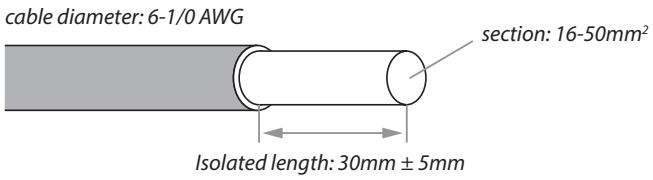
Battery selection rules

When choosing batteries, make sure they belong to the same product series and that they come from the same batch. This will prevent excessive aging of the batteries.
The preferred battery type is SLA (Sealed Lead-Acid).

For proper operation of the system, four batteries should be connected, to obtain the output voltage of 48 VDC.

Prepare cable tips

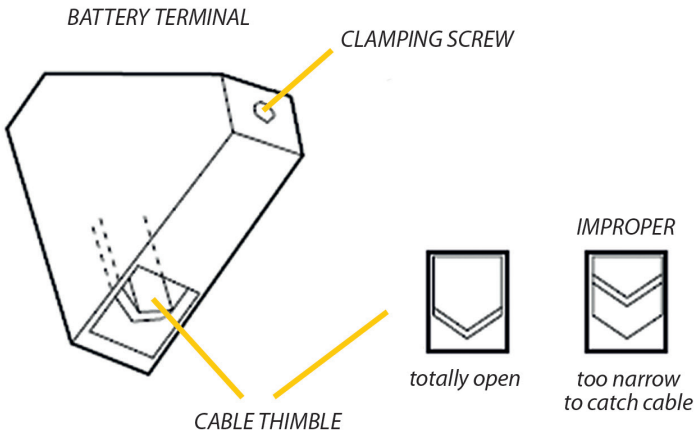
To assure a proper connection between battery terminals and cables, make sure you use a cable with a suitable diameter and prepare its tip, as below.



Drawing 76. Preparing cable tips

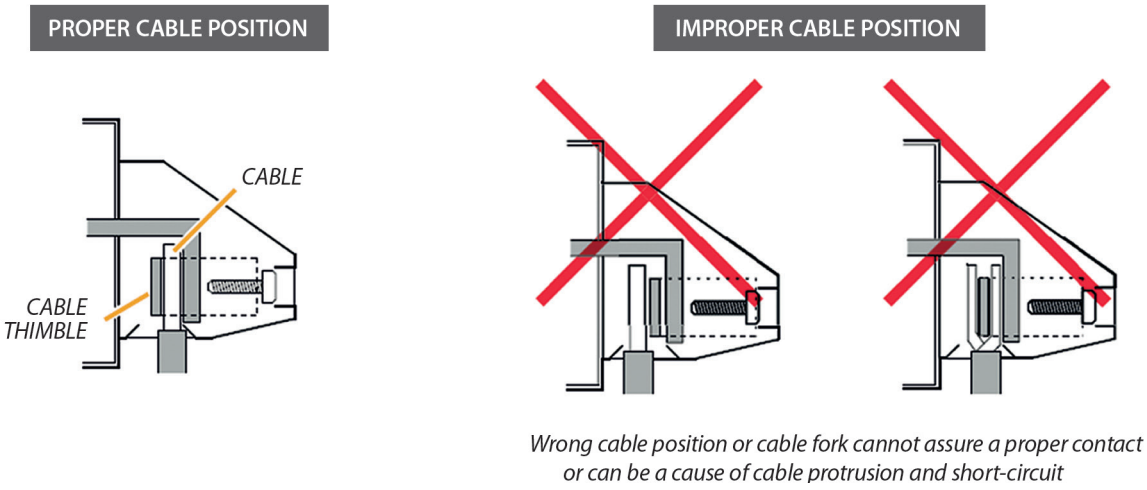
Remarks concerning connecting cables to battery terminals

» Before you connect a wire to a battery terminal, make sure it is completely open by screwing out the clamping screw.



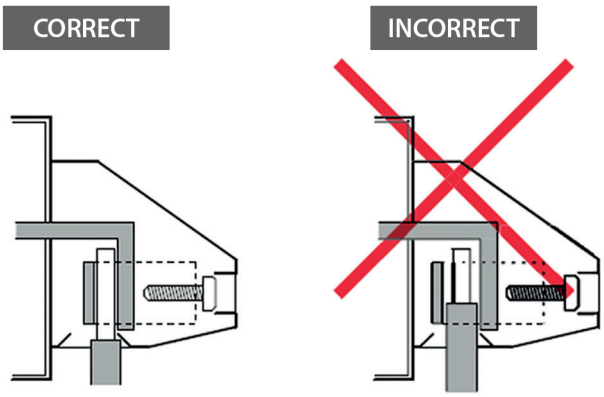
Drawing 77. Completely open Power Supply Manager terminal

» Slide the battery cable in the relevant position in the terminal, according to the drawings below.



Drawing 78. Proper cable position

» Isolate the section of the cable to assure a full contact. Otherwise, if insulation is kept, contact will not be full.



Drawing 79. Correct connection of storage battery cables

Connecting batteries

» Wait over 10 seconds after feeder cable was unplugged from AC socket located on ABT-PSM48 rear board.

» Slide cable to battery terminal and lock it by screwing in the bolt with a flat screwdriver. Never connect negative cable in the first place as in the case of short-circuit between battery positive wire and a device frame or rack cabinet element, a device damage may occur.

» Connect battery negative cable to negative terminal.

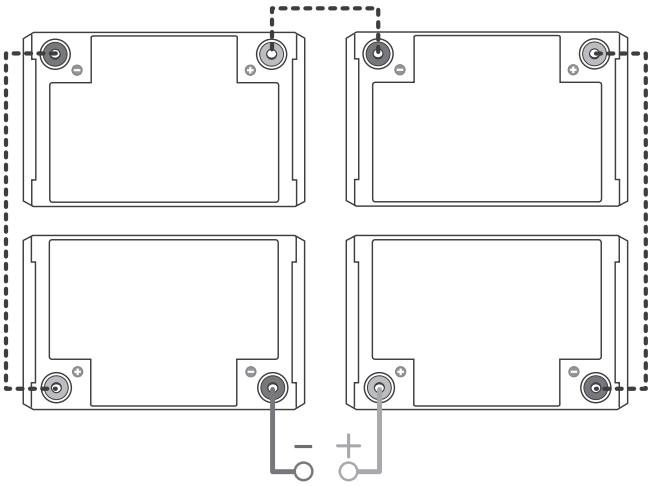
Disconnecting batteries

» Make sure battery supply is not used. To do so, check LED on ABT-PSM48 front panel which signals such state of affairs.

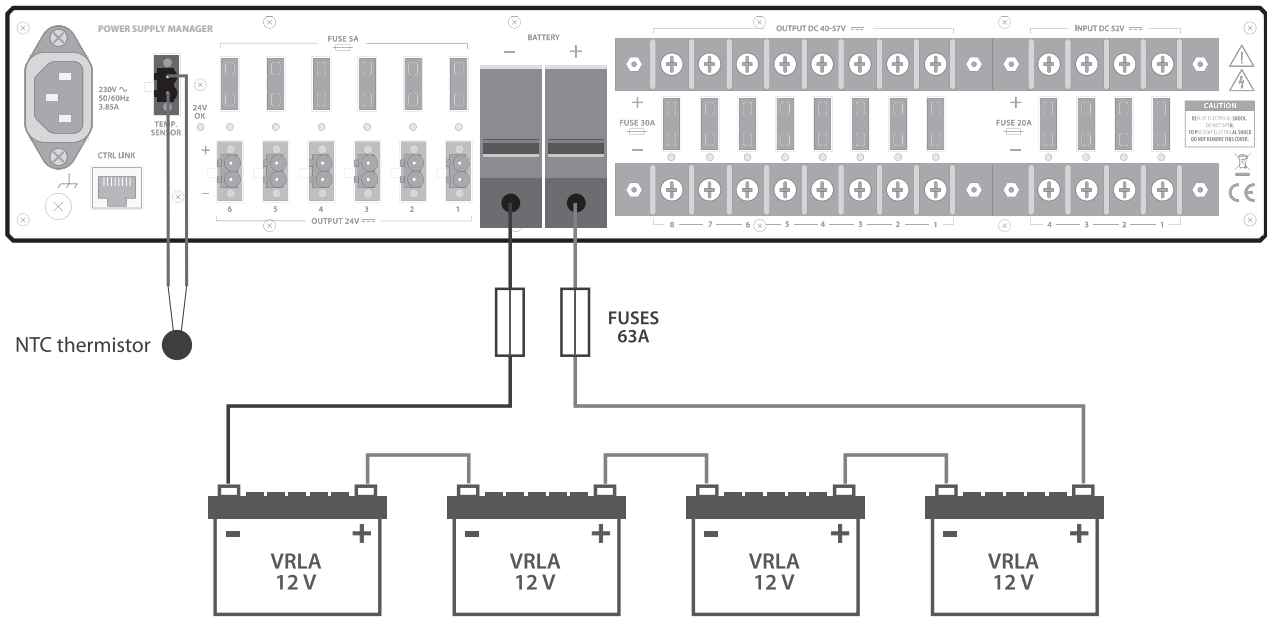
» Unscrew negative terminal of ABT-PSM48 battery supply input and take out battery negative cable from terminals. Never disconnect positive wire in the first place as it may cause short-circuit if you touch device frame or rack cabinet elements. Isolate disconnected cable tip with a suitable insulator, e.g. insulating tape, to protect against short-circuit.

» Disconnect last battery cable. Isolate disconnected wire tip with a suitable insulator, e.g. insulating tape, to protect against short-circuit.

⚠ A total voltage of storage batteries connected to the device, loading and monitoring, according to EN 54-4 should be 48 V DC (40-56 V DC). In the last stage, it is necessary to connect four VRLA 12 V storage batteries to a pair of battery terminals located on ABT-PSM48 rear panel of the manager, with special regard to wire polarity. Additionally, it is necessary to connect a thermistor temperature sensor by connecting its wire to Temp Sensor connector and placing the sensor in the place where storage batteries were installed.



Drawing 80. 4x12 V DC VRLA storage batteries connecting diagram



Drawing 81. Method of connecting storage battery batteries to power supply manager

In the circuit of storage battery batteries use: 2× 63A fuse, bus DIN ø15 mm, øA 15,9 mm L=36 mm (positive and negative wire).

Thermistor installation

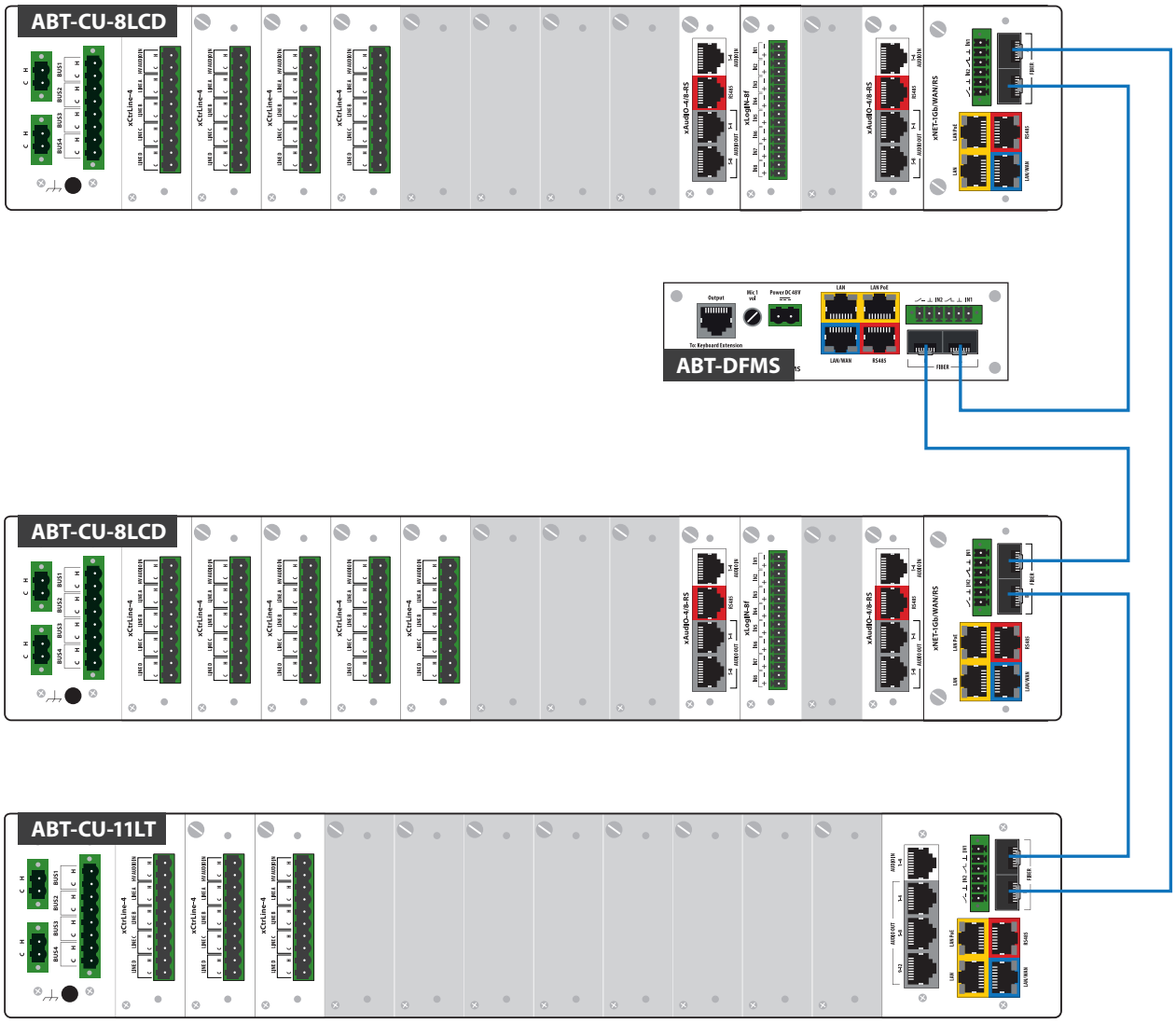
A thermistor, attached to ABT-PSM48 rear panel, is intended to compensate temperature changes when charging batteries. Place the thermistor between two batteries.
NOTE: the thermistor cable can be extended by several meters; no problems arise.

MULTIVES central unit is provided in RACK 19" cabinet with protection class IP30. The cabinet has access doors at both sides with a lock securing access levels: 2, 3 and 4.

Before VSA MULTIVES central unit is provided with power, it is necessary to perform standard inspections specified in the chapter – *Maintenance and service* – page 117.

8.3.4 Microphones

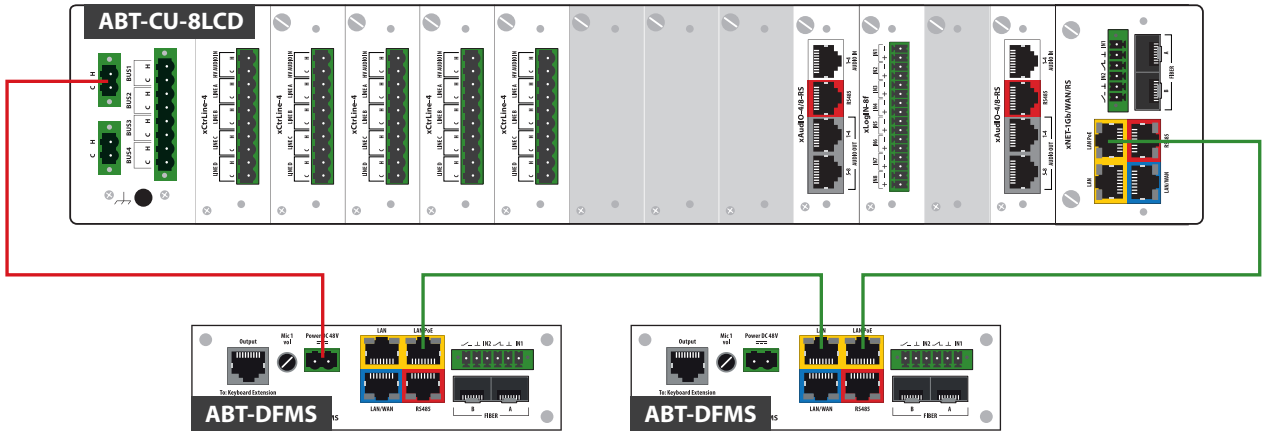
8.3.4.1 Fireman microphone RING-type optic fiber connection



Drawing 82. Fireman microphone optic fiber connection – RING topology

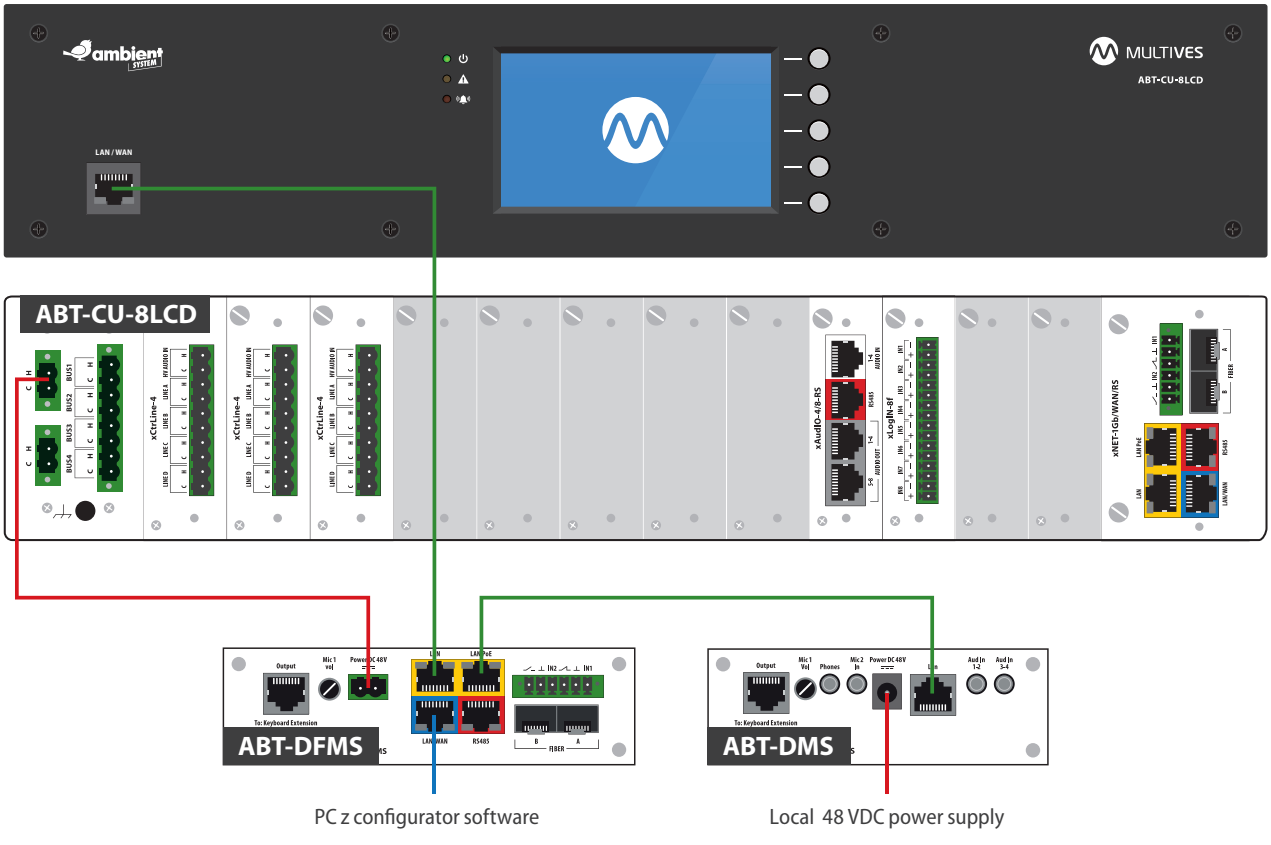
8.3.4.2 *Fireman microphone daisy chain type cable connection*

In the CHAIN-type cable connection, the first fireman microphone can be connected to the control unit via LAN PoE, whereas further microphones require external power supply. This does not apply to a system in which there are PoE switches between microphones (Switches must be supplied with fire power supply units.



Drawing 83. Fireman microphone cable connection – daisy chain topology

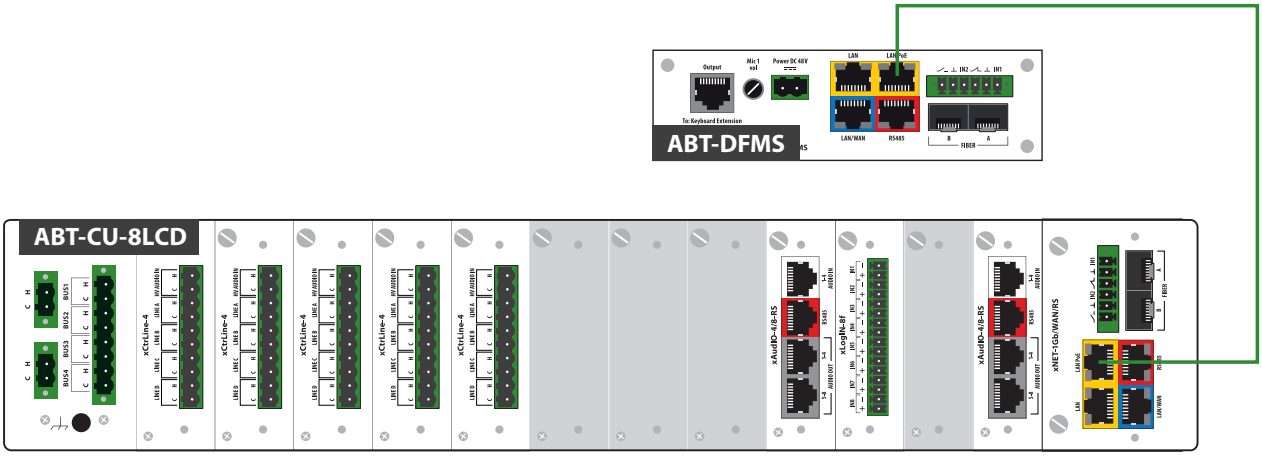
8.3.4.3 *Fireman and zone microphone cable connection via LAN/WAN slot on front panel*



Drawing 84. Fireman and zone microphone cable connection via LAN/WAN slot on front panel

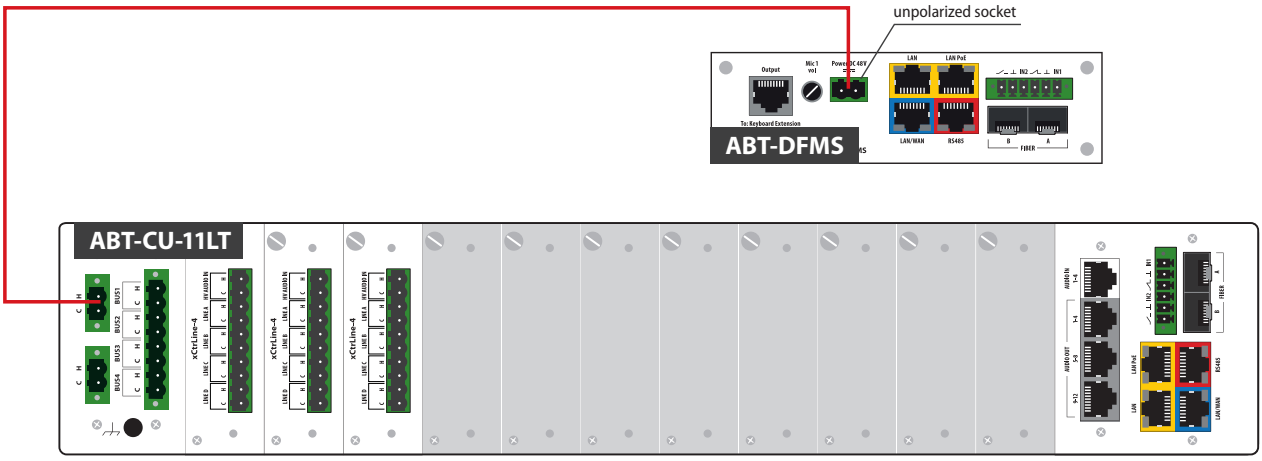
8.3.4.4 *Supplying fireman microphone*

1. **Via LAN PoE in ABT-CU-xx Control Units**



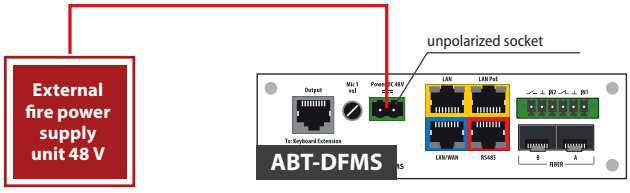
Drawing 85. Supplying fireman microphone – LAN PoE

2. **Via supply output in ABT-CU-xx Control Units, or in ABT-PSM48 power supply manager**



Drawing 86. Supplying fireman microphone – supply output

3. **Via external fire power supply unit 48 V**

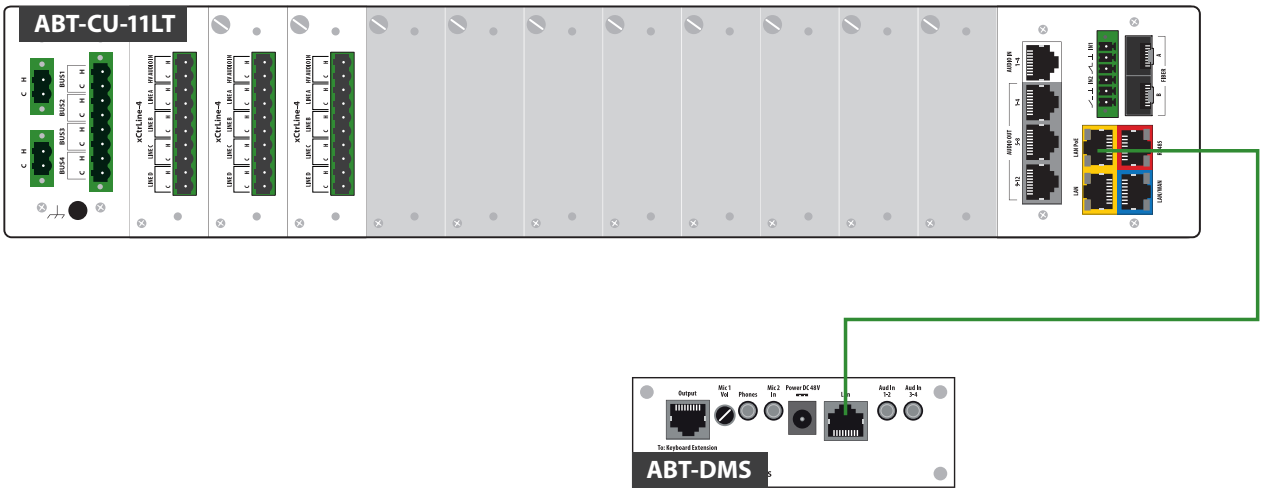


Drawing 87. Supplying fireman microphone – fire power supply unit

8.3.4.5 *Zone microphones – types of connection*

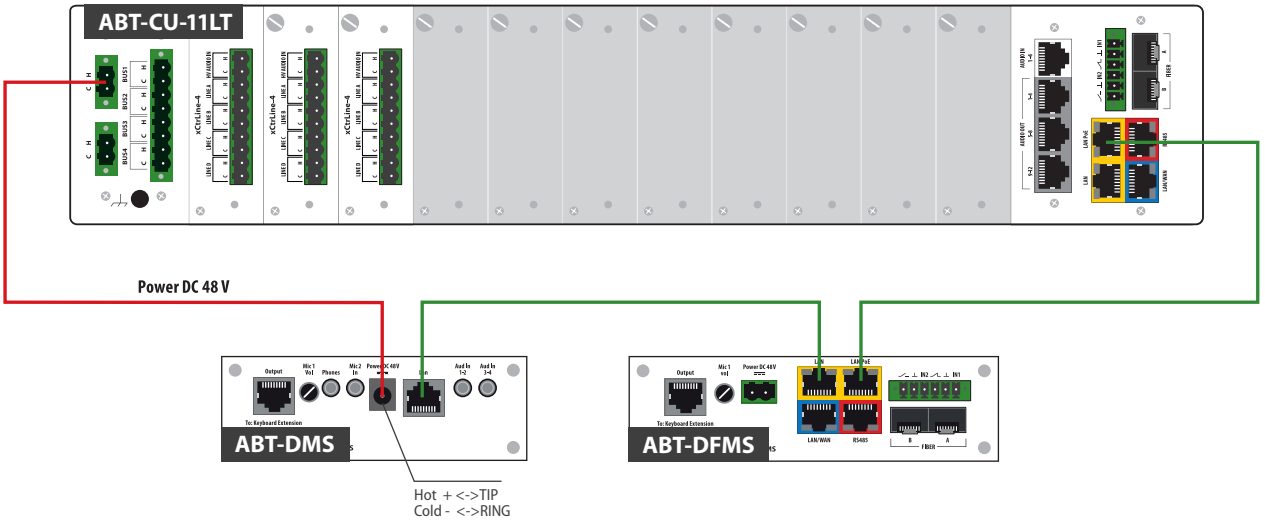
A zone microphone can be connected directly to VASCU via LAN or to the fireman microphone. Most zone microphones can be connected to VASCU via a certified switch. When the switch supports PoE function, only one wire (UTP/STP cat. 5e) is required to assure a proper microphone operation.

1. **LAN PoE connection.**
   For direct connection to VASCU, it is not required to provide additional power supply on condition that the unit has LAN PoE port.



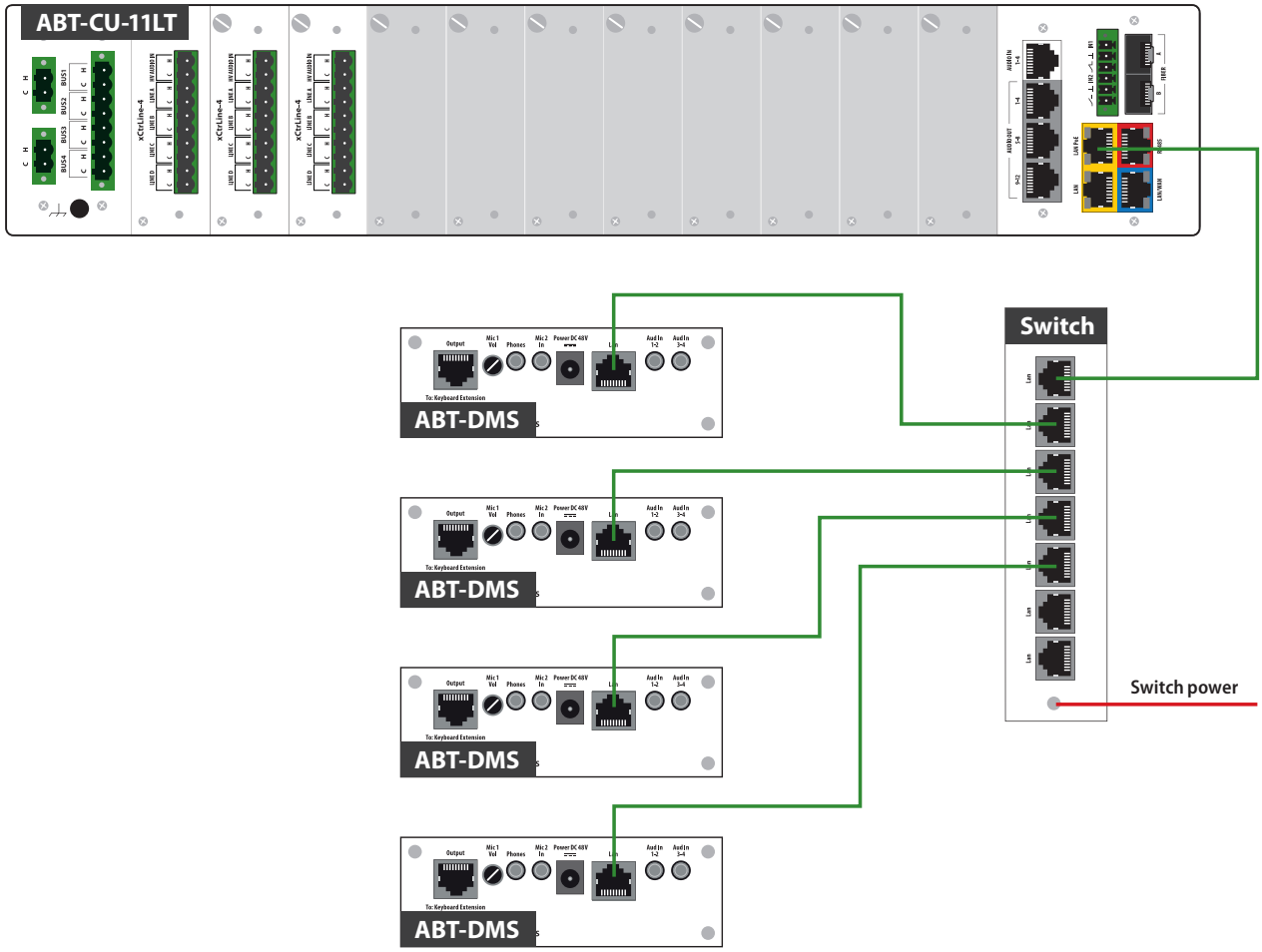
Drawing 88. Connecting zone microphone

2. **Connecting via ABT-DFMS fireman microphone**. In this case it is required to provide additional power supply from the external power supply unit or ABT-PSM48 power supply manager.

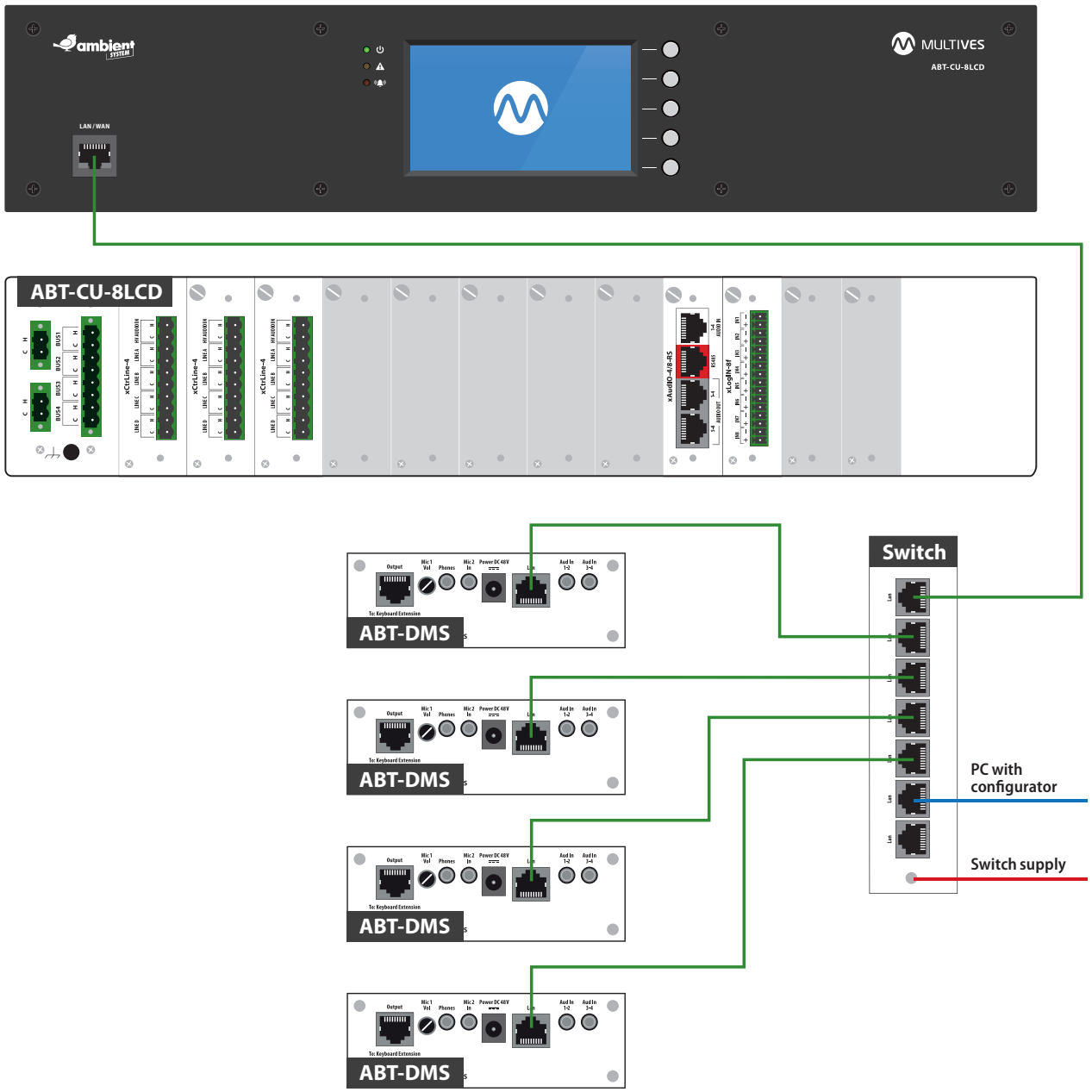


Drawing 89. Connecting zone microphone, fireman microphone

3. **Connecting with a certified network switch**. The diagram below shows connection of 4 zone microphones via a switch with LAN PoE.



Drawing 90. Connecting zone microphone – switch



Drawing 91. Connecting zone microphone – switch (connected to ABT-CU-8LCD front panel)

List of certified switches:

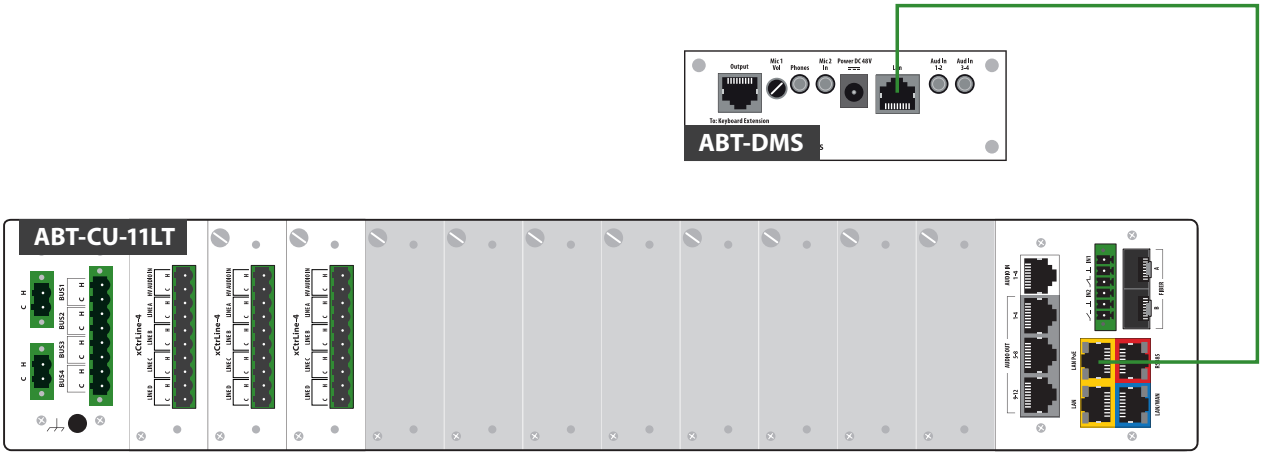
- NETGEAR – Prosafe Gigabit Plus series with PoE
- CTC Union Technologies – IGS Gigabit Ethernet Managed Switch series
- CTC Union Technologies – IFS Fast Ethernet Managed Switch

8.3.4.6 *Supplying zone microphones*

Supplying power to zone microphones occurs locally (48 V) or from VASCU via PoE.

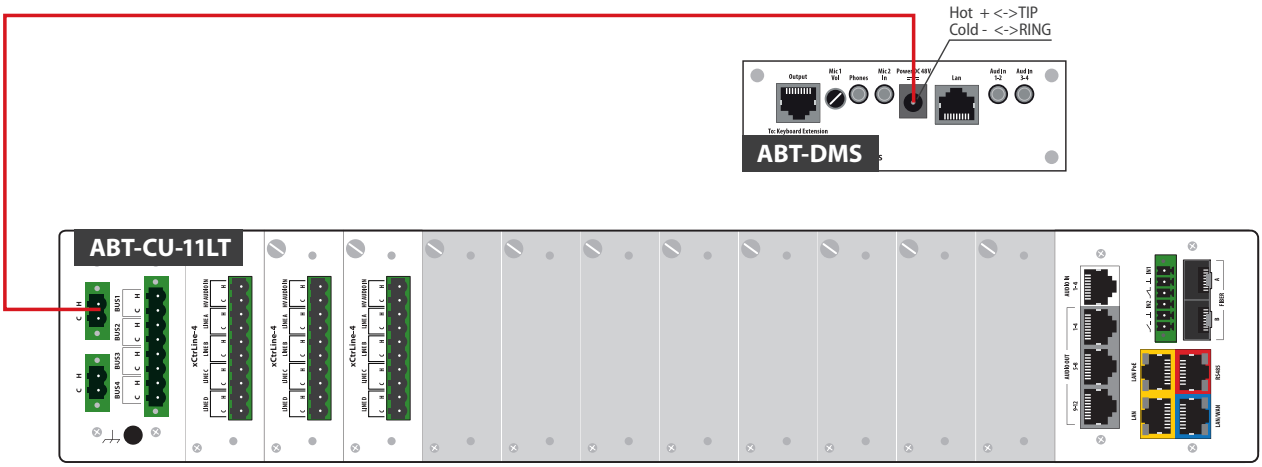
Supplying zone microphone:

1. **Via LAN PoE (from VASCU or certified switch)**



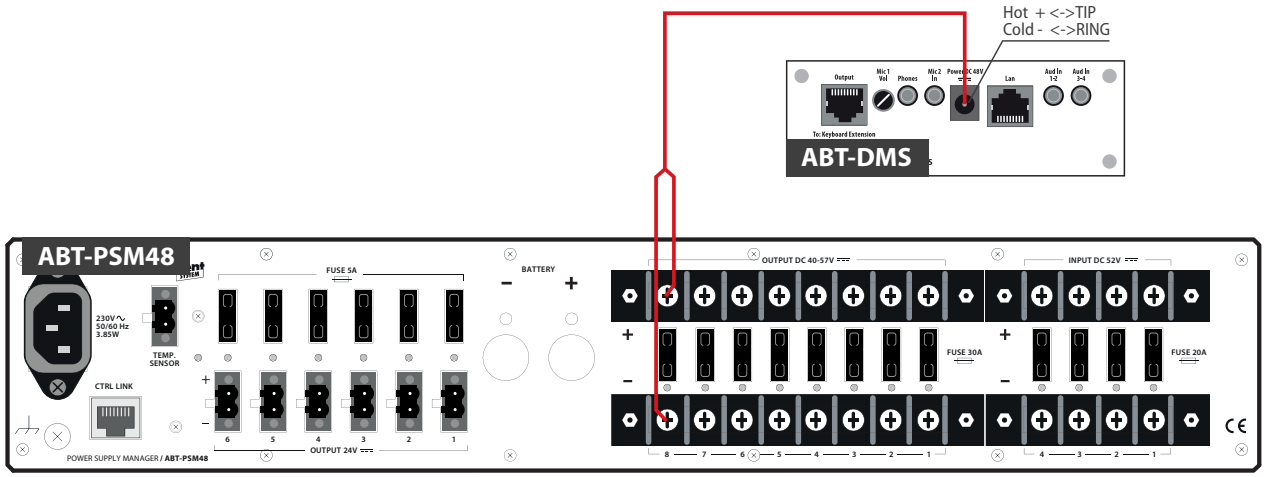
Drawing 92. Supplying zone microphone – LAN PoE

2. **Via supply output in ABT-CU-XX Control Units**



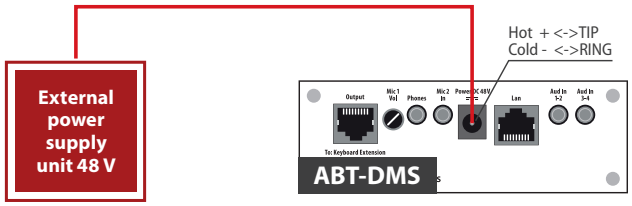
Drawing 93. Supplying zone microphone – supply output of central unit

3. **Via supply output in ABT-PSM48 power supply manager**



Drawing 94. Supplying zone microphone – supply output of power supply manager

4. **Via external power supply unit 48 V**



Drawing 95. Supplying zone microphone – fire power supply unit

8.4 Preparing sound system to start VAS system

Cabinet assembly

Loudspeaker line cables, control cables with FACIE and feeder cable – mark, take to target area of VAS sound system cabinet assembly with at least 3 meters of margin – counting from the floor. Anticipate empty service space behind the cabinet (at least 50 cm from the wall). Make sure there is a gap between the back of the cabinet and the wall.

