

SHIELD



Voice Alarm System

EN

Service Manual

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



ver. 1.2017



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NOTE!

The manufacturer reserves a right to modify parameters and methods of operation without further notice. By virtue of regular modifications and improvements, certain functions specified in this manual may differ insignificantly.

In order to avoid difficulties in operating the Voice Alarm System, it is advisable to get familiar with the manual before the first use.

VAS central unit is equipped with a set of automatic functions responsible for testing the system performance. The central unit uses FAILURE diode to signal irregularities. In such case, it is necessary to react immediately and, if necessary, consult a person in charge of VAS performance.

Exposing devices to extreme temperature, direct sunlight, moisture or dust may result in a fire or electric shock.










- ⚠ Do not connect the device to the source of power before all installation works have been completed.**
- ⚠ Read this manual.**
- ⚠ Keep this manual.**
- ⚠ Pay special attention to warnings.**
- ⚠ Follow all provisions of this manual.**
- ⚠ Avoid contact with water. Do not let the device contact water or other liquids.**
- ⚠ Use devices with utmost care.**
- ⚠ Use soft materials to clean devices. Never use solvents, such as petrol or diluent.**
- ⚠ Do not cover vent openings in device casing. Install the device in accordance with the manufacturer's instructions.**
- ⚠ Do not install the device close to sources of heat.**
- ⚠ Protect the feeder cable against stepping, pressure, bending or crushing, particularly close to plugs, sockets and the area on the device casing which is connected to the wire. A damaged feeder cable poses fire or electric shock hazards. Never touch electric plugs with wet palms.**
- ⚠ Avoid mechanical shocks. Strong impact and shocks may damage the equipment.**
- ⚠ Be careful while grabbing wires. To connect and disconnect all wires, grab a plug, not a wire.**
- ⚠ Always switch off power before disconnecting other devices. To avoid device and accessories damage, switch off the power supply by using the master switch of the device before connecting or disconnecting wires. While connecting wires, pay special attention to their polarization. A change of poles may damage them.**
- ⚠ Use accessories and additional parts specified by the manufacturer only.**
- ⚠ Do not leave any redundant items in the device.**
- ⚠ Do not try to repair or modify the device on your own. The device is not equipped with elements intended to repair the device by the user. As for maintenance, contact the authorized service provider.**
- ⚠ The warranty becomes invalid if you open or manipulate internal subassemblies on your own.**
- ⚠ Service works are required if any type of system damage occurs.**
- ⚠ The workers operating in the area where the system was installed should complete a suitable training with regard to system operation. One person must be responsible for maintaining proper performance and system maintenance.**
- ⚠ Following the regulations, the system must be maintained on a yearly basis, while the manufacturer advises to maintain the system twice a year.**

Declaration of Performance

No Nanoves-20160217

1. Product	Voice Evacuation System
2. Type of construction product	<p>NANOVES</p> <p>Components: SCU-8ZLCD / SCU-8 Z / SCU-11Z / SCU-11ZLCD SCUE-CPU / SCUE-NET-1Gb/WAN/RS / SCUE-4CTRLN SCUE-2CTRLN / SCUE-4/8AIO / SCUE-8AIN SCUE-8FLOGIN / SCUE-8FLOGOUT / SCUE-8CLOGIN SCUE-8CLOGOUT / SMA-ISLE SMA-FM / SMA-ZM / SMA-ZMLCD / SMA-EKB-20M SPA-8080B / SPA-8160B / SPA-2650B SPS-M48 / SPS-48800 / SPS-F4 SPS-EOL / SPS-REG1</p>
3. Type, batch or serial number or any other element allowing identification of the construction product	See CE mark label and marking on boards
4. Declared intended use of product	Fire Safety
5. Manufacturer	<p>Shield Fire, Safety and Security LTD Redburn House, 2A Tonbridge Road, Romford, RM3 8QE United Kingdom</p>
6. System of AVCP	1
7. Notified body	<p>Building Research Institute in Warsaw 1488-CPR-XXXX</p>

Example of VASCU NANOVES rating plate

<p>NANOVES Serial Number:</p> <p>Certificate of constancy of performance EN 54-16: 1488-CPR-0500/W Polish certificate of approval CNBOP: 2374/2015 Declaration of Performance: Nanoves-20160822 Declared intended use of product: fire safety Comply with: EN 54-16 • IP degree of protection: 30</p> <p>POWER SUPPLY EN 54-4: 1488-CPR-0395/W • EN 12101-10: 1488-CPR-0394/W • ŚD CNBOP: 1812/2013</p>	<table border="1"><tr><td data-bbox="922 443 1134 600"><p>CNBOP-PIB</p></td><td data-bbox="1134 443 1362 600"><p>15</p></td></tr><tr><td colspan="2" data-bbox="922 600 1362 696"><p>Manufacturer: SHIELD Redburn House Romford, Essex RM3 8QE United Kingdom</p></td></tr></table>	 <p>CNBOP-PIB</p>	 <p>15</p>	 <p>Manufacturer: SHIELD Redburn House Romford, Essex RM3 8QE United Kingdom</p>	
 <p>CNBOP-PIB</p>	 <p>15</p>				
 <p>Manufacturer: SHIELD Redburn House Romford, Essex RM3 8QE United Kingdom</p>					

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.

1. **SHIELD Presentation**

With more than twenty years of experience, SHIELD 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 SHIELD 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. SHIELD designs and manufactures leading products in the voice alarm systems market which have been certified PN-EN 54-4, PN-EN 54-16, PN-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 SHIELD, you are guaranteed a trustworthy partner that can be counted on for the long term.

SHIELD Field:

SHIELD audio systems have been installed in the following markets:

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

2. NANOVES system presentation

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

NANOVES 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, Iceland, Ireland, Italy, Lithuania, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Slovakia, Slovenia, Sweden, Switzerland and Great Britain.

NANOVES 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.

NANOVES 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:

SCU-8ZLCD Control Unit

SCU-11Z Control Unit

SCU-11Z-LCD Control Unit

Digital input card for SCUE-8FLOGIN function slot

Digital input card for SCUE-8FLOGOUT function slot

4 audio input card, 8 audio out and RS485 for SCUE-4/8AIO function slot

8 audio input card for SCUE-8AIN function slot

4 loudspeaker line control card SCUE-4CTRLN

2 loudspeaker line control card SCUE-2CTRLN

Digital input card for SCUE-8CLOGIN control slot

Digital output card for SCUE-8CLOGOUT control slot

SPA-8080B power amplifier

SPA-8160B power amplifier

SPA-2650B power amplifier

SMA-ISLE connection isle

SPS-M48 power supply manager

UZS SPS-48800 feeder

SMA-FM fireman microphone

SMA-ZM zone microphone

SMA-ZMLCD zone microphone with display

SMA-EKB-20M microphone keyboard extension

ABT-REG1 volume control

DEHnrail DR M 2P 150 loudspeaker line overvoltage limiter

Optional features in accordance with PN-EN 54-16 standard:

Sound signaling	x
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	✓

3. Signs used in the document

**Warning!**

This sign means a potentially hazardous situation posing a death or disability hazards

**Attention!**

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

**Warning!**

This sign means that using the above-mentioned products increases the risk of visual impairment.

4. Warranty conditions

1. The products sold to the Buyer by SHIELD, hereinafter referred to as Seller, are in conformance with the manufacturers' specifications defined in relevant materials supplied to the Buyer.
2. The Buyer shall be construed as a company who directly purchases products from SHIELD.
3. The Buyer shall be obligated to inspect all received products in order to identify possible damage, defects or missing elements immediately after reception and notify the Seller in writing within five working days counting from the delivery date of any detected damage, defects or missing elements, as well as damage, defects or missing elements which could have been identified by the Buyer.
4. Any warranty repairs of the device will be accepted if the copy of the proof of purchase has been submitted (e.g. legible photocopy of an invoice issued by SHIELD) and filled Complaint Form, annex no. 1.
5. If the Buyer resells the product, he shall be held responsible for any product damage arising from unsuitable transport or improper use if the product delivery is not performed directly by the Seller.
6. The Buyer shall notify the Seller in writing of any defects occurring in the product warranty period.
7. Unless agreed otherwise by the Seller and Buyer, the warranty period starts on the day of the sale and lasts for the period of 24 months.
8. If given products do not meet the warranty conditions or are otherwise defective, the Seller may, at his own discretion, repair or replace with the same or new products or repaired goods. The warranty shall not be accepted if:
 - a. the Buyer or third parties attempt to repair the product on their own,
 - b. the product has not been maintained according to protocol twice a year and not less frequently than every 7 months – in the case of VAS system.
9. The Seller shall not incur any work costs related to disassembly or another assembly of products, as well as single devices or their subassemblies provided to the Seller as part of the warranty claim. The Buyer commits to incur the aforesaid costs.
10. Every repaired or replaced products shall be subject to warranty for a period longer than the following periods: for remaining warranty period for initial product or period of 90 days.
11. The statutory warranty for defects pursuant to art. 558 of the civil code shall be thereby excluded.
12. The Seller shall not be held responsible for product damage arising from external factors, such as:
 - a. mechanical damage, pollution, flooding, atmospheric discharge, overvoltage, disasters,
 - b. unsuitable operation and in unsuitable conditions (e.g. voltage fluctuations, extensive dustiness, significant humidity, too high or too low ambient temperature), unsuitable installation, application, storage, maintenance or product handling,
 - c. parts and elements which are subject to natural wear as a result of operation, minor inconveniences which do not affect the performance,
 - d. product use at variance with its intended use or failure to follow the Seller's recommendations,
 - e. negligence on the user's or person's other than Seller part.
13. The warranty does not cover storage batteries or batteries supplied by the Seller.
14. If the product includes "Software" which is an integral part of the product supplied on the basis of these conditions or delivered separately, the Seller guarantees that the Software corresponds to all relevant aspects of the Seller's documents concerning this Software at the delivery.
15. As for VAS system, all activities related to system maintenance, as well as assembly and disassembly of the damaged device (understood as a complete system) may be undertaken by a person authorized by the Manufacturer/Seller only, otherwise the warranty shall be considered invalid. Subject to provisions of the point 7, the maximum range of Seller's duties is tantamount to the net purchase price which was actually paid by the Buyer.
16. This warranty shall apply solely to the original purchaser (Buyer) and shall not apply to any further purchasers or other persons whom the product ownership was transferred to. The original purchaser (Buyer) is not authorized to expand the coverage or transfer this warranty to third parties.
17. To the fullest extent permitted by law, this warranty shall replace all other warranties, conditions, statements or other provisions specified in writing or orally, clearly specified or understood pursuant to the act, including the warranty of fitness for sale or particular purpose.

18. Possible defects which make it impossible to operate the device in accordance with its intended use, and disclosed in the warranty period shall be eliminated free of charge. The repairs can be performed by SHIELD only.
19. The equipment being subject to complaint must be delivered at own expense to the head office of SHIELD (address given in the headline) in the original packaging or other assuring safe transport. The delivered equipment shall be complete, supplied with wires, connecting blocks, handles and other equipment elements. In case of lack of factory packaging, it is the Buyer who shall be held responsible for any damage arising during equipment transport to and from the warrantor.
20. The warranty repair shall not include actions specified in the service manual, which shall be performed by the Buyer on his own and at his own expense (e.g. cleaning, installing, programming). If the warrantor receives a fully operational equipment or equipment requiring actions specified in the service manual, cleaning, inspecting, testing and transporting costs shall be incurred by the Buyer.
21. The warranty expires if seals have been tampered, the device has been clearly modified or repaired by unauthorized persons. VAS system devices do not have external seals. Every manipulation attempt by unauthorized persons will be detected by a specialist service personnel, which automatically entails warranty loss.
22. Right and liabilities of parties are specified in provisions of this document which the Buyer shall get familiar with before the purchase (the basis for settling possible discrepancies is Polish law).
23. The warranty is valid in the territory of the Republic of Poland and in countries represented by authorized distributors of SHIELD.
24. This warranty does not exclude or limit, or suspend Buyer's rights arising from product non-conformance with the agreement.

5. 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 the cold environment to the warm one, 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 the transport, the devices should be packed in a way assuring reduced risk of mechanical damage and impact of weather conditions.

5.1 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).

5.2 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 1,5m.
- » The room should be properly marked.
- » If FPDOR is located at a different distance than 10m 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 values in the room, in which the console with the fireman microphone is located, should not exceed 40dB.
- » A table with dimensions allowing persons to unfold site and system documentations must be located in the room.

5.3 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 SPS-48800 switch-mode power supply modules are used as a main source of energy distribution. SPS-M48 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 SPS-F4 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 SPS-48800 power supply unit as an independent device and it is not necessary to assembly packs in the SPS-F4 frame and RACK-type cabinet. Analogically, SPS-M48800 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 PN-EN 54-16 includes as follows:

- » Power supply manager 1x SPS-M48,
- » Power supply modules 4x SPS-48800,
- » Power supply unit frame 1x SPS-F4.

6. Device description

This section provides an insight into NANOVES system components:

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

6.1 Internal devices

6.1.1 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 tracks from any source of signal to any output. Global audio track switch is possible on the basis of the programmable logic system and Ethernet 1G (UDP/IP,TCP/IP) network.

NANOVES system offers three various control units:

- » **SCU-8ZLCD unit**
 - › system primary unit, equipped with LCD screen
 - › unit can be equipped with additional and redundant SCUE-CPU card assuring full unit performance in case of CPU card failure.
- » **SCU-11Z unit**
 - › system secondary unit, or for minor sites. Not equipped with processor card but has built-in communication card
- » **SCU-11ZLCD unit**
 - › identical to SCU-11Z 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 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 SCU-8ZLCD control unit:

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

Components of SCU-11Z and SCU-11ZLCD control units:

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

6.1.1.1 SCU-8ZLCD unit

SCU-8ZLCD control unit was equipped with a color LCD screen 4,5" which provides a direct access to management and entire system monitoring functions. SCU-8ZLCD is a matrix mixer for input signals. It assigns input signals to four internal audio buses 100 V, a 28-channel digital system bus or directly to audio outputs in the unit. SCU-8ZLCD plays a role of a primary NANOVES system controller. Users can connect 4 audio input cards, audio output cards or logic cards to this system (access on rear panel):

- » SCUE-4/8AIO
- » SCUE-8AIN
- » SCUE-8FLOGIN
- » SCUE-8FLOGOUT

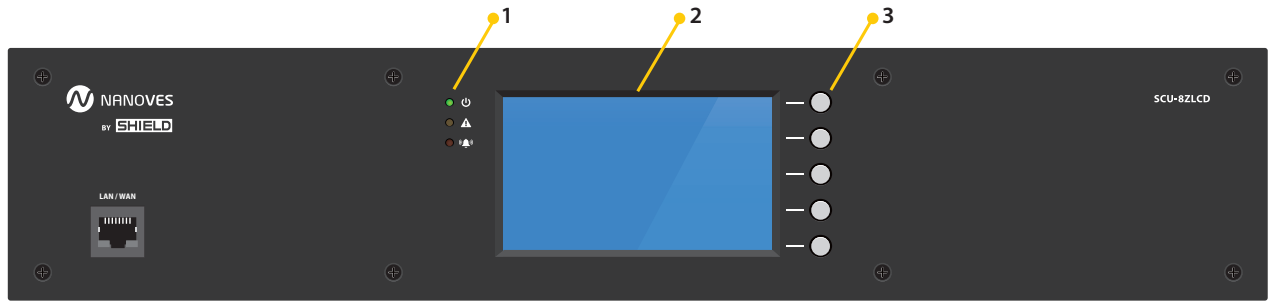
and up to 7 loudspeaker control cards or logic input/outputs:

- » SCUE-4CTRLN
- » SCUE-2CTRLN
- » SCUE-8CLOGIN
- » SCUE-8CLOGOUT

SCU-8ZLCD 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 SCU-8ZLCD 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.