Messages recorded on memory cards

Define content, language and type of recorded messages on memory cards. (Emergency messages should suit the building and be confirmed by the Fire Marshal). To record messages, please contact Ambient System Sp. z o.o. employee who is responsible for VAS start-up.

Emergency messages:

- **EVACUATION** – potential life hazard requiring evacuation – message requires to leave the building immediately,
- **WARNING** – situation in which danger is close and requires warning during evacuation,
- **CANCELLATION** – information that the alarm has been cancelled and there is no danger on the site,
- **NO HAZARDS** – operational messages, e.g. system testing.

Fire scenario and control between FACIE and VAS

Please prepare fire scenario which makes allowances for algorithm of cooperation between SAP and VAS systems. (This algorithm should be accepted by the Fire Marshal). Make sure that between the FACIE fire signaling central unit and VAS cabinet there are cable connections with regard to the number of controls allowing evacuation message and information on VSA system damage message. Control cables from FACIE central unit to VAS must be at least PH30. As for control algorithm, please consult Ambient System Sp. z o.o. employee responsible for VAS start-up.

Loudspeaker lines

Please check if loudspeaker lines have been made in accordance wit the design (number of loudspeakers on line, speaker powers- if there are suitable taps on output transformers, if line descriptions are made properly – as required by the design). Use the meter (e.g. ohmmeter or multimeter) if there are any short-circuits between loudspeaker line and earthed element. Next, check for short-circuits or open-circuits between loudspeaker line wires.

⚠ While assembling loudspeakers, power taps must be properly positioned on transformers, as specified in the design. Unsuitable power setting can lead to amplifier tip overload. In the process of system startup, it causes unwanted time and energy loss.

Power supply

1-phase power supply 230 V. RACK cabinets with wires for VAS devices are prepared for connecting 1-phase power supply 230 V. A single cabinet is equipped with an overcurrent "S"-type single-phase switch. While supplying power, make sure each RACK cabinet is provided with a separate circuit, and choose a proper protection.

3x2,5 cable responsible for supplying the cabinet must be connected before the plant power supply main switch (to supply, use inflammable wire with PH90 coefficient). The power cord must be led to the target place where VAS cabinet is assembled. The cabinet power supply circuit must be protected with a residual current device.

System start-up by employees of Ambient System Sp. z o.o.

Start of the DSO system can be commissioned to employees of the Ambient System Sp. z o.o.

To do this, contact the Sales Representative who finalized the sale of the system and make trade arrangements or report to the technical support line number (+48 601 649 484).

Prepare the sound system in accordance with the guidelines above. Make sure assemblers have access to the room intended for VAS cabinets, reduce the number of third parties at the time when the system is installed. It is strictly forbidden to perform any works in the VAS assembly room by workers unauthorized to install VAS cabinet. Once the system has been started, conduct a training related to system operation for persons responsible for proper system use, and prepare relevant protocols.

Speech transmission index test

Pursuant to provisions of EN 60849 norm, each Voice Alarm System (VAS) installation must be followed by STI tests. These tests aim to confirm that the installed sound devices are able to produce a suitable acoustic power which allows obtaining a required sound pressure level (SPL), as well as a high degree of speech intelligibility – in accordance with assumptions in the specification. The tests must be performed when the system operates in the alarm mode and does not use dynamic range compressors.

The date of testing must be arranged with a person responsible for administration of the building and Ambient System Sp. z o.o. employee. Make sure to provide access to rooms in which tests are supposed to be carried out (as a rule – all rooms in the building). Please notify persons staying in the building (i.e. plant administrator) that tests will entail unpleasant and noisy signals emitted by loudspeakers.

9. Operation modes – LED colors

LED indicators located on microphones and control units can signal various statuses. The tables below present the indicators and their functions.

Table 23. Colors signaling on the system microphones depending on the function assigned

FUNCTION	LED 1		LED 2				
	GREEN		RGB			Blink	On
	Blink	On	R	G	B		
General	✓						
Stop Scenario	✓						
Skip Scenarios Delay	✓						
Audio Monitor	✓	✓					
Volume Change	✓						
Failure Accept	✓						
Failure Delete	✓						
Alarm Mode	✓	✓	●				
Display Text	✓						
Led Test							
Select Audio Source	✓	✓					
Mute Audio Source	✓	✓					
Select Zone	✓	✓					
Block Zone	✓	✓					
Zone(s) OFF	✓						
Group Zone	✓	✓					
Start/Stop Matricing	✓	✓					

Power Safe	✓	✓		●	●		
Scenario Delay	✓		●		●	✓	
Silence		✓	●				
Intercom					●	✓	
Record Message			●	●		✓	
Failure Delete	✓		●	●		✓	
Failure Accept	✓		●	●			
Standby	✓	✓		●	●	✓	

Table 24. LED colors of the button assigned to the function Select Zone

FUNCTION	R	G	B	Blink	On
Block Zone	●	●			✓
Zone failure › short-circuit / ground fault / opening › impedance failure › switch to B side of the loop	●	●		✓	
Zone failure confirmed	●	●		✓	
Emergency message playback	●				✓
Warning message playback	●			✓	
Voice message from a fireman microphone		●		✓	
Voice message (from a zone microphone, BGM)		●			✓
Service message playback			●		✓
Zone mute		●	●		✓
Buffering messages when zone is busy			●	✓	
Standby		●	●	✓	

Table 25. LED colors on the control unit front panel

Graphic symbol	Color		Control Unit ABT-CU-8LCD / ABT-CU-11LT/LCD
⏻		**green**	POWER
⚠		**yellow**	FAILURE
🔔		**red**	ALARM

9.1 Normal mode

Activeness indicators and power supply indicators emit green light. In normal mode (no failure and locks) no LED in VASCU system emits yellow or red light.

9.2 Alarm mode

In this mode, all devices which are unnecessary during alarm (e.g. zone microphones, other devices which use structural network) are automatically disconnected.

An LED marked as ALARM emits red light on the fireman microphone, zone microphone and on the front panel of the Control Unit. Fire scenario is carried out. Any activities are recorded in the event log.

9.3 Failure mode

In case of damage related to one of the system modules, the system enters failure mode, and information about failure is displayed in the Control Unit and microphones. FAILURE yellow LED lights up. If the microphone has a button programmed as “confirm failure” the built in speaker also signals the failure. When failure is signaled, press the button marked as “confirm failure” to mute the alarm, the system will detect that the failure has just been accepted/confirmed by the Operator (this event is recorded in the event log). The failure LED goes out when the system damage is eliminated and “Failure delete” button is pressed.

9.4 Lock mode

VASCU can lock and unlock sound system zones. In the locked zone, no messages are played back until unlocked.

When the zone is locked, the LED indicator emits yellow color on every microphone.

10. Instruction for performing tests and trials

In order to confirm that MULTIVES VASCU works properly, perform a series of basic efficiency tests in accordance with the program below. Indicators and manual control elements used to perform the tests have been described in previous chapters.

10.1 Instructions for performing basic functions

10.1.1 Alarm mode

Activating alarm mode

Lift red button flap (alarm button "activate Evacuation") and press it. Green LED indicators will emit light in all sound system zones. The system enters alarm state and automatically activates all zones. In this mode, music background and zone microphones are disconnected. It is still possible to send automatic alarm messages or via fireman microphone. The system awaits messages to given zones. The alarm state applies until the button programmed as "cancel alarm" is pressed.

Cancelling alarm

During alarm state, press "Cancel Alarm" button. VASCU inactivate all alarm messages.

Sending evacuation messages

Activate alarm and select zones. A green LED next to the zone name means the zone is ready to transmit. Press "Evacuation" button. A constant red indicator next to green zone selection indicator means that evacuation message is being sent. The evacuation message will be played back in given zones in a continuous way, until the button "cancel alarm" is pressed.

Sending warning messages

Activate alarm and select zones. A green LED next to the zone name means the zone is ready to transmit. Press "Warning" button. A flashing red indicator next to green zone selection indicator means that the warning message is being sent. The warning message will be played back in given zones in a continuous way, until the button "cancel alarm" is pressed.

Sending verbal messages via microphone

Activate alarm and select zones in which you wish to speak in. A green LED next to the zone name means the zone is ready to transmit. Lift the microphone, press and hold PTT – Push to talk button and speak at the same time. Speak slowly, loud and clearly.

Message priorities

Activate alarm and select zones. Press "Warning" button – warning message will be played back in given zones. Next, press the "Evacuation" button – warning message will stop, and evacuation message will replace it because has a higher priority. Then, press PTT button – all automatic messages will stop and you will be able to transmit a live message via the fireman microphone.

Transmitting automatic messages and microphone messages in various zones

Activate alarm and select one zone. Activate evacuation message or warning message playback in the given zone. Unselect this zone (green indicator goes out, red one still emits a constant light or flashes). Select another zone. To send a verbal message, press and hold "Push to talk" button and speak to the microphone.

Transmitting verbal messages when the central processing unit is faulty – CPU OFF

Set the switch on the front panel in the CPU OFF position. The CPU OFF LED will light up with a steady green light. Press "Push to talk" button and speak to the microphone.

⚠ **NOTE!** When the switch is in the CPU OFF position, playback of the alarm messages recorded in the MULTIVES memory does not work. The processor is bypassed. A direct connection between devices is created: microphone → amplifiers → loudspeakers. Microphone input is broadcasted to the entire system. Amplifiers operate at maximum amplification level – be aware that this rises the SPL significantly.

10.1.2 Failure mode

A flashing yellow FAILURE LED means that one of VAS central unit elements or a loudspeaker line is damaged. On ABT-CU-8LCD, ABT-CU-11LCD and ABT-DFMS the system failure will be indicated by the acoustic signal. When the damage is signaled, press "confirm failure" button to mute the alarm sound, and the system will register that the failure was confirmed by the Operator (this event will be recorded in the event log). The failure LED goes out when the system failure is eliminated and "cancel failure" button is pressed.

A system maintenance technician or technical service must be notified of any damage immediately.

10.1.3 Controlling backup power batteries

The internal battery resistance can be measured at any moment manually by pressing internal battery resistance button in the Power Supply Manager menu.

10.2 Testing the system

Instructions for performing tests which will confirm proper efficiency of the VAS central unit.

1. Get familiar with the VAS service manual.
2. Check if VAS system stops performing any functions unrelated to warning while switching into alarm mode.
3. Check if VAS system disconnects secondary sound systems (e.g. local audio systems of room tenants, connected to VAS as sources of background music, adverts, etc.) while switching into alarm mode.
4. Check if the system is capable of sending massages within max. 3 seconds after the fire alarm system central unit sends a fire alarm signal.
5. Check if the system is capable of sending voice massages to one or several areas at a time, in accordance with established alarm schedule.
6. Check if the VAS alarm message control algorithm by FACIE is carried out in accordance with the established fire scenario for the building.
7. Check if transmitting various messages to sound system zones is properly indicated on fireman microphone.
8. Play back alarm messages recorded on a memory card in the given sound system zone in order to confirm quality and comprehensibility of the message (verify all messages recorded in the memory).
9. Check if the verbal message is actually sent to the zone defined on fireman microphone, if sound system zones are actually audible in given sound system zones (do a test for all zones).
10. Check if VAS failure information is sent to FACIE and if this connection is supervised by FACIE.
11. Check if deactivation of a single amplifier causes switching into back-up amplifier.
12. Check if the system detects and signals failure of loudspeaker lines properly (short-circuit, open-circuit, loudspeaker line earthing).
13. Check if the damage in the system is detected within max. 100 seconds.
14. Check if “CPU OFF” switch works properly on the fireman microphone – it is a switch responsible for bypassing the central processor unit.
15. Carry out storage battery batteries test. Press “battery test” button and check if the indicator shows the right battery series resistance.
16. Check failure indicator on ABT-PSM48.
17. Switch off AC power and check if the system works properly on the backup battery power supply:
    - check if the system performs all functions related to transmitting alarm messages played back from the memory,
    - check if it is possible to send voice messages to particular zones via the fireman microphone,
    - check if the system has disconnected secondary sources of sound connected to VAS cabinet, which do not participate in alarming,
    - check if the sound level while sending messages remains unchanged as a result of switching into backup power,
    - check if the system signals AC power failure.

11. Operation instructions

11.1 Control Unit

It is possible to navigate in ABT-CU-8LCD and ABT-CU-11LCD device menu via a touch-screen LCD display and nearby control buttons. The display shows a current VASCU system status. The menu allows the following:

- monitor VASCU system status,
- trigger loudspeaker line impedance measurement,
- check network settings,
- check software and firmware versions.

In case of damage in at least one of the system modules, the LCD display will show information about the fault.

The paragraph below describes operation instructions with an example of microphone panel configuration. The microphones are configured on a case-by-case basis for a specific purpose. During the first training, the person responsible for starting the system provides microphone operation manual.

11.2 Fireman microphone

Actions described below can be executed by authorize personnel only.

Sending verbal messages to given fire zones (fireman microphone)

- Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode.
- Press a button applying to a desired zone. You can choose more than one zone. Green LEDs will light up next to selected zones.
- Press "Push to Talk" button, hold the button and speak to the microphone. To finish transmitting, release the button.
- Once the verbal message transmission has finished, the microphone status LED will go out.
- To return to normal mode, press "cancel alarm" button.

Sending verbal messages to all zones

- Open red "Evacuation" button flap and press it. VASCU will switch into alarm mode.
- Press "all zones" button. Diodes located on the microphone and next to zones will emit green light.
- Press "Push to Talk" button. While holding the button, speak to the microphone. To finish transmitting, release the button.
- Once the verbal message transmission is finished, the microphone status LED will go out.
- To return to normal mode, press "cancel alarm" button.

Activating warning message in selected fire zones

» Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode. Next, choose zones you wish to send the message to.

» Green LEDs corresponding with selected zones will light up on the microphone.

» Press "Warning" button. To deactivate the message, press "Clear" button.

» To return to normal mode, press "cancel alarm" button.

Activating warning message in all zones

» Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode. Next, press the "all zones" button.

» Green LEDs corresponding with all of the zones will light up together with the LED next to the "all zones" button on the microphone.

» Press "warning" button. To deactivate the message, press "clear" button.

» To return to normal mode, press "cancel alarm" button.

Activating evacuation message in selected fire zones

» Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode.

» Press selected zones buttons. You can choose more than one zone. Green LEDs corresponding with selected zones will light up.

» Press "Evacuation" button. To deactivate the message, press "clear" button.

» To return to normal mode, press "cancel alarm" button.

Activating evacuation message in all zones

» Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode. Next, press the "all zones" button.

» Green LEDs corresponding with all of the zones will light up together with the LED next to the "all zones" button on the microphone.

» Press "Evacuation" button. To deactivate the message, press "clear" button.

» To return to normal mode, press "cancel alarm" button.

Mute

» In alarm mode it is possible to mute warning and/or evacuation messages. To do so, choose zone and press "mute" button. The messages will not be audible in this location.

» You can choose all zones and press "mute". Then, messages for the entire system will be muted.

» Remember that alarm mode is active all the time – (the LED next to the ALARM symbol on the microphone chassis is on), contacts, controls and settings assigned to the alarm scenario are maintained. Muting operation is recorded in the event log.

» Choose zone and activate warning or evacuation action to send messages again.

» To return to normal mode, press "cancel alarm" button.

11.3 Zone microphone

Sending voice messages to a selected zones

» Press chosen zone button. You can choose more than one zone. Green LEDs corresponding with the selected zones will light up.

» Press "push to talk" button. Speak to the microphone while holding the button.

Note: Depending on the settings of the "push to talk" button, the button may work in the following way: first press activates the microphone, second press – deactivates.

» The system can generate a gong (sound preceding the message). Once the gong has ended the "microphone active" LED will come back on.

Note: While sending messages from the fireman microphone, the gong is not emitted.

» The verbal message can be sent via the microphone when the "microphone active" LED is on again. To finish transmitting messages, release the PTT button.

» Once the verbal message has finished, LEDs corresponding with the selected zones will go out. The microphone active LED will also deactivate.

Sending verbal messages to all zones

» Press "all zones" button.

» Green LEDs corresponding with all of the zones will light up together with the LED next to the "all zones" button on the microphone.

» Press "Push to Talk" button, hold it and speak to the microphone.

Note: Depending on the settings of the "Push to Talk" button, the button may work in the following way: first press activates the microphone, second press – deactivates.

» The system can generate a gong (sound preceding the message). Once the gong has ended the "microphone active" LED will come back on.

Note: While sending messages from the fireman microphone, the gong is not emitted.

» The verbal message can be sent via the microphone when the "microphone active" LED is on again. To finish transmitting messages, release the button.

» Once the verbal message has finished, LEDs corresponding with the selected zones will go out. The microphone active LED will also deactivate.

Select sound source – dynamic assignment

» Choose zones you wish to assign source of sound to. You can choose more than one zone.

» Choose button defined as source of sound you wish to use.

11.4 Power supply manager

Buttons of the front panel are used to control the device via menu.

Menu allows the following:

» Monitoring power supply unit, charger and batteries condition,

» Measuring connection, fuse and storage battery series resistance,

» Checking battery temperature and reviewing the list of failures.

It is also possible to activate service mode in which you can choose a number of power supply units, activate storage battery protection system, set battery capacity and check power supply manager software version. Please see section: *6.1.5.5 – ABT-PSM48 Front panel operation – Enter Service Mode*

12. Maintenance and service

12.1 Preparations before VAS system maintenance works

12.1.1 Initial procedures for system testing

Schedule the time of VAS system maintenance works with the building administration, inform the site administrator about activities and range of performed works, as well as about potential inconveniences during VAS inspection.

12.1.2 System testing

Inform the building administrator that VAS system is about to be tested.

Inform the building administrator and staff (e.g. guards) that it is likely that they will experience alarm and warning messages, together with inconveniences arising from system testing procedures.

Inform FACIE monitoring center possible triggering of the remote alarm or damage signal.

Considering hazardous voltage inside the operating devices, maintenance works can be performed only if the source of power has been switched off.

All repairs must be carried out by qualified technicians or engineers. To send a service request, contact your nearest Ambient System representative.

The manufacturer shall not be held responsible for any damage caused by unauthorized modification or repair.

VAS central unit safety check and electrical inspection:

- Check if the external side of the cabinet complies with IP30 norm.
- Check conformity notification with EN 54-16 in the front of the cabinet.
- Check conformity with EN 54-4 on the charging device.
- Check conformity with EN 54-24 for loudspeakers.
- Check if front and rear doors are closed.
- Check if indicators visibility of VASCU is GOOD.
- Check and measure VASU cabinet earthing connection.
- Check log history – VASU event log.
- Check fire signaling central unit interface together with customer's engineer.
- Check all of the sound correction parameters. Save and compare settings of control elements with previously recorded data. Note and investigate all deviations.
- While evacuation message playback (use external load if the use of main speaker lines is not possible), check output level of the MULTIVES device. Save and compare with previous data.
- Check automatic system defect monitoring and test by causing a fault.

Loudspeakers:

» Measure total speaker load for each circuit, save and compare with previous results. Inspect all unexpected changes.

» Perform subjective sound quality assesment and audibility tests in all areas with restricted access. Save sound pressure levels (SPL).

Microphone control devices:

» Control condition and proper operation of switches/touch-fields.

» Check microphone overall physical condition.

» Transmit a test message, use a monitoring speaker whenever the use of main speaker lines is not possible.

System condition:

» In case of inside the central unit chassis, it is recommended to clean it with a vacuum cleaner or use compressed air. The Central Unit must remain dry at all times, do not use water to clean it.

On-site changes:

» Survey all areas which were subject to changes (specified by the Customer) and determine if the loudspeaker range is suitable.

Maintenance log:

» After you finish all operations, enter maintenance results to the maintenance log.

Checklist:

» Upon finishing maintenance, get a relevant person to sign your checklist, confirming that the system has been left in a fully operational condition. Documentation should also include your recommendations and remarks.

12.2 System maintenance

12.2.1 Daily review

All abnormalities are usually identified by the staff operating the system. VAS system operators should notify a "responsible person" of any identified problems related to the system. Any remarks should be entered into the maintenance log on a regular basis.

12.2.2 Inspection every 6 months

- ✓ Ask VAS system users about any remarks concerning system operation.
- ✓ Check maintenance log records related to inspections, repairs and controls.
- ✓ Review and read VAS system documentation.
- ✓ Review RACK system cabinet elements condition (pay attention to temperature, corrosion, humidity, cleanliness, etc.).
- ✓ Check connections, clamps and cables between particular VAS devices.
- ✓ Check for any device damage in RACK cabinet.
- ✓ Check if all lights, LEDs and indicators work properly.
- ✓ Check network and battery fuses condition.
- ✓ Check connectors and earthing connections condition.
- ✓ Check batteries in terms of corrosion and ventilation.
- ✓ Check if the battery charger works properly.
- ✓ Switch off AC power and check battery power system operation:
  - › check if the system performs all functions related to transmitting alarm messages recorded in memory,
  - › check if fireman microphone can transmit voice messages to particular zones,
  - › check if the system deactivated other PA sources connected to VAS cabinet – which do not participate directly in alarming,
  - › check if the system signals AC power failure.
- ✓ Check if information about VAS failure is sent to FACIE central unit and if this connection is monitored by FACIE central unit.
- ✓ Check if VAS alarm message control algorithm by FACIE central unit is carried out in accordance with the established fire scenario for the building.
- ✓ Check if the verbal message transmitted to the sound system zone declared on fireman microphone is actually audible in the given sound system zone (do tests for all sound system zones).
- ✓ Check if "CPU OFF" switch works properly on the fireman microphone – activating the central processing unit bypass.
- ✓ Play back alarm messages recorded on the memory card in the given sounds system zone in order to confirm the quality and comprehensibility of the message (check all messages recorded in the memory).
- ✓ Check if connections between SAP and VAS are monitored.
- ✓ Check if VAS system stops performing any functions unrelated to warning when the alarm is triggered.
- ✓ Check if VAS system disconnects all secondary systems when the alarm is triggered.

- ✓ Check if the system is capable of sending warning signals and verbal messages to one or several zones at a time, in accordance with the established fire procedure.
- ✓ Check if the system identifies and signals speaker line failure properly (short-circuit, open-circuit, earthing of loudspeaker line).
- ✓ Check if it takes the system no longer than 100 seconds to detect and signal the fault.
- ✓ Once per 6 months it is necessary to check and confirm proper performance of loudspeakers in 50% of the area of the building (100% of the area must be inspected within a year). The test must be performed by forcing loudspeaker lines to emit any signal (e.g. CD music, via microphone or previously recorded message or test sound) and by checking if all loudspeakers on the given line emit the test signal properly. While carrying out the aforesaid test, you need to check for any changes in the interior requiring relocation of loudspeakers or change of their number. Also inspect if the speaker system has been maintained properly, check for dirt, paint and mechanical damage.
- ✓ Check if transmitting messages to various zones is properly indicated on the fireman microphone.
- ✓ Check cooling fan condition.
- ✓ Disconnect the backup power batteries. Measure voltage on the charger output and on the battery terminals.
- ✓ Use software to check event log and system time clock settings.
- ✓ Use diagnostic software to check the following:
  - › microphones,
  - › power supply system,
  - › power supply manager,
  - › amplifiers,
  - › extension cards.

12.2.3 Annual inspection

All maintenance works included in the 6-month inspection apply here, yet additionally:

- ✓ Perform sound pressure level tests in randomly selected areas of the building in order to verify if there are no changes causing a decrease of parameters below the required values by EN 60849 norm.
- ✓ Check if impedance of particular loudspeaker lines is in compliant with the blueprint.
- ✓ Check alarm message scenarios sent by FAS
- ✓ Measure battery capacity – if the capacity dropped below 80% of the design capacity, batteries must be replaced.
- ✓ Safety inspection must be carried out frequently, at least every 12 months; the manufacturer recommends to take maintenance actions every 6 months.

12.2.4 Manufactures remarks

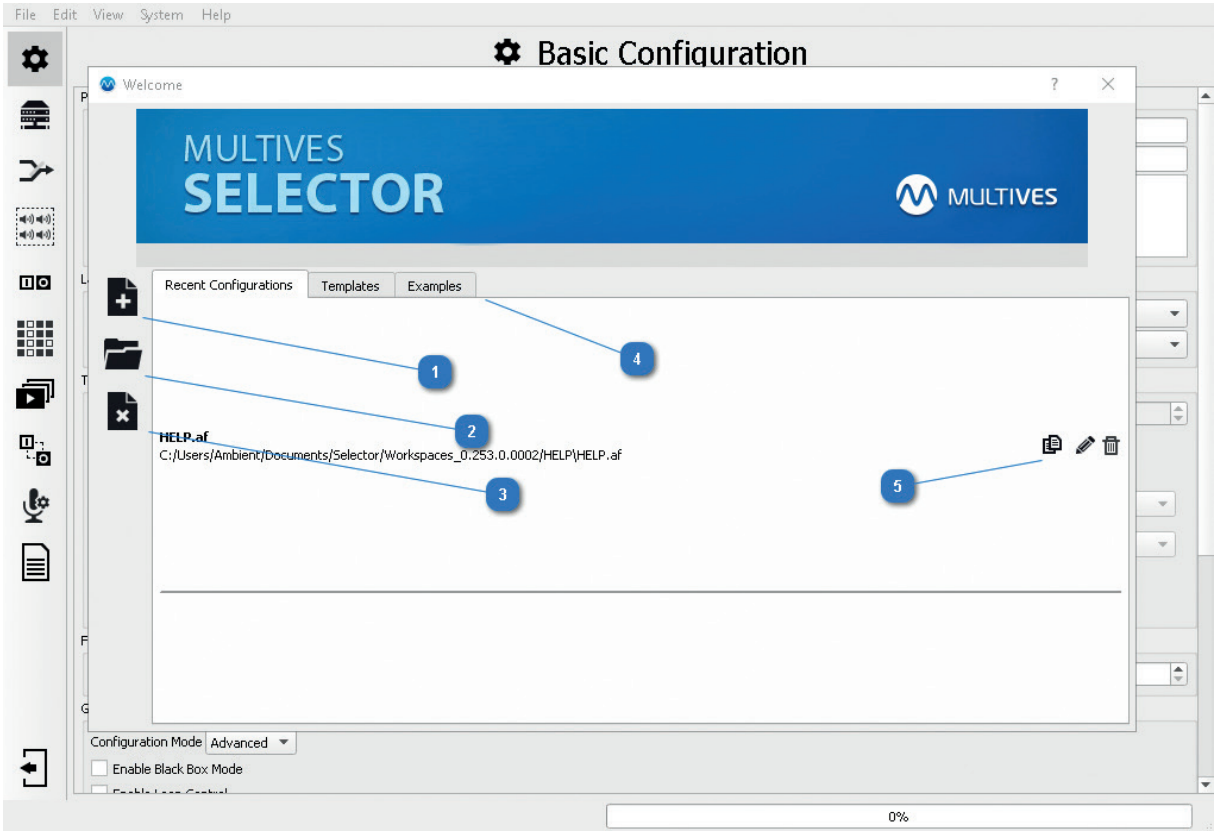
Please note that Ambient System is not responsible for results of unauthorized repairs.

Any repairs of the equipment should be carried out by the Ambient System or a service centre authorized by Ambient System.

In any unresolved issues, please contact Ambient System's trained personnel. Content contained herein is subject to change without notice. Ambient System reserves the right to change or modify the product and conditions applicable to the use of this product at any time.

13. MULTIVES Configuration Software

13.1 Welcome screen



1. **New configuration file localization**
   In order to start a project a dedicated folder for the configuration file needs to be created.
   Caution: Do not select and existing folder with data, as these will be deleted!

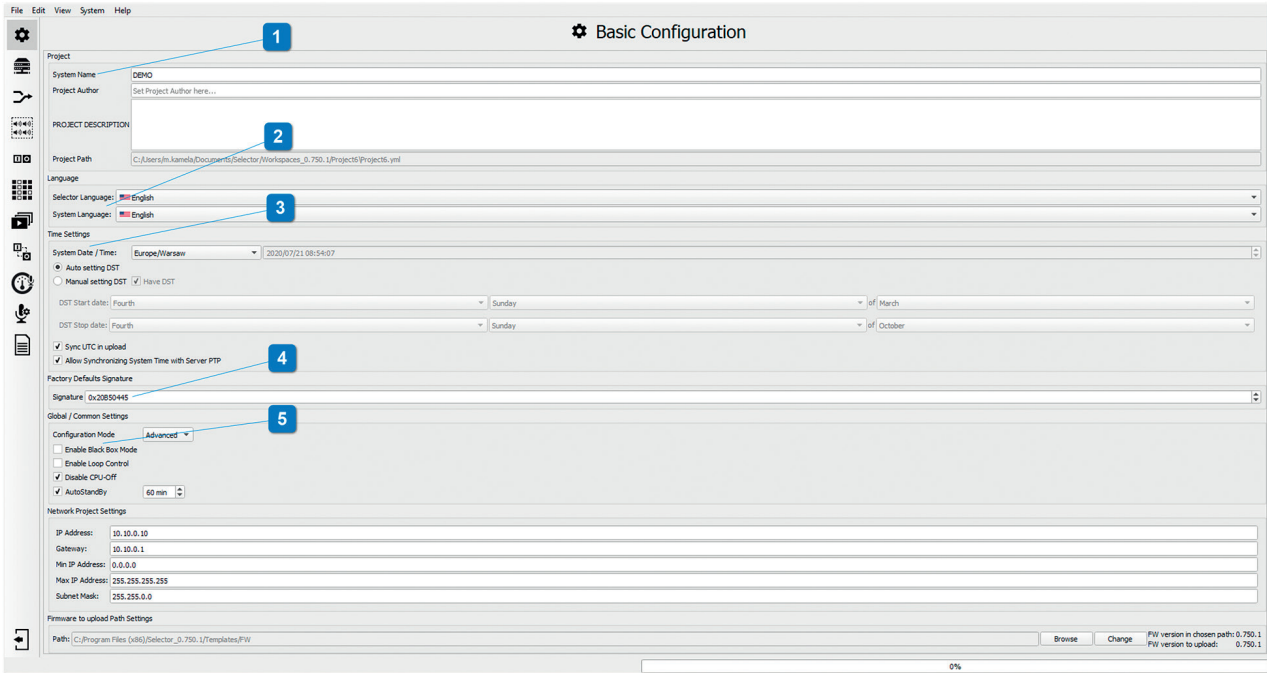
2. **Selection of configuration file from a chosen location**

3. **Creating a new project without saving**

4. **Recent and template configuration file window**

5. **Project cloning, changing and deleting project name**

13.2 Basic Configuration



1 Project name and author window, with designer's note

The Project field contains basic information on configuration of the MULTIVES system. The name of the project and its author should be supplemented here, as well as a description which should include as many detailed data as possible, such as the place and date launched, specific features of the system, customized functions. The more detailed the project description the easier servicing and making changes in the system at a later date.

2 Language selection

The Language field defines the current language of the software used to configure the MULTIVES system – Selector Language. System Language defines current the language of all available GUI touch screens in the system.

3 System real-time clock setting

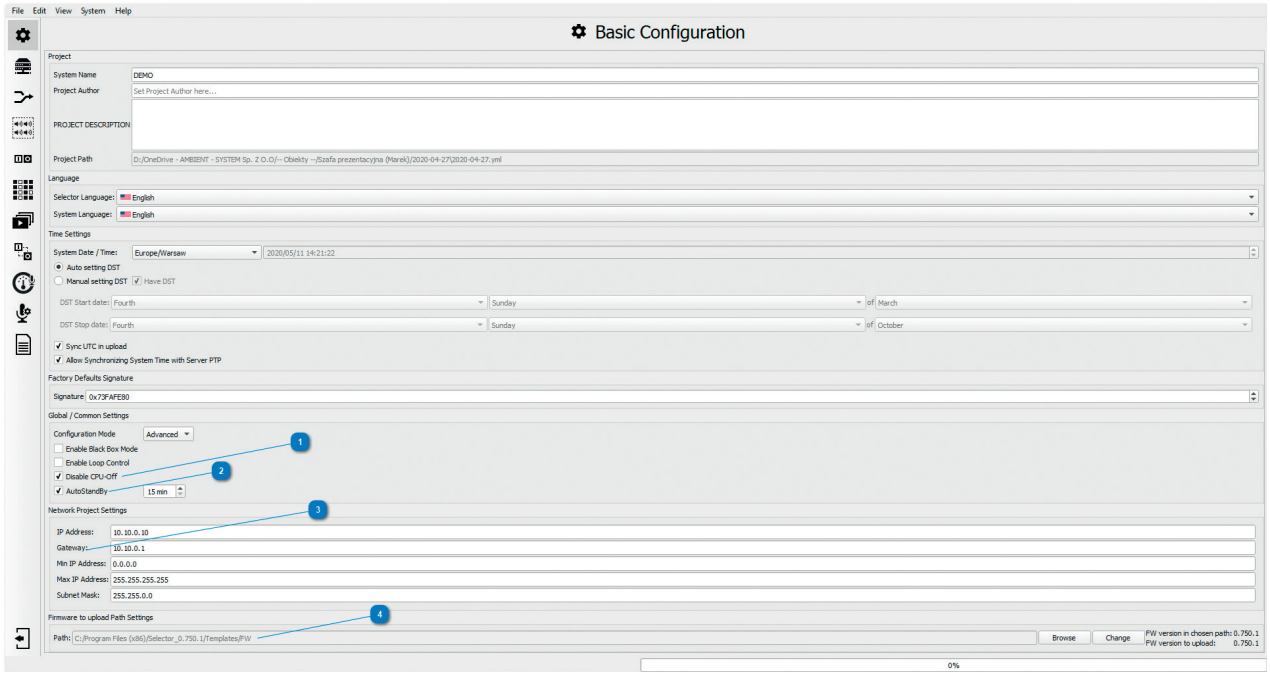
Setting the system valid time. The configurator downloads the UTC from the operating system on which the configurator is installed. In order to load time together with configuration, accept the Sync UTC in upload window and select the appropriate time zone in which the system will be installed. It's possible to turn daylight savings time on and off in this section. Choose Auto setting DST for the time to be advanced by 1 hour on the last Sunday of March at 1:00 universal time and retarded accordingly on the last Sunday of October. This applies to countries within the EU among others (UE 2000/84/EC directive). In this mode if the computer running the software is in a daylight savings zone the Selector software will act accordingly and display DST start and stop dates. It's possible to manually override the transition dates by using the next option Manual setting DST along with use DST (without the latter daylight savings time will be disabled). Additionally time can be updated automatically by a PTP server connected either to the LAN port of the central unit or the LAN/WAN port.

4 Signature

Every project is assigned with a unique signature number. If the signatures between the project uploaded to the system and the one on the project in the computer software differ, the system will not allow returning to factory settings.

5 Configurator work mode

In the Global Settings you can choose one of the configurator work modes. In the Advanced mode you have access to creating speaker zone groups, creating logic input groups, timers and scenarios, all of which are unavailable in Simple mode. Additionally you can set individual zone microphone LED behaviour in the output configuration section. Enable Black Box – this function activates audio recording on the fireman microphone when the system enters alarm mode. Enable Loop Control – activating this function enables error reporting in the fiber optic network connection.



Basic Configuration editing window – continued

1 Disable CPU-OFF

This option in it's default setting (on) disables the central processing unit bypass mode. In order to activate the CPU-Off function accessible from the ABT-DFMS and MULTIVES front panel by a dedicated switch, uncheck this box.

2 AutoStandBy

Enabling this mode in the MULTIVES system results in:

- limiting current draw from the batteries when in emergency power mode
- limiting heat generated by the amplifier modules during standard operation mode

The system enters Standby mode when no audio has been transmitted through the system for the time set in the software. The time is set in minutes in the 15 to 300 bracket. The default state of this option is active with the default time set to 60 minutes. For more details see the appendix section.

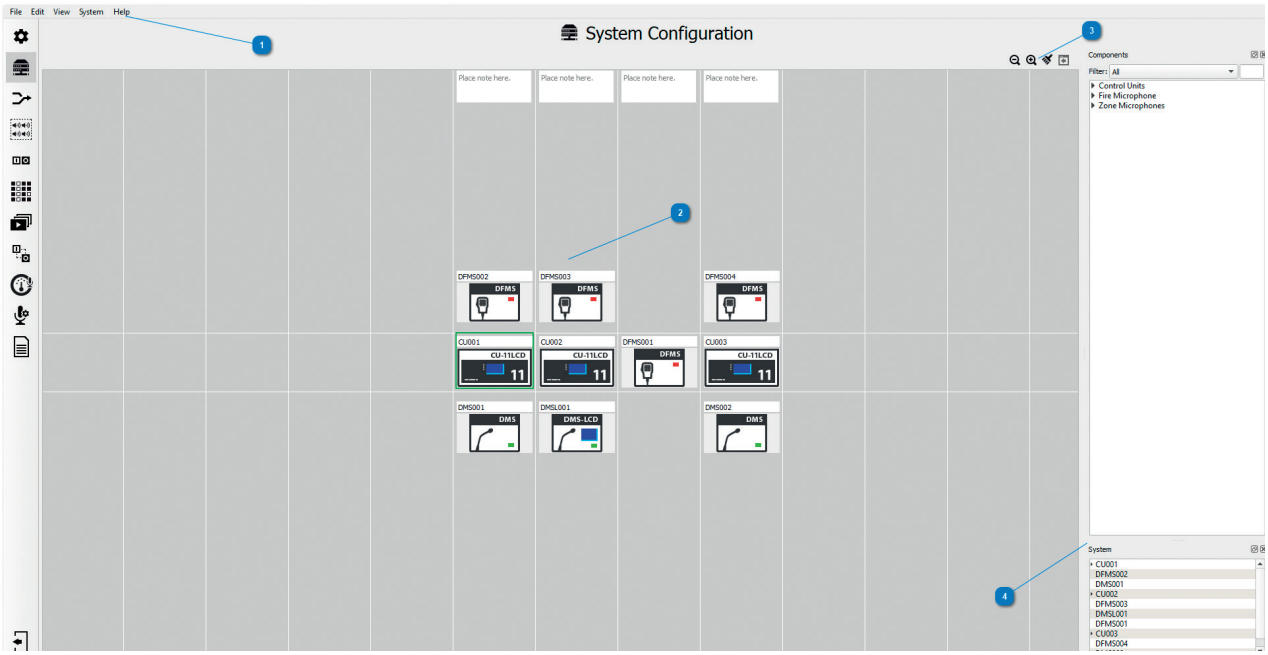
3 Defining IP address pool to assign system devices

This window shows the range the configurator uses to assign IP addresses to all programmable elements of the MULTIVES system in the internal system network. It is possible to change the settings of the assigned pool, however it is not recommended by the manufacturer. The settings should be changed prior to adding the first device to the workspace.

4 System firmware update field

Every software version has a corresponding firmware that is uploaded to the Central Units, fireman microphones and zone microphones. Every time a new configuration is uploaded to the system, the configurator software compares firmware versions. If a different firmware version than the one in the configurator is detected, it will be overwritten. It's possible to load a different (newer) firmware version than the one supplied with the software. In order to do so you must manually set the new firmware path by clicking browse. The new firmware path will appear in the path window. In order to upload the new firmware to the system, click change – this will display the new firmware version in the FW version to upload field.
For more details see the Appendix section.

13.3 System Configuration



1 Main Menu bar

File, Edit, View, System, Help

2 Workspace

The System Configuration tab is one of the most important items in the MULTIVES system configuration software. The main window, called Workspace, represents system connections by means of vertical and horizontal lines. Placing devices along a vertical line represents a copper wire connection within a single location. The horizontal space between the two lines in the center of the workspace represents a fiber optic connection. Devices placed next to each other within this space are connected by a fiber optic link and are often separated by a greater distance. Additionally, all of the connections upwards from the central fiber connection part of the workspace are monitored – the system checks for device and link fault. The system elements placed below the central field (zone microphones) will not be monitored.

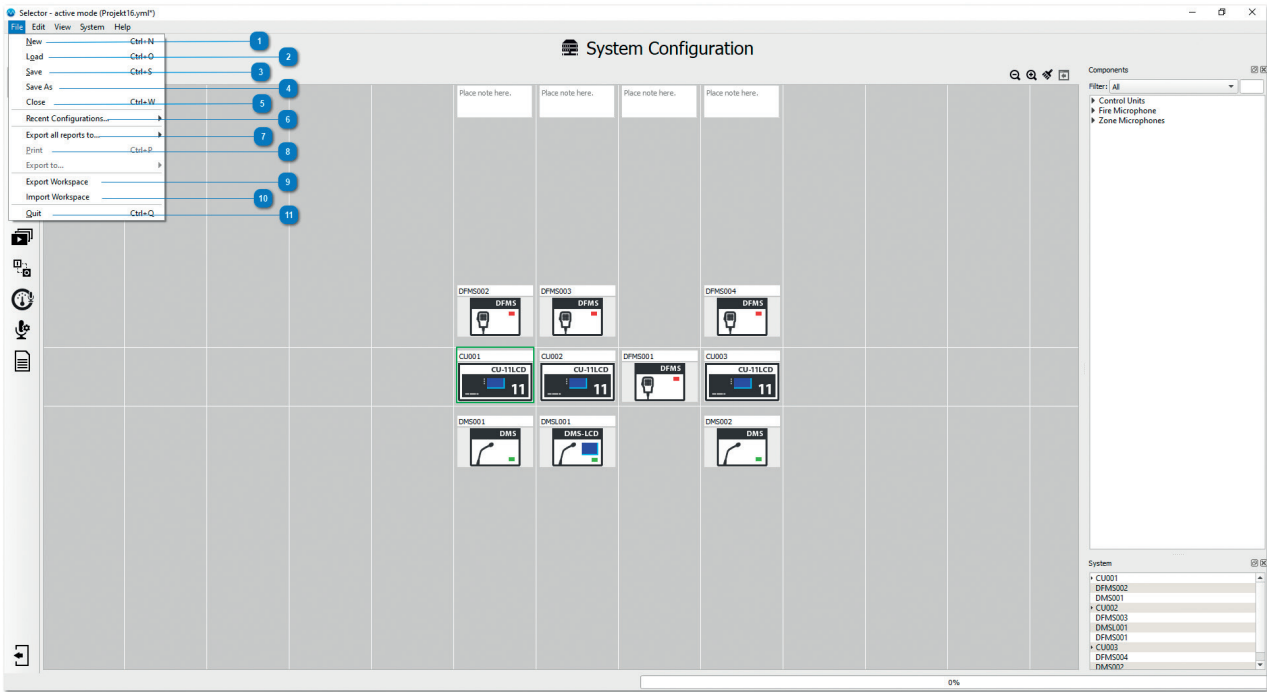
3 Components

In the top right part of the work field there is the tab with all available elements of the MULTIVES system – the Components tab. In order to find it press the arrow next to Control Units in the components tab and a list of available units will drop down, next simply use the drag&drop method. The software suggests, with a grey rectangle, where a given element can be placed only if the cursor with the element being drawn is located within the work field. Repeat the procedure for Fireman Microphones and Zone Microphones tabs.

4 System

In the bottom right part of the work field there is the tab System. This tab is used for detailed configuration of the devices and shows allocation of cards in individual control unit slots. Having added a control unit to the work field, the name of the unit will appear in the system tab as well as a triangle icon meaning a drop-down list. Right-clicking on the name displays the option Go to configuration. When the list drops down, a list of available slots will be displayed. Right-clicking on a slot displays additional option of Go to configuration (card detailed editing), Add Control / Function Card – adding a card to an empty slot or changing allocation of the card in the slot, Remove Card – removal of a card which was assigned to a slot before. In addition, detailed editing of elements from the work field may be triggered by double-clicking of the left mouse button on each of the devices in the work field. If the device contains more elements to be configured, as in the case of control units, then the first double click of the left mouse button results in moving to the next level of editing where we can see all defined cards in a unit. A next double click on any available element means moving to the detailed parameter card of a given element.
A detailed description of the editing window for individual elements of the MULTIVES system is available in the following tabs: DFMS, DMS, xCtrLine-2/4, xLogIN-8c/f, xLogOUT-8c/f, AudIO-4/12.

13.3.1 File



1 **New**

This option creates a new folder in which all configuration data for a given project will be saved. In order to create a folder, click the "folder with a plus sign" icon. Creating a new or selecting an existing folder is the first thing to do to be able to go on with the configuration of the system. **Caution:** Selecting a folder with an earlier created configuration results in having the data in this folder completely deleted for the purposes of a new project.

2 **Load**

This loads a system configuration created earlier. The configuration file has the extension *.af.

3 **Save**

This saves a configuration in the created Workspace folder.

4 **Save as**

This saves a configuration in the created Workspace folder enabling a change of the *.af configuration file name.

5 **Close**

This closes the current configuration file.

6 **Recent Configurations**

The configuration software stores up to 10 recently used system configurations, you can load them using this list.

7 **Export all reports**

This generates tables from the Reports tab in one of the following formats: HTML, PDF, XML, ODF.

8 **Print**

Prints all available reports generated by the configurator.

9 **Export Workspace**

All configuration files, together with messages, are compressed into a file with the extension *.afz. This is a complete record of the configuration, unlike files with the extension *.af which do not contain messages.

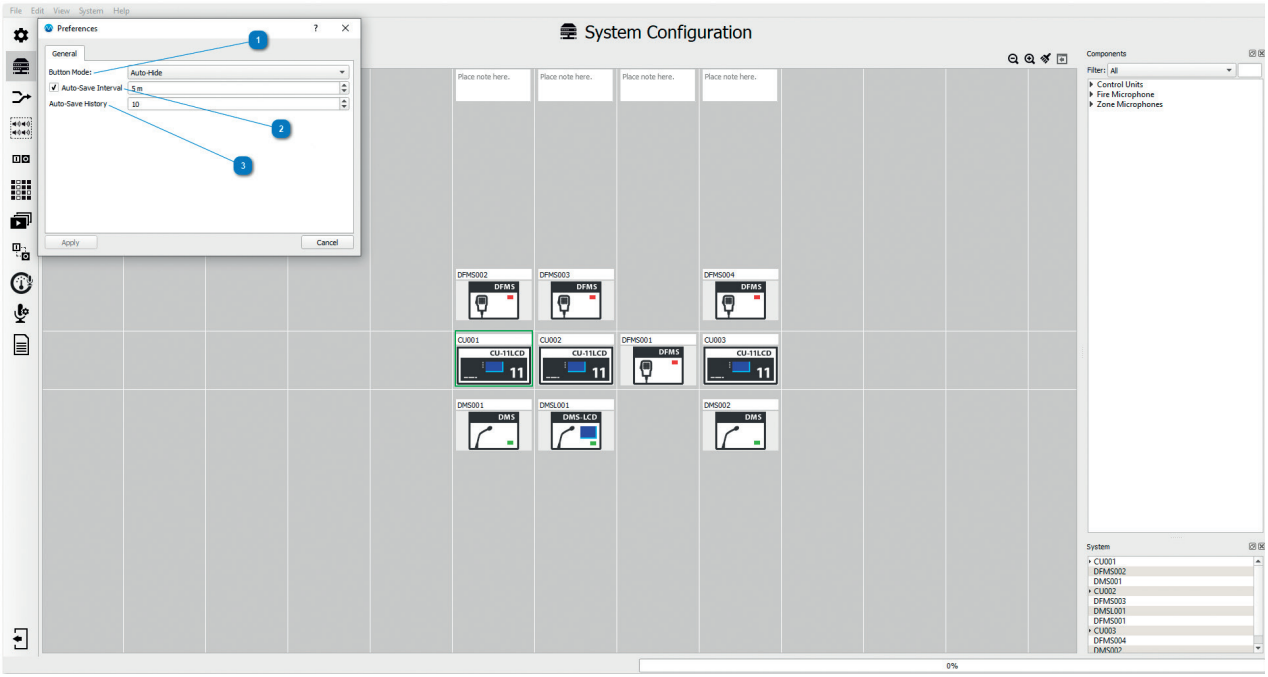
10 **Import Workspace**

Automatic decompression of a *.afz file and loading the complete configuration of the system.
See FAQ 3: cannot open downloaded system configuration.

11 **Quit**

Closing the MULTIVES system configuration software.

13.3.2 Preferences



1 **Button Mode:**

This enables personalization of the view of the configuration software. In the Auto-Hide mode, the main Icons, such as Basic configuration, System configuration, Priority Manager, Group Zone Configuration, Matrix, Scenario and Event Configuration have no subtitles and moving the mouse cursor over an icon results in all icon names being displayed:

Text and Icon – icons and names are always visible
Icon only – only icons are always visible
Text only – only names are visible

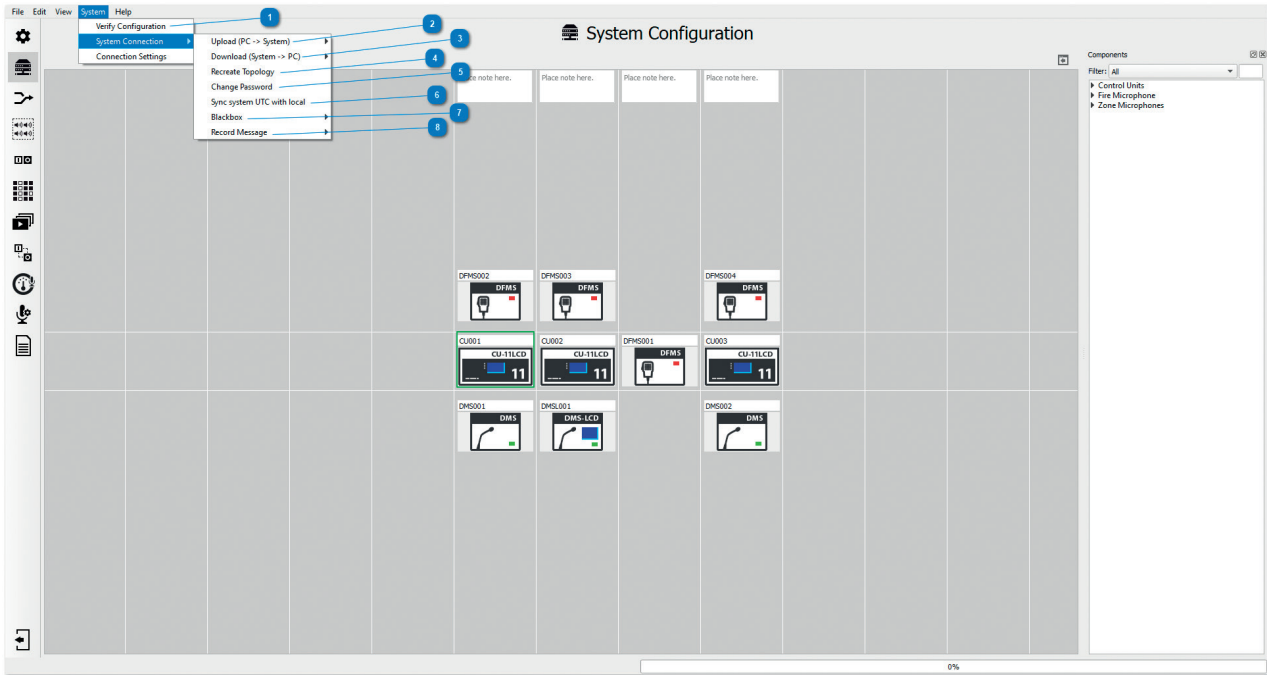
2 **Auto-Save Interval**

This option, when activated, results in having the current configuration saved into the configuration file at predefined intervals expressed in minutes.

3 **Auto-Save History**

In this section you declare the number of autosave configurations you wish to be stored in the software. It is closely linked to the autosave interval, if the interval is set to 1 minute and the value of the autosave readout is 10, then the configurator will allow to load the maximum of 10 minutes back. Of course, both the save interval and the number of files to read may assume a value from 1 to 99.

13.3.3 System



1 **Verify Configuration**

The configurator checks created configuration for it's integrity. It classifies verified elements into 3 groups – Errors, Warnings and Info. If the software detects configuration errors, it will not allow it to be loaded into the system. By selecting Show details, we gain access into the details of the problems which have occurred.

2 **System Connection / Upload (PC -> System)**

This allows to send a configuration, created on a PC running the configurator software to the MULTIVES system connected to that PC. Prior to sending the configuration to the system, the software verifies the configuration file. Upload full configuration – sends the entire configuration from the PC to the system, including audio files in the PCM format. Loading of a full configuration must be executed for the first time an empty system is being programmed, every successive configuration change which does not require changes in audio files may be loaded into the system via Upload configuration without audio which makes programming of the system much faster.

3 **System Connection / Download (System -> PC)**

This allows to download the current full system configuration or the configuration prior to the current one from system into a PC.

4 **System Connection / Recreate Topology**

This function reads the system architecture. The system is able to identify cards located on a particular slot of the control unit, it detects all zone and fireman microphones connected and the method and place of connection of the units and microphones (optical fibre, cat5). **Caution:** the only element which is not detected by the system recreating topology are microphone extensions.

5 **System Connection / Change password**

Allows to change the previously set password needed to upload the configuration to the system. The change is authorized either by entering the previous password or by generating a token. The token is created by Ambient System after received a five digit code generated by the Control Unit GUI (applies only to units equipped with LCD screens).

6 **System connection / Sync system UTC with local**

This option synchronizes the system's internal clock with the time on the computer running the configurator software.

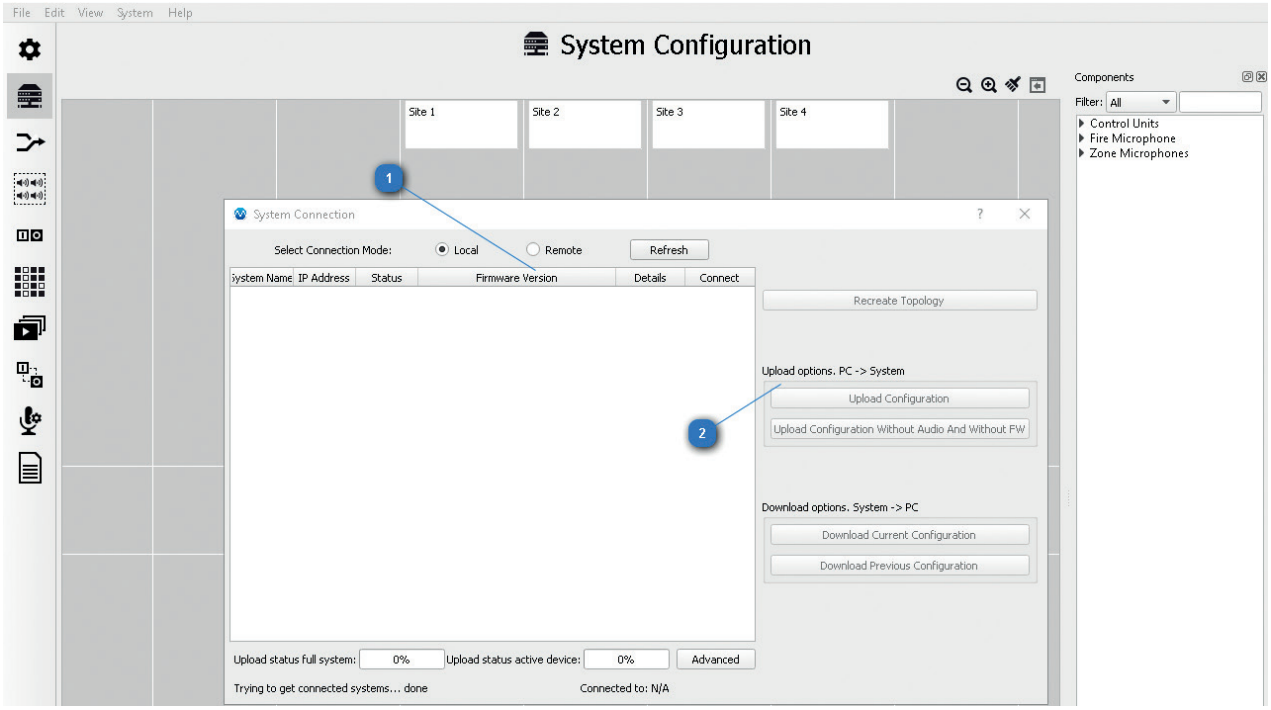
7 System Connection / Blackbox

The Blackbox function records audio from all connected DFMS fireman microphones while the alarm mode is active. Download blackbox buffer retrieves the data stored in the microphones. Clear blackbox buffer - erases all the messages recorded during alarm mode.

8 System Connection / Record message

If this function has been enabled in the system you can download the messages recorded by DFMS, DMS or DMS-LCD microphones by clicking Download record message buffer. Clear record message buffer deletes all the messages.

13.3.4 System Connection Settings



1 Connection Settings

This window allows the system to connect with a PC. Network card of the PC with MULTIVES Selector should be configured in such a way that the Internet Protocol Version 4 (TCP / IPv4) should be set to obtain an IP address automatically. The connection between the PC and the control unit or DFMS should be achieved through the LAN / WAN connection. If the connection is properly configured server called the same as a project that is uploaded to the system should appear in the Connection Settings. In the case of connecting to a clean unconfigured system, the server will be named NewSystem. MULTIVES system is using the AutoIP protocol to assign an address from the special address pool 169.254.x.x to the communications card of the control unit and the network card of the PC. If a connected server does not appear in the window – see *FAQ 1 Server not visible in the connection window*. In the case of an external active DHCP server in the network (e.g. a switch) the IP addresses are assigned to both the PC and the MULTIVES system. The Remote option – this allows the configurator to connect to the MULTIVES global server. All units worldwide with an internet connection and the owners consent to do so connect to the global server. Through the MULTIVES global server, the Ambient System support team may upgrade the software, create configurations and detect system errors.

This window also displays progress while loading a new configuration into the system. Having the configuration loaded, the Connection window will have a message displayed Uploaded, the same configuration which results in having two identical configurations existing on the PC and the MULTIVES system.

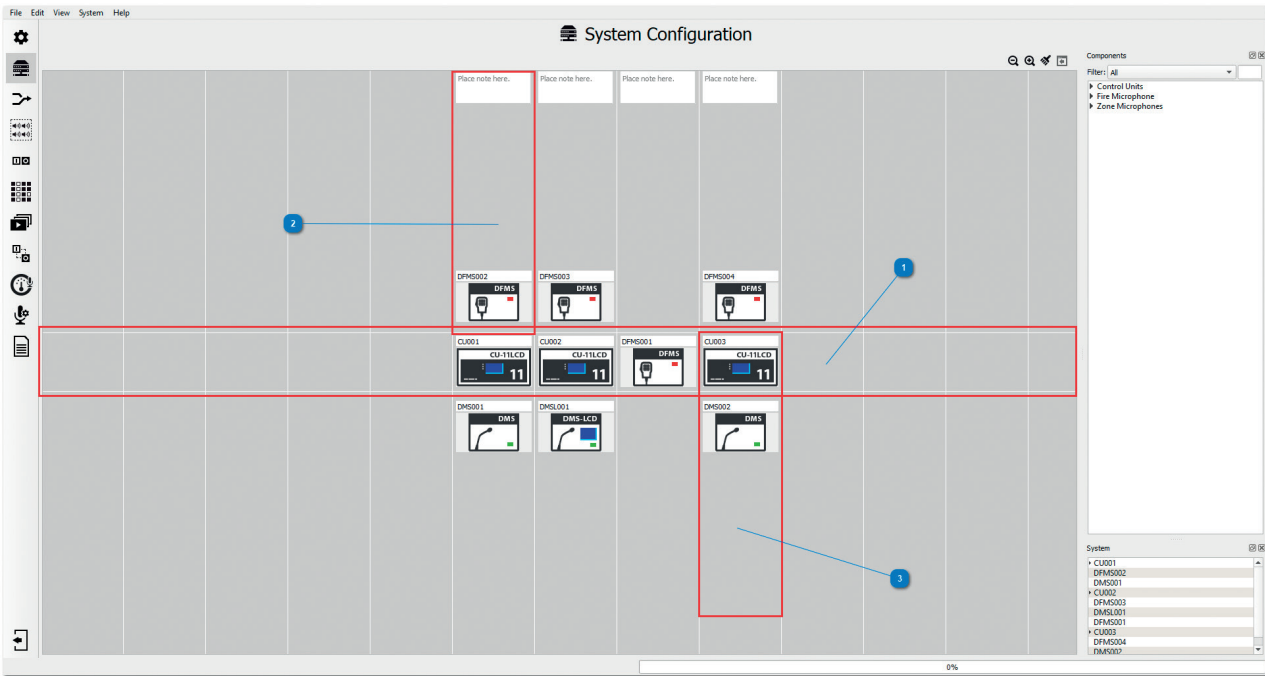
2 Connection Settings options

Recreate Topology – this function reads the system architecture. The system is able to identify cards located in a particular slot of the control unit, it detects all zone and fireman microphones connected and the method and place of connection of the units and microphones (optical fibre, cat5). **Caution:** the only element which is not detected by the system recreating topology are microphone extensions.

Upload options. PC -> System – this allows to send a configuration, created on a PC running the configurator software to the MULTIVES system connected to that PC. Prior to sending the configuration to the system, the software verifies the configuration file. Upload full configuration – sends the entire configuration from the PC to the system, including audio files in the PCM format. Loading of a full configuration must be executed the first time an empty system is being programmed, every successive configuration change which does not require changes in audio files may be loaded into the system via Upload configuration without audio which makes programming of the system much faster.

Download options. System -> PC – this allows to download the current full system configuration or the configuration prior to current one from the central unit. For this purpose, the file "config.afz" is downloaded to the folder "downloadedconfiguration" of the project. Launching the downloaded configuration is done through the Import Workspace.

13.3.5 Workspace



1 Fibre-optic link horizontal line

System elements arranged along this line are connected to each other by means of an optical fibre. The fibre-optic link makes the main communication loop of the system. The types of the connectors are specified in the technical documentation.

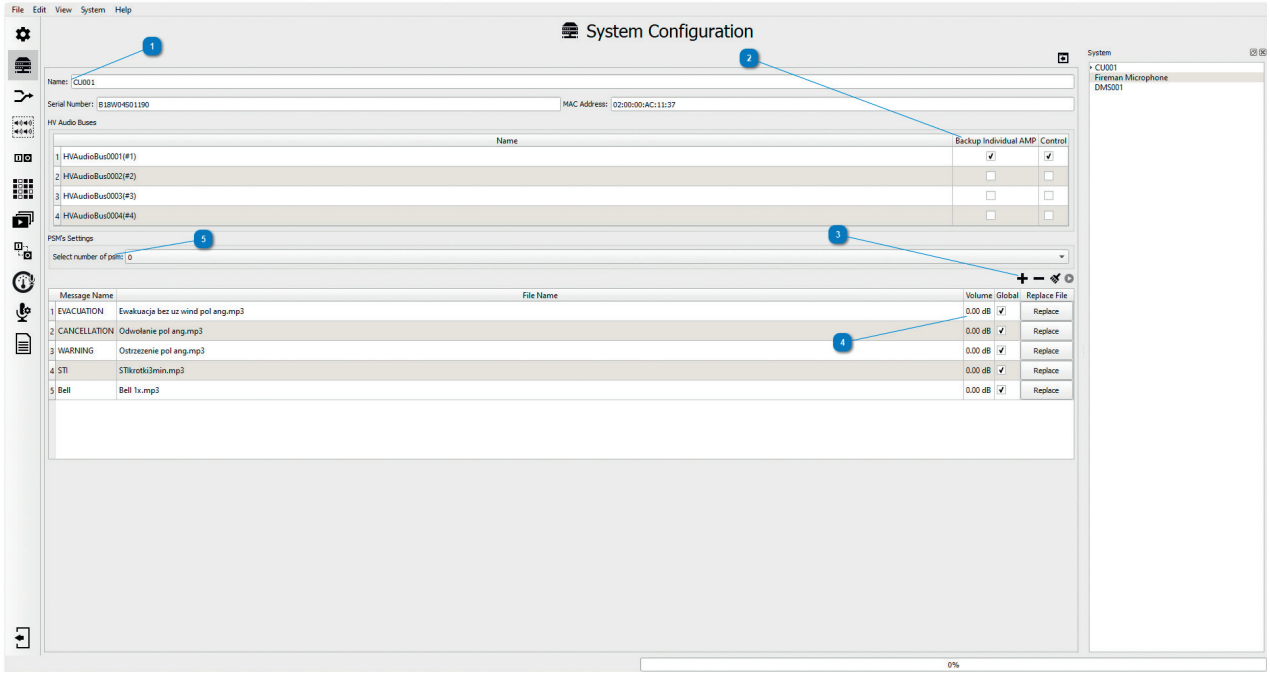
2 Vertical line of system component connection by means of Cat5 UTP cable – monitored

System elements are arranged along a vertical line. Within one column, they are connected to each other by means of a Cat5 UTP cable. This is a local connection, monitored within one location, intended only to connect control units and fireman microphones.

3 Vertical line of system component connection by means of Cat5 UTP cable – unmonitored

System elements are arranged along a vertical line. Within one column, they are connected to each other by means of a Cat5 UTP cable. This is a local connection, unmonitored, intended only for zone microphones.

13.3.6 System Configuration



1 Change of unit name

2 Editing HVAudioBus 1-4

We can mark if the system is to supervise the presence of an amplifier on a given bus – Control. Backup is used to declare a backup amplifier in case of a failure of one of the amplifiers supplying the control card via an individual input – HVAudioInput. In case a failure occurs of an amplifier supplying only one control card, the system will switch this card over to be supplied by an amplifier attached to a selected HVAudioBus with the options Backup and Control selected. *See the description for assignment of backup amplifiers.*

3 Adding messages to system

Selecting the icon ✚ we add a sound file. The configuration software accepts formats audio MP3 and wav and converts them to the PCM 48 kHz 16 bit format which is used by the MULTIVES system. In addition, we can attribute an individual name to the added audio file (Message Name), which will enable its identification within the system. The Global option – means that a message will be saved on the memory cards of all available units in the system. The Local Copy option – clicking Copy will result in saving the original audio file (prior to its conversion into PCM) in the Workspace folder. Replace File – this is used to replace a selected audio file with another one.

The icon serves to delete all messages held on the list.

The icon is used to hear audio files on a computer on which the configuration software is installed, before these are loaded into the system.

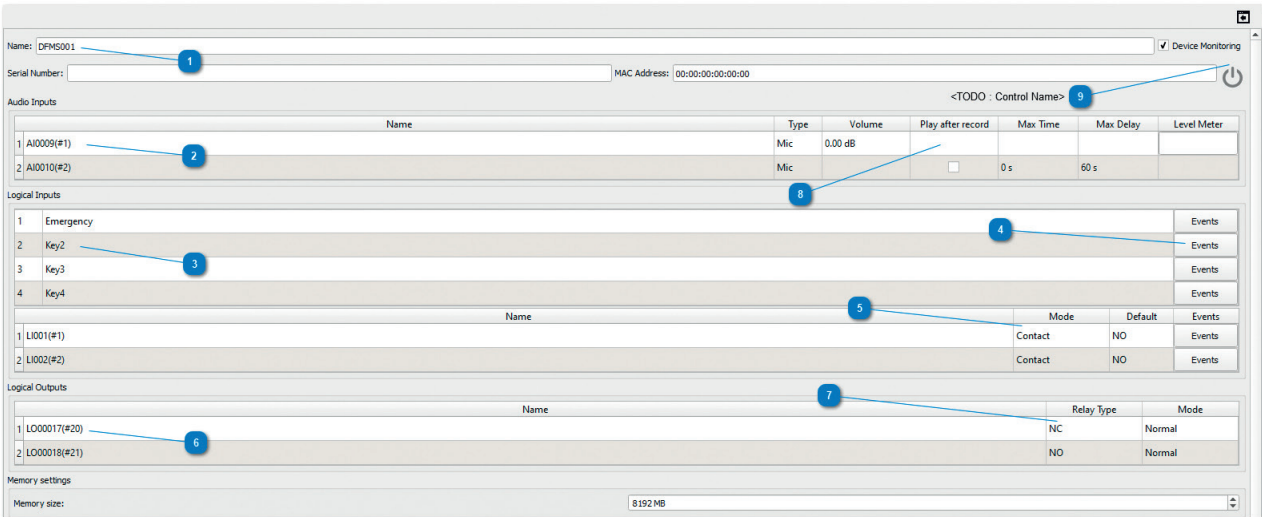
4 Volume

Adjusting the playing volume of audio messages. Selector before converting audio file to the pcm format changes the volume by defined value. Any changes in level cause that the file must be re-sent to the system.

5 PSM's settings

PSM's settings is a field that must be filled carefully. Enter the number of Power supply managers directly connected via RS485 to the control unit by ABT-ISLE module. The declaration of the amount of PSMs connected to the control unit is required for correct reporting of the errors from managers and power supplies, which are supervised by the them.

13.3.7 DFMS



1 Name

The name field enables assignment of an individual name to the fireman microphone, other than the generic name assigned by the configurator.

2 Audio Inputs

The Audio Inputs field contains all available audio inputs on the DFMS microphone. Item 1 is the microphone used only in the Alarm mode – as the standard setting, the input at Item 1 always has the highest priority of 0 (see the Priority Manager tab – the fireman microphone may have priorities assigned from the range 0-99). Item 2 is the same physical microphone as in Item No 1, however with a General-type priority (200-299). The Item 2 microphone is used to transmit ordinary messages in the MULTIVES system, e.g. Public Address. Double-clicking the name of the audio input enables to change the generic name assigned by the configurator.

3 Logical Inputs

The Logical Inputs tab contains all available buttons as well as logical inputs on the fireman microphone. A double click on the name of a button / logical input enables to change the generic name assigned by the configurator.

4 Events

The Events buttons transfers the programmer directly to the EventConfiguration tab. This enables to assign any function or event group to a selected button. A right-click on the name of a button / logical input in the EventConfiguration tab, as well as selection of Go to definition, enables to return quickly to the editing menu of the fireman microphone.

5 Mode / Default

The logical input editing window enables activation of the input monitoring function – Mode Contact / Monitor. In case the Monitor option is selected, it is necessary to install two parametrizing resistors at the end of the line, of 4.7 kΩ.

In the window Default, we select the input status for inactivity for the NC option the system anticipates a closed circuit on the input, opening results in activation of the function assigned in EventCongifuration. For NO the situation is reverse: the system anticipates an open circuit on the input, closing results in activation of the assigned function.

6 Logical Outputs

The Logical Outputs tab contains all available logical (relay) outputs on the fireman microphone. A double click on the name of a logical output enables to change the generic name assigned by the configurator. Assigning a function to a chosen relay is possible in the EventConfiguration – select an input event, assign a general function and click Add control outputs action (the circle in a square icon).

7 Relay Type / Mode

Relay type is a window to inform of the physical type of the relay installed. NC – normally closed, in case of a power cut, the relay will be closed, NO – normally open, in case of a power cut, the relay will be open.

The Mode window enables to reverse the relay logic, opposite to its behaviour in case of a power cut. The Inverse causes, e.g., that the relay NC / Inverse– in the original status it is a NO relay, and activation of the function to which it is assigned will change the status of the relay into the opposite one, i.e. NC. For NC / Normal in the original status (not triggered by any function) the relay is closed, activation of the function, as assigned to this output, causes that the relay status changes into the opposite one, i.e. open. The values from the windows Relay Type and Mode are also duplicated in the information window below Scenario State and in the EventConfiguration tab the function General – Logical Outputs, also in the information window below State.

8 Audio input options

Activating the play after record option allows recording up to 40 s of a message being transmitted by the ABT-DFMS and playing it back immediately after releasing the PTT button.

	Name	Type	Volume	Play after record	Max Time	Max Delay	Level Meter
1	AI0037(#1)	Mic	0.00 dB				
2	AI0038(#2)	Mic		☑	40 s	0 s	

Max time – sets the length of recorded message.
Max delay – sets the longest time the system will wait for the intended transmission zone to be freed. After the set time the message will be played back from the buffer. If the operator chooses to transmit to more than one zone, the system will play the message in all the available / free zones after the set delay time has passed and erase the message from the buffer.

	Name	Type	Volume	Play after record	Max Time	Max Delay	Level Meter
1	AI0037(#1)	Mic	0.00 dB				
2	AI0038(#2)	Mic		☐	40 s	60 s	

9 On-line mode

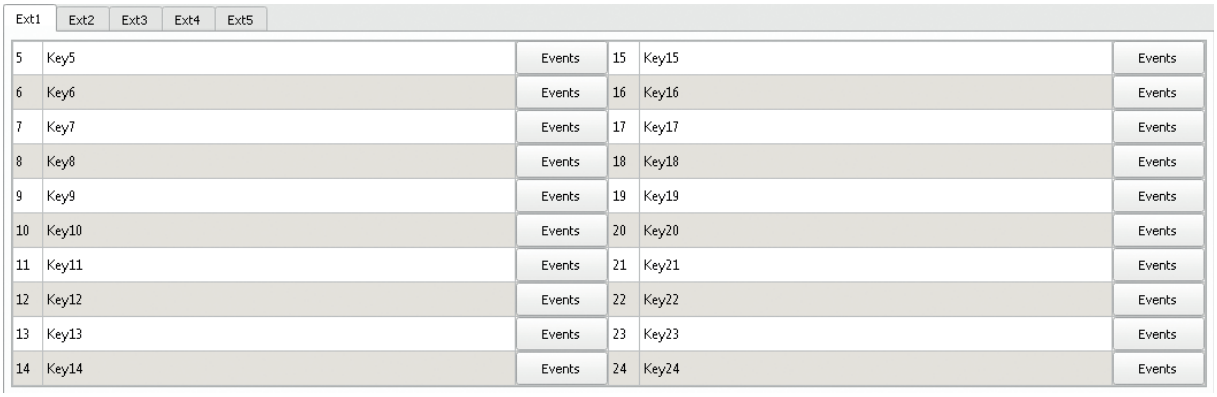
The online mode offers the user the possibility to view the audio level meter in real time and to adjust the mic volume level. After uploading the configuration into the system, you can enter the on-line mode by clicking the icon – it will then change it's color to green indicating active on-line mode.



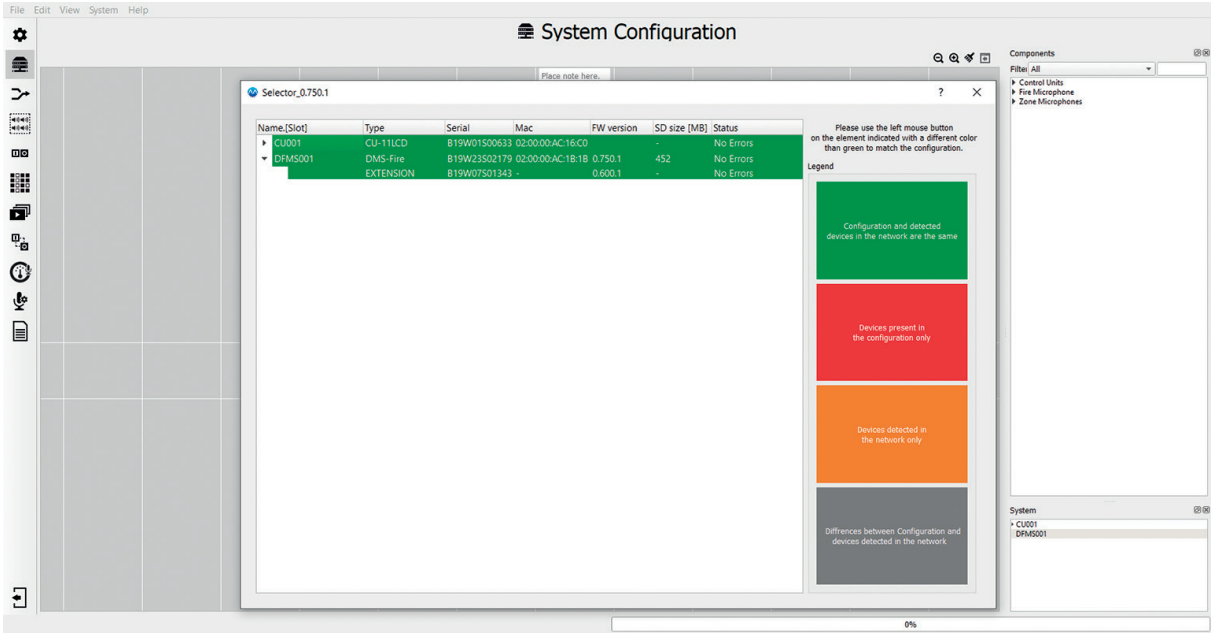
DFMS editing window – continued

1 Extension Configuration

In this window the user declares the number of connected extensions. The maximum of 5 supervised extensions with 20-buttons can be connected to the microphone. Respectively to the selected number of extensions, the configuration window will extend to include the field for additional button name editing and ability to assign a function using the Events button. The extended editing field is shown below:



Extensions connected to the fireman's microphone are visible after downloading the topology from the system.



2 Fireman Microphone Configuration

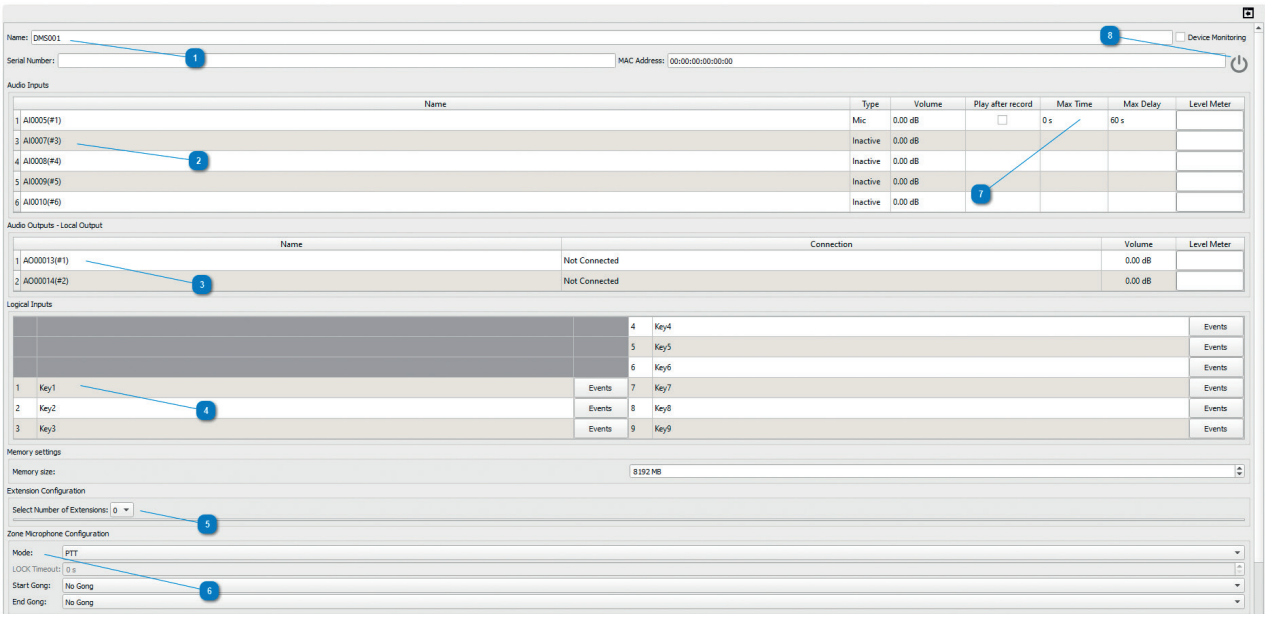
The fireman microphone PTT button function window. Apart from the PTT – Push to talk mode in the Mode option, there is a possibility to select LOCK, i.e. having pressed the PTT button, the microphone is active for the time defined in the Lock Timeout window. The maximum microphone activation time is 60 seconds.

The Start Gong option – this enables the gong having pressed the PTT button; End Gong will be activated after the PTT button is released.

3 Network Settings

This is the address which will be assigned to a physical device having loaded a configuration into the system. Changing IP addresses assigned by the configurator is not recommended.

13.3.8 DMS



1 Name

This field enables to assign an individual name to the DMS microphone, other than the generic name assigned by the configurator.

2 Audio Inputs

The Audio Inputs field contains all available audio inputs in the zone microphone. Item 1 on the above figure, is a gooseneck condenser microphone – connected to the built in XLR socket.. As standard, adding a zone microphone sets the gooseneck microphone using the built in XLR as activates the main microphone. Item 2 is a jack TRS 3.5 mm type socket located on the ABT-DMS rear panel, intended for electret microphones. The system automatically detects a microphone connected to the TRS jack and disconnects the built in XLR in this event. Items 3,4,5,6 are four unbalanced linear audio inputs. Available via 3,5 mm TRS jack sockets. In one jack 3,5mm socket we have access to 2 channels – Tip: Channel 1+, Ring: Channel 2+, Sleeve 1,2. In order to activate the input, in the Type window change the value Inactive into Line IN on the selected input which we want to activate. Double-clicking the name of the audio input enables to change the generic name assigned by the configurator.

3 Audio Outputs – Local Output

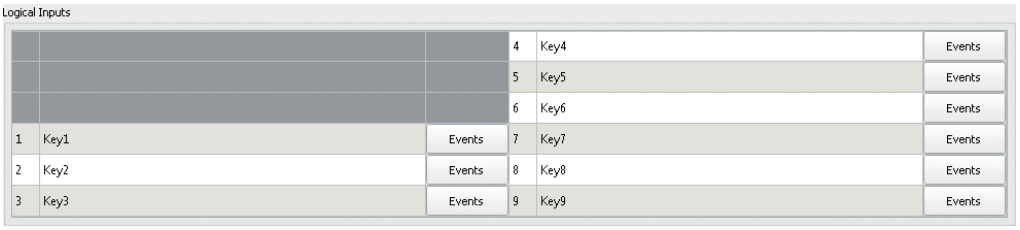
Each zone microphone is equipped with two audio outputs. Item 1 is an output directly connected to the internal amplifier of the built-in speaker. Item 2 is a linear output, socket type TRS. Tip: out2+, Ring: out2+, Sleeve 2-. In order to activate the output, in the Connection window change the value from Not connected into Line output. An activated output is shown as a separate subzone in the system.

4 Logical Inputs

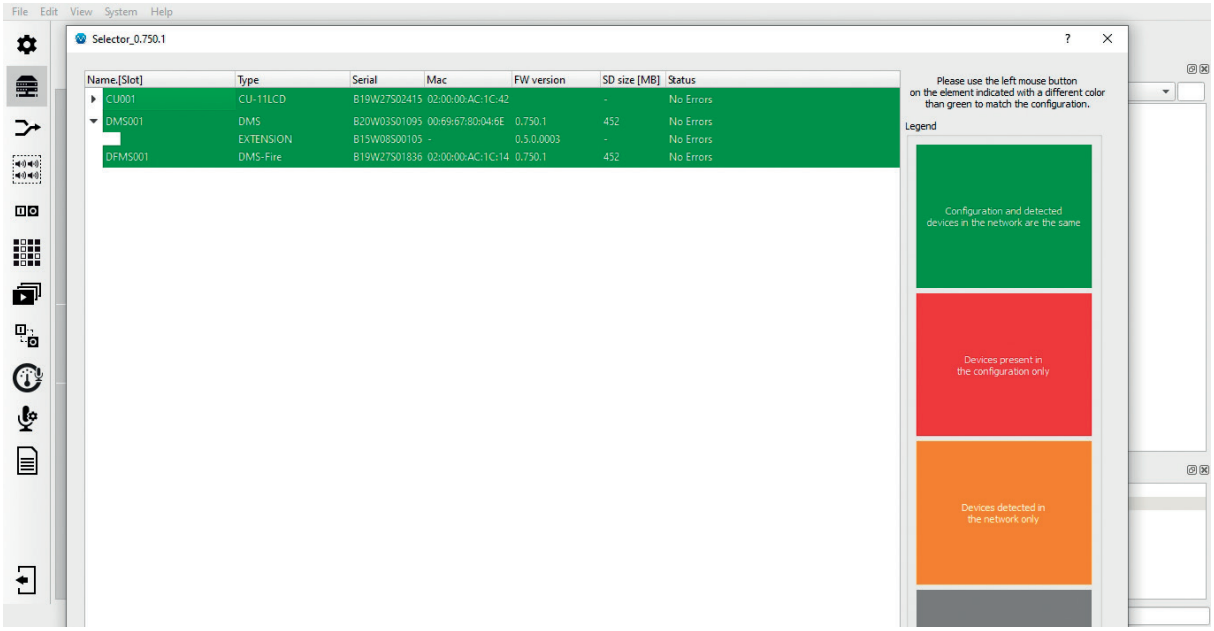
The Logical Inputs tab contains all available buttons on a zone microphone. A double click on the name of a button enables to change the generic name assigned by the configurator. The Events buttons transfers the programmer directly to the EventConfiguration tab. This allows to assign any function or event group to a selected button. A right-click on the name of a button / logical input in the EventConfiguration tab, as well as selection of Go to definition, enables to return quickly to the editing menu of the zone microphone.

5 Extension Configuration

In this window the user declares the number of connected extensions. The maximum of 5 20-button extensions can be connected to the microphone. Respectively to the selected number of extensions, the configuration window will extend to include the field for additional button name editing and ability to assign a function using the Events button. The extended editing field is shown below:

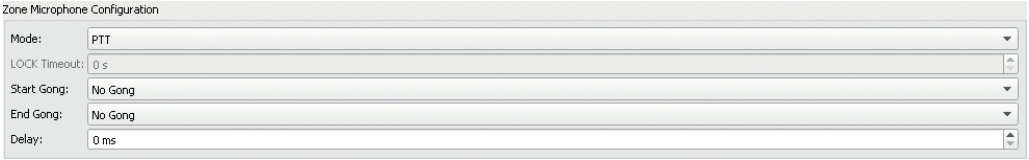


Extensions connected to the fireman's microphone are visible after downloading the topology from the system.



6 Zone Microphone Configuration

The dedicated section for PTT button is placed on the front panel of the zone microphone function window. Apart from the PTT mode – Push to talk in the Mode option, there is a possibility to select LOCK, i.e. having pressed the PTT button, the microphone is active for the time defined in the Lock Timeout window. The maximum microphone activation time is 60 seconds. The Start Gong option – this enables activation of the gong having pressed the PTT button; End Gong will be activated after the PTT button is released.



7 Audio input options

Activating the play after record option allows recording up to 40 s of a message being transmitted by the ABT-DMS and playing it back immediately after releasing the PTT button.

	Name	Type	Volume	Play after record	Max Time	Max Delay	Level Meter
1	AI0037(#1)	Mic	0.00 dB				
2	AI0038(#2)	Mic		☑	40 s	0 s	

Max time – sets the length of recorded message.
Max delay – sets the longest time the system will wait for the intended transmission zone to be freed. After the set time the message will be played back from the buffer. If the operator chooses to transmit to more than one zone, the system will play the message in all the available / free zones after the set delay time has passed and erase the message from the buffer.