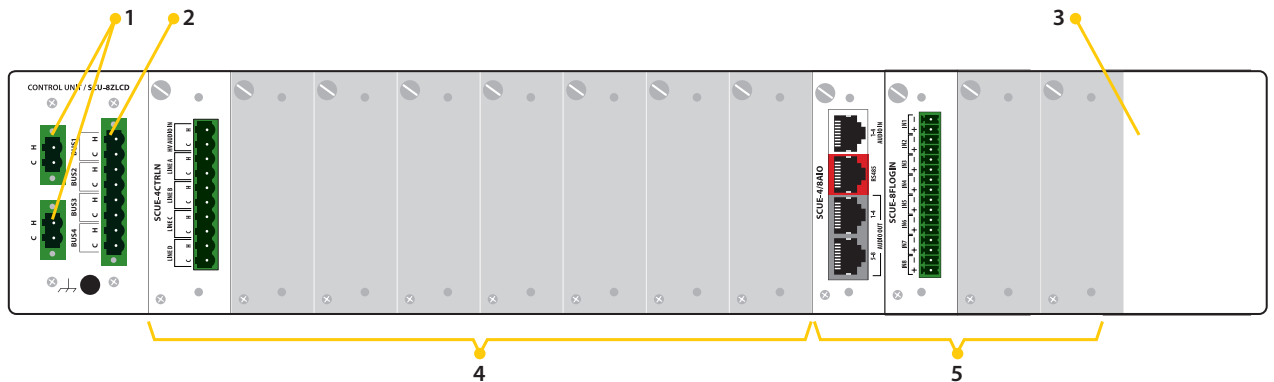
Table 1. Technical data of SCU-8ZLCD

Model	SCU-8ZLCD system control unit
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 HC up to 32 GB / The set included 512 MB SLC SDHC cards 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, 16 band parametric EQ and Delay lines on each of the audio output
Data communication	<p>Communication between devices over large distances:</p> <ul style="list-style-type: none"> › 1000BASE-X on the fiber › 2 ports provide a redundant connection <p>Communication between devices installed side by side:</p> <ul style="list-style-type: none"> › 1000BASE-TX / RJ45 CAT5E cables after – 2 ports available on the back panel. › 100BASE-TX / RJ45 CAT5 cables after – 1 port available on the rear panel for connection to an external network (see notes) › 100BASE-TX / RJ45 CAT5 cables after – 1 port available on the front panel (the main processor card) for connection to an external network
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 / +60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C / +70°C
Storage Humidity	15% to 80% (non-condensing)
Finish Case Material:	Finish Case Material: Steel The front panel is made of metal plate painted black
Dimensions	482 (W) X 85 (H) × 325 (D) mm
Mounting	19" – rackmount
Weight	Up to 8 kg (depends on configuration)
Accessories	2 brackets and 4 screws for rack, 8 caps for free slots



Drawing 1. Front panel of SCU-8ZLCD

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



Drawing 2. Rear panel of SCU-8ZLCD

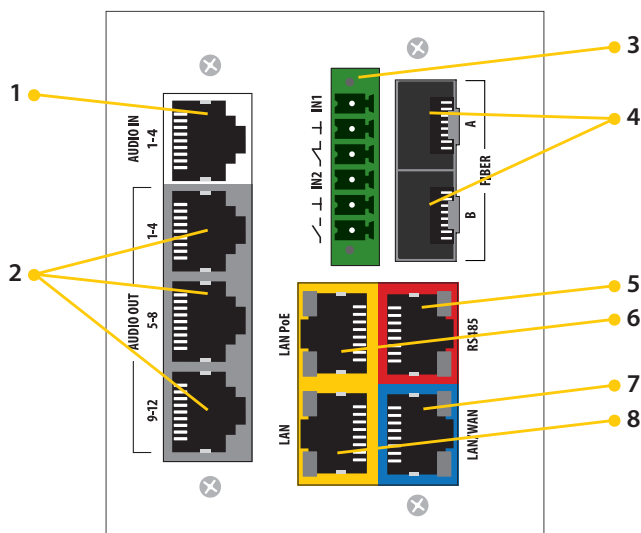
1. **Power supply**, two identical connectors
2. **Connector for 100 V amplifier output** to supply internal BUS available for all control cards
3. **Communication card slot**, 1 item
4. **Control card slot**, 8 items
5. **Function card slot**, 4 items

6.1.1.2 SCU-11Z unit

SCU-11Z 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.

SCU-11Z 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 (SCUE-CPU-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 SCU-11Z 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 SCU-11Z

Model	SCU-11Z
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 HC up to 32 GB / The set included 512 MB SLC SDHC cards 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 and delay line on all of the audio outputs
Number of audio inputs	4
Type of audio inputs	Differential
Connector type	1x RJ45
Frequency response	40 Hz... 20 kHz (@1dB) / 400 Hz... 8 kHz (@0,1dB)
Input impedance	≥ 10 kΩ
Maximum input voltage	≥ 3 Vrms
Number of outputs	12
Type of outputs	Balanced
Connector type	3x 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

	<p>Communication between devices over large distances:</p> <ul style="list-style-type: none"> › 1000BASE-X on the fiber › 2 ports provide a redundant connection <p>Communication between devices installed side by side</p> <ul style="list-style-type: none"> › 1000BASE-TX / RJ45 CAT5E cables – 2 ports available on the back panel. › 100BASE-TX / RJ45 CAT5 cables – 1 port available on the rear panel for connection to an external network (see notes) › 100BASE-TX / RJ45 CAT5 cables – 1 port available on the front panel (the main processor card) for connection to an external network
Data communication	

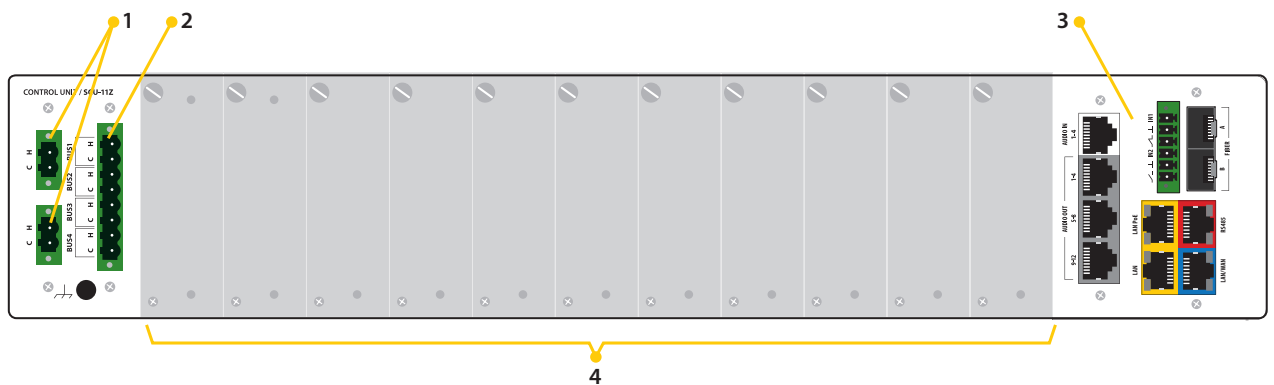
Fiber module – connector type / kind of fiber	Modules type SFP / Connector SC/LC / Multimode or single-mode / E 30 or E 90, OM lub OM2
Communication with PC	PC software: RJ45 connector twisted pair connection TIA/EIA568-B by the Ethernet protocol
Operating temperature	0°C / +60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C / +70°C
Storage Humidity	15% to 80% (non-condensing)
Finish Case Material	Finish Case Material: Steel The front panel is made of metal plate painted black
Dimensions	482 (W) X 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, 8 caps for free slots