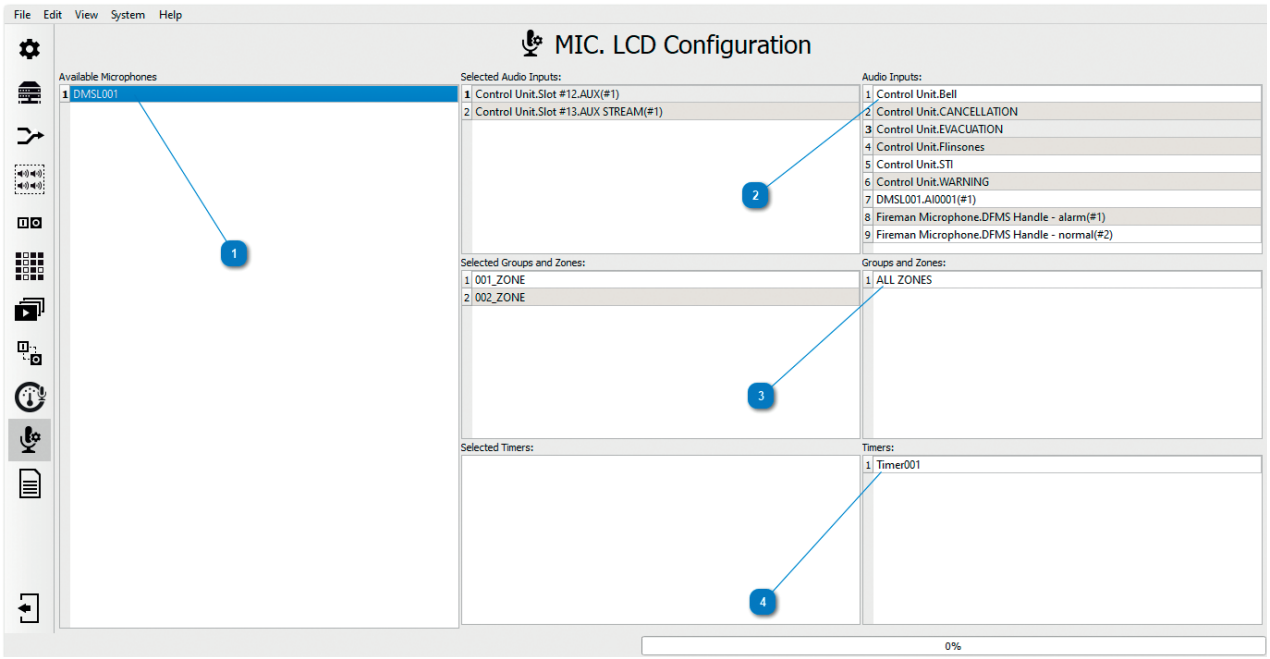
	Name	Type	Volume	Play after record	Max Time	Max Delay	Level Meter
1	AI0037(#1)	Mic	0.00 dB				
2	AI0038(#2)	Mic		☐	40 s	60 s	

8 On-line mode

The online mode offers the user the possibility to view the audio level meter in real time and to adjust the mic volume level. After uploading the configuration into the system, you can enter the on-line mode by clicking the icon – it will then change it's color to green indicating active on-line mode.

13.3.9 DMS-LCD

The DMS-LCD microphone has the same configuration window as the DMS microphone. The only exception being that, to set up the messages and zones visible on the LCD touch panel you should go to the DMS-LCD configuration tab on the left side of the screen menu bar .



1 Available Microphones

A list of available DMS-LCD microphones in the system. Every microphone can have individually programmed access to audio inputs and zones.

2 Audio inputs

A list of defined audio sources / messages available in the MULTIVES system. A double-click on the chosen input source will transport it to the Selected Audio Inputs field and add it to the DMS-LCD microphone touch screen menu.

3 Groups and zones

A list of defined audio outputs / zones available in the MULTIVES system. A double-click on the chosen output transports it to the Selected Groups and Zones field and add it to the DMS-LCD microphone touch screen menu.

4 Timers

A list of defined timers available in the MULTIVES system. A double-click on the chosen output transports it to the Selected Timers field and add it to the DMS-LCD microphone touch screen menu.

13.3.10 NCS6 Configuration

Connection and configuration

The ABT-NSC6 module is a Noise Sensing Controller and is used to automatically adjust the volume of the signal in relation to the sound pressure level of the ambient noise in the desired area.

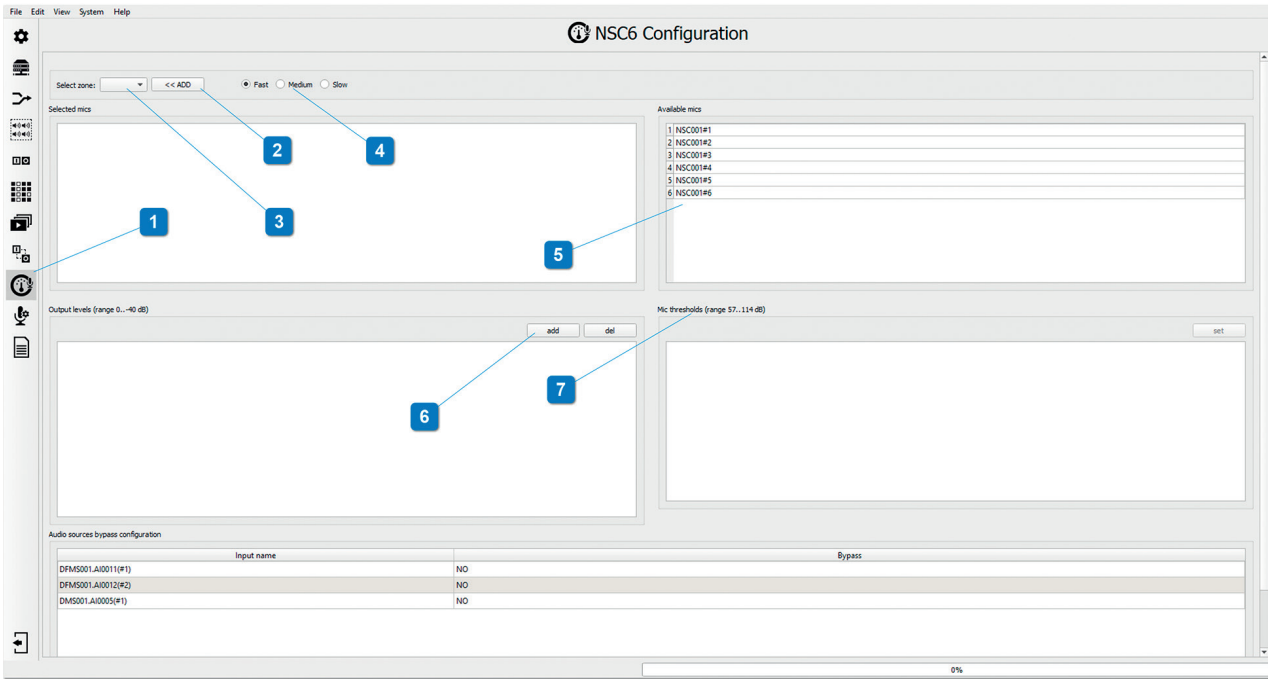
The ABT-NSC6 module connects to the rest of the system using an Ethernet cable as standard TIA / EIA-568-B and the LAN or LAN / POE port, its further configuration is carried out in the Selector software.



Two types of noise sensing microphones are available, compatible with the ABT-NSC6 module:

- ABT-NSM1
- ABT-NSM2

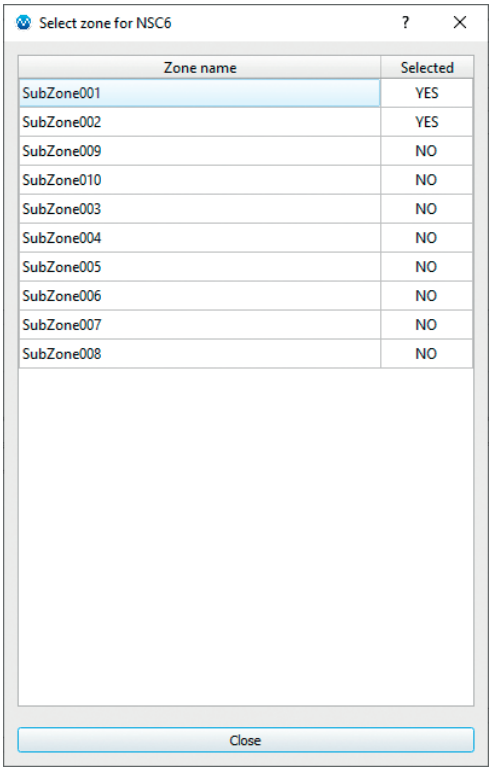
NSC6 configuration panel allows to assign one or many Noise Sensing Microphones to one zone or group of zones. In this area output levels together with number of microphone thresholds can be also defined (from 1 to 10).



1 The NSC6 Configuration icon is used to open configuration window background microphone controller ABT-NSC6.

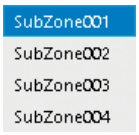
2 << ADD

To start NSC6 configuration process assigning of NSC to desired zones has to be made. To do this <<ADD has to be pressed. Then, dedicated window with available zones will be displayed. To select zones, which will be controlled by NSC please double-click on NO in Selected column to switch it to YES value.
After selection window can be closed with × sign or Close button.



3 

After zone selection process described above, next step is to select from drop-down list Zone or Group which detailed settings will be defined in next step.

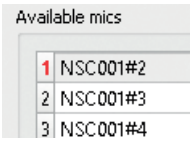


4 

Each volume change on zone or group can be defined with own reaction time for ambient sound pressure level change. Three modes are available: Fast, Medium, Slow. Each of those modes define reaction time for rising Edge (UP) and falling Edge (DOWN). Values in seconds are shown below:

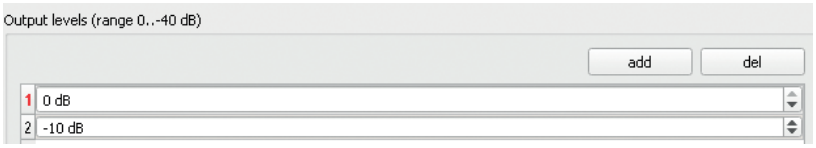
	UP	DOWN
FAST	2	4
MEDIUM	5	10
SLOW	10	20

The selection is made for each selected zone separately.

5 

It is needed to assign at least one NSC microphone input to zone, which will be controlled. In this possible to assign up to 6 NSC inputs to single zone – in this case triggering threshold limit by one of microphones will result in volume change on controlled zone.
To assign NSC microphone:

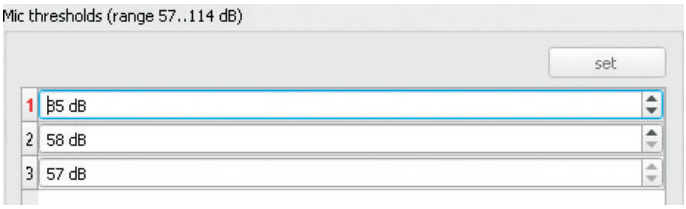
- select zone from drop-down list
- by double LMB click select in column Available mics desired inputs, that will be used for volume adjustments.

6 

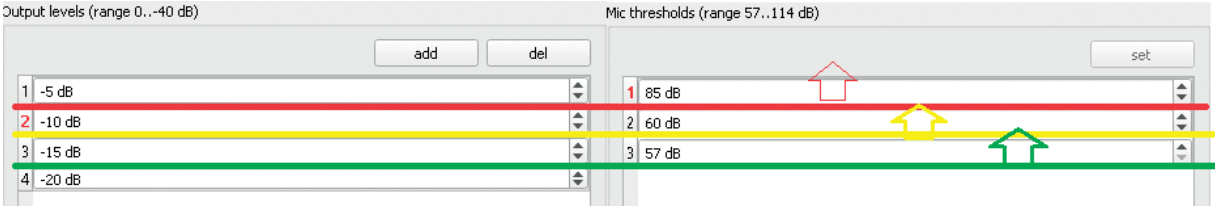
Next stage is to define number and
It is possible to define up to 10 levels. Changing number of levels is done by ADD and DEL buttons. Each of those levels can be adjusted by 1dB with up and down arrows.



7



Number of Thresholds is directly connected with number of Output levels parametrized in step before.
Number of Thresholds equals number of Output levels -1.



On above example principle of work of NSC is shown. If measured ambient sound pressure level is below 57dB (green line) then output volume will be attenuated by -20dB. When SPL will be between 58 and 60dB then output volume will be attenuated by -15dB. When SPL will be above 85dB then output volume will be attenuated by -5dB.
Both Output Levels and Mic Thresholds can be individually defined.

NSC is active all time, when system is broadcasting messages or is in standby.

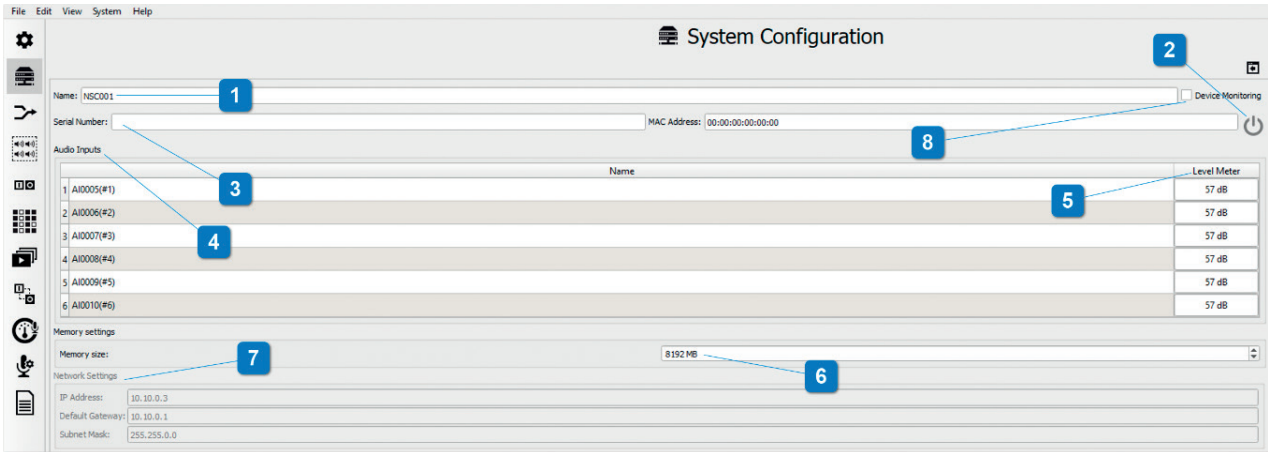
NOTICE: To measure the ambient noise level live, go to the System Configuration tab, in the topology view, double-click NSC6 module, enable ON-LINE mode, then read the sound pressure values that will be displayed on the right of the microphone input fields. Observe the maximum and minimum SPL received by NSC microphones and use these values as the maximum and minimum microphone thresholds.

8

List of audio sources in which Bypass can be activated and volume control disabled for these sources. To do this, double-click the NO icon in Bypass column.
Changing to the YES form confirms activation of bypass.



Further configuration is possible by double-clicking NSC6 module in system topology window.



1 Name: NSC001

The Name field allows you to give an individual name to each NSC6 module.

2 On-Line mode allows you to view SPL values in the Level Meter column. When the system has an updated configuration and is active, clicking the gray icon ⏻ swill activate the on-line mode, which will be confirmed by a change icon color to green ⏻. When online mode is active, the measured sound pressure value is displayed.

3 Serial Number: MAC Address: 00:00:00:00:00:00

The field with serial number and mac address is completed automatically after reading the system topology.

4 Audio Inputs

1 AI0005(#1)

Each NSC6 module has 6 inputs for ABT-NSM background microphones. The generic name of the input, e.g. AI0005, can be changed freely and symbol # with the number indicates number of physical input on PCB module .

5 Level Meter 57 dB

The value shown in the Level Meter column is measured value if online mode is active. This value is useful when setting thresholds for attenuation.

6 8192 MB

This field shows the physical capacity of the memory card.

7 Network Settings

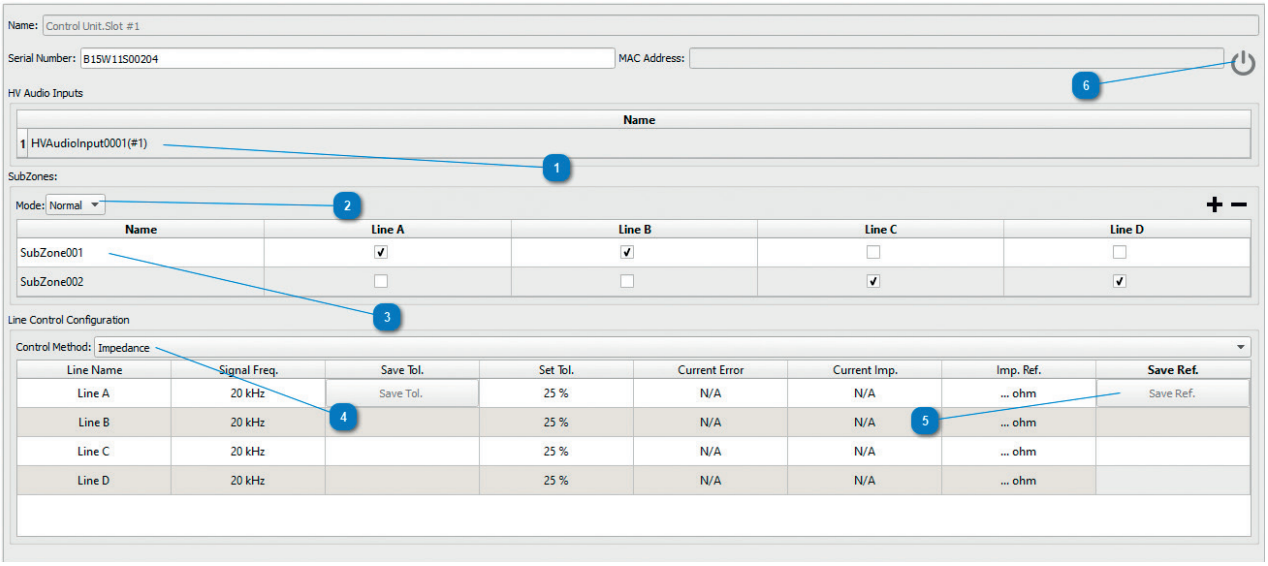
IP Address: 10.10.0.3
Default Gateway: 10.10.0.1
Subnet Mask: 255.255.0.0

These fields present network parameters such as the IP address that will be assigned to the NCS6 controller. This is for informational purposes only and these values should not be changed manually.

8 ☐ Device Monitoring

Checking this box means that the NSC-6 module connection will be supervised.

13.3.11 xCtrLine-2/4



1 HV Audio Inputs

The name field enables to assign an individual name to the input intended to receive a 100 V signal from an amplifier output. The name is shown on the main AudIO-4/12 editing window, in the Connection tab.

2 SubZones / Mode:

Mode enables switching the card into following modes: Loop – the system detects short circuit / open line as well as ground leakage; Regulator – the volume control mode on the speaker line.

3 SubZones

Speaker zone editing window. It enables changing of the generic name of a zone by double-clicking the name. In addition, it is possible to define which speaker line outputs (A,B,C,D) are assigned to a given zone. Any combination is possible, however the default settings are accordant with the EN54-16, EN54-4 standards and assign two outputs per each zone.

4 Line Control Configuration / Control Method:

Speaker line supervision method window – options include: Impedance method and Switching off the speaker line supervision.

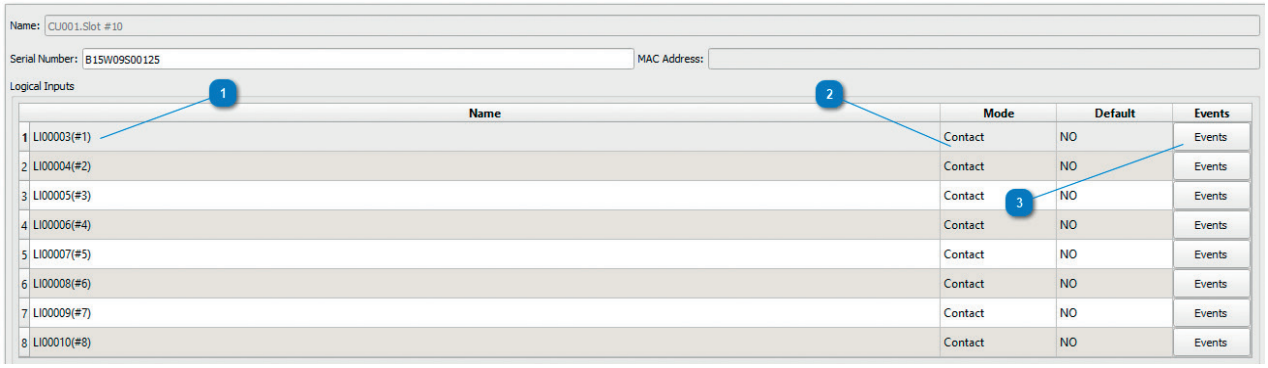
5 Save Rev.

If the system is supposed to supervise speaker lines by means of the impedance method, having loaded a configuration into the system and connected a speaker line of a properly matched power and free of ground faults, load the impedance reference for a given line. In order to do this, select the Save REV button. From now on, the system properly supervises the operation of the speaker line. The impedance method continuously measures the impedance of the speaker line and if the value set in the tolerance window has been exceeded, an error is reported. The impedance method is equipped with a number of algorithms to minimize reporting untrue faults resulting from abrupt temperature changes which affect line impedance, as well as sudden changes of impedance itself. Adequate impedance measurement range on a single speaker line starts at 12.5 Ω, and ends at 10 kΩ, for measured frequency of 20 kHz. A 4-output xCtrLine-4 card (A,B,C,D) can be loaded up to 800 W of total power, the maximum load for a single speaker line is 300 W. In the case of a bridged connection of outputs A+B and C+D, the maximum tolerated power for each pair is 450 W. for a 2-output xCtrLine-2 card (A,B), the correct impedance measurement range on a single speaker line is minimum 12.5 Ω, max 10k ohm, for the reference frequency of 20 kHz. A 2-output card can be loaded up to 400 W of total power, the maximum load for a single speaker line is 300 W. In the case of a bridged connection of outputs A+B and C+D, the maximum supported power for each pair is 450 W.

6 On-line mode

The on-line mode enables to view the impedance values, as measured, as well as record reference impedance into the control card. Having loaded a configuration into the system, a single click on the left mouse button on the grey icon ⏻ results in entering the real-time view mode and change of the colour of the icon into bright green ⏻. A change of tolerance, reference impedance or real-time measurement must be preceded by entering into the on-line mode.

13.3.12 xLogIN-8c/f



1 Logical Inputs

The Logical Inputs tab contains all available logical inputs in the xLogIN-8 card. A double click on the name of a logical input enables to change the generic name assigned by the configurator.

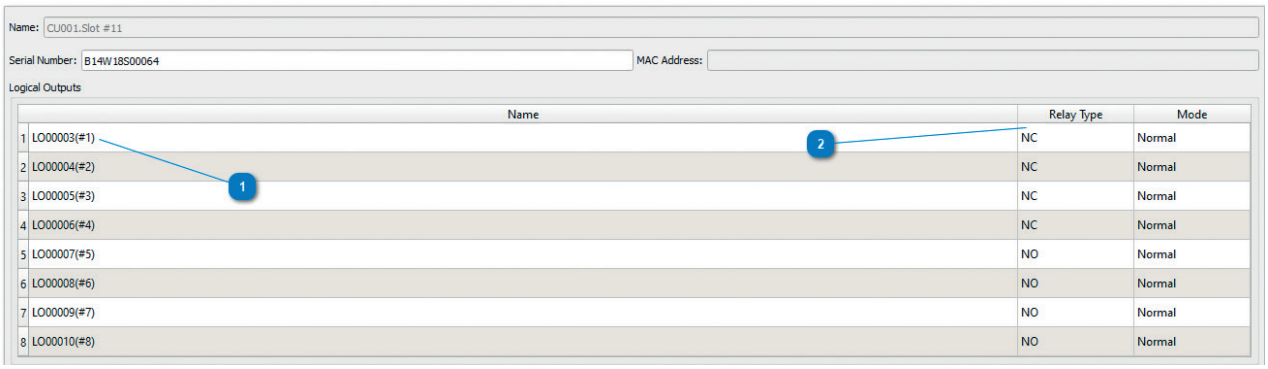
2 Mode / Default

The logical input editing window enables activation of the input monitoring function – Mode Contact / Monitor. In case the Monitor option is selected, it is necessary to install two parametrizing resistors at the end of the line, of 4.7 kΩ. In the window Default, we select the input status for inactivity – for NC the system waits for closing on the input, opening results in activation of the function assigned in EventCongifuration; for NO the situation is reverse: the system waits for opening on the input, closing results in activation of the assigned function.

3 Events

The Events buttons transfers the programmer directly to the EventConfiguration tab. This enables to assign any function or event group to a selected button. A right-click on the name of a button / logical input in the EventConfiguration tab, as well as selection of Go to definition, enables to return quickly to the xLogIN-8 editing menu.

13.3.13 xLogOUT-8c/f



1 Logical Outputs

The Logical Outputs tab contains all available logical (relay) outputs on the xLogOUT-8 card. A double click on the name of a logical output enables to change the generic name assigned by the configurator.

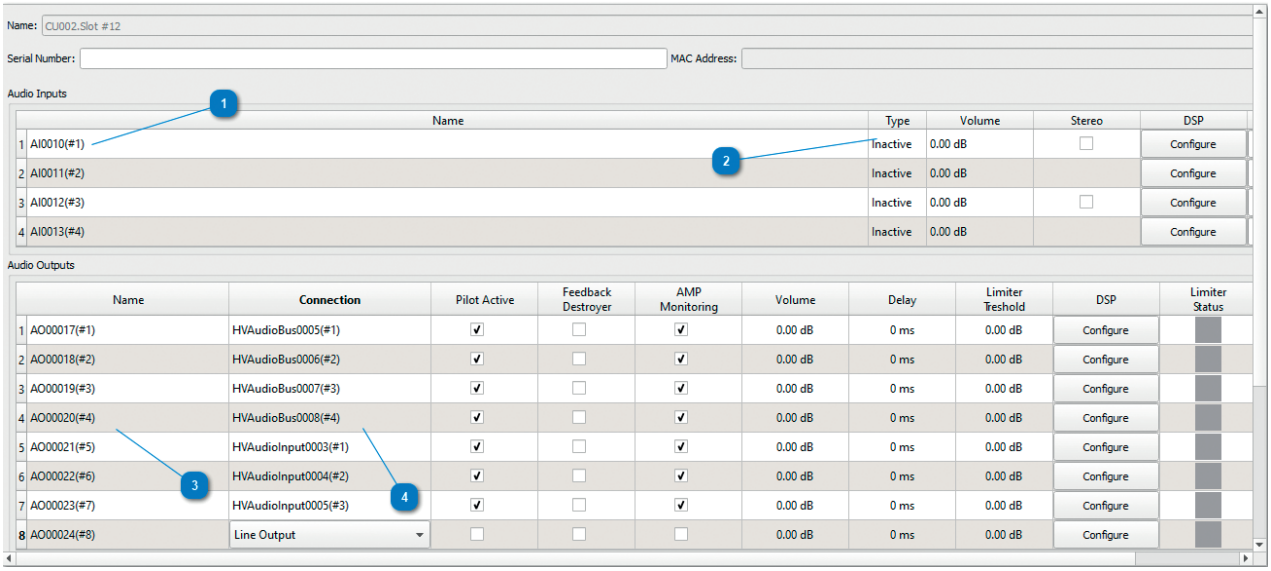
2 Relay type / Mode

Relay type is a window to inform of the physical type of the relay installed:
NC – normally closed, in case of a power cut, the relay will be closed;
NO – normally open, in case of a power cut, the relay will be open.

The Mode window enables to reverse the relay logic, opposite to its behaviour in case of a power cut. The Inverse causes, e.g., that the relay NC / Inverse – in the original status it is a NO relay, and activation of the function to which it is assigned will change the status of the relay into the opposite one, i.e. NC. For NC / Normal in the original status (not triggered by any function) the relay is closed, activation of the function, as assigned to this output, causes that the relay status changes into the opposite one, i.e. open. The values from the windows Relay Type and Mode are also duplicated in the information window below Scenario State and in the EventConfiguration tab the function General – Logical Outputs, also in the information window below State.

The maximum loads of a single relay output are presented below:
Max VDC = 48 V | Max IDC = 500 mA | Max DC Power = 20 W

13.3.14 AudIO-4/12



1 Audio Inputs

The Audio Inputs field contains all available audio inputs locally accessible in the ABT-CU-11LT/LCD control unit. Item 1 on the above figure is a line level input available via a Phoenix connector on the side wall of the ABT-ISLE module. A built-in AudIO-4/12 card in the ABT-CU-11LT/LCD units had 4 independent audio inputs available on Phoenix sockets of the ABT-ISLE module.

2 Audio Inputs / Type

In order to activate the input, change the value Inactive into Line IN. Double-clicking the name of the audio input enables to change the generic name assigned by the configurator.

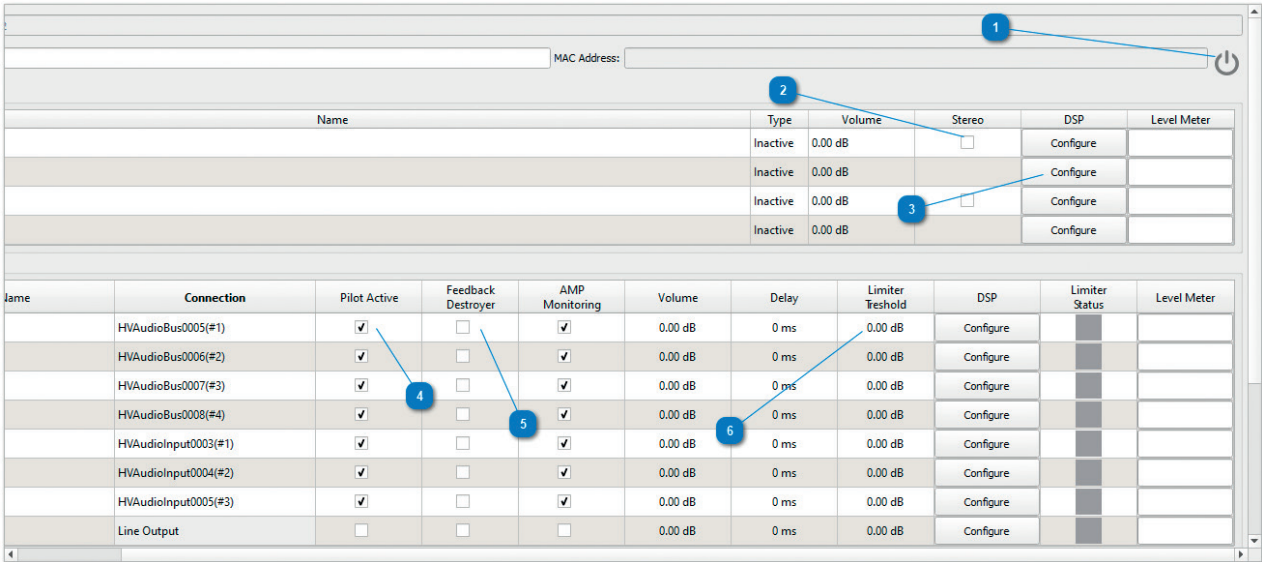
3 Audio Outputs / Name

AudIO-4/12 card has 12 independent audio outputs. Double-clicking the name of the audio output enables to change the generic name assigned by the configurator.

4 Audio Outputs / Connection

This is a very important item on the configurator. Here we define whether the control unit uses only the connections on 4 common, internal 100 V buses or amplifiers are connected directly to individual inputs on the HVAudioInput control cards, or we use a mixed mode (some cards are supplied by internal 100 V buses, some from individual inputs). Defining the Connection field is a necessary condition for proper operation of the MULTIVES system. One should remember that the denotation HVAudioInput... (#1,2,3 etc.) means the physical location of the card on the slot. The number following # refers to the number of a slot.

The line output is not monitored by the system. The unit treats the output lines as a zone in the system (eg. signal to an independent PA system) to which can transmit the message.



AudIO-4/12 editing window – continued

1 On-line mode

Online mode allows to preview the levels of inputs and outputs audio channels. In addition, allows to change parameters such as delay, volume level, limiter threshold and EQ settings. After uploading the configuration into the system you can enter the on-line mode by clicking the icon, it will then change it's color to green indicating active on-line mode. Any parameter changes on the card must be preceded by selecting on-line mode. Switching Feedback Destroyer (Feedback Suppressor) requires re-upload the configuration to the system.

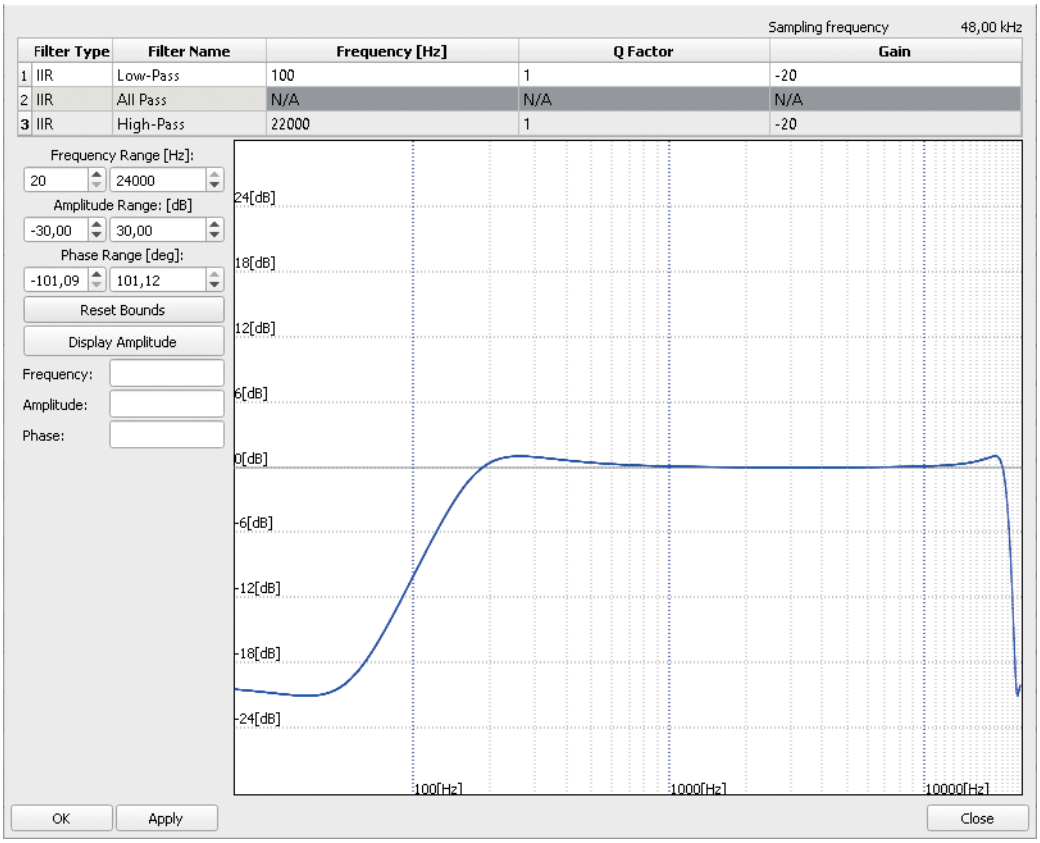
2 Audio Inputs / Stereo

Selecting Stereo option causes summing two audio signals into one in the ratio of 50 / 50 which results in correct stereo signal transmission to the loudspeaker zones.

3 Audio Inputs / DSP

Audio card on each audio input has a 3 band parametric equalizer which can be freely configurable in two ways:

1. by uploading the configuration to the system with the center frequency, filter quality and gain settings;
2. by changing the parameters of the filters in on-line mode.



4 Audio Outputs / Active Pilot

Selected Active Pilot option activates the control of the connection between audio output (DSP) and amplifier 100 V.

5 Audio Outputs / Feedback Destroyer

Activating Feedback Destroyer means that in places where the speakers are located in close proximity to the system microphone, effect of acoustic feedback is significantly limited.

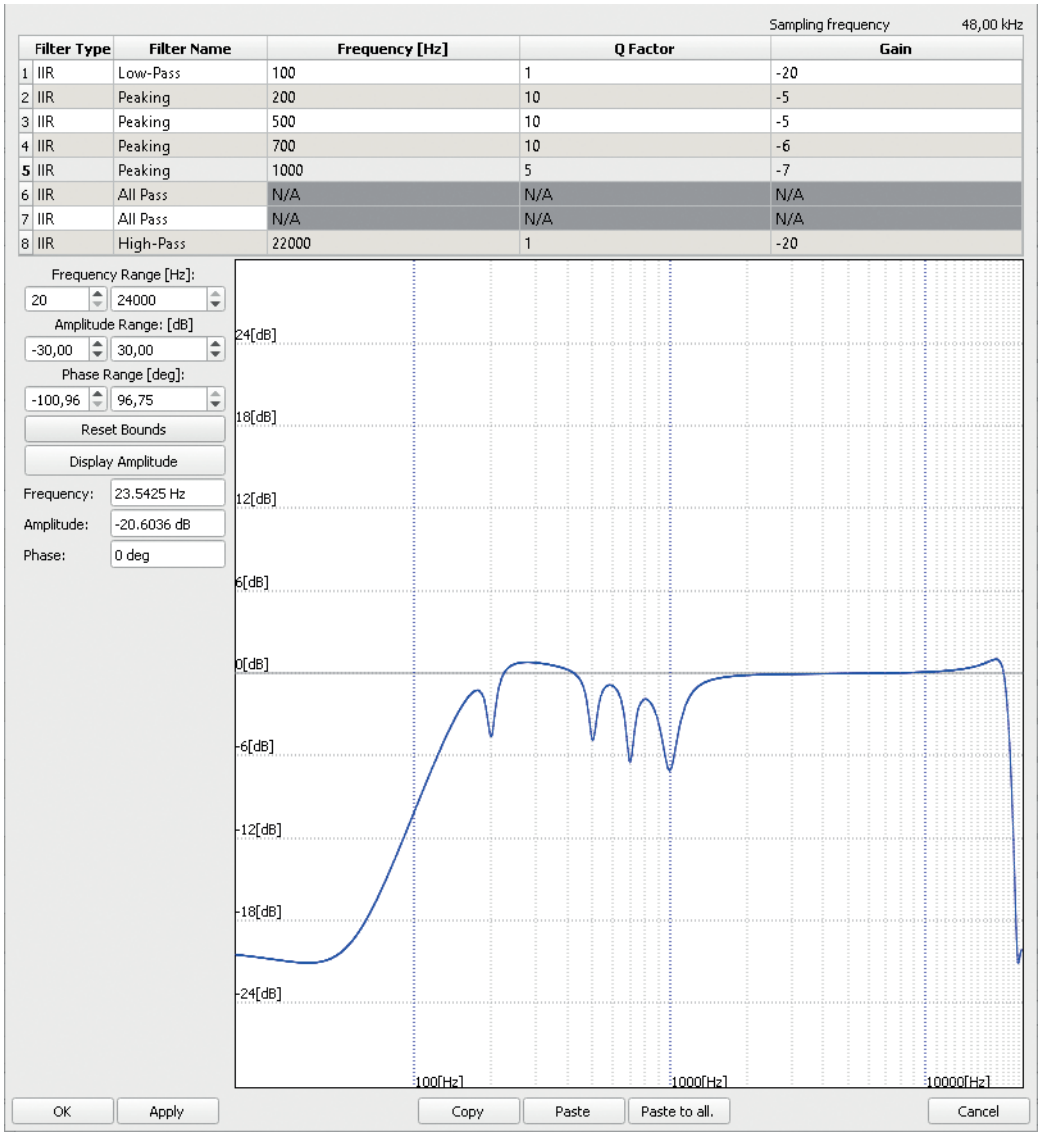
6 Audio Outputs – other options

The window allows to change parameters like delay, volume level, limiter threshold and EQ. Setting parameters is possible in two ways:

1. by changing the values in a particular window Volume / Delay and uploading the configuration to the system;
2. by changing the parameters in the Volume / Delay section in on-line mode.

Audio card on each output has 8 band parametric equalizer which can be freely configurable in two ways:

1. by changing the center frequency, filter quality and gain and uploading the configuration to the system;
2. by changing the parameters of the filters in on-line mode.

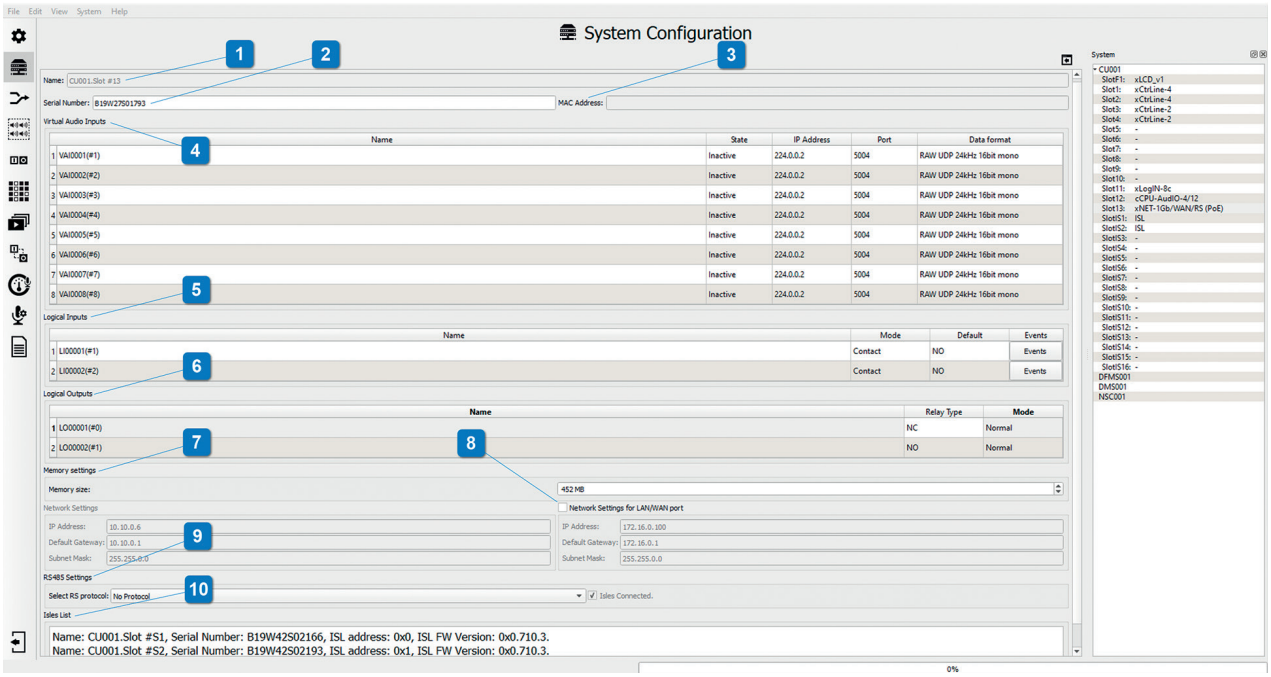


Paste to all function allows to copy EQ settings to all outputs available in the control unit. To do so select Copy to save the settings of the filters and then select Paste to all to propagate all filters settings to all outputs.

Setting the level of threshold below 0 dB activates the audio limiter. Signal level exceeding threshold is indicated by the red color in the Limiter status. Green indicates that the output is below the threshold. In practice activation of audio limiter means that above a threshold, output signal is not increasing, regardless of what value the input signal reaches. Limiter allows to protect the system amplifiers from clipping the signal peaks and sharp reduction in high-level transients without affecting the essential content sound material.

Signal Level Meter is only active in on-line mode. The maximum level shown on the indicator corresponds to the voltage of 1 V RMS output codec.

13.3.15 xNET-1Gb/WAN/RS



1 Name

Field in which xNET card name is generic assigned.
The name consists of two parts:

- control unit name (editable in the BUS card)
- slot number in which it is located

2 Serial Number

Field with serial number of xNET card.

3 MAC Adress

Field with MAC adress of xNET card.

4 Virtual Audio Inputs

A window enabling system configuration to receive audio stream from the network.
The xNET card enables reception of 8 audio streams as independent sources.

5 Logic Inputs

Logical Inputs field allows you to configure the available logical inputs in xNET card.

6 Logic Outputs

Logical Outputs field allows you to configure the available logical outputs in xNET card.

7 Memory settings

Field informing about capacity of installed memory card in module.
This value is automatically filled after reading system topology.

8 Network Settings for LAN/WAN port

Edit field of LAN / WAN port network parameters.

In a default configuration, a device with xNET card works as DHCP server and automatically assigns a network address to connected device (e.g. computer) to LAN / WAN port.
After defining the parameters, it is possible to set a fixed network address of the xNET card.
It should be remembered that a device with xNET card in which permanent addressing is set will not be visible to devices whose network card is in automatic address acquisition (DHCP) mode.

9 RS485 Settings

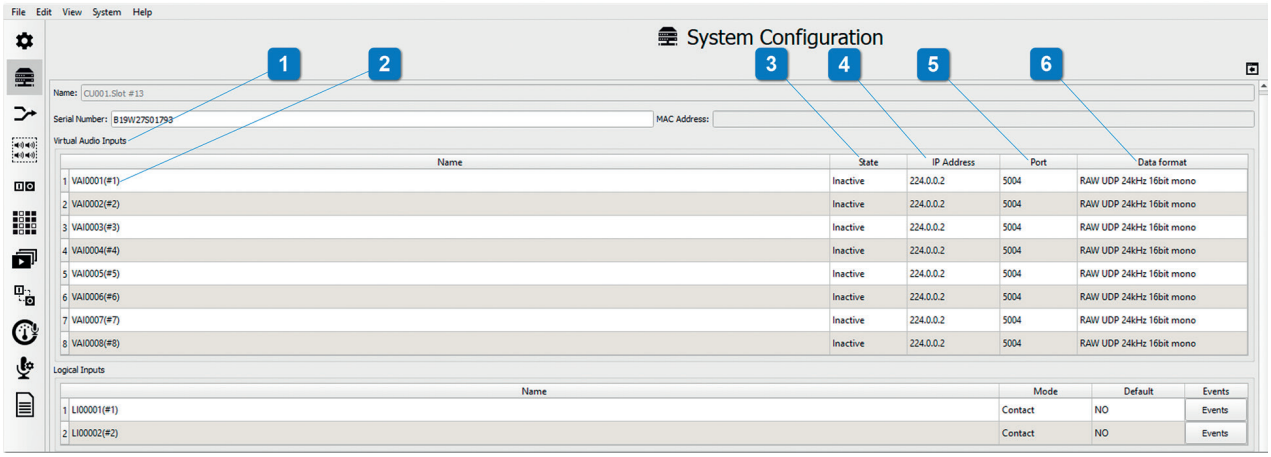
Functionality of this field is temporarily inactive and will be available in the future.

10 Isles List

Window displays information about connected ABT-ISLE modules after reading system topology.

System configuration for receiving multicast from network

To enable system to receive audio stream, open the settings of the xNET-1Gb / WAN / RS network card that will be connected to network.



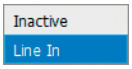
1 Virtual Audio Inputs

Window for editing parameters of virtual audio inputs.

2 Name

Window for editing name of virtual audio inputs.

3 State

From the drop-down list, select Line input 

to make it active.

4 Adres IP

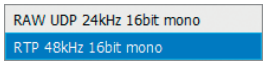
Window for editing of IP address for receiving audio stream.

5 Port

Field for editing of port for receiving audio stream.

6 Data format

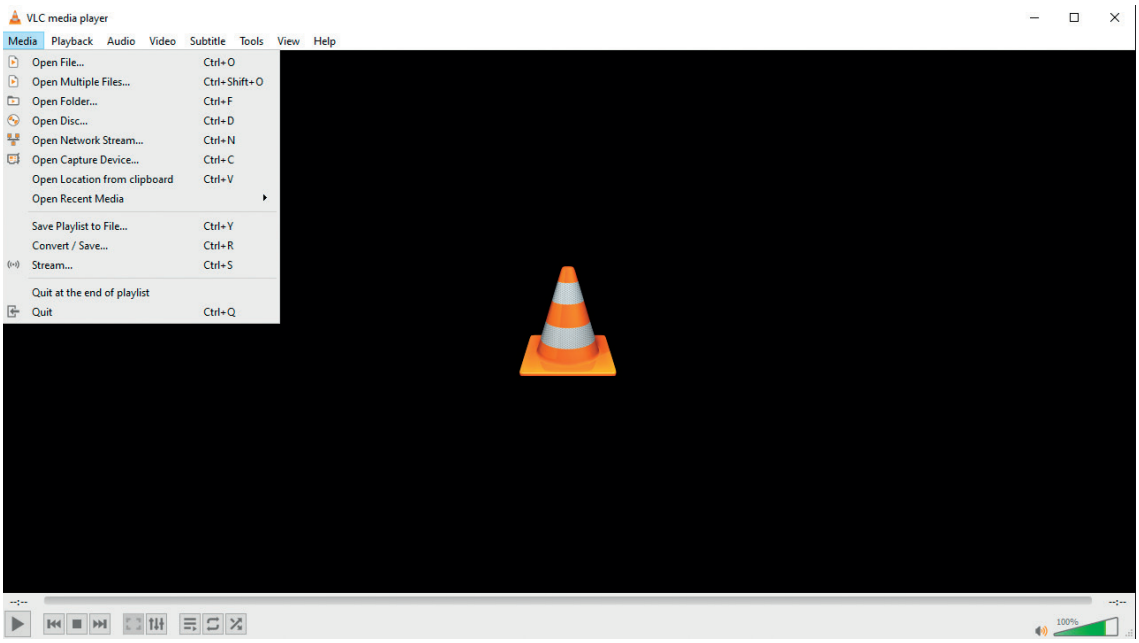
From the drop-down list select format in which the stream is transmitted.

In our example it will be RTP 48kHz 16bit mono 

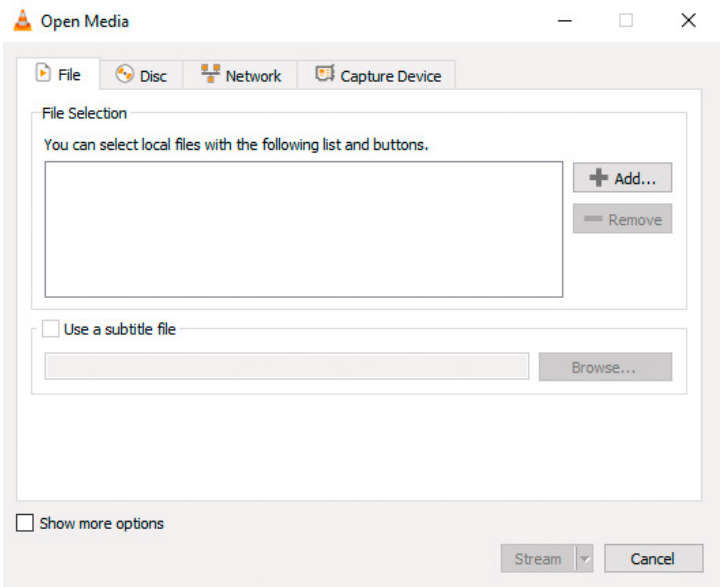
Multicast network audio streaming

VLC multicasts settings step by step.

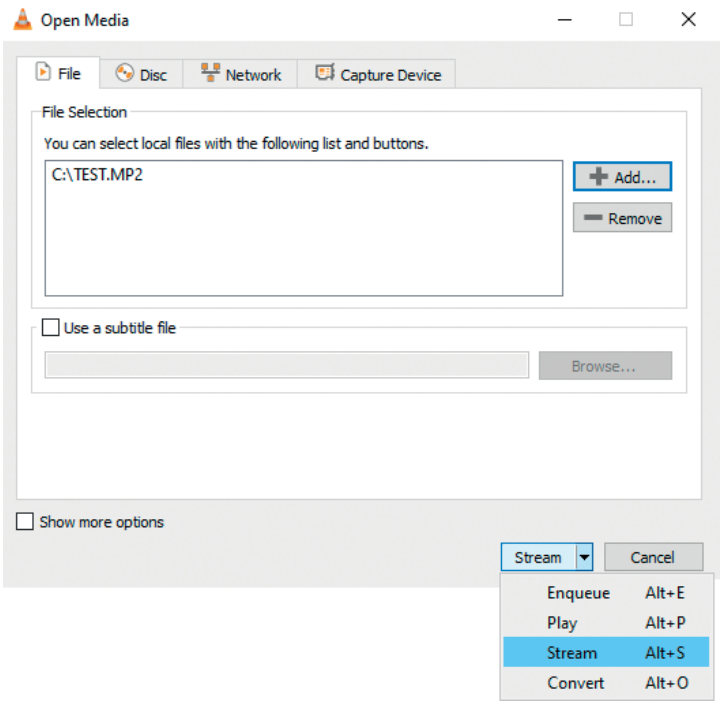
1. In File menu select Stream



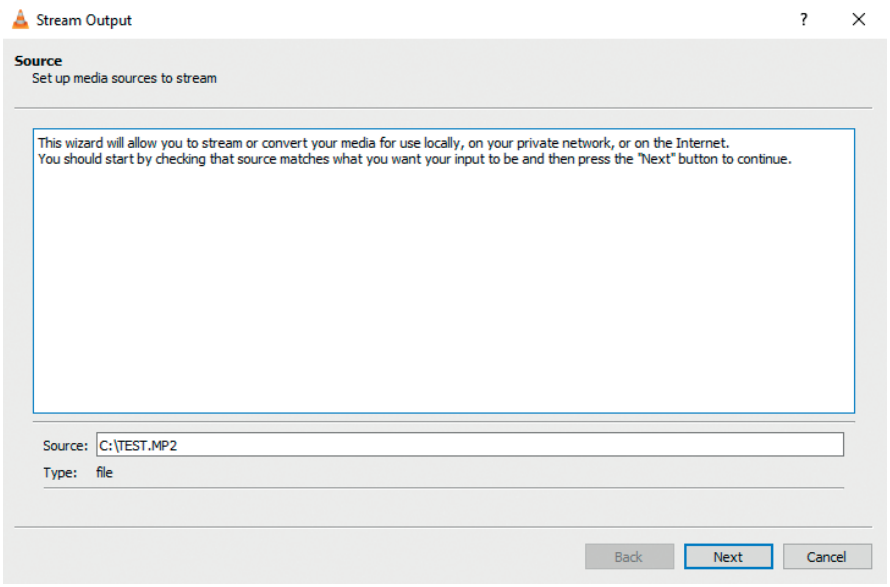
2. Add audio file for streaming



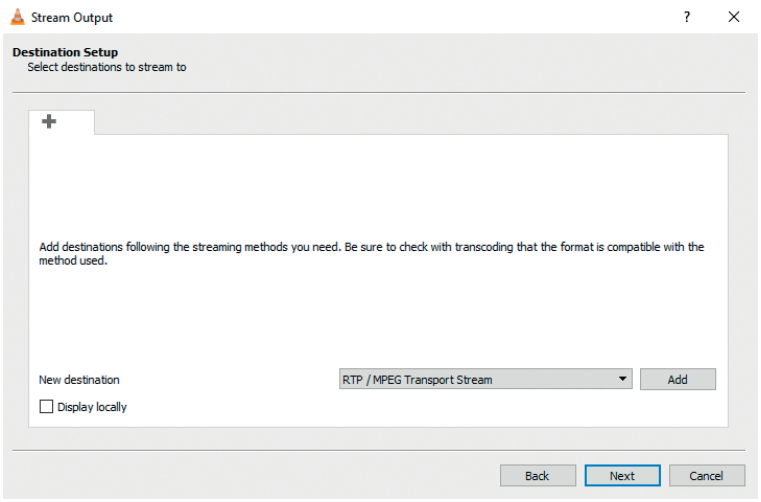
3. In File menu select Stream



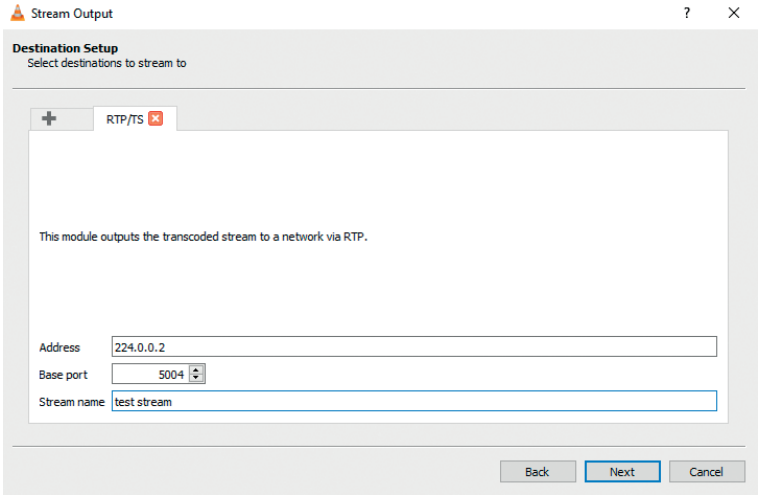
4. Select Next



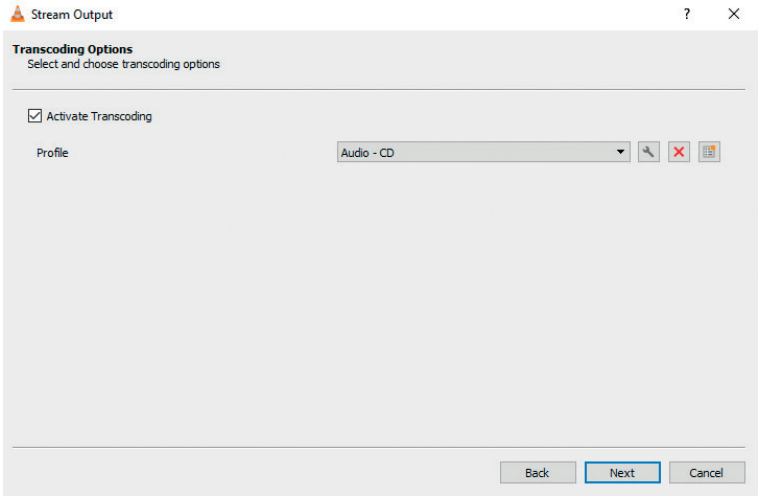
5. Add output stream as below



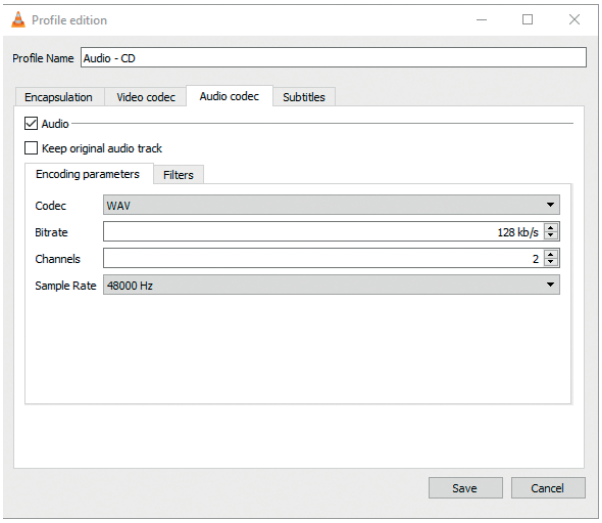
6. Click Add button and configure stream ip address and port



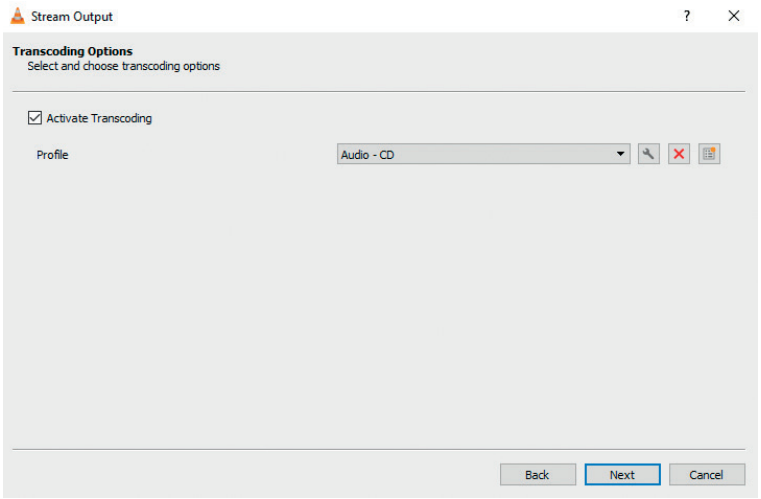
7. Click Edit selected profile button



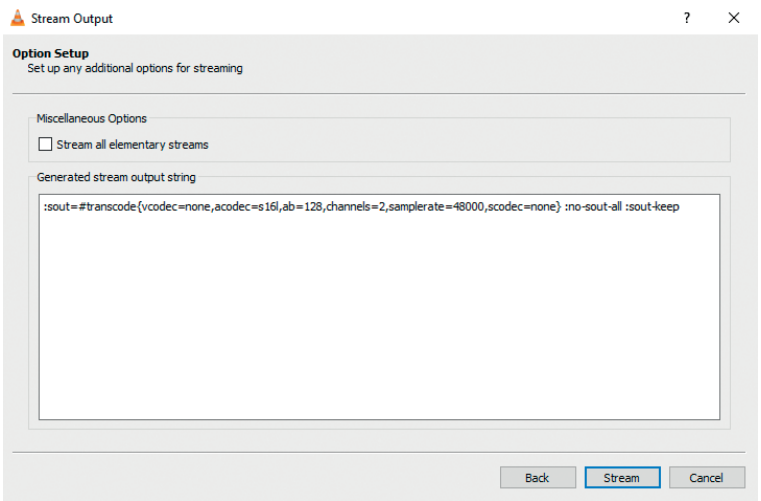
8. Select Audio codec tab and set parameters as below and accept by Save button.



9. Click Next button.



10. Push Stream buton to activate audio stream.



13.4 Description of backup functionality for MULTIVES system

The Backup function is an advanced method of replacement of a damaged amplifier in order to provide for continuity of message propagation in accordance with the EN54-16 standard for sound emergency systems. For a functionality analysis, three various methods should be considered of amplifier connection in the MULTIVES system:

1. Amplifiers / amplifier channels (max 4) connected to four 100 V buses common for all control cards.
2. Amplifiers / amplifier channels connected to control card individual inputs. Each control card may be supplied by only one channel of the amplifier.
3. Mixed mode: out of the 11 available slots in the CU-11 control unit, some control cards may be supplied by 100 V buses, and some from individual inputs on the control cards.

Method 1 – only 100 V buses

In case there are up to 4 amplifiers connected to a control unit and we use 4 100 V buses. The system, having detected a failure of one of the amplifiers, will replace it with an amplifier connected to another bus, as available, then the message priority criterion, and in case of priority equivalence – taking the programmed modes FIFO, LIFO. For FIFO – the amplifier which supplies Message 1 will not be expropriated to 2 until completion of Message 1 (matrix). For LIFO – the Message 1 amplifier will be disconnected and assigned as backup to Message 2.

Expropriation of amplifiers in case of a failure on one of the buses, as detected, is done by means of an analysis of the Matrices – or, more precisely, their priorities – executed at the moment of failure occurrence. The amplifier is always expropriated which executes Matrices of the lowest priority and a lower one than the matrix for which the amplifier is in disrepair. Such logics always provides an amplifier for Matrices of the highest priority, even with repeated damages to backup amplifiers.

It should be noted, though, that the buses are being assigned on a dynamic basis and according to the needs of the zones to be matriced. This means that the backup system does not switch amplifiers at the moment a fault has been detected, but on being used, i.e. matricing. An amplifier failure is signalled on detection of the fault. According to the EN54-16 standard, detection takes maximum 100 seconds following failure, and the time to switch over to a backup amplifier, from the moment the fault has been detected, is 10 seconds (in MULTIVES it takes max 1 second). After dematricing, the amplifier which has been used returns to the resource group to be assigned again if needed – this is dynamic selection of an amplifier as needed.

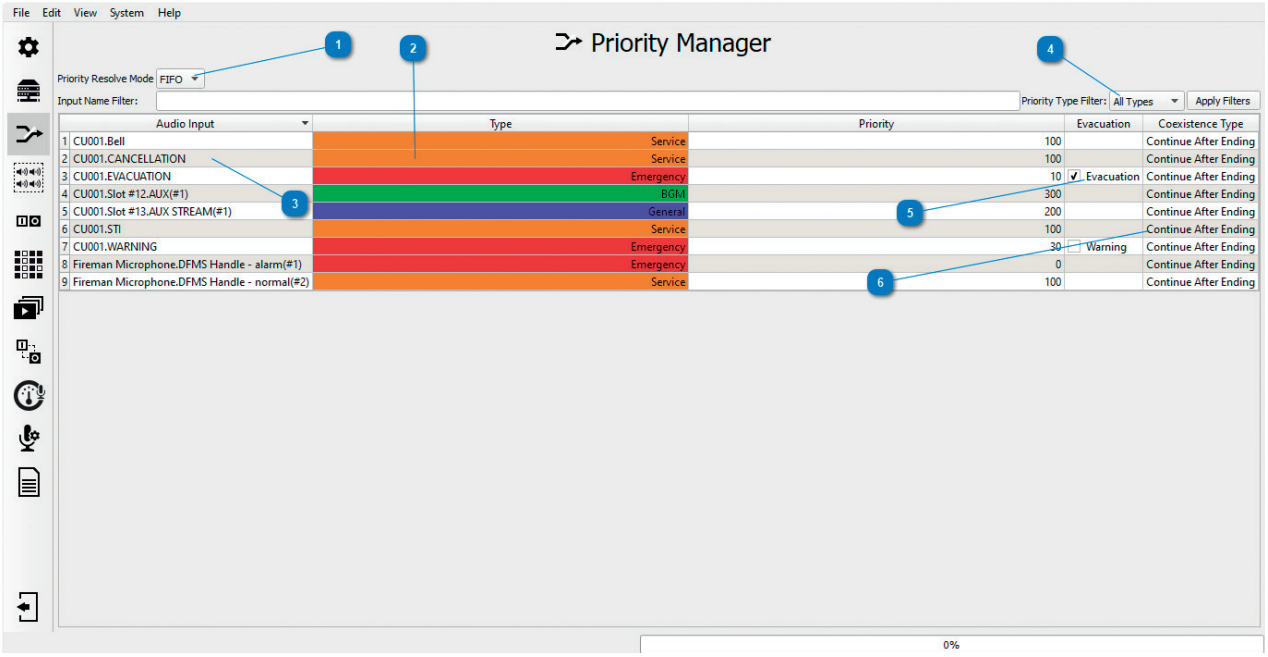
Mode 2 – amplifiers connected to control card individual inputs

In this mode, a damaged amplifier connected to a control card individual input, will be replaced by an amplifier supplying one of the four 100 V buses. It must be ticked in the configurator which of the buses is the Backup individual amp so that when a fault occurs a specific amplifier from a bus was assigned instead of the damaged one. All the prioritizing principles, as described above, FIFO, LIFO and dynamic assignment of backup resources (assigning and returning as needed) pertain, as in Mode 1.

Mode 3 – mixed: some control cards may be supplied from 100 V buses, some from individual inputs on control cards

With such connection and system configuration, 100V bus amplifier failures are taken care of by replacing the affected amplifier with free 100 V bus amplifier resources, whereas a failure of an amplifier on a control card individual input triggers dynamic assignment of the 100 V bus amplifier to have been declared in the configurator as the Backup individual amp (a specific amplifier). In this mode, the declared individual input backup amplifier will never replace a 100 V bus-supplying amplifier. Therefore, this mode requires that two backup amplifiers be provided: a separate backup amplifier for 100 V buses, which, in principle, is a high-power one, and a separate amplifier for amplifiers connected to control card individual inputs.

13.5 Priority Manager Configuration



Each zone microphone, fireman microphone or audio input available in the system must have its priority defined in order to ensure correct operation, as intended for sound emergency systems.

1 Message priority mode in case of conflict – FIFO / LIFO

Priority Resolve Mode – this is a global system function which defines the system's behaviour in case a conflict occurs. The conflict being a simultaneous transmission to the speaker zone from two or more audio sources of the same priority.

For FIFO (First in first out) – in the case when Source 1 of Priority X is transmitting to Output Y and after some time Source 2 of Priority X wants to transmit to Output Y too, Source 2 can not transmit until Source 1 has finished transmitting to Output Y.

For LIFO (Last in first out) – in the case when Source 1 of Priority X is transmitting on Output Y (speaker zone) and, after some time, Source 2 of Priority X will start transmitting on Output Y (speaker zone) too, then Source 2 will replace Source 1, as transmitting, and will commence transmitting to Output Y.

Priority Resolve Mode also determines the method of dynamic assignment of a backup power amplifier in case a failure occurs of the amplifier modules which are responsible for transmission of simultaneous messages of the same priorities. In case two equally prioritized messages are executed to various zones, Message 1 of Priority (100), Message 2 of Priority (100) too, which was matriced after Message 1 – when an amplifier module failure occurs for the FIFO mode: the amplifier which supplies Message 1 will not be taken over by Message 2 until Message 1 (matrix) has been completed; for LIFO – the Message 1 amplifier module will be disconnected and assigned as a backup amplifier for Message 2.

2 Audio source type selection: Emergency, General, Service, BGM

The MULTIVES has 4 priority groups, each of the groups has 99 levels. Priorities are numbered in the reverse order: the fireman microphone in Emergency mode has the highest 0 priority the lowest priority is BGM 399.

Priority types:

Emergency, range 0-99 – audio sources with the assigned priority ranged 0-99 are active only when the system is in the Alarm Mode. The Emergency priority can only be assigned to the ABT-DFMS fireman microphone, messages recorded on memory cards and control unit audio inputs.

Service, range 100-199 – can be assigned to every audio source type and does not allow matrix activation in the Alarm Mode. A loss of the 230 V AC basic power supply does not deactivate Service-type source messages. Sources of priorities contained within this group are subject to the Zone(s)off function.

General, range 200-299 – can be assigned to zone microphones and messages. It does not operate in the alarm mode and in case of a loss of the 230 V AC basic power supply. Sources of priorities contained within this group are subject to the Silence, Power Save and Zone(s)off functions.

BGM, range 300-399 – assigned only to audio inputs located in control units and zone microphones. BMG-priority audio source Matrices do not operate in the alarm mode and in case of a loss of the 230 V AC basic power supply. Sources of priorities contained within this group are subject to the Silence, Power Save and Zone(s)off functions.

As standard, the configuration software assigns arbitrarily priorities from the Emergency group, depending on the audio source, that is:

1. For the ABT-DFMS fireman microphones – the Emergency Priority NB 0-10 is the highest priority pool reserved only for these devices.
2. Sound messages played back from system memory cards for the Emergency Priority Evacuation checkbox – these are assigned a value ≥ 10.
3. Sound messages played back from system memory cards for the Emergency Priority Warning checkbox – these are assigned a value ≥ 30.
4. For the remaining audio inputs on control units with a possibility of being assigned the Emergency Priority Evacuation checkbox – these are assigned a value ≥ 20, and for the Warning option ≥ 40.

3 Audio source description

The Audio Input and Component items indicate specifically which audio input, zone microphone, fireman microphone or message a selected priority is assigned. The Component tab informs of the location in which a given message was recorded and will be played back from or – in case of audio inputs – specifies the device in which the selected input is located.

4 Zone retained signaling mode, Evacuation / Warning modes

Having assigned the Emergency mode to any audio source, the Warning checkbox appears in the right corner. This means that as the initial setting for the Evacuation mode, in case of transmitting a message on a given zone, on the RGB button diode programmed as the Select Zone of this zone, the red LED will be blinking. Ticking the checkbox is equivalent to changing the mode to Evacuation which results in the RGB LED – the red one – being on during a message transmission.

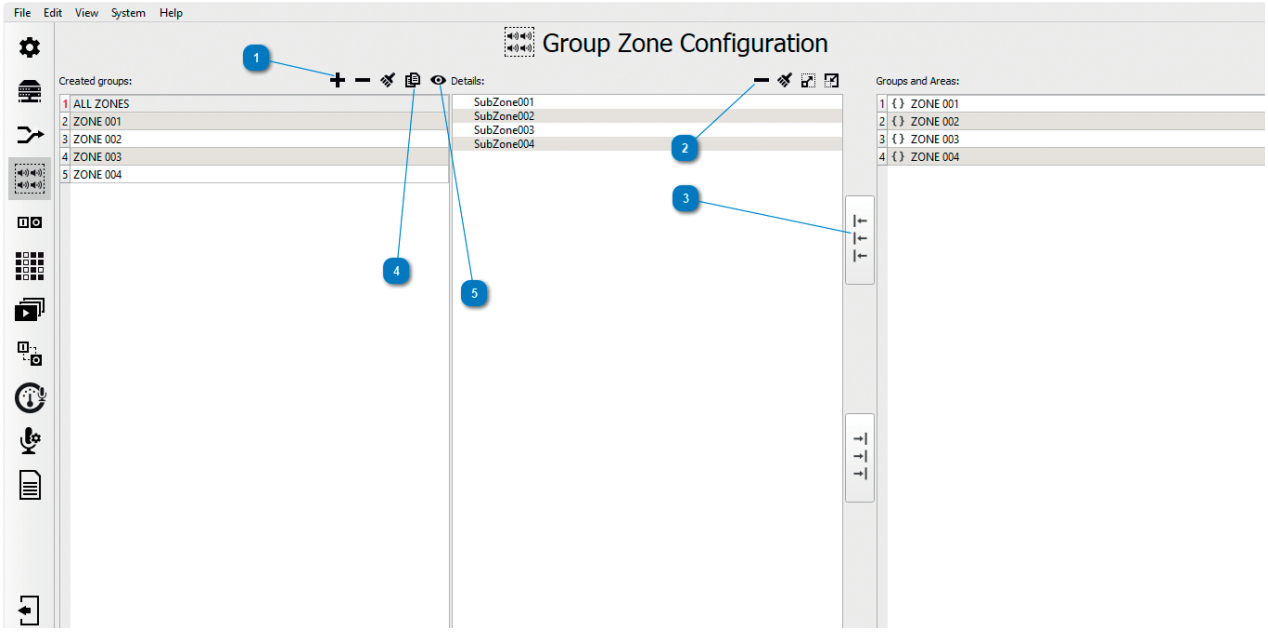
5 Priority group filtering

The filtering tool enables to display all audio sources from a selected priority group. To do this, click the left mouse button once on the All Types tab. This will result in options dropped down, then select a group and confirm activation of the filter by clicking Apply Filters.

6 Coexistence type

This function defines the systems behaviour when an incoming message has superseded the message occupying this zone at the moment. f the superseding message / audio source is defined as Continue After Ending it means that the system will return to transmitting the previous (lower priority) message after a higher priority message has ended. If the superseding message / audio source is defined as Remove All After Ending then after the end of the higher priority (superseding) message, the lower priority message will not be restored.

13.6 Group Zone Configuration



This function is available only from the advanced configurator level – Basic Configuration – Configuration Mode – Advanced. It is used to combine any predefined speaker lines / zones into one. A group created in this way has the same functionalities in the system as a single zone.

In order to create a new group, the following must be done:

1. **Using the + icon**, a new group is created whose generic name is ZoneGroup0000x; the name is editable by moving the mouse cursor over it and pressing the left mouse button.

2. From the **Group and Areas** tab, the column on the right hand side of the screen, move the mouse cursor over available Subzones, Zones and add elements to the group by double-clicking of the left mouse button.

3. It is also possible to add all available subzones and zones by means of the dedicated icon .

4. **Group cloning function: Clone Group** – this is available under the icon . Highlight the previously created group by moving the mouse cursor over its name and by clicking the left mouse button once. Then select the icon . Clone group results in creating a new group of the identical composition as the source group.

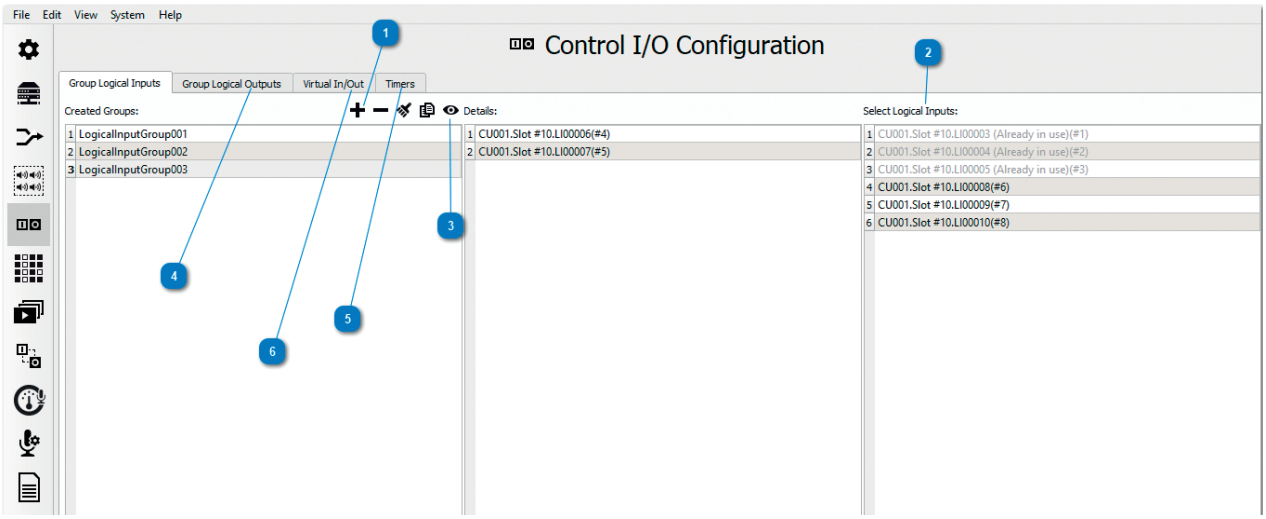
5. **Group element graphic view: Preview Group** – this is available from the icon . This function presents, in a graphic form, in one table, all groups which have been created, as well as their members.

	SubZone001	SubZone002	SubZone003	SubZone004
ALL ZONES	●	●	●	●
ZONE 001	●			
ZONE 002		●		
ZONE 003			●	
ZONE 004				●

13.7 Control I/O Configuration

This tab is only available from the advanced configurator level – Basic Configuration – Configuration Mode – Advanced. The tab consists of 3 pages: Group Logical Inputs, Group Logical Outputs and Timers.

13.7.1 Group Logical Inputs



Group Logical Inputs – this is grouping two or more logical inputs in order to trigger action in the system for a specified condition.
In order to create a group:

1. **Using the + icon**, create a new group with the generic name LogicalInputGroup0000x; the name is editable by moving the mouse cursor over it and pressing the left mouse button.

2. From the **Select Logical Input** tab, using the left mouse button, add elements to the group. Each of the elements can only be assigned to one group.

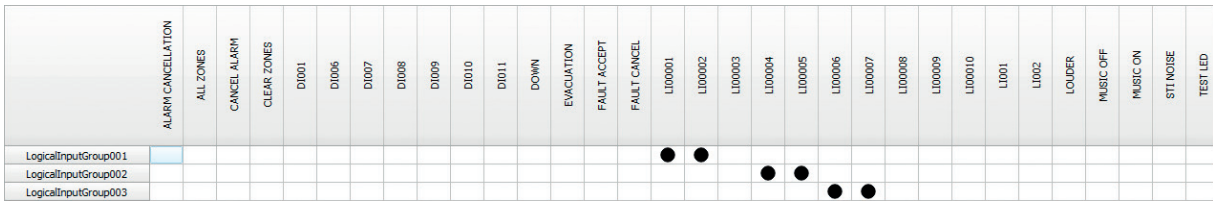
   The created group is shown in the Event Configuration tab, in the Input tab. For a logical input group, execution of the action, as assigned to the group, is determined by fulfilling the Condition from the Event Configuration tab. Condition value =1, =0, = decimal value, < decimal value, > decimal value, <= decimal value, >= decimal value. The decimal value entered is to be interpreted in the following way – each group member has an item assigned: the first added element in the middle table from the Control I/O Configuration tab – Group Logical Inputs comprises the bit of the smallest weight, found in the digital word, rightmost. The last element from the group is the bit of the biggest weight, leftmost. A binary number created in this way must be translated into the decimal system and entered into the condition.

   For NO (Normally Open) Default Logical Inputs – 1 is input closing, 0 – opening. NC (Normally Closed) Default Logical Input – 1 is input opening, 0 – closing. If we want to programme a logical input group, e.g. Input 1 NO, Input 2 NO, to trigger any function following closing of both inputs, enter the condition = 3 (11 in the binary numeral system).

   In case of a 2-input group, we have the following condition options:
   00 = 0 Opening of both inputs,
   01 = 1 Closing of Input 1 and opening of Input 2,
   10 = 2 Opening of Input 1 and closing of Input 2,
   11 = 3 Closing of both inputs;

If we have a group of 3 logical inputs, Input 1 – NO, Input 2 – NO, Input 3 – NO, we have the following condition options:
100 = 4 In 1 open, In 2 open, In 3 closed
101 = 5 In 1 closed, In 2 open, In 3 closed
110 = 6 In 1 open, In 2 closed, In 3 closed
111 = 7 In 1 closed, In 2 closed, In 3 closed

3 **Group element graphic view: Preview Groups** – this is available under the icon . This function presents, in the form of a graphic matrix, in one table, all groups which have been created, as well as their members.



4 **Group Logical Outputs** – this is grouping of two or more logical (relay) outputs in order to simplify assignment of many relay inputs to a given event in the system.

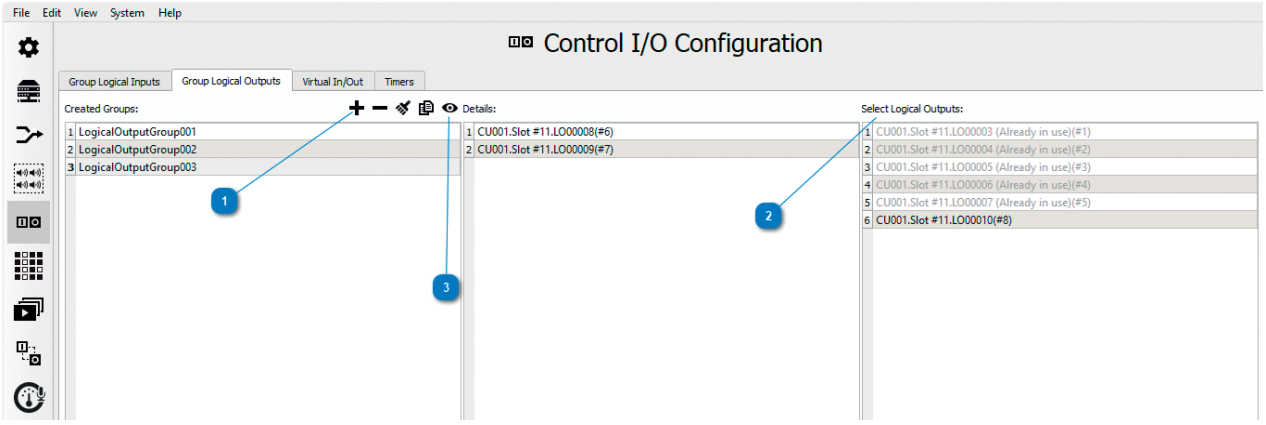
5 **Timers**

The Timers functions serves to create elements triggering given actions in the MULTIVES system, using time dependences.

6 **Virtual In/Out**

Iit is used to create logical (virtual) inputs, by means of which we can run defined functionalities in the system or activate virtual output. Virtual logic input is activated by means of an SMS protocol, used for communication with monitoring and system management platforms.

13.7.2 Group Logical Outputs



Group Logical Outputs – this is grouping of two or more logical (relay) outputs in order to simplify assignment of many relay inputs to a given event in the system:

1 **Using the + icon**, create a new group with the generic name LogicalOutputGroup0000x; the name is editable by moving the mouse cursor over it and pressing the left mouse button.

2 From the **Select Logical Outputs** tab, using the left mouse button, add elements to the group. Each of the elements can only be assigned to one group.

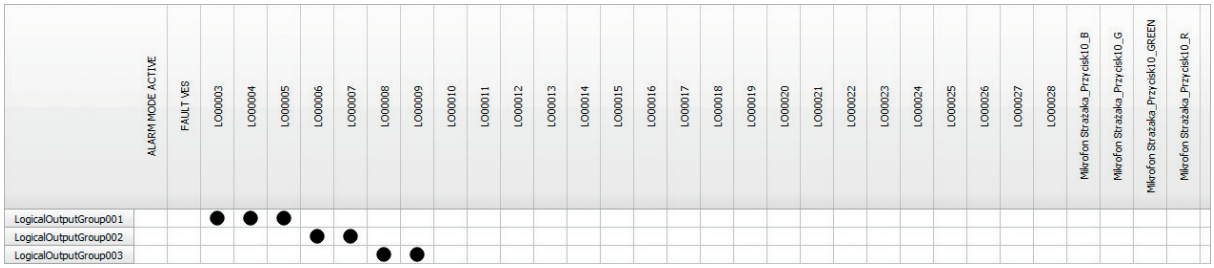
The created group is shown in the Scenario Configuration – Add control outputs action tab, as well as in Event Configuration, having selected any Input, and then assigning the General – Components Groups function to it. For a logical output group, execution of a relay output group is determined by the State parameter which is a decimal number. The decimal value entered is to be interpreted in the following way – each group member has an item assigned: the first added element in the middle table from the element from the Control I/O Configuration tab – Group Logical Outputs comprises the bit of the smallest weight, found in the digital word, rightmost. The last element from the group is the bit of the biggest weight, leftmost. A binary number created in this way corresponds to the states of relay outputs from the group, as set.

For NO-type (Normally Open) Logical Outputs – 1 is a closed output, 0 – opened. For NO Inverted relays: 1 – is an opened output, 0 – closed. For NC-type (Normally Closed) Logical Outputs – 1 is an opened output, 0 – closed. For NC Inverted relays: 1 – is a closed output, 0 – opened.

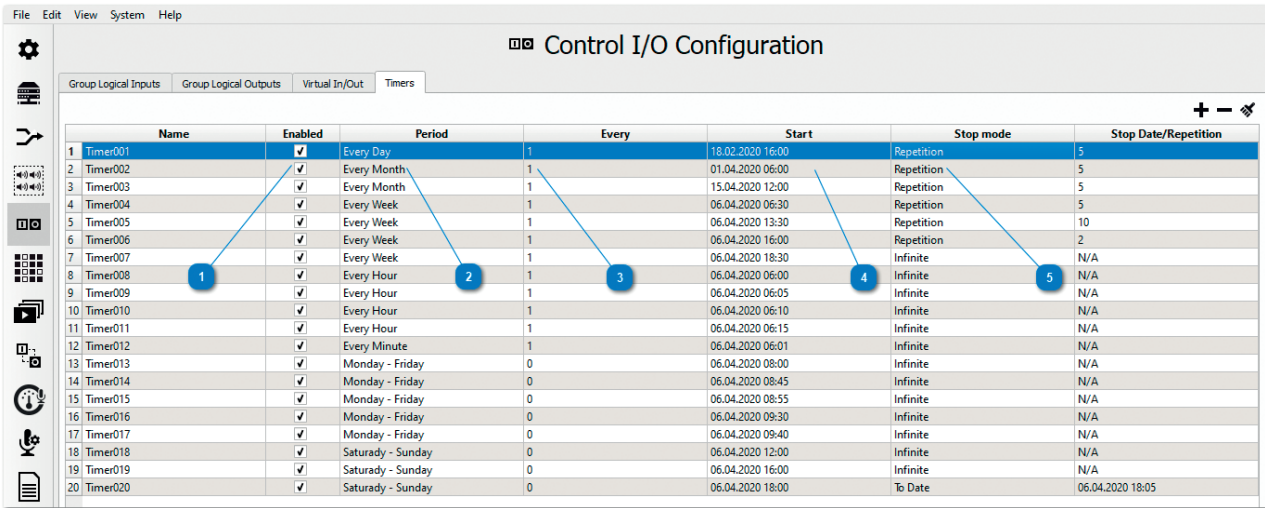
In case of a NO 2-output group, we have the following manipulation options, depending on the State value:
State = 0 Opening of both outputs (00)
State = 1 Closing of Output 1 and opening of Output 2 (01)
State = 2 Opening of Output 1 and closing of Output 2 (10)
State = 3 Closing of both outputs (11)

If we have a group of 3 logical outputs, Output 1 – NC Normal, Output 2 – NC Normal, Output 3 – NC Normal, we have the following manipulation options, depending on the State value:
State = 4 Out 1 close, Out 2 close, Out 3 open (100)
State = 5 Out 1 open, Out 2 close, Out 3 open (101)
State = 6 In 1 closed, In 2 open, In 3 open (110)
State = 7 In 1 open, In 2 open, In 3 open (111)

3 **Group element graphic view: Preview Groups** – this is available under the icon 👁. This function presents, in the form of a graphic matrix, in one table, all groups which have been created, as well as their members.