Drawing 4. Front panel of SCU-11Z

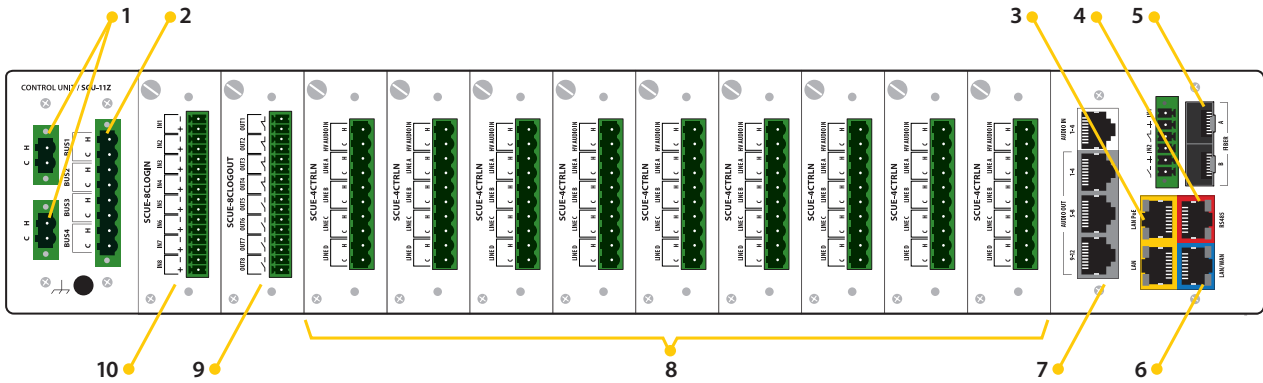
1. Indicators

- a. Power supply indicator (green LED)
- b. Failure indicator (yellow LED)
- c. Emergency indicator (red LED)



Drawing 5. Rear panel of SCU-11Z

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 SCU-11Z. Example extension card arrangement

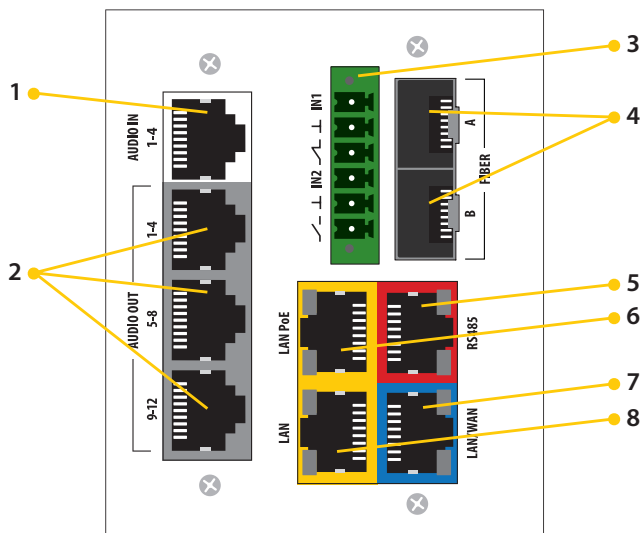
1. **Power supply**
2. **Connector for 100V amplifier outputs** to supply internal BUS available to all control cards
3. **RJ-45 connectors, LAN with PoE**, 2 items
4. **RJ-45 connector – RS485 signal**
5. **Optical fiber connectors**, marked as A, B
 - ⚠ An optical fiber connector is equipped with laser. Be particularly careful and avoid eye contact with laser beam.
6. **RJ-45 connectors, WAN**; in case of alarm, this port locks automatically
7. **SCUE-CPU-Audio-4/12 card**; 4 audio input channels (upper port) are white, while 12 audio outputs (3 lower ports) – grey
8. **SCUE-4CTRLN control cards**
9. **SCUE-8CLOGOUT logic output card**
10. **SCUE-8CLOGIN logic input card**
 - ⚠ SCU-11Z control unit has integrated communication card and audio input/output card.

6.1.1.3 SCU-11ZLCD unit

SCU-11ZLCD control unit was designed to perform minor VAS systems or as an extension unit in complex systems. 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 SCU-11Z 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.

SCU-11ZLCD 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.



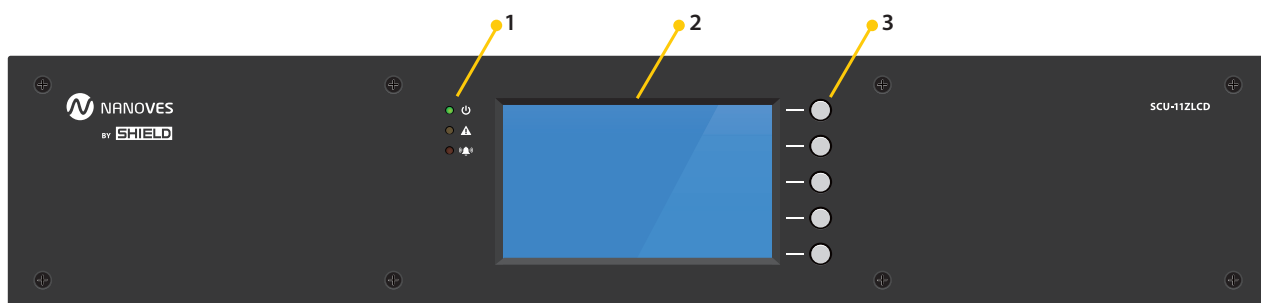
Drawing 7. Diagram of dedicated communication card of SCU-11ZLCD control unit

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 SCU-11ZLCD

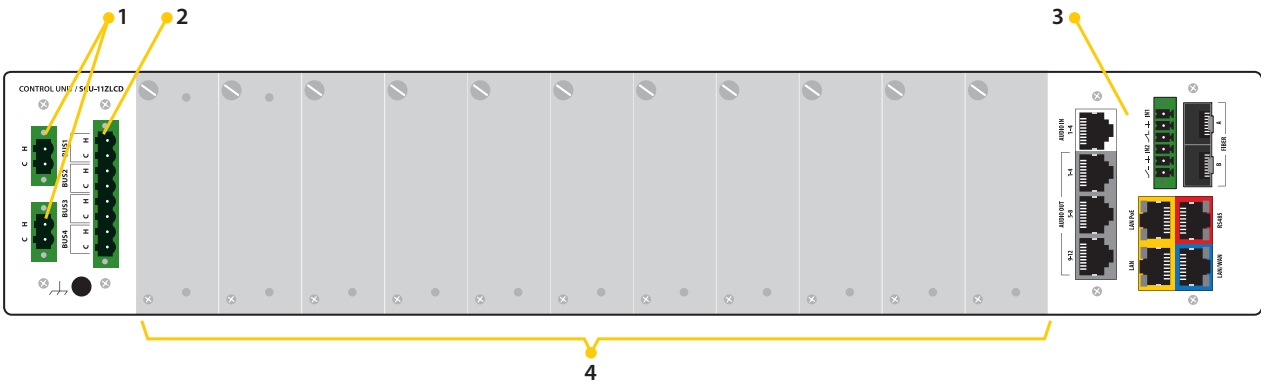
Model	SCU-11ZLCD
Power supply	48 V DC (operating range 40-57 V DC) connector with screw terminals M2.5, the distance between the partitions of 5.08mm
Power consumption	Up to 100 W (depends on configuration)
Number of control slots	11
Number of function slots	0
Messages	Supported SD HC up to 32 GB / The set included 512 MB SLC SDHC cards 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 and delay line on all of the audio outputs
Number of audio inputs	4
Type of audio inputs	Differential
Connector type	1x RJ45
Frequency response	40 Hz... 20 kHz (@1dB) / 400 Hz... 8 kHz (@0,1dB)
Input impedance	$\geq 10 \text{ k}\Omega$
Maximum input voltage	$\geq 3 \text{ Vrms}$
Number of outputs	12
Type of outputs	Balanced
Connector type	3x RJ45
Frequency response	40 Hz... 20 kHz (@1dB) / 400 Hz... 8 kHz (@0,1dB)
Harmonic distortion (THD+IMD)	$\leq 0,05\%$
Headroom	10 dB
SNR	$\geq 90 \text{ dB}$
Channel separation	$\geq 80 \text{ dB}$
Output impedance	600 Ω
Nominal output level	1 Vrms
Data communication	<p>Communication between devices over large distances:</p> <ul style="list-style-type: none"> > 1000BASE-X on the fiber > 2 ports provide a redundant connection <p>Communication between devices installed side by side</p> <ul style="list-style-type: none"> > 1000BASE-TX / RJ45 CAT5E cables – 2 ports available on the back panel. > 100BASE-TX / RJ45 CAT5 cables – 1 port available on the rear panel for connection to an external network (see notes) > 100BASE-TX / RJ45 CAT5 cables – 1 port available on the front panel (the main processor card) for connection to an external network