13.7.3 Timers



	Name	Enabled	Period	Every	Start	Stop mode	Stop Date/Repetition
1	Timer001	✓	Every Day	1	18.02.2020 16:00	Repetition	5
2	Timer002	✓	Every Month	1	01.04.2020 06:00	Repetition	5
3	Timer003	✓	Every Month	1	15.04.2020 12:00	Repetition	5
4	Timer004	✓	Every Week	1	06.04.2020 06:30	Repetition	5
5	Timer005	✓	Every Week	1	06.04.2020 13:30	Repetition	10
6	Timer006	✓	Every Week	1	06.04.2020 16:00	Repetition	2
7	Timer007	✓	Every Week	1	06.04.2020 18:30	Infinite	N/A
8	Timer008	✓	Every Hour	1	06.04.2020 06:00	Infinite	N/A
9	Timer009	✓	Every Hour	1	06.04.2020 06:05	Infinite	N/A
10	Timer010	✓	Every Hour	1	06.04.2020 06:10	Infinite	N/A
11	Timer011	✓	Every Hour	1	06.04.2020 06:15	Infinite	N/A
12	Timer012	✓	Every Minute	1	06.04.2020 06:01	Infinite	N/A
13	Timer013	✓	Monday - Friday	0	06.04.2020 08:00	Infinite	N/A
14	Timer014	✓	Monday - Friday	0	06.04.2020 08:45	Infinite	N/A
15	Timer015	✓	Monday - Friday	0	06.04.2020 08:55	Infinite	N/A
16	Timer016	✓	Monday - Friday	0	06.04.2020 09:30	Infinite	N/A
17	Timer017	✓	Monday - Friday	0	06.04.2020 09:40	Infinite	N/A
18	Timer018	✓	Saturady - Sunday	0	06.04.2020 12:00	Infinite	N/A
19	Timer019	✓	Saturady - Sunday	0	06.04.2020 16:00	Infinite	N/A
20	Timer020	✓	Saturady - Sunday	0	06.04.2020 18:00	To Date	06.04.2020 18:05

This is a function used to create elements activating given actions in the MULTIVES system. In order to create a timer, click the + icon in the Control I/O Configuration – Timers tab. In this way a timer is created with the generic name Timer00000x; the name is editable by moving the mouse cursor over it and pressing the left mouse button. **Each timer has the following set of parameters:**

1. **Enabled (check box)** – Timer activity window. It is used to deactivate the timer if we do not want a given event, which is triggered by the timer, to be executed, and we do not want to remove the event from the system, then to do this we deactivate a selected timer.

2. **Period – activation period:**
   - annual
   - monthly
   - weekly
   - daily
   - hourly
   - minute
   - (Monday through Friday)
   - (Saturday & Sunday)

3. **Every** – the time interval number between the activations depending which parameter is selected from the Period window. If Every Minute is selected and the Every parameter is set to 15, this means activation of the timer every 15 minutes.

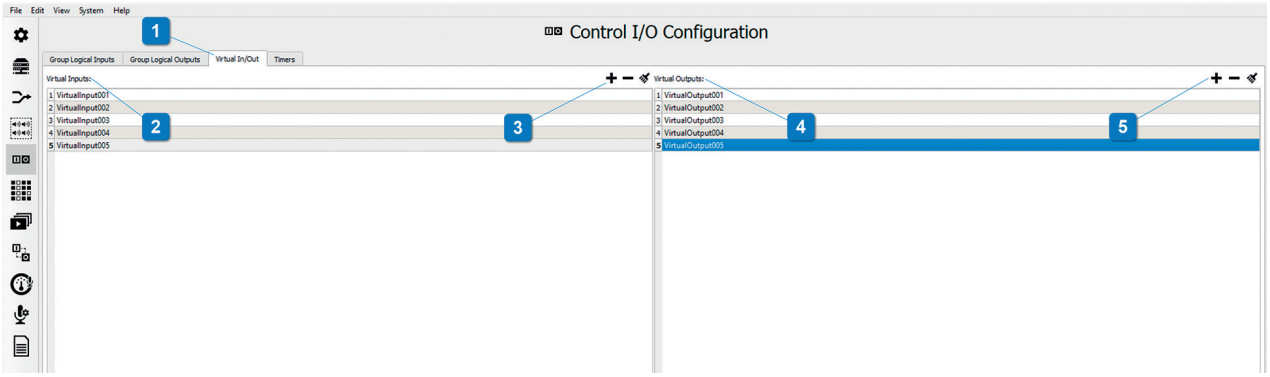
4. **Start** – defines the exact date and time of the first activation of the timer.

5. **Stop** – defines ending the operation of the timer, the available options being:
   - To date – the date and time to end activation
   - Infinite – activation without defining the end
   - Repetition – the exact specification of the number of repetitions

A defined timer is available in the Event Configuration tab, in the Input column, and all system functions can be assigned to it, as to zone microphone or logical input buttons.

13.7.4 Configuration of virtual inputs and virtual outputs

Virtual inputs and outputs are used for network integration with 3rd party systems. They work as usual logical inputs, but can be triggered via LAN network, similarly logical outputs can send information via LAN network that virtual output has been closed or opened.



1 **Virtual In / Out tab**
In this tab you can add virtual logic inputs and virtual logic outputs.

2 **Virtual Inputs window**
Here you can define number of Virtual Inputs.

3 **Buttons** (from left): Add Virtual Input, Remove Virtual Input, Remove all Virtual Inputs.

4 **Virtual Outputs window**
Here you can define number of Virtual Outputs.

5 **Buttons** (from left): Add Virtual Output, Remove Virtual Output, Remove all Virtual Outputs.

Virtual Inputs, once added will appear in Event Configuration Panel.

How to trigger Virtual Input?

ID of Virtual Input can be found in ci.lua file in:
C:\Users\[USER]\Documents\Selector\Workspaces_[FW_VERSION]\[PROJECT_NAME]\tmp\conf
(search for Virtual Inputs in file, LUA file can be opened in Notepad)

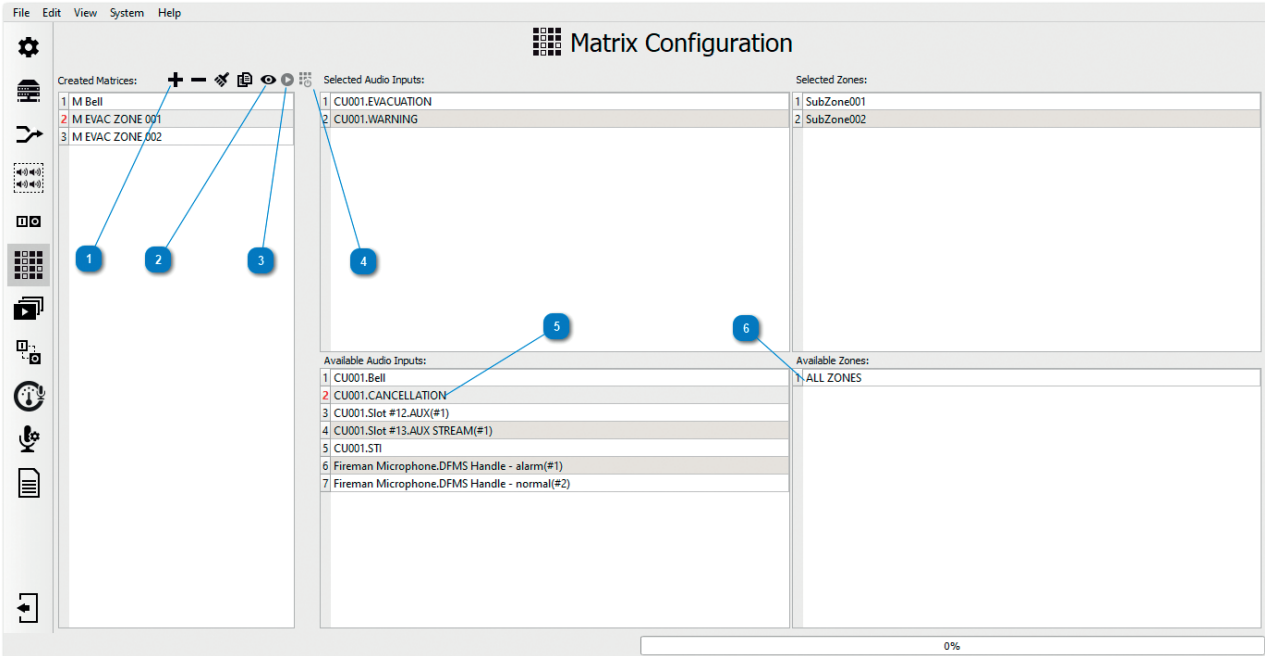
How to activate Virtual Output?

In General function select Add Control Output Action, then as a Component chose Virtual Outputs.



Then, find co.lua file in:
C:\Users\[USER]\Documents\Selector\Workspaces_[FW_VERSION]\[PROJECT_NAME]\tmp\conf
(search for Virtual Outputs in file, LUA file can be opened in Notepad)

13.8 Matrix Configuration



Matrix Configuration is used to create connections of all audio sources available in the system to audio outputs.
The tab has 3 sections: creating Matrices, audio sources and speaker zones or zone group.

1 **Matrix editing tab**

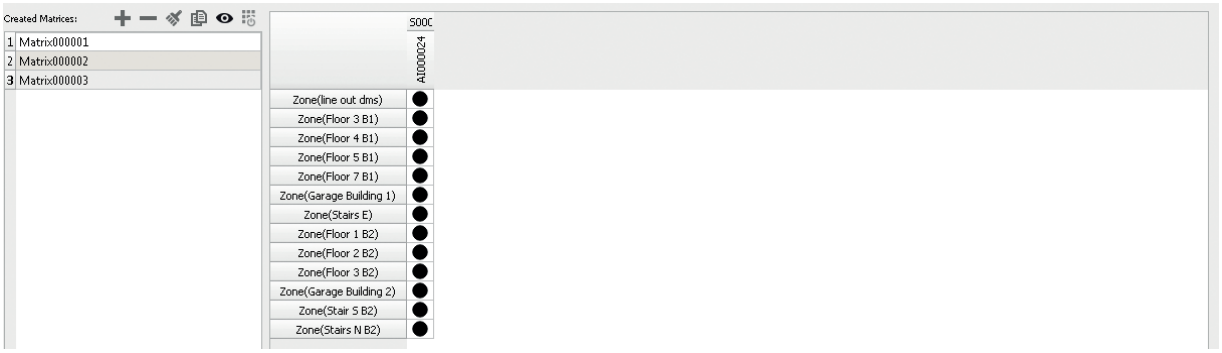
By means of the icon +, a new matrix is created with a generic name which can be change by double-clicking of the left mouse button on the matrix name. Creating the first matrix in the system, we activate the available audio source and available speaker zone field.

Icon − results in deleting the marked matrix completely.

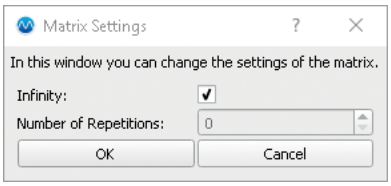
Icon deletes all previously created matrices.

Matrix cloning function: Clone Matrices – this is available under the icon . Highlight the previously created matrix by moving the mouse cursor over its name and by clicking the left mouse button once. Then select the icon . Clone Matrices results in creating a new matrix of the identical composition as the source matrix.

2 **Matrix element graphic view: Preview Matrices** – this is available under the icon . This function presents, in the form of a graphic matrix, in one table, all created connections of audio sources to the selected matrix outputs. Moving the mouse cursor over the matrix name and clicking the left mouse button once results in displaying the elements of a selected matrix in the Preview Matrices table. The output from the Preview mode is executed by a single click of the left mouse button on the icon .



3 **Matrix settings** – the number of message repetitions specific to the matrix is accessible under the icon . If the Infinity checkbox is ticked the message is played back in a continuous loop. Untick the checkbox to gain access to setting the number of repetitions of the message with the maximum number being 100.



4 **Test dynamic matricing** – available under the icon .

This is a service function which enables creation of dynamic audio connections from the configurator for testing/servicing purposes. This option is active only if and when the system has a configuration loaded and the computer with the configuration software is connected to the system and has the same configuration as the system. Setting a connection is executed by selecting an audio source from the first column – a single click of the left mouse button, and then selecting a speaker zone from the second column – a single click of the left mouse button, followed by selection of the + icon.

The − icon deletes all single connections, whereas selecting the icon deletes all connections which have been set.

5 **Available Audio Inputs**

Audio sources available in the entire system. Double-click a chosen audio source to transport it to the Selected Audio Inputs field.

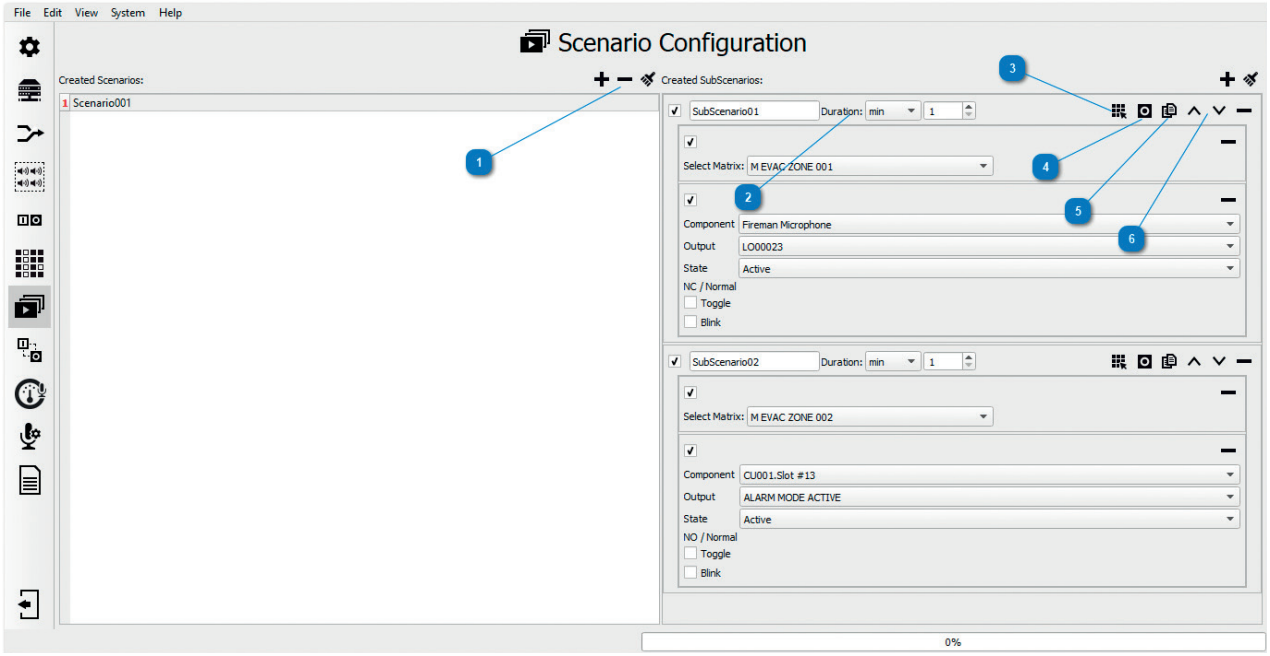
6 **Available Zones**

Available speaker zones, as declared in the system. Double-click a chosen speaker zone to transport it to the Selected Zones field.

In order to create a matrix correctly:

1. **Create a matrix by selecting the + icon**.
2. **Select an audio source** – a double click of the left mouse button on any element from the available audio input list.
3. **Select a zone** – a double click of the left mouse button on any element from the available zone list. Remember that it is possible to assign only one audio source to a given zone within one matrix. Adding another audio source within one matrix makes any previously used zones unavailable for successive sources as they are already used with previously defined audio inputs.

13.9 Scenario Configuration



Scenario Configuration – this enables to create an event sequence that is time-limited in any way and executed one by one (SubScenario after SubScenario). Scenarios can consist of matrixes, logical (relay) outputs and individually created functions in the LUA language.

1 **Scenario editing tab** enables to create new scenarios, changing their names and deleting selected ones.

By means of the icon +, a new scenario is created, whose generic name can be changed by double-clicking the left mouse button on the scenario name.

Icon − results in deleting the marked scenario completely.

Icon deletes all previously created scenarios.

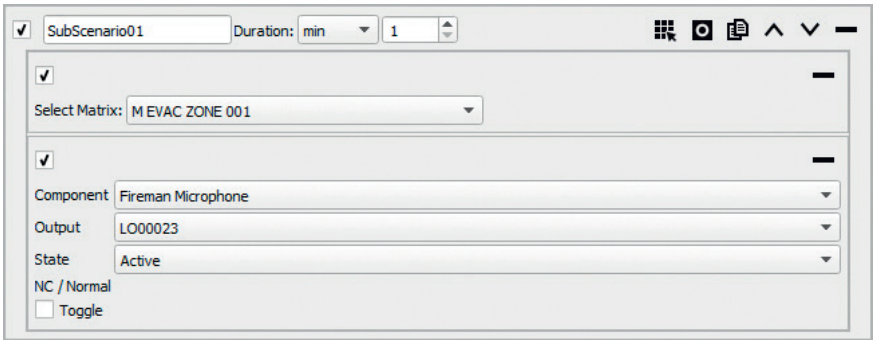
2 **Advanced scenario editing**

Each subscenario has a predefined duration (Duration). Available options include as follows:

- ms – millisecond (1000 ms = 1 second)
- s – second
- min – minutes
- hours
- days
- weeks
- years
- infinite (no end defined)

3 **Icon adds a matrix or a number of matrices to a subscenario**. It must be remembered that after the Duration time has expired, counting from activation of a given scenario, the created matrices are deactivated.

4 **Icon assigns available logical (relay) outputs to a subscenario**. Having added a logical output, the following windows are to be filled:



Component – select an output card or fireman microphone, a communications card containing the output we want to use.

Output – select from the list of available outputs on the device, from the Component tab, the output which we want to control.

State – allows to determine the final state of the relay contacts following activation. Active results in changing the relay state to the opposite one on execution of a scenario. For Inactive, the relay does not change its state when the scenario is activated.

NC/ Normal (Inverse) – informs of the initial state of a relay before activation of the function. If we set Active in the State, then activation of the scenario for an NC/Normal relay causes transition into NO – Normally Open. It must be remembered that after the Duration time has expired, as counted from activation of a given scenario, the assigned logical outputs remain in the state as defined in the subscenario. They do not return to the default settings.

By marking the Toggle option causes that each time when the output assigned to a scenario is activated, then the relay state changes into the opposite to the one which was set at an earlier activation. The default state at the first activation depends of the State field settings.

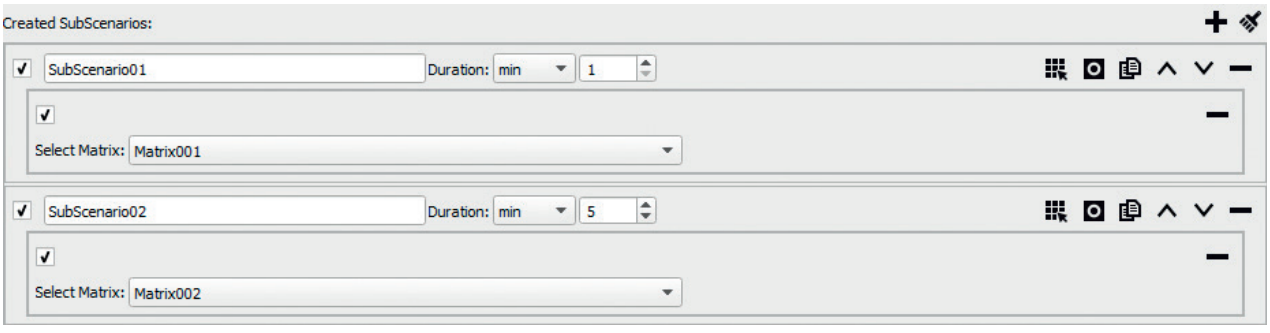
5 **Subscenario cloning function: Clone Subscenario** – this is available under the icon . A single click of the left mouse button on the icon creates a new subscenario of the identical composition as the one created before.

6 **Up / Down arrows** – enable to change the order in which scenarios are executed. The order of subscenario execution by the system is top to bottom according to the times, as declared in the Duration window.

Scenario Delay

Scenario delay is used to delay the actions, which will be executed by programmed scenario.

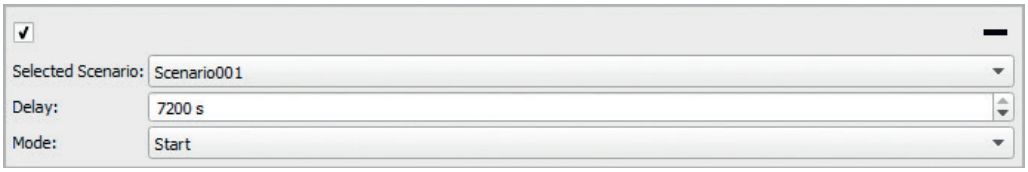
When scenario will be triggered, first SubScenario will take the place. When SubScenario01 will reach it's timeout (i.e. 1 minute like on example below) second SubScenario02 will take the place until it's timeout (5 minutes on example below), then the whole Scenario will be stopped.



If there is a need to delay the first SubScenario01 a function called Scenario Delay can be used.

			Condition	Value	Function
1	^	v	Active	N/A	Scenario Delay

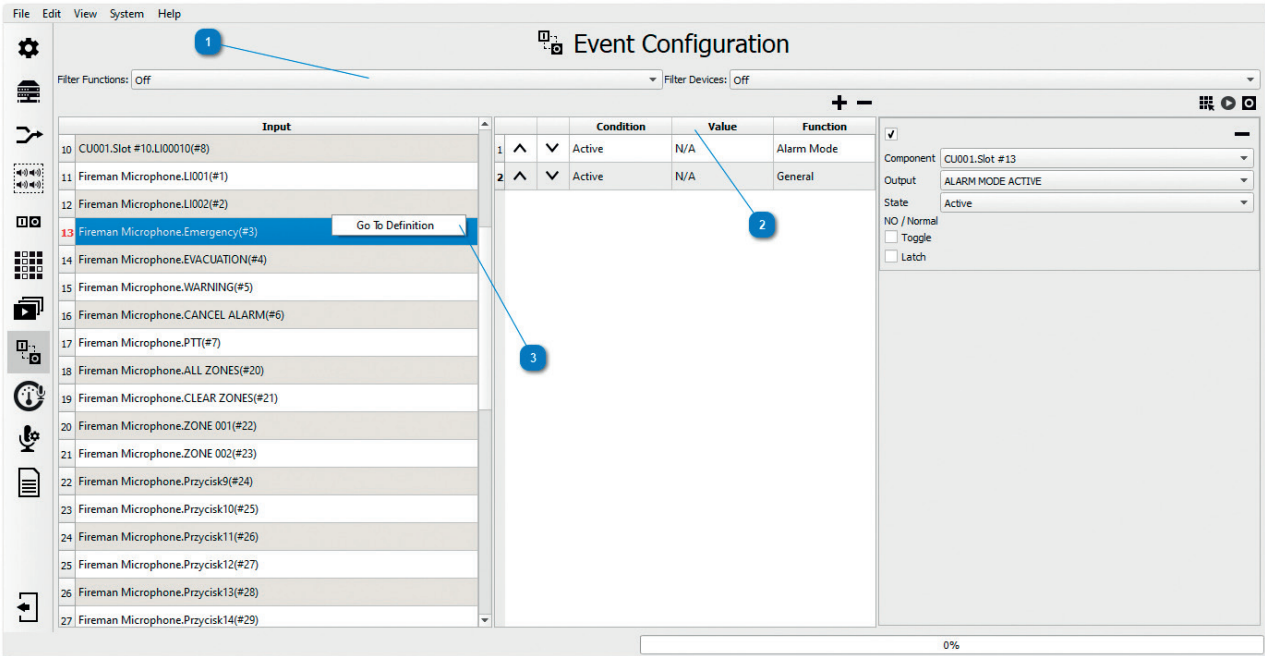
Delay time can be set between 1 second and 7200 seconds (120 minutes).



Example:

1. Delay time is set as 7200s
2. Scenario001 is triggered by control input
3. Delay clock is counting down from 7200s to timeout
4. When 7200s will pass, Scenario001 will be started
5. SubScenario01 will be performed for 1 minute, then will be stopped
6. Subscenario02 will be performed for 5 minutes, then will be stopped
7. Scenario001 will be stopped

13.10 Event Configuration



Event Configuration – this tab enables assignment of a selected system function to each logical input and button available on fireman and zone microphones, as well as scenario and matrix activation / deactivation. Moreover, in the Event Configuration – Inputs tab there are 4 system States available, to which one can assign any function, matrix, scenario, as well as define activation of relay outputs.

The signalled system states include as follows:

- **Alarm Mode** – will activate an assigned action upon the system entering the alarm mode.
- **Error** – will activate an assigned action upon detection of an error in the system.
- **Blocking** – activation of an action when blocking a single speaker zone.
- **Backup power** – activation of an action subsequent to the central unit detecting a 230 V AC power failure and switching to the emergency power source (batteries).

Assignment of any system function / action triggered by one of the above system states has been created to facilitate state signaling on any available element of the system, e.g. any output on a logic output card.

	Input
1	Alarm mode
2	Error
3	Blocking
4	Backup Power

1. The filters in the Event Configuration tab enable to search for any logical input or button sorted by the assigned function – Filter Functions, sorted by the device containing the given element – Filter Components or by using available inputs – Filter control inputs.

2. **In order to assign a function to any button or logical input:**

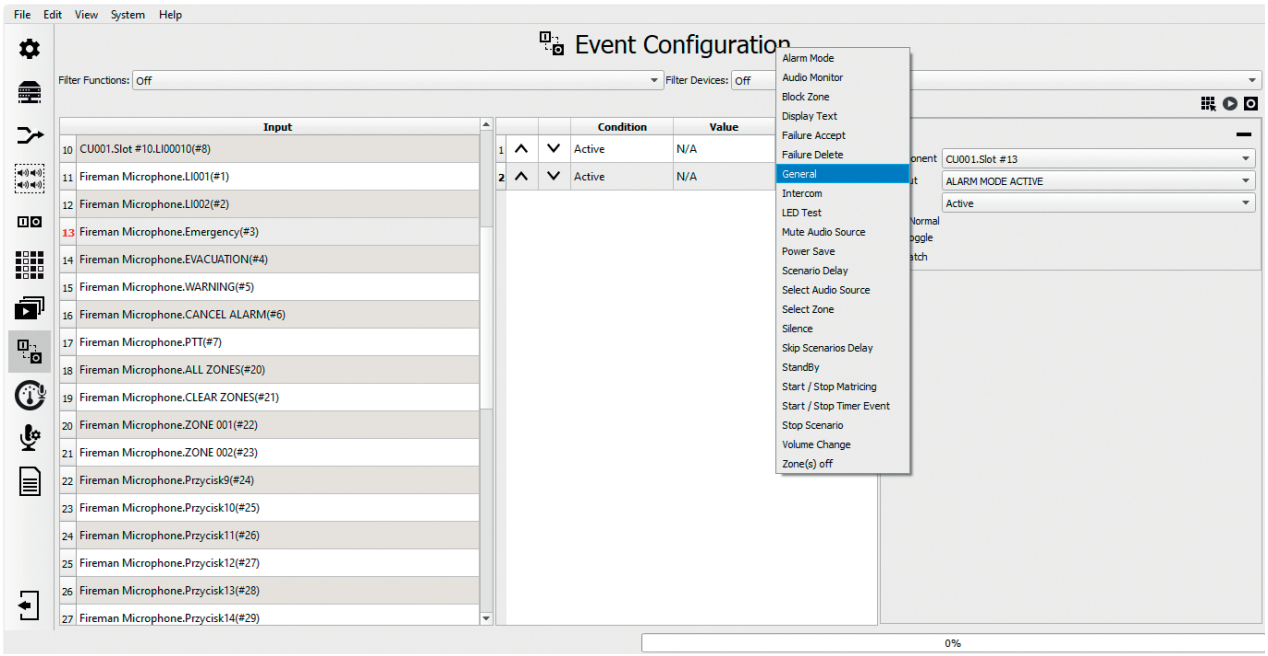
   1. Select an element from the Inputs list by single-clicking the left mouse button on the element name.

	Input
1	LI000003
2	LI000004
3	LI000005 (In Group)
4	LI000006
5	LI000007
6	LI000008
7	LI000009
8	LI000010

   2. Click the left mouse button once on the icon ✚, and then select an appropriate function from the Functions column in the window. It is possible to assign many function to one button or logical input.

3. **Go to Definition** is a quick access function which is activated by clicking the right mouse button while moving over onto the name of a logical input and any button in the Event Configuration – Inputs tab. The function results in going to detailed editing of the microphone, card, microphone extension, device in which the element being edited is located.

13.10.1 Functions



Alarm Mode

The alarm mode function results in the system entering into a detected threat warning and evacuation mode. In this mode, fireman microphones and evacuation-type messages are active All the other sources: BGM, General, Service, are inactive until the system goes out of the alarm mode. More information of assigning type to a sound source, message or zone microphone is to be found in the Priority Manager tab. The Alarm Mode can be activated in many ways. Most frequently by the dedicated Evacuation button on the fireman microphone or any programmable logic input located on the xLogIN-8c card, on the xNET-1Gb/WAN/RS communications card and the fireman microphone. The function itself my operate in three available modes: Start, Stop and Toggle.

Audio Monitor

The audio monitor function enables to hear a message / audio signal, as transmitted, in any zone on the built-in speaker of the ABT-DMS and ABT-DMS-LCD zone microphones. In order to programme the function in the MULTIVES, select a zone which we want to preview from the Source zone selection window and from the Target zone selection window below select the zone to which the zone microphone internal speaker is assigned. In order to activate the zone microphone speaker output enter the Zone microphone configuration window in the Audio outputs table, from the first line in the Connections field select the Output line. Having switched from No connection to Output line, the system creates a zone whose generic name is editable in the Name window. In this way a zone has been created consisting only of a zone microphone built-in speaker which is available in the Matrices configuration tab, as well as for all functions referring to speaker zones, including the audio monitor.

Block Zone

This function can have one or many zones assigned to it. Blocking a zone results in a total lack of possibility to transmit sources to a zone or zone group, regardless of the source type. The block zone is signalled by a constant, yellow LED on the button programmed as Zone selection having the highest signaling priority.

Custom

The window of this non-standard function enables to create, programme one's own function or series of actions for the system to execute. The code of the programme which is to be placed in the Custom field must be consistent with the syntax of the LUA language and refer to variables, functions and libraries defined by the Ambient System in the LUA language implementation instructions in the MULTIVES system.

Display Text

Activation of the display text function opens a dialogue box on a selected and available GUI screen in the system and prompts display of the text entered into the Text to display window.

Failure Accept

This is a global function which mutes the acoustic signalization of a failure within the entire system. The moment any failure occurs in the system, the yellow LED on the failure accept button blinks additionally on each element of the system equipped with a GUI, the buzzer goes off as well. Having accepted the failure, the yellow LED is lit and the persistent acoustic signal stops.

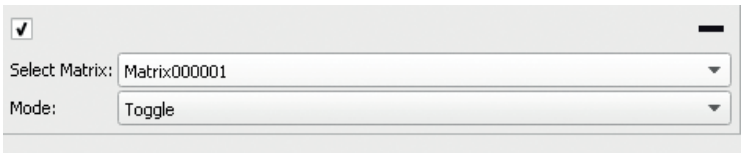
Failure Delete

Deleting a failure is a global function affecting the entire system. The function is active only if and when the system is in the failure status. Activation of the Failure delete results in resetting of the system element in which the failure was detected, and then running the system test procedure.

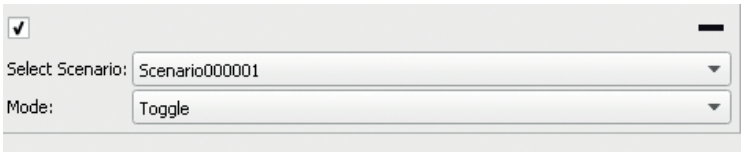
General

This function combines three main functionalities of the MULTIVES system: Scenarios, Matrices and logical outputs, alongside an access to RGB LED behaviour programming on zone microphones. The General function enables to assign to a logical input or a button of any defined scenario, matrix combination, alongside a possibility to define system LED and logical output activation in an individual way.

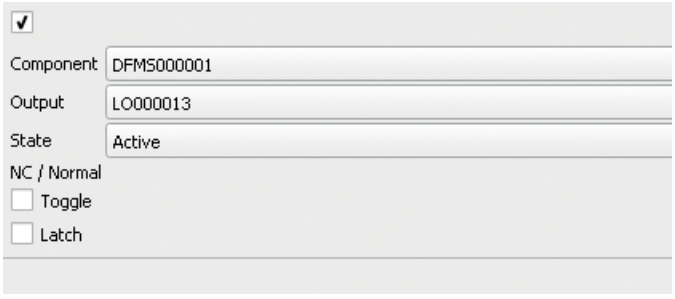
If in the General function, the icon is selected, then this function is assigned a matrix. Activation of the general function enables to activate or deactivate one or multiple matrices defined in the system, using one logical input or button on a zone / fireman microphone. Each matrix can have an individual activation mode assigned to it – start / stop / toggle.



If in the General function, the icon is selected, then this function is assigned a scenario. Activation of the general function enables to activate or deactivate scenarios using one logical input or button on a zone / fireman microphone. Each scenario can have an individual activation mode assigned to it – start / stop / toggle.



If in the General function, the icon is selected, then this function is assigned a selected logical / relay output. The figure below presents the options, as available:



Component – enables to select an output card or fireman microphone from the list, a communications card containing the output we want to use.

Output – enables to select from the available output list on the device, from the Component tab, an output which we want to control.

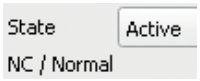
State – allows to determine the final state of the relay contacts following activation. Active results in changing the relay state to the opposite one on execution of the General for Inactive, the relay does not change its state when the General is activated.

NC/ Normal (Inverse) – this field informs of the initial state of a relay before activation of the function. If we have Active in the State, then activation of the General function for an NC/Normal relay causes transition into NO – Normally Open. If we have Active in the State, then activation of the General function for an NC / Invers will cause transition into NC – Normally Closed.

By marking the Toggle option causes that each time when the output assigned to the General is activated by such a system element as a logical input or button on a zone microphone, the relay state changes into the opposite to the one which was set at an earlier activation. The default state at the first activation depends of the State field settings.

Latch

Marking the Latch option results in a relay output changing its status to the opposite one than specified in the information field located below the State tab (see Figure below) on the first activation of the General function.



The relay does not change its state into the opposite one, does not return to the settings defined in the relay information field on deactivation of the General function.

Intercom

This function sets up an intercom connection between two microphones available in the system. The Select microphone from field is automatically migrated by the device containing the key we are assigning the intercom function to. In the Select microphone to field the recipient of the intercom connection should be chosen. The Enable sound when call appears checkbox lets the user define the acoustic signals for the connection, Select the sound for initialization of call being the sound we hear while waiting for the recipient to answer the call on the device that initializes it. The Select sound for incoming call field defines the sound we hear on the device being a recipient of an awaiting connection.

LED test

The LED test function activates all LEDs on the element to which it is assigned. In addition, activation of this function on the fireman microphone triggers the warning buzzer signal. The function can be activated in three modes.

Mute audio source

This function mutes one selected audio source in all matrices to which it is assigned. In the Source selection window, select from the available and defined audio inputs, microphones and messages in the system to define the function correctly. Stopping the Mute audio source function results in turning up the audio source volume to the full level and restoring the matrices to the state before activation of the mute function.

Power Save

The power save function disconnects all active BGM and General-type sources. The function is activated by dynamic assignment. The function can be activated in three modes. Deactivation of the Power Save function results in restoring the previously disconnected sources.

Record Message

This function is used to record messages directly from the ABT-DMS, ABT-DMS-LCD zone microphones without having to connect to the system via dedicated software and during the system's normal operation. Messages are recorded in the flash microSD memory on the control unit to which the zone microphone is directly connected. Message recording is signalled by a red LED at the Record Message button. The function records a message into a file whose name is defined in the configurator, in the Message window. In case of filling up the memory, this is signalled by a yellow LED. Replaying of a recorded message is executed via the Select Audio source function for which one of the predefined names is assigned from the list: Message1, Message2, Message3.

Scenario Delay

This function cause a time delay in the scenario execution. The maximum time to declare a delay in a scenario execution is 600 seconds. In order to execute the scenario with a delay, activate the scenario delay function and then activate scenario execution via the General function. The period of the delay from the moment of activation of a scenario is signalled by a purple LED blinking.

Select audio source

This function enables easy execution of the dynamic matricing function. Dynamic matricing consists of creating a matrix (combining a source to speaker lines) from a zone microphone or GUI in any configuration according to the user's current needs. The following items can be assigned as an audio source: messages, fireman microphones and all available zone microphones and their audio inputs. In order to initiate dynamic matricing, select dedicated Zone selection buttons in the given order: highlight the zone or zone group to which we want to transmit to, then – using the Source selection button – initiate transmission of the programmed source into the selected zones.

Select Zone

The zone selection function serves to assign one zone or a zone group to a selected button. Having selected the function in the configurator, assign the selected zone in the Select Zone field, and then select one of the activation modes.

Silence

This is a global function which deletes all active sound sources of the BGM or General priorities. This function is available only for logical inputs and the ABT-DFMS fireman microphone buttons and may be activated even if the fireman microphone is not in the alarm mode. If the Silence mode is active (a red LED on the microphone at the Silence function button is on), then BGM and General matrices cannot be activated. Deactivation of the function unblocks priority matricing.

Skip Scenarios Delay

This is a global function and results in prompt execution of all scenarios for which the delay time countdown has started (purple LED blinking).

Stop Scenario

The function results in stopping execution of a scenario, as declared in the configurator. The scenario stop causes switching off all active matrices included in the scenario, whereas the status of the relay outputs which might have been a part of the scenario remains consistent with the programmed state at the moment of stopping the scenario.

Start / stop matricing

The function enables activation or deactivation, via one logical input or button on the zone / fireman microphone, of one or many matrices, as defined in the configurator. Each matrix can be assigned an individual activation mode – start / stop / toggle.

Zone(s) off

The function acts on the principle of dynamic assignment, i.e. in order to activate the function, one needs to follow a predefined order. The first activity is to select a zone or many zones using the programmed button Select Zone, then the Zone(s) off button is selected. Thus activated, the function causes irreversible disconnection of all active sound sources of BGM, General, Service priorities.

External Fault CIN

The External fault CIN can only be assigned to a system logical input. Having activated the logical input to which the function is assigned, in the fault window on the GUI, as well as in system logs, an entry will be displayed with the name of the logical input. Change the name of the logical output in order to identify the fault-reporting device in an unequivocal way.

Volume change

The volume change function controls levels of audio outputs and inputs in the MULTIVES system. The function is activated by dynamic assignment. There are two methods of volume change execution in the configurator:

1. Change – the level of signal at an audio output will be decreased or increased by the value declared in decibel in the Volume window compared to the level set in the audio output individual configuration window. Each successive activation of the function within the Change mode results in a decrease or increase by the value with respect to the level having been set.
2. Set – the level of the signal of an audio output will be set to the value declared in decibel in the Volume window.

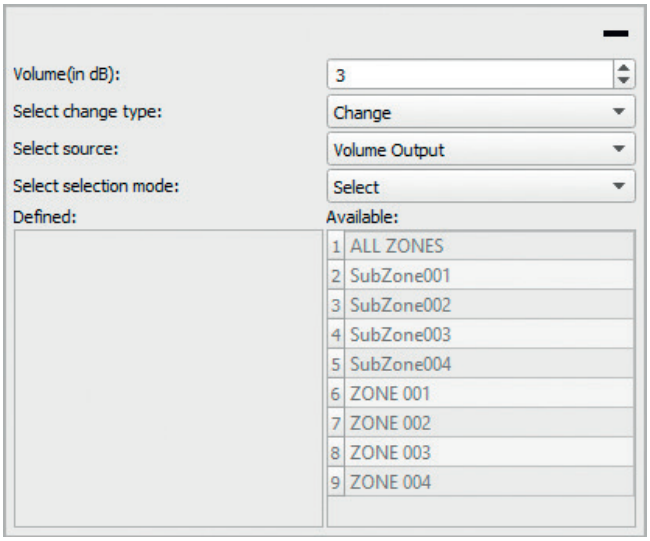
If the control unit utilizes only matricing using common HVaudioBus, then the Volume change function is not active.

The volume can be adjusted in two modes, depending on the choice of the place where it will be performed:

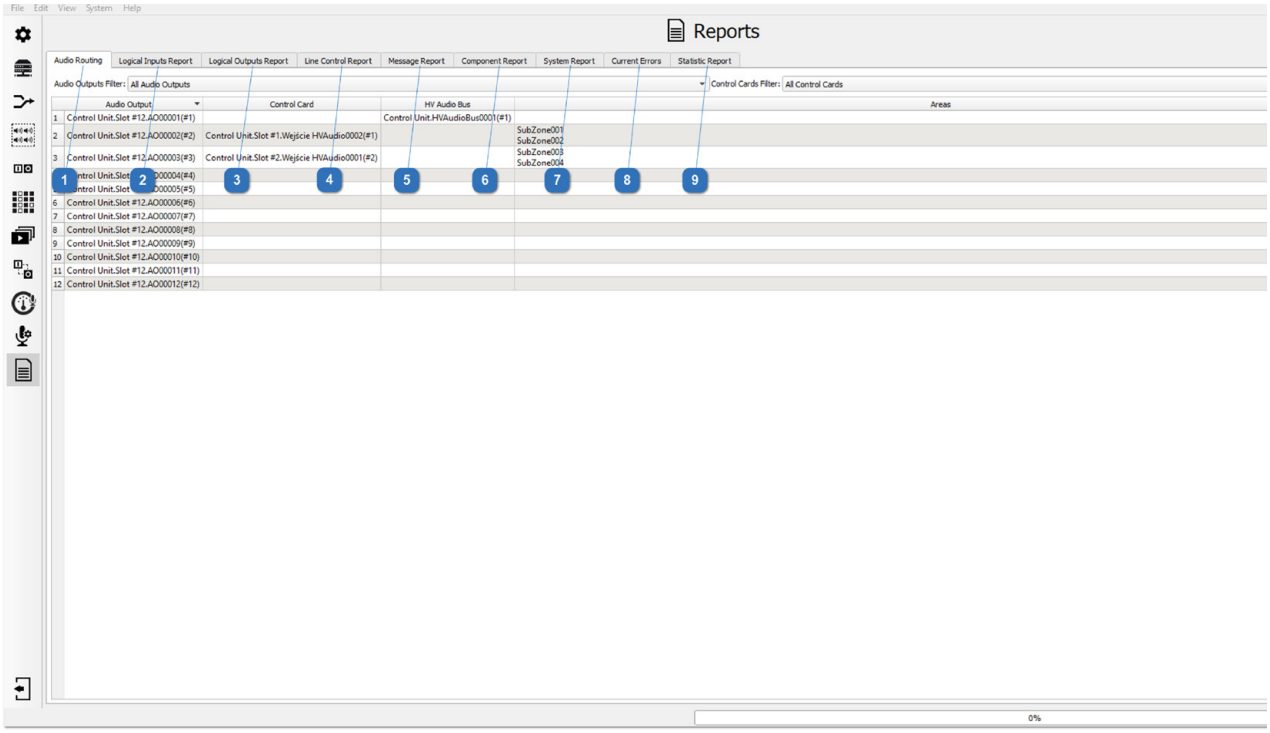
- Volume Output: the adjustment is made on the audio card outputs and applies to all audio signals
- Volume Input: the adjustment is made only on the audio card inputs and applies to external audio signals connected to dedicated inputs in ABT-ISLE modules.

Additionally in the Select zone selection mode field you can choose between:

- Selected zones – meaning that dynamic assignment is being applied. Choose the zones by pressing the dedicated zone selection button and then use the volume change function.
- Defined zones – meaning that the zones affected by the function are predefined. In this mode the volume control is activated immediately after pressing the assigned button with no need of selecting the zones. To predefine affected zones double-click the desired items in the Available zones field.



13.11 Reports

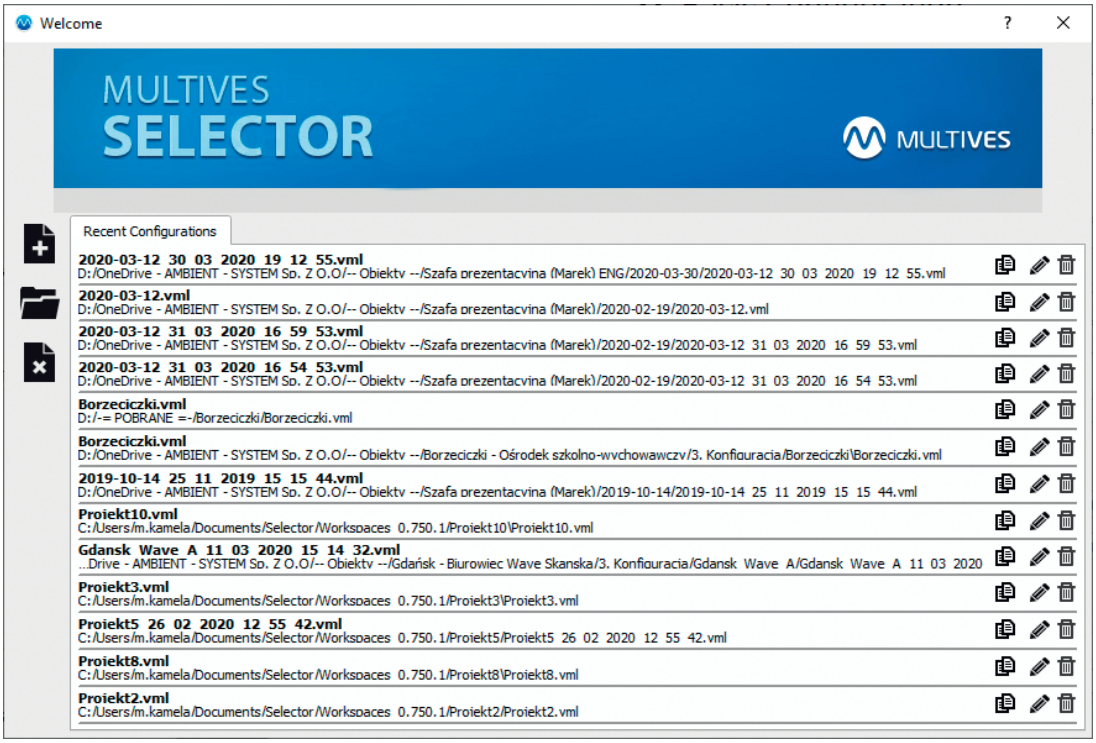


1. **Routing audio** –this is the list of all audio connections in the system.
2. **Logical Input Report** – this is a list of all logical inputs with information about the current operating mode NO / NC.
3. **Logical Output Report** – this is a list of all logical outputs with information about the current operating mode NO / NC.
4. **Line Control Report** – the list of measured impedance references saved in the system.
5. **Message Report** – lists all messages loaded into the system.
6. **Component Report** – a quantitative list of all cards, zone/fireman microphones, touch screens included in the MULTIVES system. In addition, there is a summary of available audio inputs and outputs, logical inputs and individual component software versions.
7. **System Reports** – a list of all failures and software events that occurred during normal operation. The system is capable of storing and reading over 100 thousand single events. An advanced filtering method, using date, unit and system state, makes it much easier to identify a problem which occurred in the system.
8. **Current errors** – list of current errors in the system.
9. **Statistic Report** – enables displaying of all available service data from diagnostic modules located on SFP slots. This is a unique function which shortens the time needed to verify the quality of the optical fibre and eliminate communications faults by displaying, among others, the strength of the signal transmitted and received, the number of lost packages or the internal temperature of the SFP insert.

13.12 Basic steps required for programming of the system

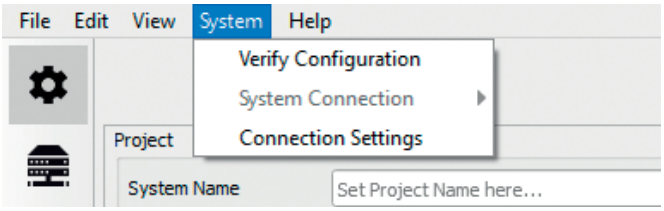
To program the basic version of the MULTIVES system it is recommended to follow the list of steps shown below:

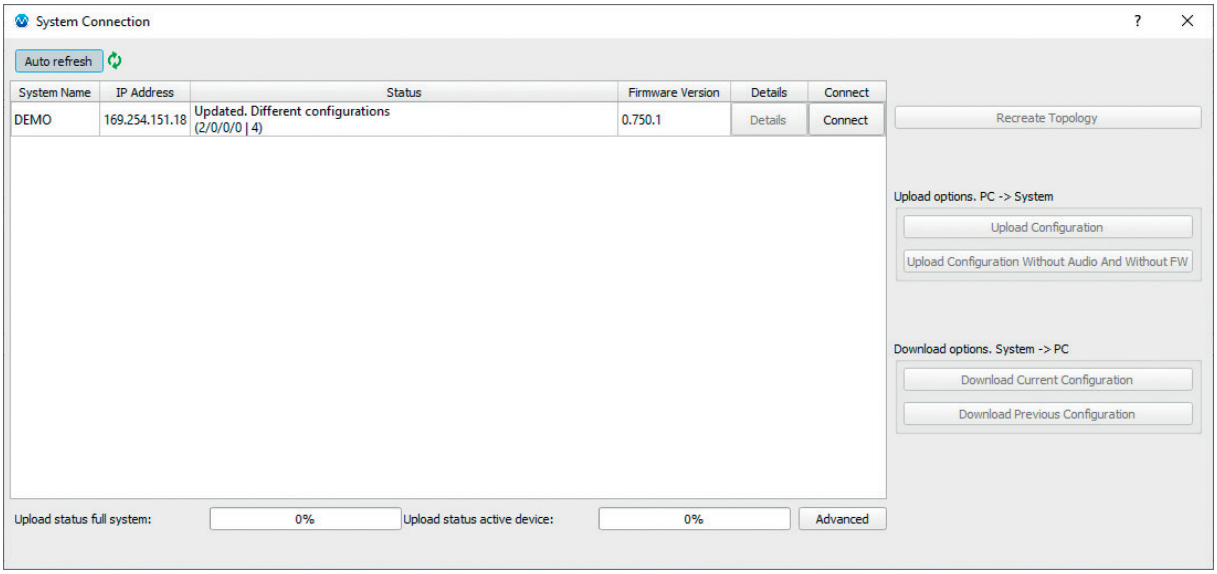
1. Create a new project by the New configuration button . This will create a folder in which all configuration data will be saved.



2. Connect the computer's network card with MULTIVES Selector software to the port labeled LAN/WAN on the control unit or DFMS (from firmware version 0.750.1, communication via the LAN / WAN port is done using an encrypted protocol).

3. To connect to the system, go to the System tab and then click Connection Settings.
   If the MULTIVES server did not appear – read FAQ 1.

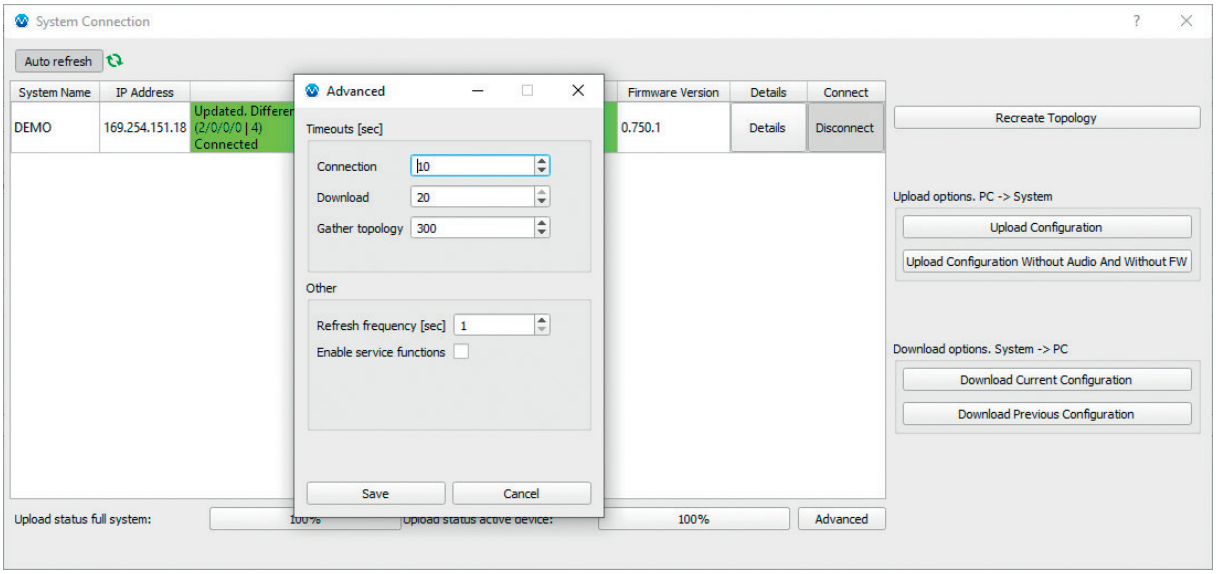




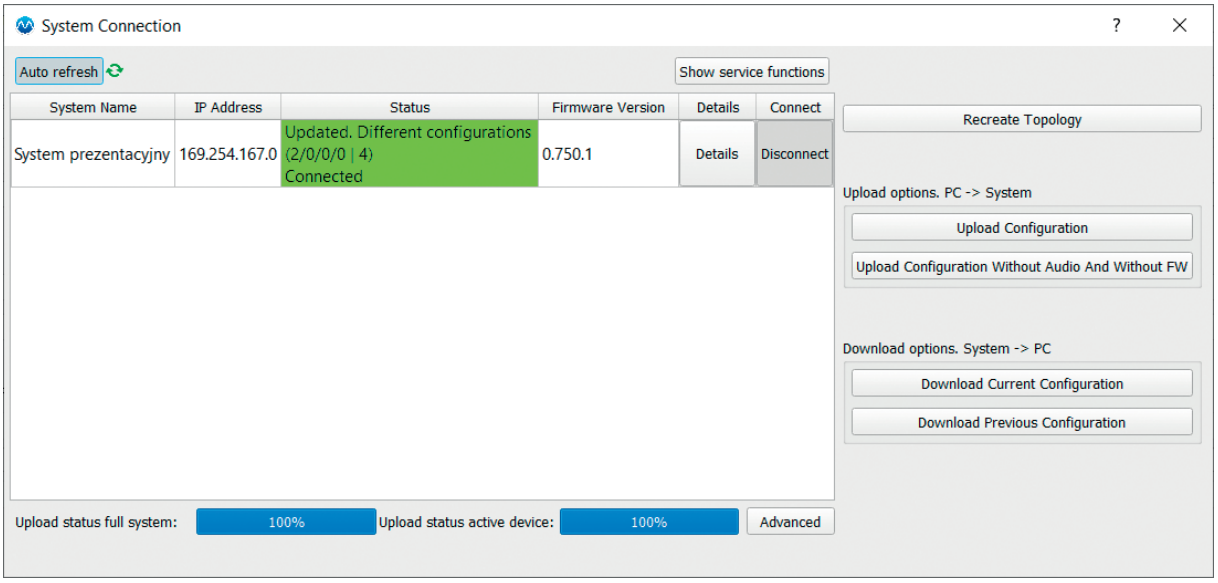
Correct connection with the system will result in highlighting the green status field and displaying the Connected status.



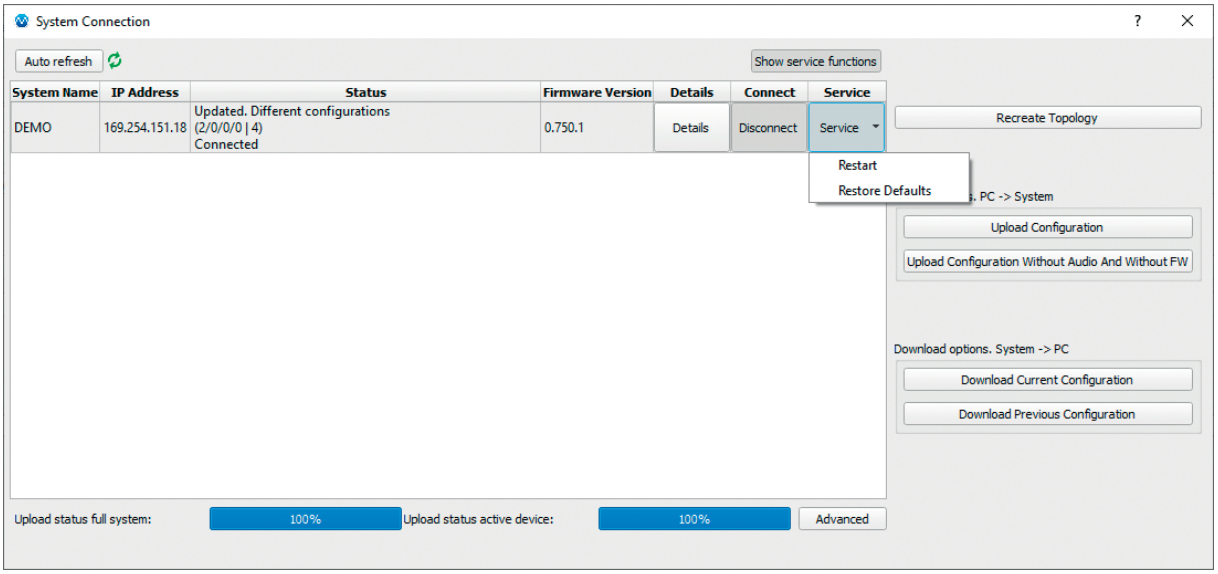
The Restart and Restore defaults functions can now be found by clicking the Advanced button, then select the checkbox checkbox Enable service functions.



After this operation, the Show service functions icon will appear at the top of the connection window.



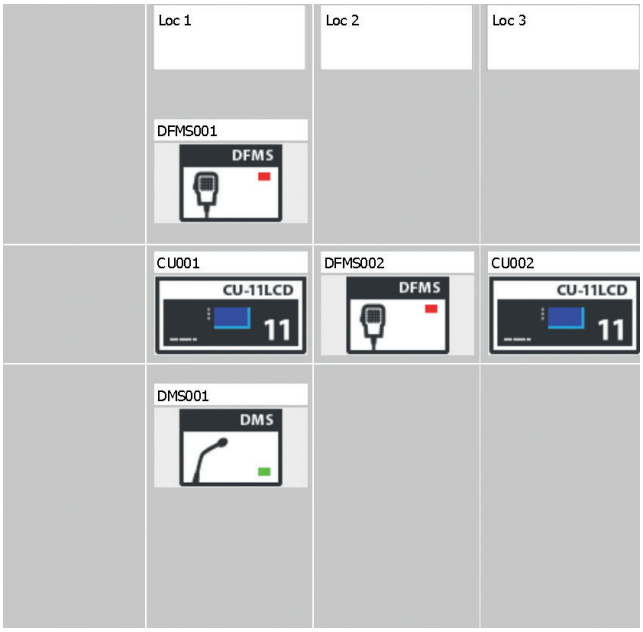
After pressing it, the Restart and Restore Default functions will appear.



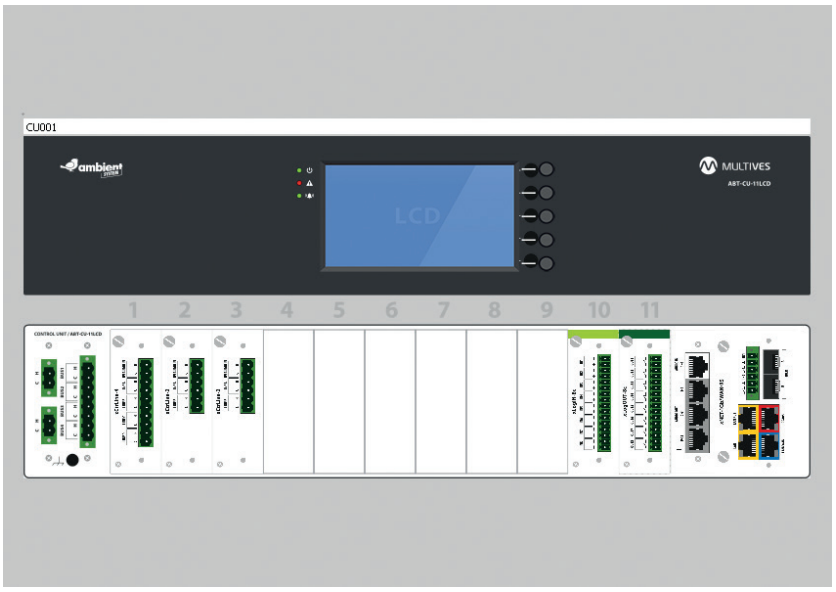
4. Download the topology of devices available in the system by pressing the Recreate Topology in the System Connection.

5. Complete the basic data in the fields: Project Name, Author and switch Configurator mode to Advanced in Basic Configuration tab .

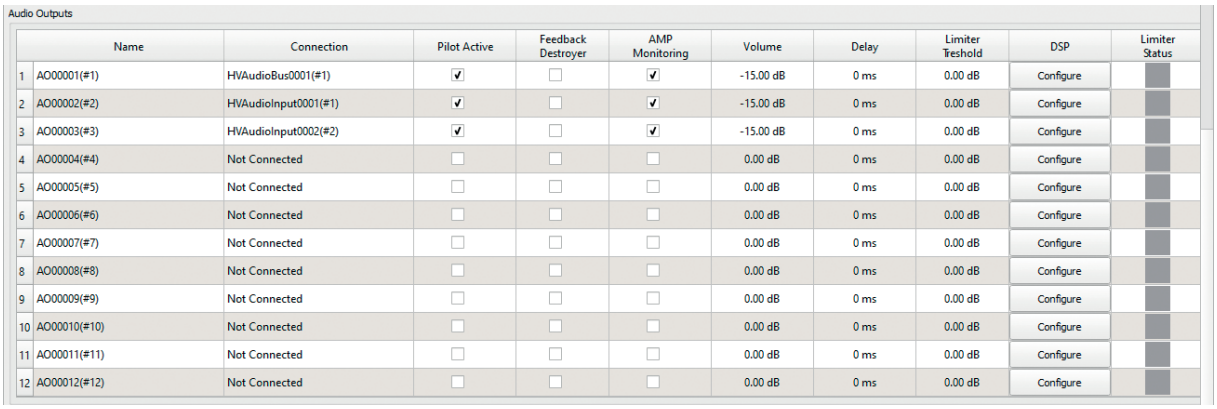
6. Go to System Configuration tab , verify that all MULTIVES system devices have been displayed in the expected fields of workspace and according to the method of connection (fiber / twisted pair Cat 5e SF/UTP).



7. By double-clicking the left mouse button on the control unit go to view window of unit slots.

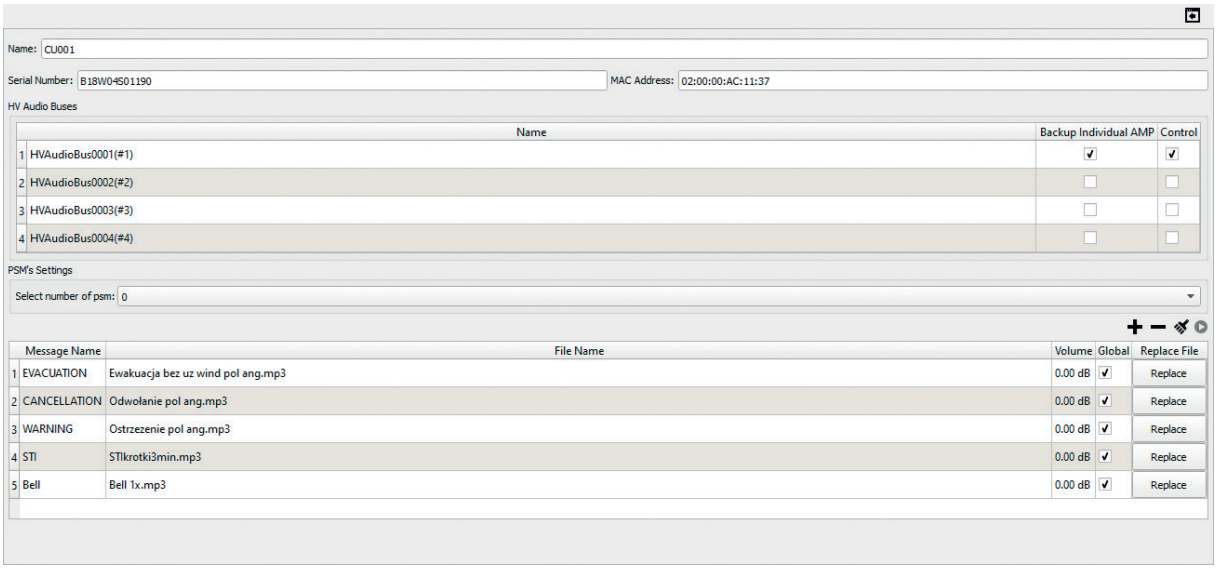


8. By double-clicking the left mouse button on the audio in / out card we define how to connect the amplifiers to unit (choose the option Bus 1-4 – HVAudioBusXXX or individual 100 V inputs on control cards – HVAudioInputXXX). The definition of Connection fields is required for proper operation of the System because without that the control unit does not have any information on the route that can transmit a signal onto the selected speaker zone.


Audio Outputs

	Name	Connection	Pilot Active	Feedback Destroyer	AMP Monitoring	Volume	Delay	Limiter Treshold	DSP	Limiter Status
1	AO00001(#1)	HVAudioBus0001(#1)	☑	☐	☑	-15.00 dB	0 ms	0.00 dB	Configure	
2	AO00002(#2)	HVAudioInput0001(#1)	☑	☐	☑	-15.00 dB	0 ms	0.00 dB	Configure	
3	AO00003(#3)	HVAudioInput0002(#2)	☑	☐	☑	-15.00 dB	0 ms	0.00 dB	Configure	
4	AO00004(#4)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
5	AO00005(#5)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
6	AO00006(#6)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
7	AO00007(#7)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
8	AO00008(#8)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
9	AO00009(#9)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
10	AO00010(#10)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
11	AO00011(#11)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	
12	AO00012(#12)	Not Connected	☐	☐	☐	0.00 dB	0 ms	0.00 dB	Configure	

9. Through the icon located in the upper right corner we return to step no. 7. By double-clicking on the Buses sections, we go to the Buses editing, declaring the PSM amount connected to the given unit and we add messages that we want to upload together with the configuration.


Name: CU001

Serial Number: B18W04S01190 MAC Address: 02:00:00:AC:11:37

HV Audio Buses

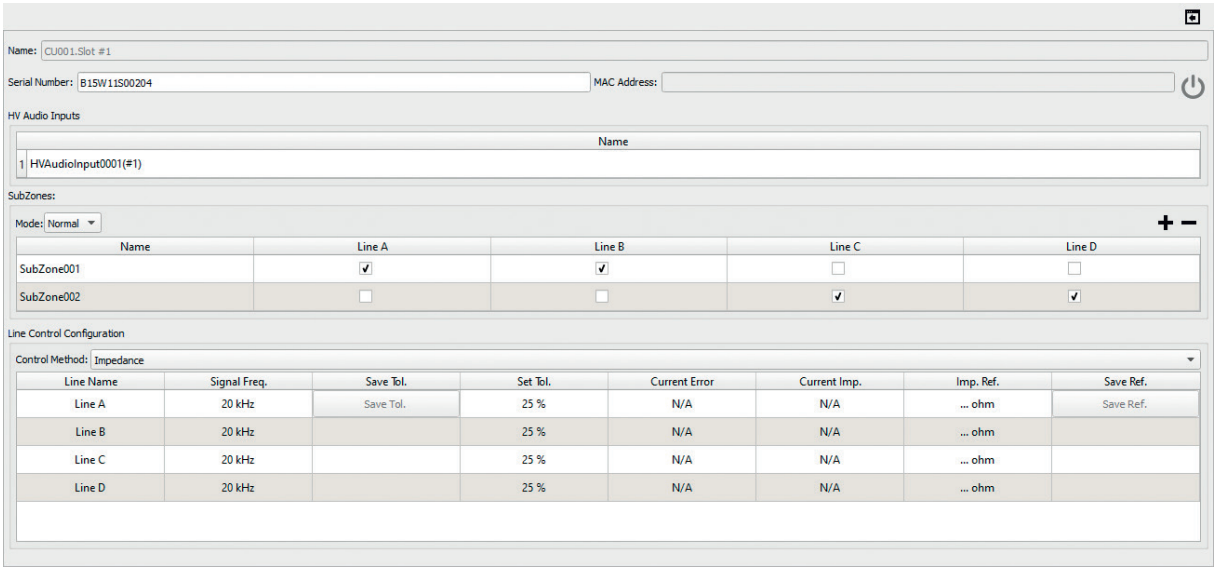
	Name	Backup Individual AMP	Control
1	HVAudioBus0001(#1)	☑	☑
2	HVAudioBus0002(#2)	☐	☐
3	HVAudioBus0003(#3)	☐	☐
4	HVAudioBus0004(#4)	☐	☐

PSM's Settings

Select number of psm: 0

	Message Name	File Name	Volume	Global	Replace File
1	EVACUATION	Ewakuacja bez uz wind pol ang.mp3	0.00 dB	☑	Replace
2	CANCELLATION	Odwołanie pol ang.mp3	0.00 dB	☑	Replace
3	WARNING	Ostrzezenie pol ang.mp3	0.00 dB	☑	Replace
4	STI	STIkrotki3min.mp3	0.00 dB	☑	Replace
5	Bell	Bell 1x.mp3	0.00 dB	☑	Replace

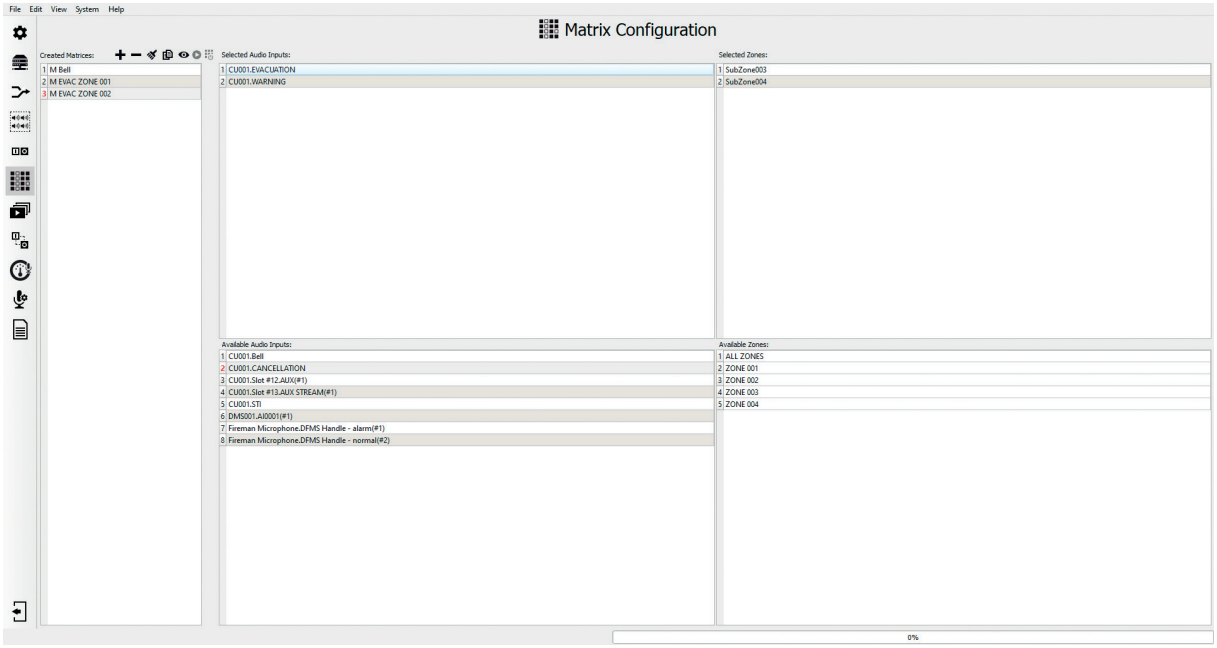
10. Through the icon located in the upper right corner we return to step no. 7. By double-clicking on Slot1 we begin editing of control cards placed in the given unit. We should give names to zones, assign appropriate card outputs (A, B, C, D) and turn on line impedance monitoring. Repeat that action for each of control cards. Cards xLogIN and xLogOUT should be ignored – they will be edited in the final programming phase after defining matrices and scenarios.



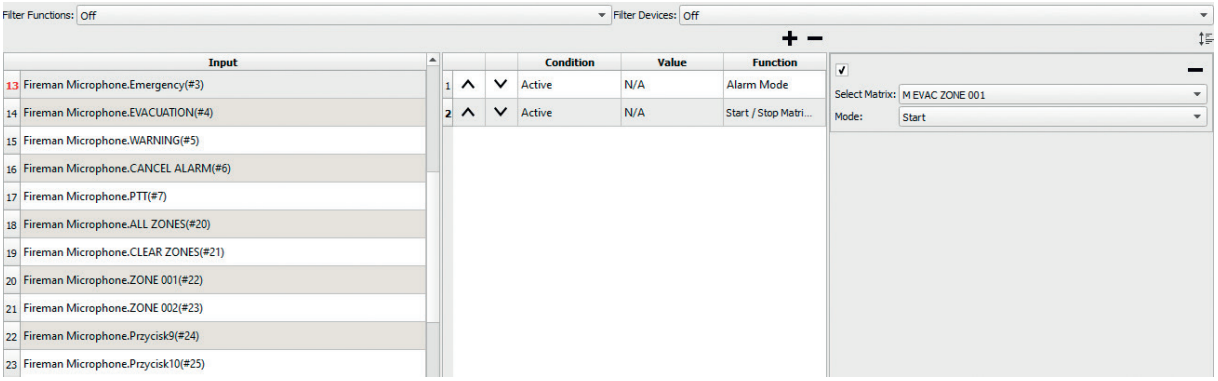
11. Go to the Priority Manager tab. Select the appropriate type of priority. Keep in mind that messages such as Emergency are played only if the system is in Alarm state. Messages / audio sources such BGM, General, Service are played only when the system is in Normal mode.

12. Group speaker zones in tab .

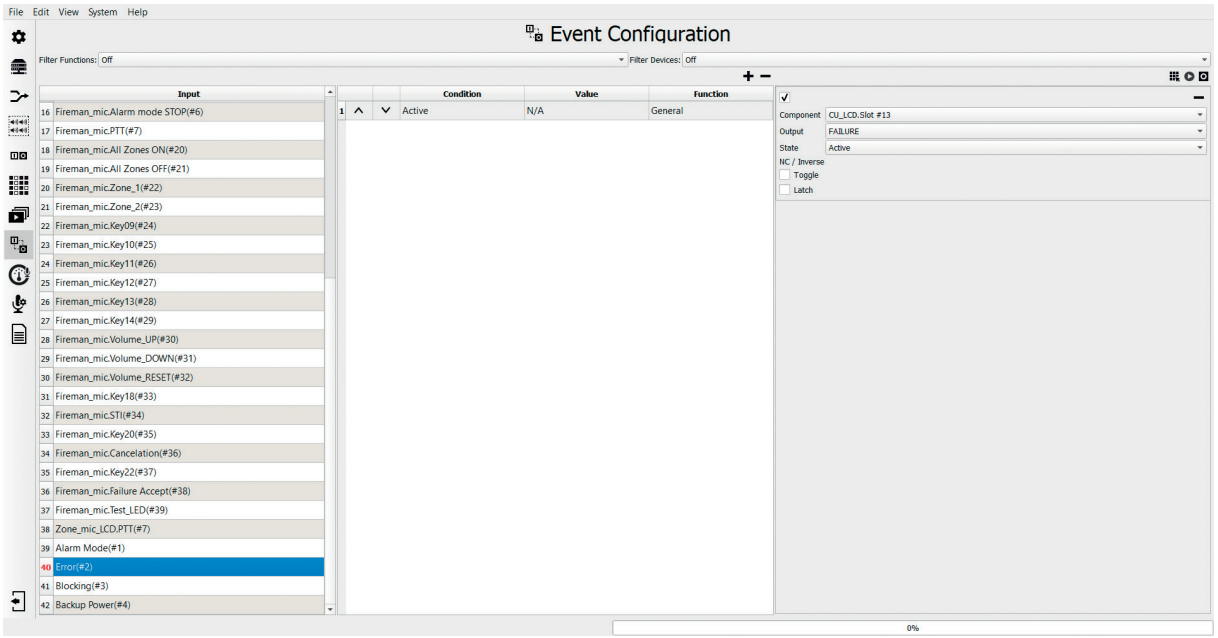
13. Define matrices, which are to be created during the evacuation and during normal operation of the system – e.g. music for zones.



14. Program xLogIN card – logic inputs and buttons on the system microphones. Go to the Event Configuration tab. Sample configuration by activation of button on the DFMS fireman microphone causes system entrance to the Emergency mode and activation of the evacuation matrix.



15. Assignment of Error signaling system to active the relay output – program in the Event Configuration tab. From the Inputs list select the Error function and assign the General function –> Add control output action .



16. Send the configuration to the system by selecting System –> Connection settings –> Upload configuration. The system is programmed when the Server Status displays the following information: Downloaded – The same configuration.

13.13 Glossary

Function activating modes

Start – selected button or logical input only activates a function programmed in the system.

Stop – selected button or logical input only deactivates a function programmed in the system.

Toggle – selected button or logical input triggers, a change of state to the opposite upon every next activation, acting like an on / off switch. In case of logical inputs, a necessary condition for reactivation of the function in the toggle mode is returning to the input's idle state.

Dynamic assignment

In order to trigger a function whose activation relies on dynamic assignment, follow the predefined order. The first activity is selection of a zone or multiple zones by means of the programmed Select Zone button, in this way we highlight which zone(s) the function is to affect, then select the button assigned to the function which we want to execute.

Audio inputs – these are all analogue inputs available in the MULTIVES system to which external sound sources can be connected to.

Audio outputs – these are all outputs available in the MULTIVES system, whose parameters are compatible with the audio inputs of the amplifiers. Control units are equipped with audio outputs, e.g. ABT-CU-11 has 12 audio outputs, as well as zone microphones which are equipped with 4 outputs.

Audio source – in the MULTIVES system, an audio source is both a recorded message, regardless of its priority, a linear audio input on a unit and a zone microphone, as well as the microphone itself.

Individual HV Audio In – this is an input found on each xCtrLine-4 /xCtrLine-2 control card which is used to connect an amplifier 100 V output to the card. In this way the control card has a specific amplifier assigned to it and does not use in normal system operation (i.e. no damage to individual amplifier) the common 4 four 100 V buses available for all control cards in a given unit.

System states – there are 4 system states available in the configurator: Alarm mode, Error, Blocking, Backup Power due to which any function can be activated or an element available in the system can be controled.

Go to Definition is a quick access function which is activated by clicking the left mouse button while moving over onto the name of any element in the system. This function results in a transition to the card, microphone, device microphone extension detailed editing window.

Configurator

Software supplied with the MULTIVES system with the help of which it is possible to manage and program system devices.

FIFO (First IN, First OUT) – in case of conflict of two audio sources of the same priority, where Source 1 is already transmitting to the zone and Source 2 is also to begin transmitting to the same zone, Source No 1 will not be removed in order to make the zone available for Source No 2 until Source No 1 (matrix) has concluded transmission.

LIFO (Last IN, First OUT) – in case of conflict of two audio sources of the same priority, where Source 1 is already transmitting to the zone and Source 2 is also to begin transmitting to the same zone, Source No 1 will be disconnected from the zone and Source No 2 will transmit to the zone.

LUA – scripting language used to extend the functionality of the MULTIVES system. This language is implemented as the C language library, written according to ANSI C, providing: simplicity, performance and code transferability.

Signalization priority

	PRIORYTET (0 – highest)
Block zone	0
Zone failure › closing / shorting / opening › no EOL › impedance error › switching into LOOP ……	1
Zone failure confirmed	1
EVACUATION MESSAGE playback	2
WARNING MESSAGE playback	2
Spoken message from fireman microphone	2
Spoken message from zone or BGM microphone	2
Volume change	3
Audio Monitor	4

13.14 FAQ

1. No MULTIVES server visible in the System Connection window

In order to upload the configuration to the system, download the reports from the system or go to online mode the configuration software must be combined with a server visible in the Connection Setup window (System –> Connection Settings). If the server is invisible you should at first reassure that the static IP address is not set on the local LAN adapter of computer with MULTIVES Selector software. Check the card properties or Internet Protocol Version 4 (TCP / IPv4) if obtaining of an IP address is set automatically. Then, disable the Windows Firewall (Settings –> Control Panel –> System and Security –> Windows Firewall – enable or disable the firewall). Turn off Windows Firewall for both the private and the public networks. If the server is still not visible in the System Connection window, make sure that the computer does not have security software installed. If so, choose Suspend protection option. In order to reactivate Windows system security it is recommended to add the connection to the MULTIVES server to the secure connection list.

Another reason for server invisibility in the connection window may be the encrypted connection used since firmware version 0.750.1:

» attempting to connect Selector from version 0.750.1 to a system with a lower version
Read firmware version information from the LCD control unit in the "Interface Settings" section or connect to the system via Selector in lower version, read firmware version in connection window and continue working on dedicated version of Selector.

» attempting to connect Selector below version 0.750.1 to a system with version from 0.750.1
Read firmware version information from the LCD control unit in the "Interface Settings" section and continue working on dedicated Selector version or connect to Selector in a version not lower than 0.750.1.

2. Configuration of the operating MULTIVES system cannot be downloaded

In order to download the correct configuration of the system:

1. Start the software MULTIVES Selector
2. Select Create a new configuration – **please note that it is a very important step!**
3. Connect to the server via System –> Connection Settings and select the Connect button
4. Then in the same window choose the Download current configuration option

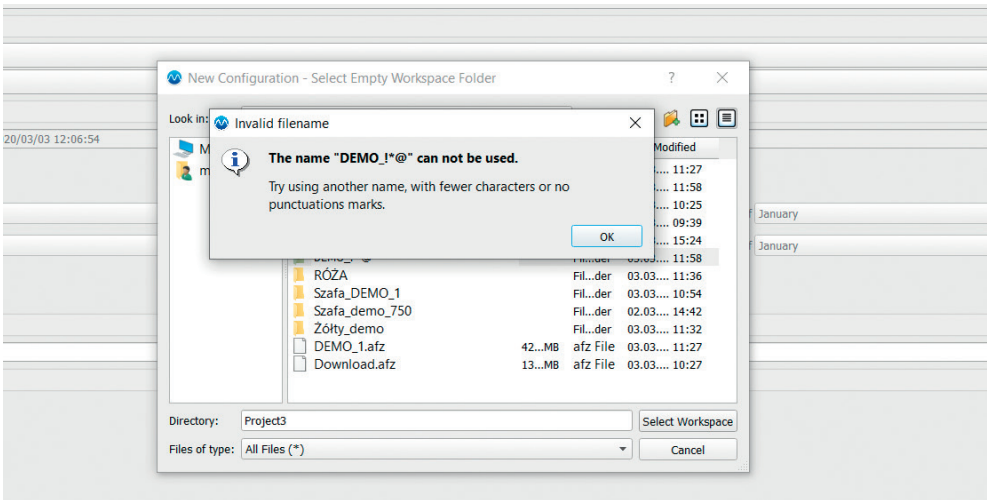
3. A downloaded configuration of the operating MULTIVES system cannot be opened

The downloaded file from the system, config.afz can be found in the tab Documents –> Selector –> Workspaces_x.x.x (where x indicates the version of the software) –> downloadedConfiguration. To run the downloaded file from the system (* .afz) you need to:

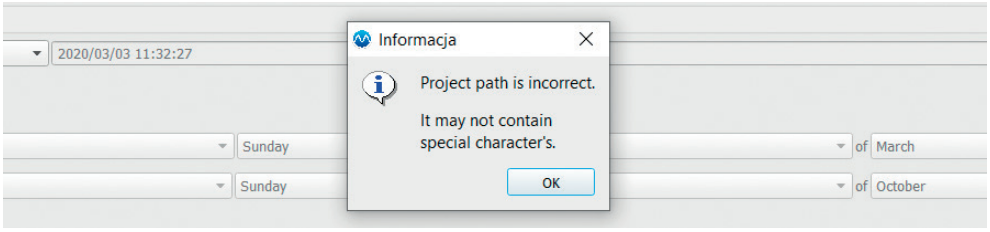
1. Select in the configuration software: File –> Import working area
2. As a standard, the configuration software creates files and saves them under: C:\Users\Documents\Selector\ Workspaces_x.x.x \downloadedConfiguration. If you have chosen a different access path, please choose from it the appropriate file with the .afz extension and then select option Open.
3. When you select Open option, the system asks for the indication of a new folder in order to copy the imported content from the system configuration. You should create a new folder, give it any name, select it and choose Select Folder option. **Please note that it is a very important step!**
4. Select YES option in the window if you want to open the imported configuration
5. The configuration will be loaded – in the System connection window with the Connect option, the Same configuration status should be shown. If Different configuration status is shown in the window, please select File –> Load –> the newly created folder while importing the file with the .afz extension. There are available the configuration.afz files in the location they were created when configuring the system. You have to load those files and then check the status until it shows the Same configuration status.
6. If the Selector used is older than v0.750.1, the program will not see a system connection lower than v0.750.1 in the System Connection window. This rule also occurs when we try to use a lower version of the system with v0.750.1 software. This is due to differences in communication encryption.

4. The selected action cannot be completed - Selector indicates illegal characters in the names

When creating a new workspace or when unpacking from .afz file, you cannot use national special characters (e.g. ä , ö, ü) or any other special characters (e.g. !,@,#). The system will inform you about an invalid situation:



or



Particular attention should be paid to the names of HV Audio inputs and subzones in the control cards, the system will not allow you to enter a special character without any prompt.

In other places, such as device name or button description, special characters can be used.

5. DFMS, DMS or DMS-LCD microphone reboots when connected to the system

If to a properly functioning system you additionally connect a microphone, that resets after connection this means that the microphone does already have a preloaded configuration into the memory which is different from the configuration of the system. In this situation the factory (default) settings should be restored to the microphone and then the microphone should be reconnected.

6. The configuration software suspends while trying to compare the topology of the configuration created in offline mode

If the system cannot properly detect the devices available on the MULTIVES network and prevents assigning MAC addresses to the configuration items created in offline mode it means that the list of devices in the Working area is different from what is visible in the system. The solution to this is to create a new project, which does not include any devices in the Working area and then select an option Play topology (System –> Connection Settings). In this way you get to know the correct arrangement of the system devices in the Working area. The arrangement of devices in the Working area should be restored to its original configuration created in offline mode and then option Play topology –> Compare should be reselected. When there appears a table with all elements available in the system to assign addresses to devices Mac added Field work set together, please select the Repair button.

7. The system does not respond to command Restore to Factory Defaults

Each project possess its own unique Factory Defaults signature, which is available in the window: Basic Configuration –> Factory Defaults. Every time you call the Default settings, the system checks the validity of the system signature with the one located in the configurator. Lack of compatibility will cause the command disregard.

8. How should I transfer a configuration that can be opened on another computer?

Full configuration means the device settings, source audio file, and summary of matrix, scenarios, zones etc. after conversion to pcm. It is written via Export working area function in the File tab.

9. After signal stenciling onto the selected zone the system reports an "E0209'"error – "lack of measurement conditions"

Ensure that digital volume control regulators, available from the front panel system amplifiers are set within the -4 – 0 dB range. Setting values below -4 dB results in decrease of expected values of the testing pilot and declaration of system error "Lack of measurement conditions". It is suggested to check the settings of all channel amplifiers available in the system.