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 / +60°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C / +70°C
Storage Humidity	15% to 80% (non-condensing)
Finish Case Material	Finish Case Material: Steel The front panel is made of metal plate painted black
Dimensions	482 (W) X 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, 8 caps for free slots



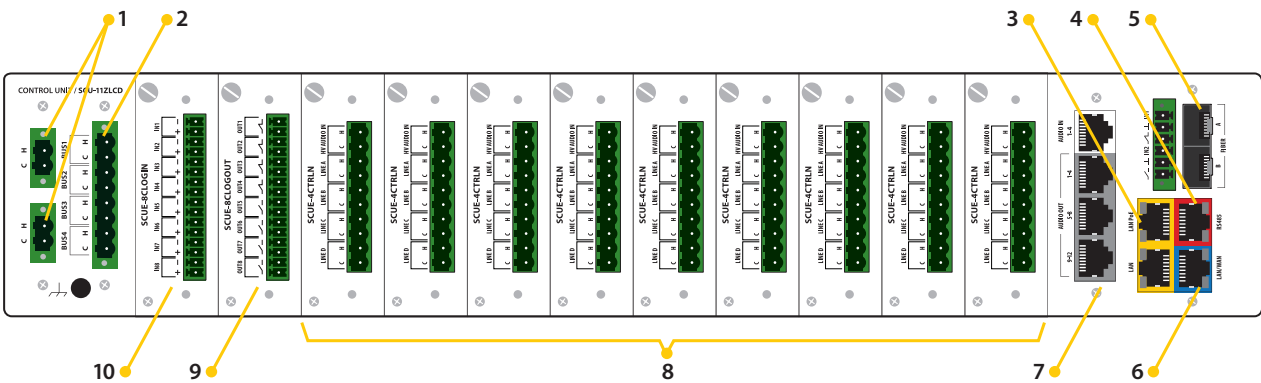
Drawing 8. Front panel of SCU-11ZLCD

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 SCU-11ZLCD.

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 SCU-11ZLCD. Example of extension card arrangement

1. **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**. In case of alarm, this port locks automatically
7. **SCUE-CPU-Audio-4/12 card**; 4 audio input channels (upper port) are white, while 12 audio outputs (3 lower ports) – grey
8. **SCUE-4CTRLN control cards**
9. **SCUE-8CLOGOUT logic output card**
10. **SCUE-8CLOGIN logic input card**
 - ▲ SCU-11Z control unit has integrated communication card and audio input/output card.

6.1.2 Extension card

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

6.1.2.1 SCUE-CPU – processor card

SCUE-CPU 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. SCU-8ZLCD control unit can support 1 SCUE-CPU processor card which can reproduce 8 messages at a time.

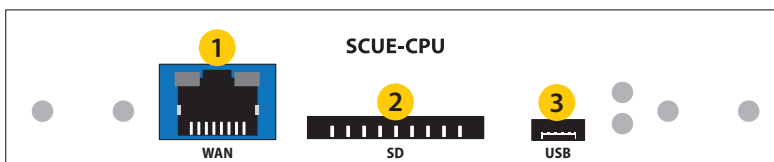
SCUE-CPU supports SD cards up to 32 GB for individual messages, as well as event or defect logs or system update files.



Drawing 11. SCUE-CPU processor card

Processor card:

- » has SDHC memory slot supporting up to 32 GB,
- » remembers its configuration and configuration of other units and system elements,
- » has its own group of alarm messages,
- » records events and defects,
- » allows system upgrade,
- » has micro B USB 2.0 port.



Drawing 12. SCUE-CPU processor card

1. LAN/WAN 100 Mb/s port (unsupported in 1.0.0 version)
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 SCUE-CPU

Model	SCUE-CPU
Source of power	SCU-8ZLCD Control Unit Backplane
Power consumption	+5 V, typically 270 mA, max. about 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
Working temperature	from 0°C to +60°C
Ambient humidity during operation	from 15% to 80% (without condensation)
Ambient temperature during storage	from -20°C to 70°C
Ambient humidity during storage	from 5% to 95% (without condensation)

6.1.2.2 SCUE-NET-1Gb/WAN/RS – communication card

SCUE-NET-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 NANOVES 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 SHIELD innovative protocol. Additionally, this card is equipped with RS485 port which implements and integrates NANOVES with any system, e.g. SAP. Another advantage is support of PoE technology to supply, e.g. fireman microphone.



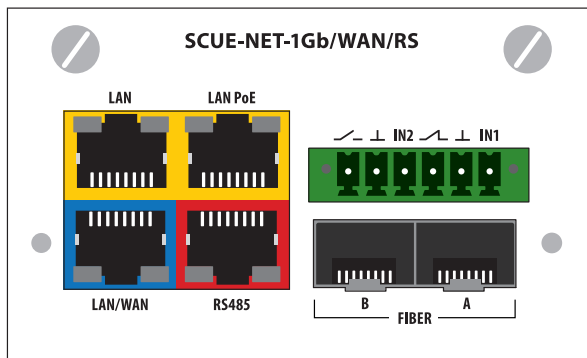
Drawing 13. SCUE-NET-1Gb/WAN/RS communication card

The communication card:

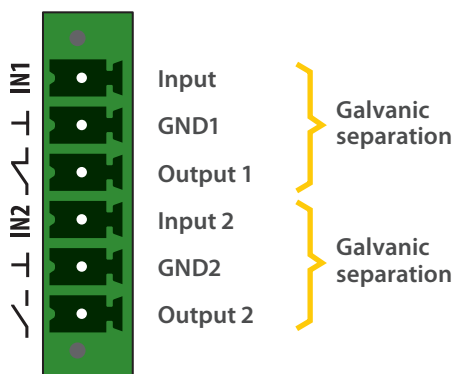
- » has two switches (2 LAN 10/100/1000 ports), system (for VAS communication) and for remote connections (disconnected during fire-fighting) (1 LAN/WAN 10/100 port – configurable working mode),
- » is equipped with VAS switch with AVB support,
- » allows 1Gb/s transmission speed and has optical-fiber 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 multiple-mode optical fibers sending information with up to 1,25 Gbps speed. They transmit data through optical fiber pairs (duplex). A type of connectors does not matter, you can use LC and SC types. Another function is a possibility of performing digital diagnostics.



Drawing 14. SCUE-NET-1Gb/WAN/RS communication card



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

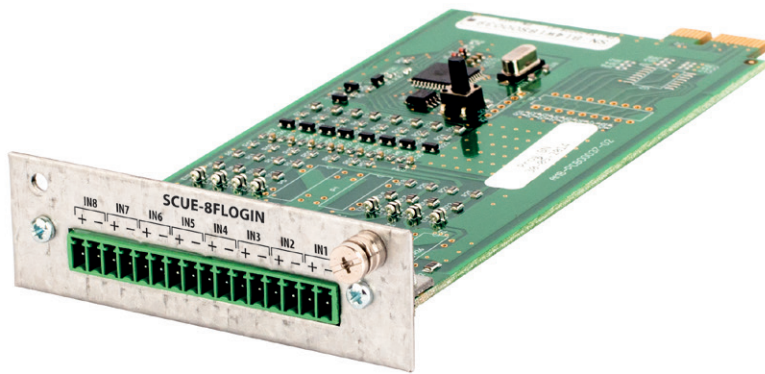
Table 5. Technical parameters of SCUE-NET-1Gb/WAN/RS communication card

Model	SCUE-NET-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 1x NO, 1x NC output
Source of parametric input signal	Passive, standard resistors: 4 k Ω ↔ 10 k Ω , 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)
Working temperature	0°C to +60°C
Ambient humidity during operation	from 15% to 80% (without condensation)
Storage temperature	-20°C to +70°C
Ambient humidity during storage	from 15% to 80% (without condensation)
Dimensions	70 x 160 x 30 (mm)

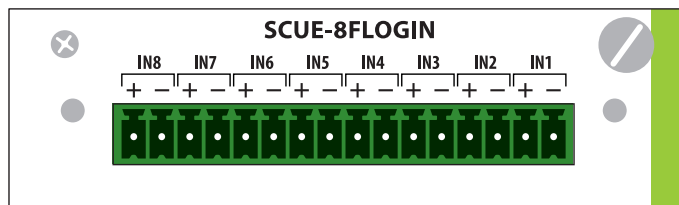
6.1.2.3 SCUE-8FLOGIN – logic input to function slot card

Main features of the card:

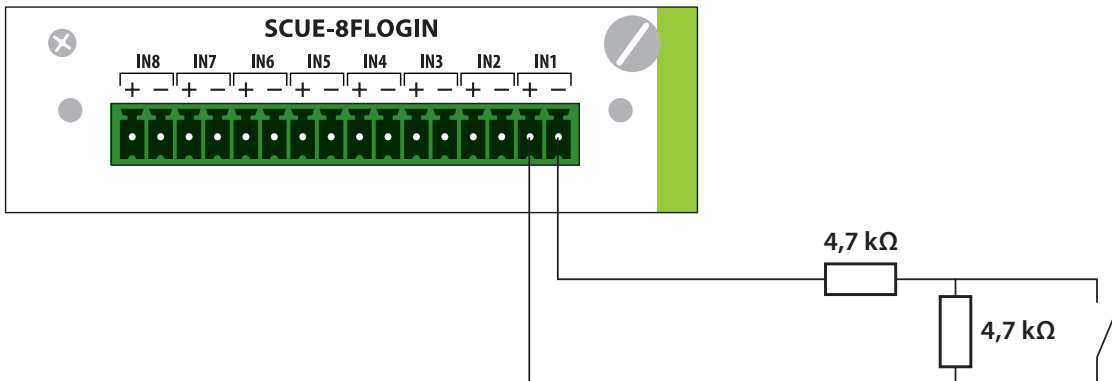
- » reporting hardware errors identified on the card,
- » reporting incorrect input voltage level (short-circuit, open-circuit); connector monitoring feasible by measuring voltage at parametric resistors; the card detects four statuses: line short-circuit, line open-circuit and input closing and opening,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



Drawing 16. Logic input to function slot card



Drawing 17. Logic input to function slot card



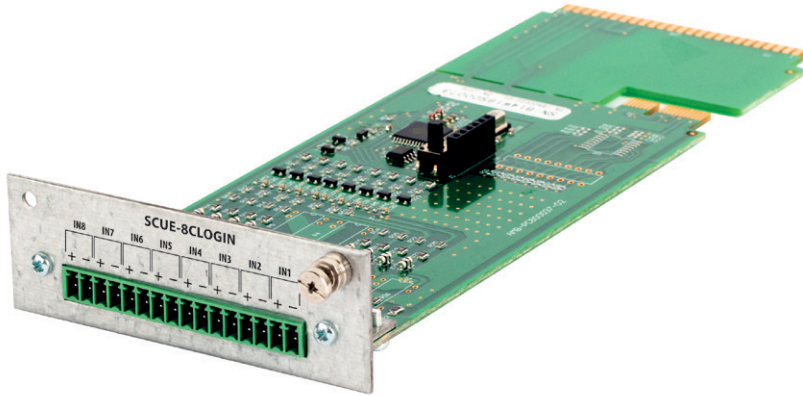
Drawing 18. Example of diagram of connecting resistors on monitored line

Table 6. Technical data of SCUE-8FLOGIN and SCUE-8CLOGIN

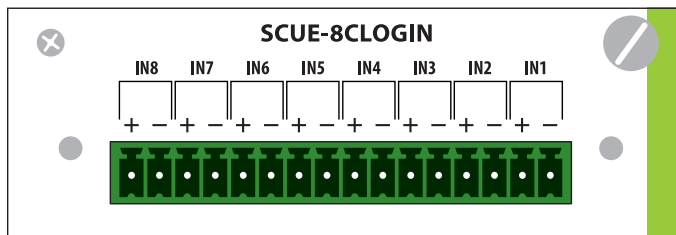
Model	SCUE-8FLOGIN / 8CLOGIN
Power supply	Internal from the Control Unit
Current consumption	10 mA at 48 V
Number of logic inputs	8
Voltage source	12 V
Types of control logic	NO / NC
The resistance value interpreted as the opening of the line	RL>20k
The resistance value interpreted as a contact close	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	SCUE-8CLOGIN – 70 x 215 x 25 (mm) SCUE-8FLOGIN – 70 x 160 x 25 (mm)
Accessories	Connector with screw terminals 16 pins, the distance between the partitions of 3.5 mm

6.1.2.4 SCUE-8CLOGIN – logic input to control slot card

The card is identical to SCUE-8FLOGIN in terms of functions. The only difference is PCB length and a type of connector.



Drawing 19. Logic input to control slot card

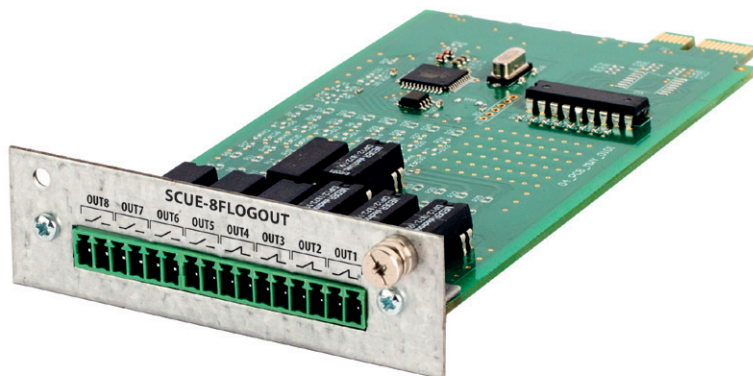


Drawing 20. Logic input to control slot card

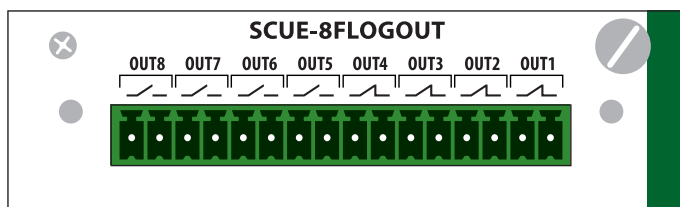
6.1.2.5 SCUE-8FLOGOUT – logic output to function slot card

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 outputs of xLogOUT-8f card



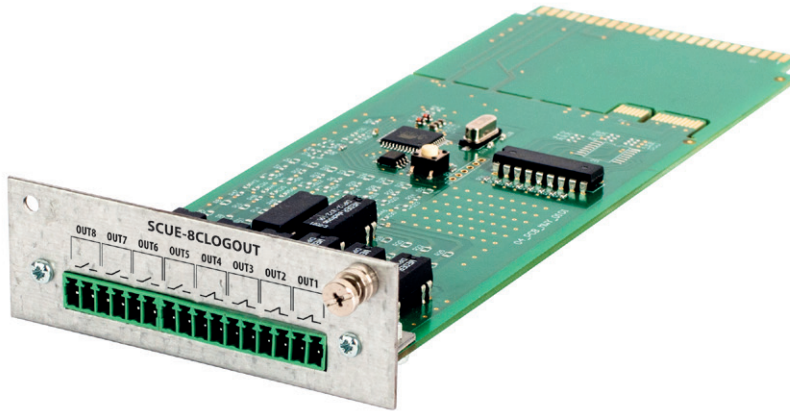
Drawing 22. Logic outputs of xLogOUT-8f card

Table 7. Technical data of SCUE-8FLOGOUT and SCUE-8CLOGOUT

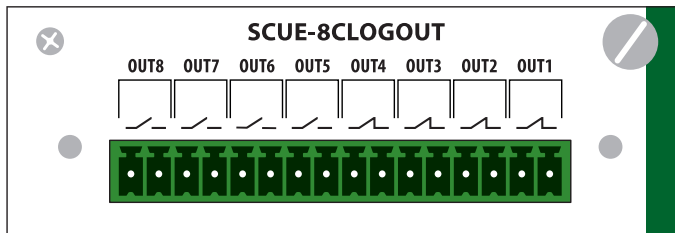
Model	SCUE-8FLOGOUT / 8CLOGOUT
Power supply	Internal form the Control Unit backplane
Power consumption	10 mA at 48 V
Number of logic outputs	8, each output galvanically isolated
Type of outputs	4x NC 4x NO
Connector type	16 pin screw terminal type PHOENIX, 3.5 mm
Switching current (Max.)	0,5 A
Breakdown voltage (Min.)	200 V
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	SCUE-8CLOGOUT – 70x215x 25 (mm) SCUE-8FLOGOUT – 70x160x 25 (mm)
Accessories	Connector with screw terminals 16 pins the distance between the partitions of 3.5 mm

6.1.2.6 SCUE-8CLOGOUT – Logic output to control slot card

The card is identical to SCUE-8FLOGOUT in terms of functions. The cards differ in terms of PCB length and a type of connector.