10. The system does not report any PSM power manager errors

If the system does not report any PSM device errors, make sure that PSM is properly connected to the ISLE module, and that ISLE module (island) is connected to RS485 port on control unit. In addition, check if under Select PSM option the number of connected power supply managers has been defined.

11. Short, unwanted, beeps are hearable in the speakers

Check through the Selector software and the sound card preview to see if the audio signal is switched from the audio path dedicated to the appropriate speaker line control card to the spare channel.

If so, check if the total power of the lines connected to the speaker line control card matches the power of the amplifier that supports it.

Otherwise, check if the problem only occurs with a specific audio solution, e.g. an external audio source and check the cable connections.

13.15 Appendix

1. AutoStandby mode

The purpose of the operation in Standby mode is:

» limiting the power consumption from the battery while there is the loss of the primary power supply 230 V voltage;
» reduction of heat energy generated by the amplifiers as far as control units while working on the primary power at any preset time, if the system does not have any active matrices – standby / idle mode.

Principle of operation Standby

Standby mode is activated automatically and every time when the following conditions are met simultaneously:

» there has been a loss of primary power supply (230 V) and the system passed on battery power
or
» system has no active audio matrices and operates in Normal mode (no Alarm).

While working in active Standby mode the MULTIVES system periodically changes its operating states on the following sample states:

» *active_state*
» *suspended_state*

Duty cycle of the above conditions is as follows:

» *suspended_state* – 85 seconds
» *active_state* – 5 seconds

Managing processor actions (e.g. the card processor) in Standby mode:

» Periodically sends signals to the amplifiers indicating the current mode and operating state to enter amplifiers into power saving mode.
» Periodically sends signals to all the control cards (xCtrl-2, xCtrl-4) informing cards about the current state of work (*active_state* / *suspended_state*) to force a power saving state to control cards (or exit from this state).
» Each time while sending a command to change the state of the control card – it verifies whether the card has changed its state and if it properly reacts to read state.
» Turning control and error reporting is done automatically after sending commands to change the status on *active_state* and confirmation from the card it has exited this mode.

Amplifiers actions in Standby mode:

» During operation in the *suspended_state* amplifiers enter a reduced power mode (amplifiers stop working and do not consume energy or consume a minimum value of it).
» During operation in the *active_state* amplifiers enter a reduced power mode so return to normal operation.

Standby mode is called using the Standby function.

» That function can be activated by using:
  › o timers (it can be called in a cyclic manner at any preset time);
  › any logic inputs;
  › programmable "Key" push buttons;
  › automatic run in the absence of active matrices defined by the user time [min] AutoStandby.
» This function can be activated under the following conditions:
  › system is not in alarm mode;
  › there are no active audio matrices with Emergency / Service priority;
  › system is powered from the primary source 230 VAC (while entering on battery power it happens automatically if the system is not in alarm mode and there is lack of active Emergency / Service matrices).

AutoStandby – the function is activated / deactivated by the user on the level of the configuring software in the form of a checkbox. The function is activated in the absence of active audio matrices of Emergency / Service priorities by the time defined in the Configurator.

The time is determined in minutes / The time interval [15 ... 300 minutes]
Default state – checkbox enclosed, active function
Default activation time: 60 minutes

AutoStandby function is available in the Basic Configuration:



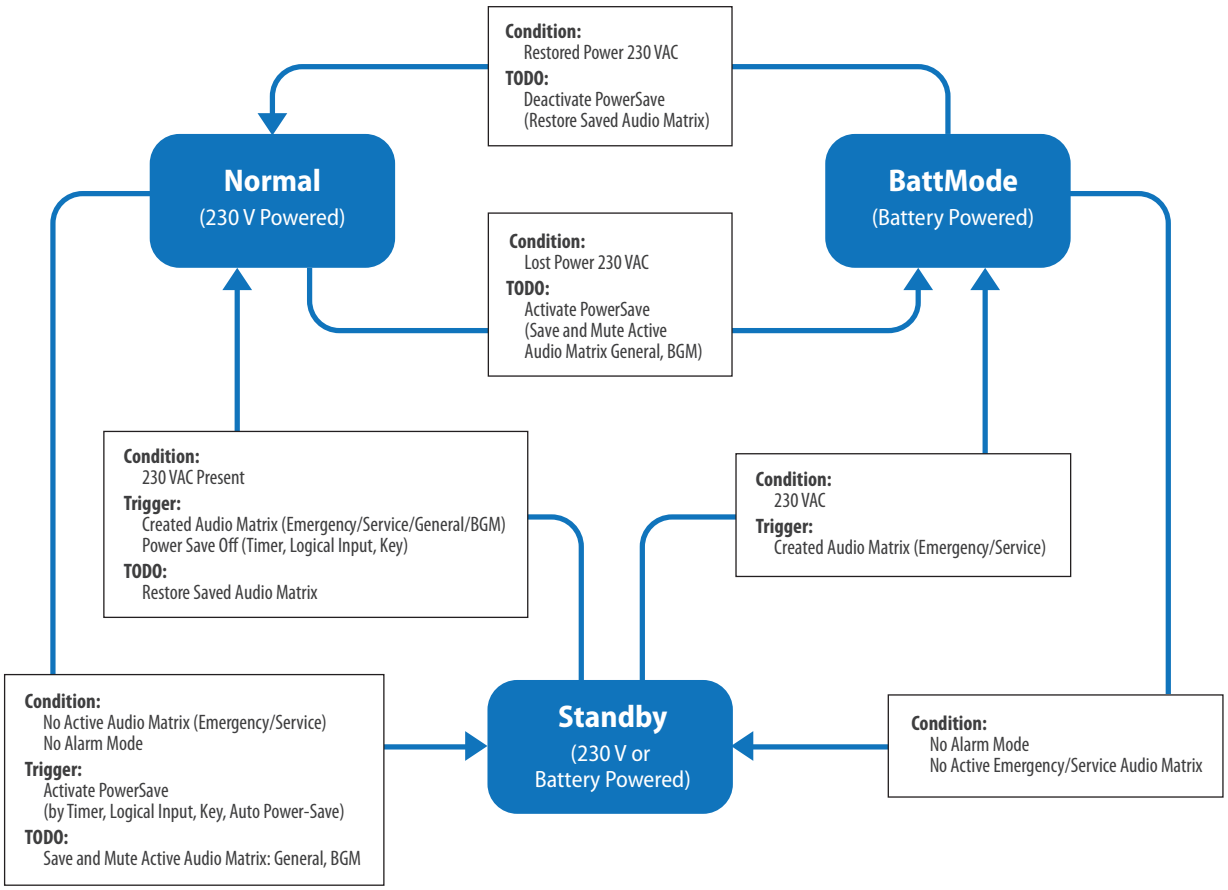
Each attempt of audio broadcasting while Standby is active causes:

- » exit from Standby to the Normal mode (when the power supply is basic), regardless on the priority of a message;
- » exit from Standby mode to the BattMode (when there is lack of primary power supply) only when messages will have Service / Emergency priority.

The maximum duration of the activation process of exit from Standby mode to broadcasting message is shorter than 500 ms.

Because the function has been implemented in Phase 1 of MULTIVES development and its activation is in a dynamic way (Zone selection then pressing Power Save button) there is need to change the way of its implementation from the dynamic to static (PA zones strictly defined in the configurator are to be deactivated / activated by friendly Power Save features.

Diagram of transition Normal mode – Battery mode – Standby mode is shown below:



2. The list of errors reported by the system

E: Error – fault description visible on GUI of the control unit / **W: Warning** – access to this type of the information via Selector software – System Report only / **I: Info** – access to this type of the information via Selector software – System Report only.

"E0001" – "Function backplane power failure" – no 5 V in the functional part
"E0002" – "Function backplane power failure" – no 12 V in the functional part
"E0003" – "Function backplane power failure" – no -12 V in the functional part
"E0011" – "Control backplane power failure" – no 5 V control part
"E0012" – "Control backplane power failure" – no 12 V control part
"E0013" – "Control backplane power failure" – no -12 V control part
"E0022" – "Power control system failure" – damage control system control part
"E0023" – "Power control system failure" – damage control system functional part
"E0101" – "Device do not respond"
"E0102" – "Logical input open"
"E0103" – "Logical input short"
"E0104" – "Speaker line ground fault"
"E0105" – "Speaker line short"
"E0106" – "Files integrity error"
"E0107" – "Speaker line impedance error"
"E0108" – "Speaker line open"
"E0109" – "EOL error"
"E0110" – "Interruption of the audio path"
"E0111" – "Battery failure"
"E0112" – "Backup power / PSM missing"
"E0113" – "230V AC power failure"
"E0114" – "Amplifier overheat"
"E0115" - "Fuse failure"
"E0116" - "Power system manager failure"
"E0117" - "48 V DC error"
"E0118" – "No communication with ABT-ISLE"
"E0119" – "Loop link error"
„E0120" – "48V DC failure on port RS485"
„E0122" – "Optical link connection mismatch"
„E0130" – "FAN failure"
„E0131" – "Amplifier oveheat"
„E0132" – "Microphone failure"
„E0133" – "Temperature sensor failure"
„E0134" – "Supply failure"
„E0135" – "Battery voltage too low"
„E0136" – "No batt. or damaged fuse"
„E0137" – "No calibration data, CU001"
„E0138" – "Calibration data corrupted"
"E0200" – "ABT-DFMS missing"
"E0201" – "Evacuation button error"
"E0202" – "Backup audio path interruption"
"E0203" – "CPLD verification error"
"E0204" – "Interruption of the audio path in ABT-DFMS capsule"
"E0205" – "Internal hardware error"
"E0206" – "Error triggered from logical input"
"E0207" – "Integrity state error"
"E0208" – "Test generator failure"

"E0209" – "No conditions for measurement"
„E0210" – "Incorrect number of extensions connected"
"W0001" – "Function backplane power overload" – over current power supply 5 V functional part
"W0002" – "Function backplane power overload" – over current power supply 12 V functional part
"W0003" – "Function backplane power overload" – over current power supply -12 V functional part
"W0011" – "Control backplane power overload" – over current power supply 5 V control part
"W0012" – "Control backplane power overload" – over current power supply 12 V control part
"W0013" – "Control backplane power overload" – over current power supply -12 V control part
"W0021" – "Power supply overheat" – power supply overheat functional part
"W0022" – "Power supply overheat" – power supply overheat control part
"W0031" – "System operates on battery power"
"W0101" – "Standby mode activation"
"W0102" – "Standby mode deactivation"
"W0103" – "Device Initialization error, dev=%x"
"I0101" – "Alarm mode activation"
"I0102" – "Alarm mode deactivation"
"I0103" – "Event activation %xx"
"I0104" – "Event deactivation %x"
"I0105" – "Matrix activation %x"
"I0106" – "Matrix deactivation %x"
"I0107" – "Failure Accept"
"I0108" – "Failure Delete"
"I0109" – "Device start, dev=%x"
"I0110" – "Connection state 0x%x->0x%x: %d"
"I0111" – "Logical input 0x%x state changed %d"
"I0112" – "Logical output (Relay) 0x%x state changed to the value %d"
"I0119" – "Backup link activation"

Expanded error code 205 "Internal hardware error" list

An internal hardware error (E0205) is reported by the module when it diagnoses that one of its components is not working properly. Usually it concerns communication problems with elements connected to the |2C bus, but it can also indicate incorrect configuration or incorrect operation. In order to facilitate the diagnosis, a parameter was added to the error to determine which element is the problem. This parameter is a collection of flags.
Each flag is assigned to a specific item or erroneous state. The table below describes the meaning of each flag:

xCPU (ISA00003-02)
0x0001 no communication pca9548 (switch_i2c, bus 0, addr 0x70)
0x0002 no communication pca9548 (switch_i2c, bus 1, addr 0x70)
0x0004 no eprom communication on backplane
0x0008 no communication vcxo
0x001 0 no FPGA communication

cAudio-4/12 (ISA00005-01)
0x0001 no ADAU1701 communication (sigmaDSP,addrOx36)
0x0002 no ADAU1701 communication (sigmaDSP, addr 0x34)
0x0004 no communication ADAU1701 (sigmaDSP, addr 0x35)
0x0008 no communication pca9548 (switch_i2c, 0x70)
0x0010 no communication pca9548 (switch_i2c, 0x71)
0x0020 no eprom communication on backplane
0x0040 no communication expander (16 channel IO, addr 0x20)
0xOO8O no communication expander (8 channel IO, addr 0x21)
0x0100 no vcxo communication

xAudIO-4/8—RS (|SA00004—01)
0x0001 no communication ADAU1701 (sigmaDSP)

xNET-1Gb/WAN / RS (ISA00001-02)
0x0001 no communication MCP3021AOT (ex_input, addr 0x48)
0x0002 no communication MCP3021AOT (ex_input, addr 0x4d)

DFMS (TA00003-01)
0x0001 no communication pca9555 (buttons)
0x0002 no communication MCP3021AOT (ex_input, addr 0x48)
0x0004 no communication MCP3021AST (ex_input, addr 0x4d)
0x0008 no communication cs426S (codec)
0x001 0 no communication dac
0x0020 no pca9955 communication (led driver, addr, 0x61)
0x0040 no pca9955 communication (led driver, addr, 0x62)
0x0080 no communication max11601 (talk button, alarm button, potentiometer)
0x0100 no vcxo communication
0x0200 no communication pca9548 (switch_i2c)
0x0400 invalid state pca9955 (led fault)

Tables – damage to the guardless
MULTIVES – island (ISLE)
0x0001 blown fuse of the CH1 amplifier
0x0002 blown fuse on the CH2 amplifier
0xOOO4 blown fuse of the CH3 amplifier
0x0008 blown fuse of the CH4 amplifier

miniVES
Minives (xCharge)
0x0800 blown power supply fuse
0x1000 blown fuse of the CH1 or CH2 amplifier
0x2000 battery fuse blown
0x4000 blown fuse 48V (internal bus)

xCharge (BRD00012-01)
0x0001 invalid state BOARD_FFLAGO, TBD
0x0002 invalid state BOARD_FFLAG1, TBD
0x0004 invalid state BOARD_FFLAGZ, TBD
0x0008 invalid state BOARD_FFLAG3, TBD
0x0010 invalid state BOARD_FFLAG4, TBD
0x0020 invalid state BOARD_FFLAGS, TBD

xNET_M|N|—1Gb/WAN (BRD00010-01), xNET_M|N|—1Gb/WAN /RS (BRD0001 1-01)
0x0001 no communication PCA6416 (io_exp)
0x0002 no communication PCA6408 (io_exp ctrl)
0x0004 no communication PCA9548 (switch_iZc)
0x0008 no communication PCA9546 (switch_i2c ctrl)
0x0010 no communication AT24C02 (backplane eeprom)
0x0020 no communication PCA6416 (keypad io_exp)
0x0040 no communication MAX11601 (keypad adc)
0x0080 no communication MCP4651 (pa_potch1)
0x0100 no communication MCP4651 (pa_pot ch2)
0x0200 no communication PCF2129 (RTC charger)
0x0400 no communication PCA6416 (dip_sw)
0x0800 no communication CDCE913 (vcxo)
0x1000 no communication MCP4725 (vcxo_dac)
0x2000 no communication ADAU1701 (sigmaDSP)

3. The size of memory card in the control unit compared to available length of the message played, recorded and the number of entries in reports

SD Card [MB]	512	1024	2048	4096	8192	16348	32768
Audio Message 16 bit / 48 kS/s	20 min	40 min	80 min	160 min	320 min	640 min	1280 min
Reports	100 k	200 k	400 k	800 k	1600 k	3200 k	64000 k
BlackBox	60 min	120 min	240 min	480 min	960 min	1920 min	3840 min
RecordMessage	20 min	40 min	80 min	160 min	320 min	640 min	1280 min

4. Software compatibility

The official versions possess three identification characters:

x.y.z

For the official version it is acceptable (but not preferred) to have four-character marking, but in this situation the last character always has to be zero "0":

x.y.z.0

Subsequent version numbers may only increase (in time), however increasing the number of the more significant character is always accompanied by resetting the less significant character.

The importance of the individual characters:

X (major number) – it is so called a major version. This number is changed only in special cases, while introducing major changes to the functioning and structure of the software.
It is forbidden to substitute software with any other numbering at major number. Such a change could mean eg. change of the operating system, framework, core libraries, and almost always results in a lack of compatibility backwards. Also, there is no guarantee of the correct functioning of the hardware. In particular, substitution of software – even if successful – can cause permanent damages to the device. There is also no guarantee of the proper functioning of equipment after returning to the previous version of the software. Replacement of the software in this case should always be consulted with the software provider.

Y (API number / feature) – this number is always increased at the time when differences at the *Application Programming Interface* level occur – that is, very often when adding new functionality to the officially released version. You may also have additional bug fixes – but this is not mandatory. Changing the number on the Y level due to other (e.g. new) functionality will usually mean the lack of full software compatibility, but does not exclude that the new functionality does not affect compatibility. Such a change should always ensure no damage to the equipment after replacing software. Information of software compatibility backward should always be provided during the official release.

Z (bug number) – number incremented always at the subsequent bug fixes. Compatibility of hardware and software backwards is guaranteed. There is no new functionality resulting in the lack of backward compatibility. This means that the FW / SW is fully compatible when X.Y are the same (except the ones with fixed errors or minor adjustments).

Note: due to the introduction of encrypted communication, from version 0.750.1 there is the following dependence:

- systems with FW lower than 0.750.1 will not be visible in the System Connection window of the Selector in version higher or equal to 0.750.1
- systems with FW 0.750.1 or higher will not be visible in the System Connection window of the Selector lower than 0.750.1

14. MULTIVES system touchscreen user manual

The following instructions describe the available functions and how to operate them from the touch screen located on the front panel of the ABT-CU-8LCD and ABT-CU-11LCD control units.

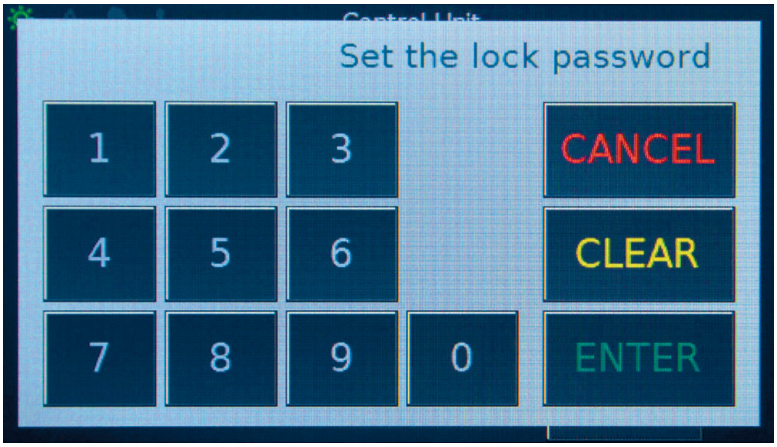
14.1 Home screen (screen saver)

Control units in idle status display the start screen (screen saver) informing about the system status, control unit name, current date and time in the system.



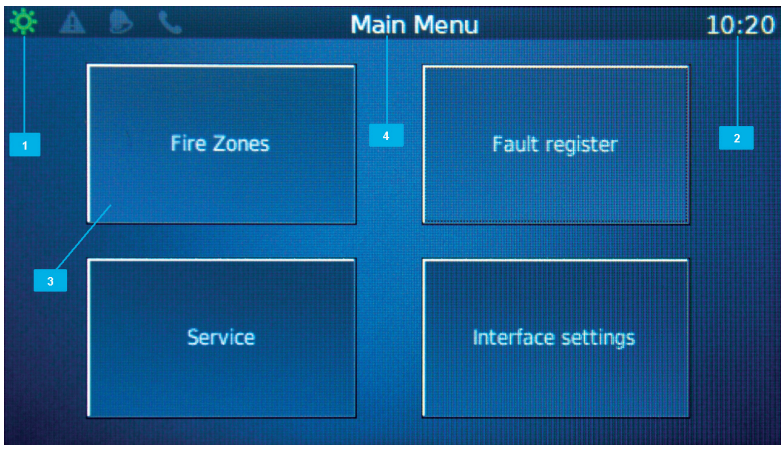
14.2 Lock screen

From the start screen (screen saver), we can use the Lock function, which allows you to set a password to access the screen.
Touching the Lock icon displays an applet with which you can set a password consisting of one to six digits.
The password has been confirmed with the ENTER icon.



Once set, the lock password will be remembered by the system until you restore the factory settings from the Selector program.

14.3 System Options



1 System Status Icons

The top left field of the screen contains information about the current state of the MULTIVES system.

When only the green power icon is displayed, it means that the system is in normal mode (no Alarm) and no faults have been detected. Changing to a blue icon means the system is in standby mode.

The triangle icon with an exclamation mark indicates that internal mechanisms monitoring the state of the system have detected damage. Fault details are available after selecting the Fault register icon.

A red bell icon means that the system is in alarm mode and only audio signals with Evacuation priority can be active.

2 The field displays the time of the internal system clock

3 The four main icons are used to navigate between the various functions available from the screen

4 The name of the displayed window

14.4 Fire zones

The Fire Zones tab allows you to matrix an audio message / input to a selected zone or fire zones, as well as to view the status of a given zone: failure, blocks, playback with information as to which source.

Note – the up / down arrow markings and return are carried out using the physical buttons located on the right side of the screen, not the icons themselves.

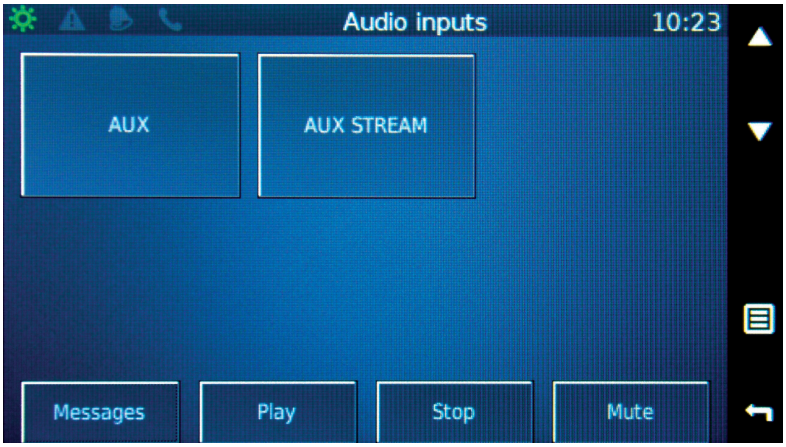


To matrix an audio source for a selected zone / zone group:

1. Select the icon(s) with the name of the zone or select the Select all icon – when selected, the icon(s) will turn yellow.
2. Select the Source icon:
   Select the available audio input from the list or switch via the Messages icon to available messages loaded into the system's memory – select from the list and then select the Play icon.

This will create the matrix and activate it – the selected audio source will be played in the selected zones.
To stop playing the selected audio source, select the source again and press the Stop icon.

Audio Inputs window



Message window

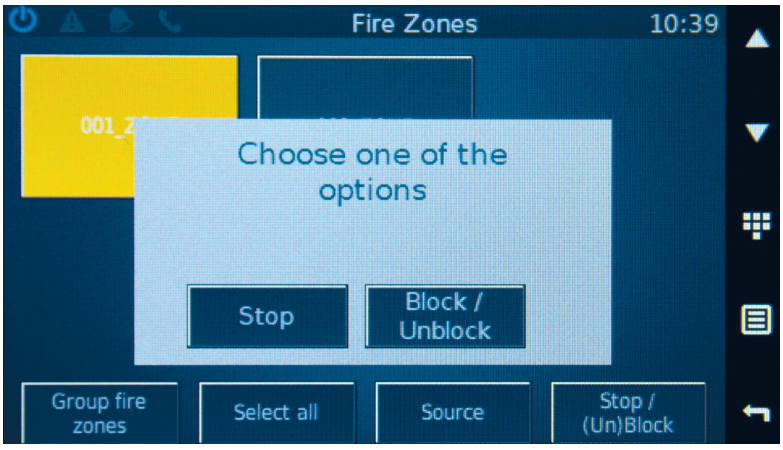


The Mute function is used to mute the audio source / message globally throughout the system. Select the source, the selected source will highlight in yellow and then select the Mute icon.

By clicking the back button located next to the icon you will go to the main window Fire Zones, where we can verify if the zone selected by us plays the selected source (signaling within the zone icon).

Access to defined fire zone groups is displayed after selecting the Group fire zones icon from main menu Fire Zones.

In order to disable the zone (stop playing messages or audio inputs) or completely stop the possibility of playing any audio signal, select the zone / group (it will be highlighted in yellow) and then select the Stop / Unblock, which is located in the lower right corner of the Fire Zones screen. After selecting the appropriate option Stop or Block / Unblock, the function will be performed.

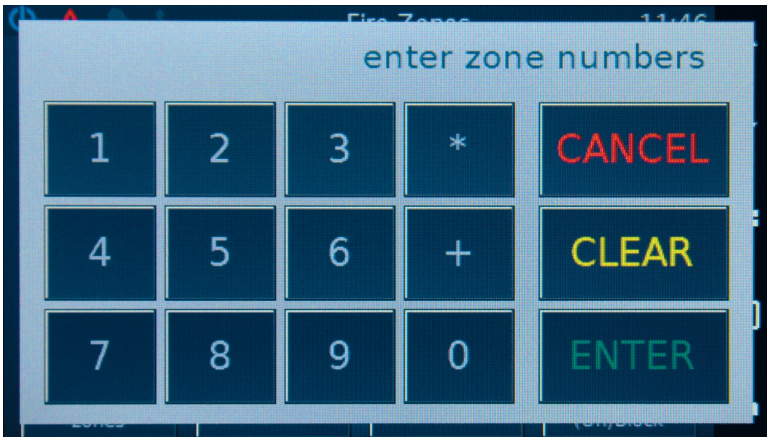


14.5 Numerical selection of fire zones

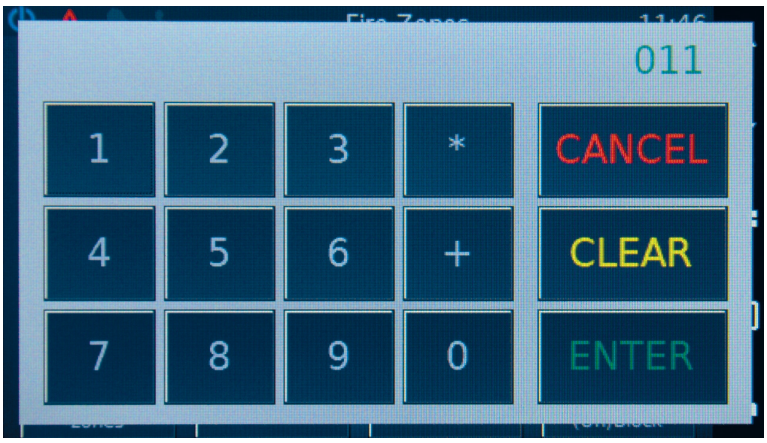
It is possible to select fire zones in the system using three-digit numbers.
To make this functionality active, you must give the zones names during the system configuration, including the three-digit prefix, according to the scheme XXX_zone name (e.g. 001_ZONE).



After opening the Fire Zones tab, use the button near this icon  to activate the numerical selection of the fire zone.



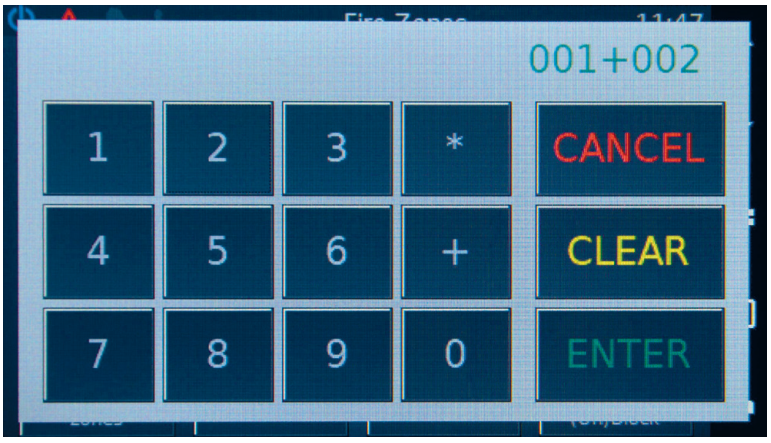
Enter the three-digit number of the fire zone and confirm with ENTER icon.



The fire zone we have chosen will be highlighted in yellow.



It is also possible to select several zones at the same time. To do this, enter the numbers of the selected zones, placing the **+** symbol between them.
Example in the graphic below.



Operation is confirmed with the ENTER icon.

Another option for selecting fire zones allows you to select zones whose first elements of the name are common, e.g. all names starting with the syntax **01**. To do this, enter the syntax you want and add the symbol *****.



Operation is confirmed with the ENTER icon.

14.6 Fire zone groups

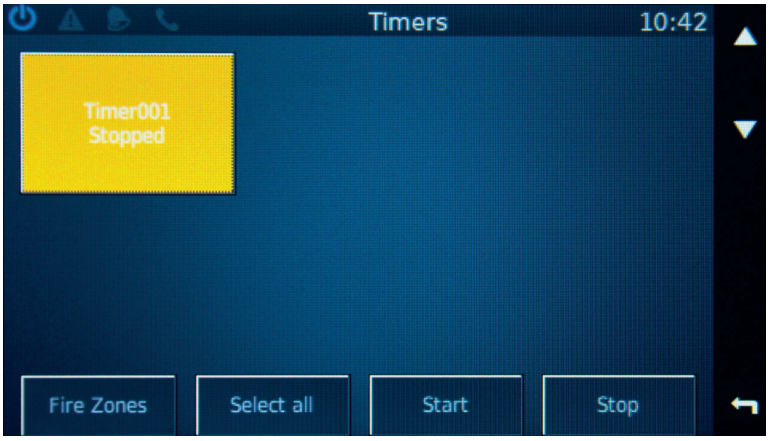


The Group fire zone icon allows you to open the screen with a view of the previously defined fire zone groups.



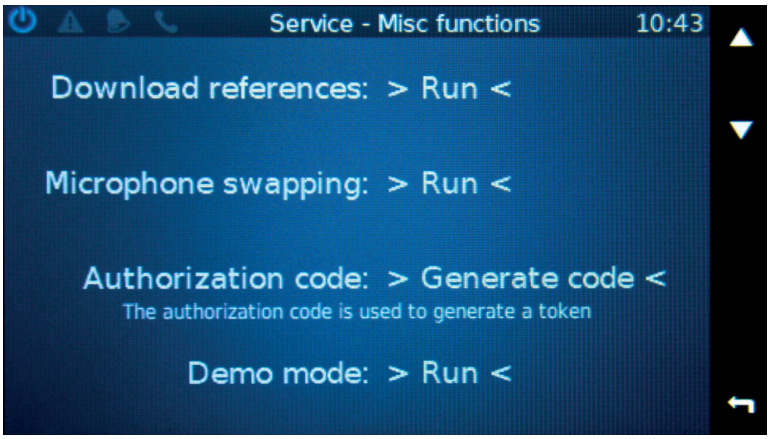
This tab allows you to perform the following actions:

- » check or uncheck a group of zones;
- » starting or stopping previously defined timers by selecting the timer (yellow color) and then using the Start or Stop icon; the timer status is signaled by a description within the timer icon;
- » select / deselect all fire zone groups (Select all icon).



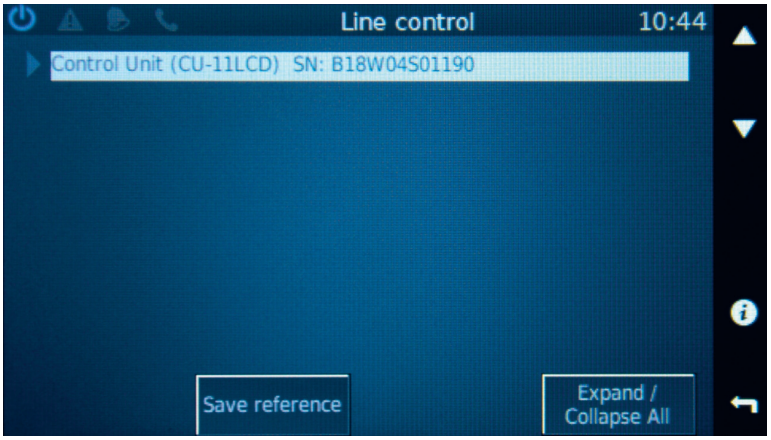
14.7 Service

The Service – Misc functions tab provides access to the basic functionalities needed for servicing or starting the system. Allows you to view impedance on each line of the control card, save impedance reference globally (on all cards) or on the selected output. It is also possible to generate an authorization code, swap zone microphones and fireman microphones in the event of physical substitution of devices, and to launch demonstration mode.



To download the impedance reference of the loudspeaker lines, select the Run field in the Download reference position:

In the Line control window, choice of control units with the buttons on the up / down . For initiate the process of downloading impedance reference values use Save reference icon.



To view the current impedance on the selected control card, select the control unit, use the button, select the speaker line control card and use the button again.

To save the impedance reference on the selected control card, use the buttons up / down to select the control card and then use the icon Save reference – the impedance reference measured only on the speaker lines in the selected line control card will be saved.

The Expand / Collapse All icon displays the serial numbers of the speaker line control cards in all control units.

The Microphone swapping option is used to replace the configuration files of the zone microphones and the fireman in the case of substitution with a new one without configuration. In order to load the configuration into a new replacement microphone – e.g. a damaged one – select the Run field in to the Microphone swapping option. Then, using the up / down icons select from the list of unavailable devices the microphone that has been removed from the system (List of mic. undetected), then select the List of new mic. icon and select a new microphone that is active but has no configuration. Individual serial number of the microphone is used for identification. To assign a configuration, select the Pair microphone icon.

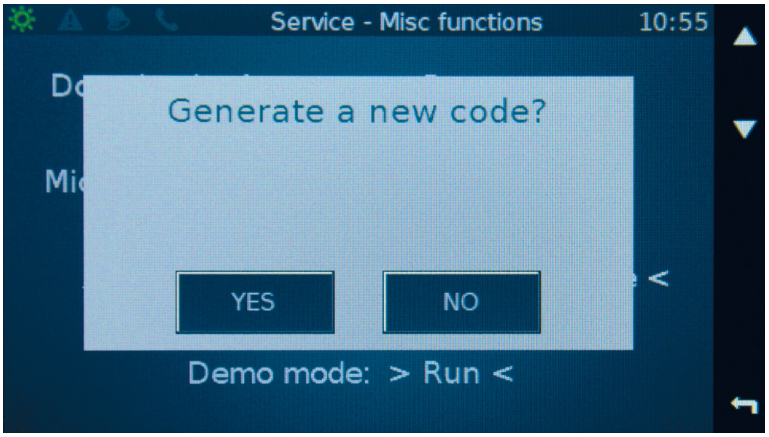
List of undetected microphones in the system



List of new microphones but without configuration



Code generation:

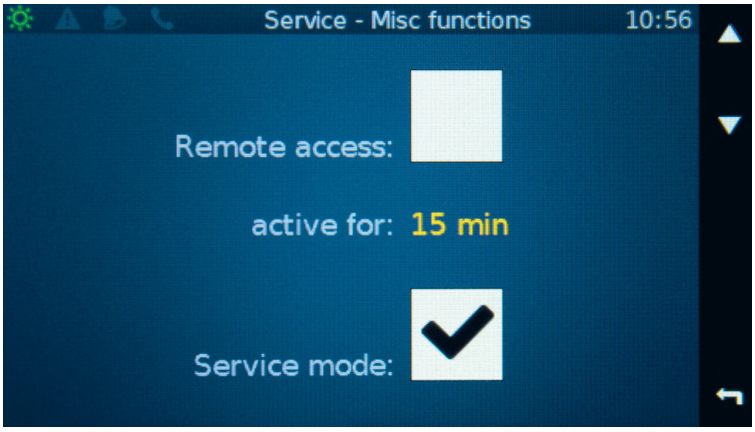


If the system configuration has been password protected and the password is unknown, there is a way to overwrite the old password by authorizing it in the configuration software using a token. After selecting the Authorization code option in the Service main menu, a 6-digit number will be displayed, which should be sent to Ambient System (support@ambientsystem.pl) to generate the authorization token.
Note: a request to generate an authorization token can only be sent by the system owner or manager or a person who obtains the written consent of the owner or manager and attaches it to an email.

From the Service window, use the buttons up / down to go to additional functions available on the GUI:

» Remote access. It is an option that allows the system to connect to a remote server, where the simultaneous activation of remote access disconnects the local server enabling connection to a computer via Selector software. The connection time with the remote server is defined by clicking the time field and changing with the buttons up / down in the range from 15 minutes to 3 days.

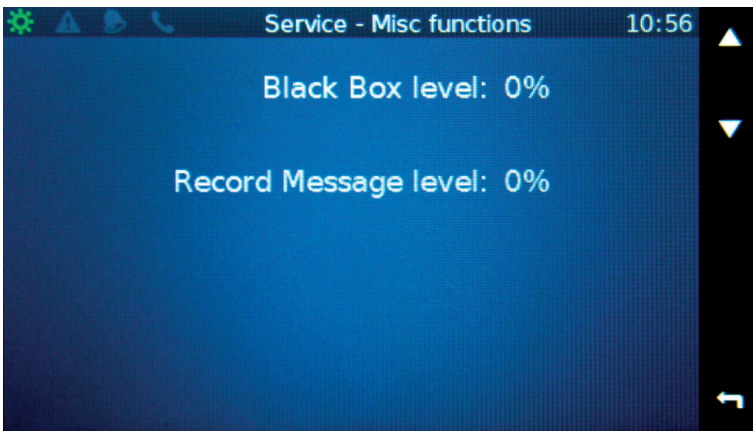
» Service mode. Unchecking the service mode will restrict access to system functions. If the service mode is turned off, it is only possible to select zones and activate audio sources from the touch screen.



The service mode is reactivated after successive presses of four icons in the upper left corner of the display  .
It practically comes down to repeatedly sliding your finger on these icons until you see information about the activation of the service mode, which must be confirmed with the OK icon.



Selecting the "down" button again will take you to the last tab showing the occupation of the Record Message and Black Box buffers.



14.8 Fault register

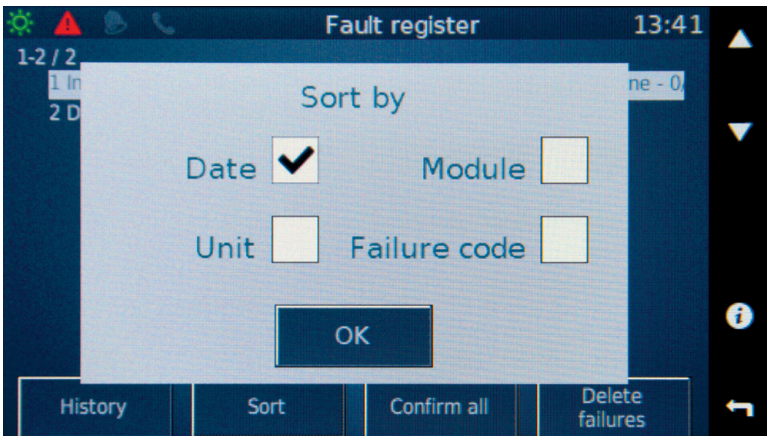
The Failure register tab allows you to view the current damages detected by the system. The buttons located at the bottom of the screen allow viewing the failure history, sorting entries, confirming the fault (after confirming the fault acoustic signaling is turned off) and clearing the fault with calling the check function again.



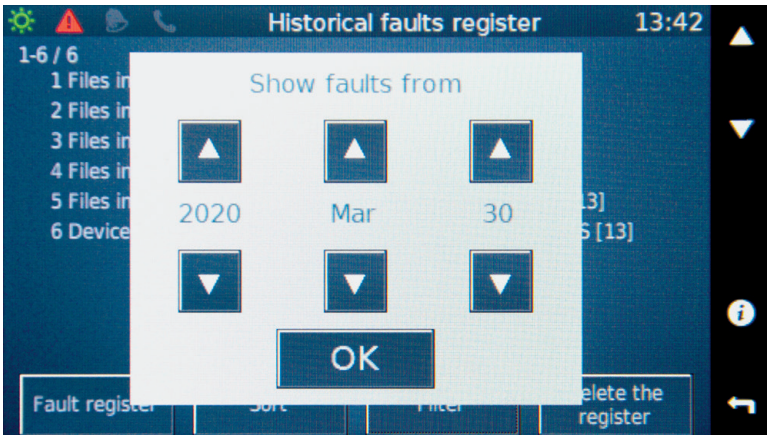
Scroll the list of faults with the buttons up / down . The detailed description of the fault is displayed by pressing the information button . A detailed description of the information includes: notification number, error code, date and time of the fault occurrence, description of the fault and a detailed description of the device the fault relates to (control unit, card name, slot, line – assigned audio output).



Selecting the Sort icon allows you to sort the damage list by date, module, unit, failure code.



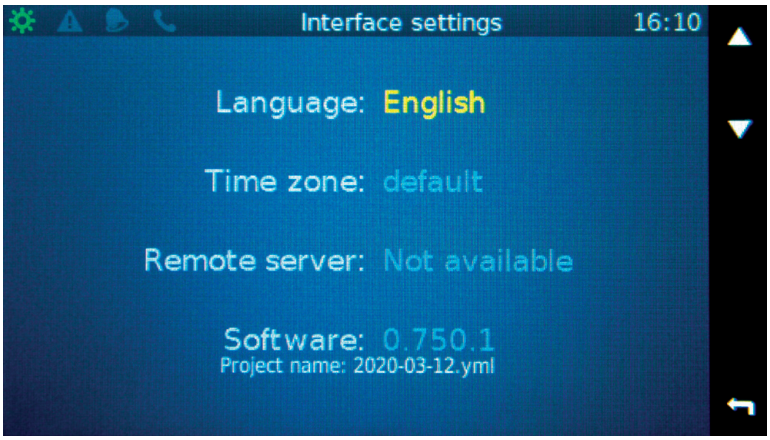
Selecting the History icon allows you to view past failures with the ability to view failure details, sort, filter by start date, and delete the registry.



Selecting the Delete the register icon clears all entries in the failure history.
Deleting the history log has no effect on the system event log, available through the Selector program.

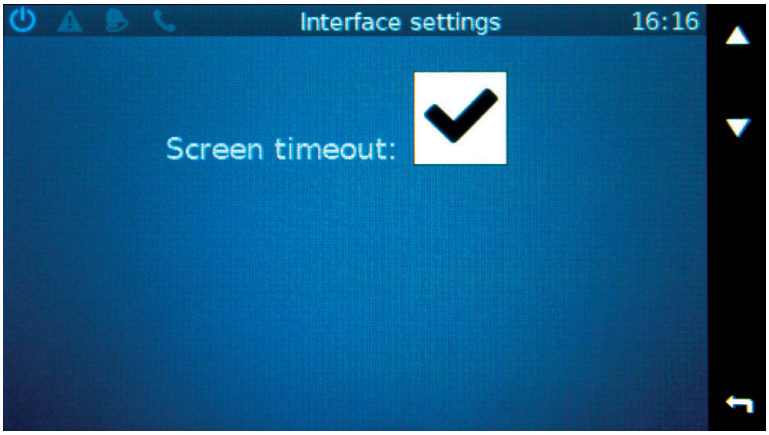
14.9 Interface setting

The Interface settings window is used to set the language in which the display is operated, change the time zone and display information about the expected IP address of the remote server, the signature of the system firmware version along with the project name.



Screen timeout

Use the buttons up / down to access the window activating the transition of the display to the energy saving mode.
This function is natively active. It will cause that after 5 minutes from the last activity, the display will switch to the time and date view and after another 30 seconds, it will be completely blank.



15. Annexes

» List of certified switches to connect devices in daisy chain topology

16. Certificates

17. Glossary

AFL
Ambient Flex Language – internal script language based on LUA language. LUA is covered by X11 license.

AVB
Audio Video Bridging – technology of sending audio and video streams a computer network.

FACIE
Fire Alarm Control and Indicating Equipment – central part of fire signaling system powering fire detectors and receiving fire detection signals in order to trigger the alarm.

VASCU
Voice Alarm System Central Unit – central unit managing the voice alarm system.

TDM
Time-division multiplexing – method of realizing two or more communication channels in one transmission medium. Multiplexing allows limiting the number of transmission mediums.

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