Drawing 23. Logic output to control slot card



Drawing 24. Logic output to control slot card

6.1.2.7 SCUE-4/8AIO – Audio input/output card with RS485

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

This extension is mounted in the function card slot. Every card has a separate audio signal input. The card provides 4 audio inputs symmetrical with 3 parametric filters into channel and 8 symmetrical audio outputs with built-in feedback suppressor, audio limiter and 8 parametric filters for each channel.



Drawing 25. SCUE-4/8AIO card

RS485 First connector

Type : RJ45

Assigning pins in connector:

Pin	Name	Description
1	+48 V	Power supply, max 1 A
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	GND	Ground
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 SCUE-4/8AIO

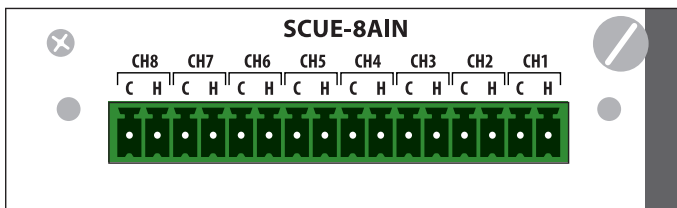
Model	SCUE-4/8AIO
Source of power	SCU-8ZLCD Control Unit main backplane
Power consumption	typically 100 mA with 48 V
Audio inputs	
Number of audio inputs	4
Type of audio inputs	Differential
Type of connector of audio inputs	1x RJ45
Input impedance	$\geq 10 \text{ k}\Omega$
Max. input voltage	$\leq 3 \text{ Vrms}$
Audio outputs	
Number of audio outputs	8
Type of audio outputs	Symmetrical
Type of connector of audio inputs	2x RJ45
Pass band	20 Hz – 20 kHz (@ 1 dB) 400 Hz – 8kHz (@ 0,1 dB)
Non-linear distortion (THD+IMD)	$\leq 0,05\%$
Reserve output power (headroom)	10 dB
Relation signal/noise	$\geq 90 \text{ dB}$
Channel separation	$\geq 80 \text{ dB}$
Output impedance	600 Ω
RS485 interface	
Number of seats	RJ45 x1
Transmission speed	$\geq 19200 \text{ bps}$
RS485 connector supply	48 V with current efficiency 2 A
Working temperature	from 0°C to 70°C
Storage temperature	from -20°C to 70°C
Ambient humidity during operation	15% to 80% (without condensation)
Ambient humidity during storage	5% to 95% (without condensation)
Dimensions	70 x 160 x 25 (mm)

6.1.2.8 SCUE-8AIN – 8 AUDIO input to function slot card

SCUE-8AIN card serves to connect 8 symmetrical audio sources to NANOVES system. It was created with a view to apply NANOVES system for Public Address purposes. Every audio input is equipped with 3 parametric filters and amplification adjustments.



Drawing 26. SCUE-8AIN card model – 8 audio inputs



Drawing 27. SCUE-8AIN card model

Table 9. Technical data of SCUE-8AIN

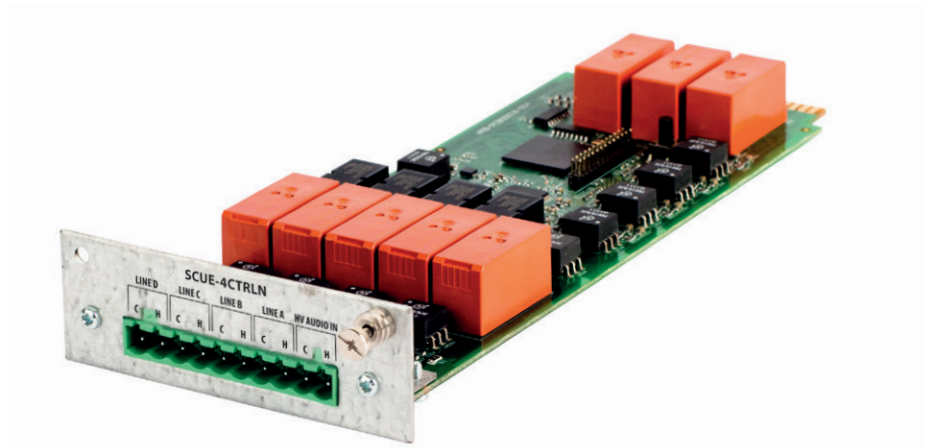
Model	xAudi-8
Source of power	SCU-8ZLCD Control Unit main backplane
Power consumption	25 mA with 48 V
Number of audio inputs	8
Type of audio inputs	Differential
Type of connector and number of audio inputs	Screw terminals PHOENIX 16 pin -type, 3,5 mm
Input impedance	≥ 10 kΩ
Max. input voltage	≤ 3 Vrms
Working temperature	from 0°C to 60°C
Ambient temperature during storage	-20°C to 70°C
Ambient humidity during operation	from 15% to 80% (without condensation)
Ambient humidity during storage	from 5% to 95% (without condensation)
Dimensions	70 x 160 x 25 (mm)

6.1.2.9 SCUE-4CTRLN – Control card of 4 loudspeaker lines

SCUE-4CTRLN card provides 4 independent outputs of loudspeaker lines (A,B,C,D).

The card assures matrix of 100 V signal to loudspeaker line from individual input audio HV placed on the card's front panel or one of four internal 100 V bases available for all control cards.

The card allows switching between main and back-up amplifiers.



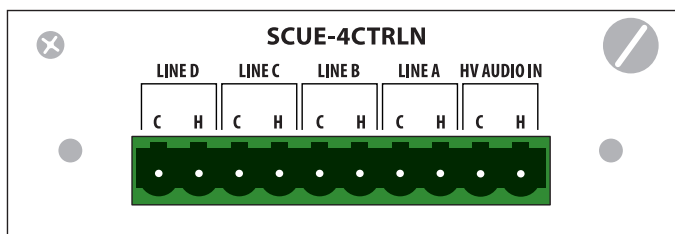
Drawing 28. SCUE-4CTRLN loudspeaker lines control card

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

- » impedance,
- » loop.

The card detects short-circuit, open-circuit and absence of elements.

⚠ Maximum power which SCUE-4CTRLN 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.



Drawing 29. SCUE-4CTRLN loudspeaker lines control card

Table 10. Technical data of SCUE-4CTRLN

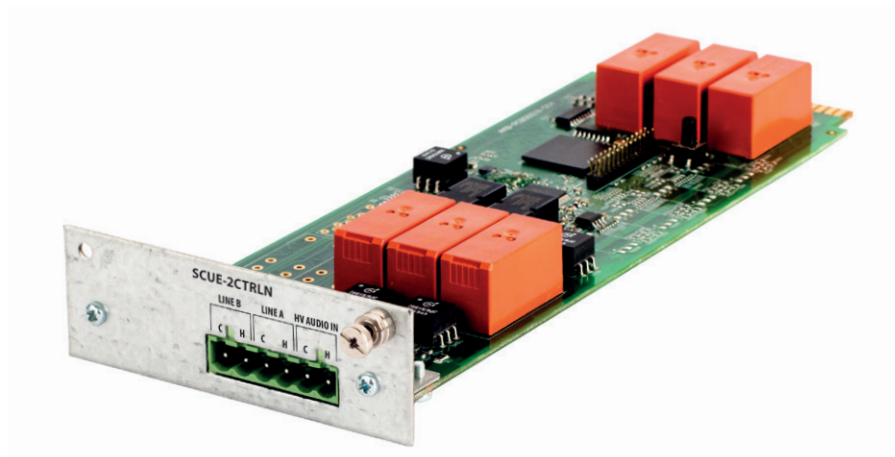
Model	SCUE-4CTRLN
Power supply	Internal from the Control Unit backplane
Maximum current consumption	152 mA for 48 V
Type of connector	10 pin screw terminal type PHOENIX, 5.08 mm
Impedance measurement frequency	1 kHz to 48 kHz
Frequency of the signal for EOL modules	18 kHz to 24 kHz
Maximum measured current	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 x 215 x 30 (mm)
Accessories	Screw terminals 10 pins, the distance between the partitions 5.08 mm

6.1.2.10 SCUE-2CTRLN – 2 loudspeaker lines control card

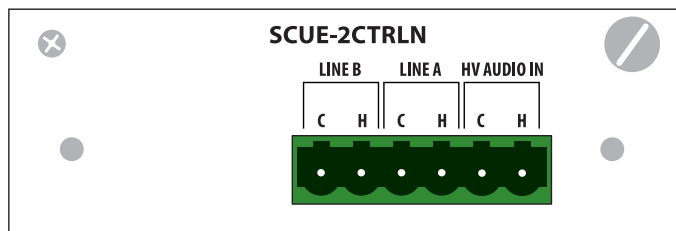
SCUE-2CTRLN card provides 2 independent loudspeaker line outputs (A,B).lcd

The card assures matrix of 100 V signal to loudspeaker lines from individual audio input HV located on the card's front panel or from one of four internal bases 100 V available to all control cards.

The card allows switching between main and back-up amplifiers.



Drawing 30. SCUE-2CTRLN card model



Drawing 31. SCUE-2CTRLN card model

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

- » impedance,
- » loop.

The card detects short-circuit, open-circuit and absence of elements.

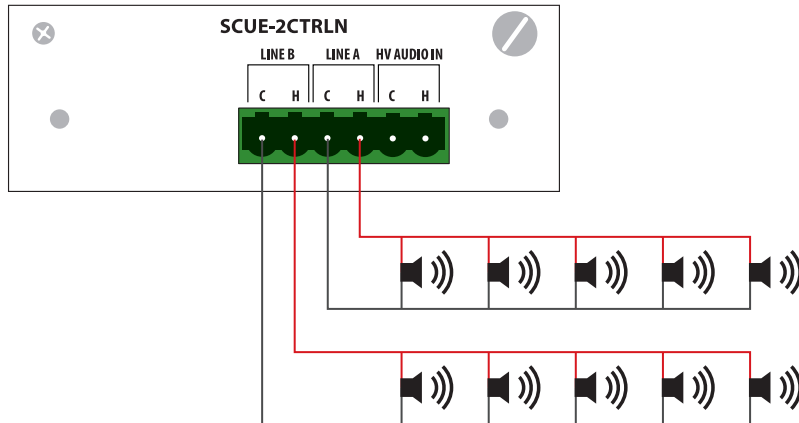
⚠ Maximum power which SCUE-2CTRLN can handle is 600 W for 100 V line. Each output on the card can handle up to 300 W (100 V Line), in the parallel connection of the A-B, C-D maximum load is 450 W.

Table 11. Technical data of SCUE-2CTRLN

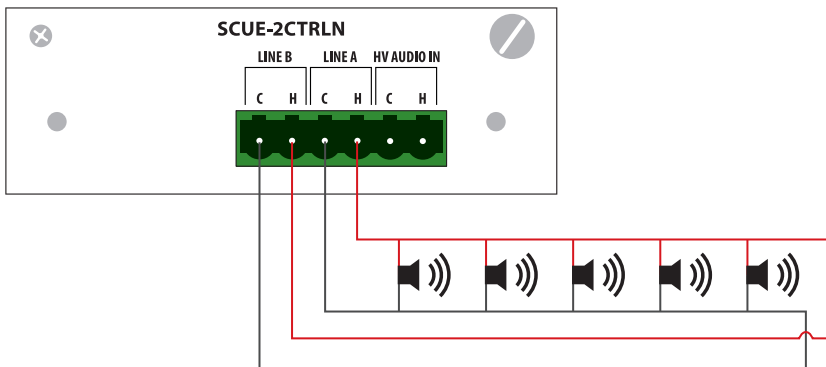
Model	SCUE-2CTRLN
Power supply	Internal from the Control Unit backplane
Maximum current consumption	121 mA for 48 V
Type of connector	6 pin screw terminal type PHOENIX, 5.08 mm
Impedance measurement frequency	1 kHz to 48 kHz
Frequency of the signal for EOL modules	18 kHz to 24 kHz
Maximum measured current	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 x 215 x 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

6.1.3 Power Amplifiers

SPA-xxxxB power amplifier is used for amplifying and distributing an audio signal supplied by the VACIE system control unit or an external BGM source. SPA-xxxxB 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 SHIELD Power Supply Equipment comply to EN 54-4: Power Supply Manager SPS-M48 works with SPS-48800 Power Supply Units and the 4 x 12 V VRLA battery bank as a back-up power source.

The SPA-xxxxB are a 2-U high 19" rack mountable units, dedicated to use with SPS-M48 power supply manager and SPS-48800 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:

- » **SPA-8080B** – 8 audio channels x 80 W
- » **SPA-8160B** 8 audio channels x 160 W
- » **SPA-2650B** – 2 audio channels x 650 W

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

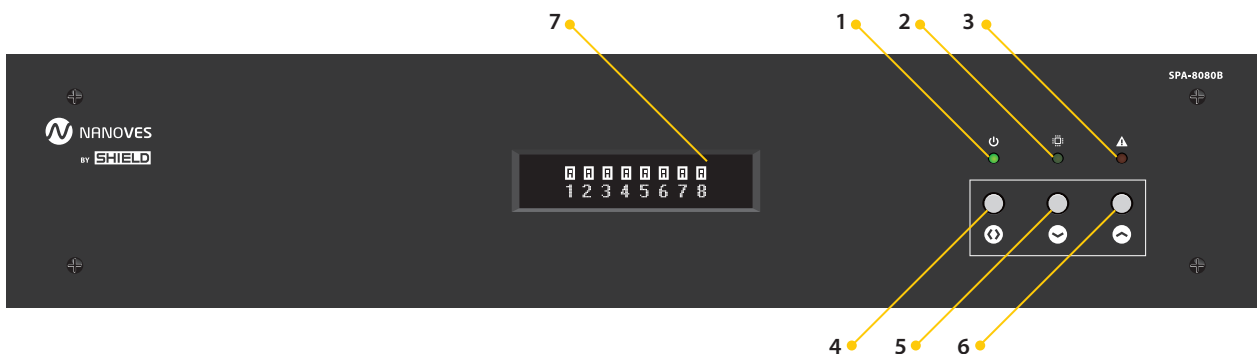
- » SPA-8160B in 4 channel version
- » SPA-2650B in 1 channel version

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.

6.1.3.1 Front panel

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

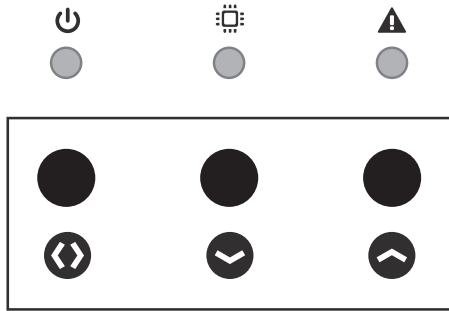


Drawing 34. Front panel of SPA-xxxxB Amplifier's

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. **Up arrow button** – menu navigation button
6. **Down arrow button** – menu navigation button
7. **Display** – alphanumeric LCD display presents the menu and status of the Amplifier

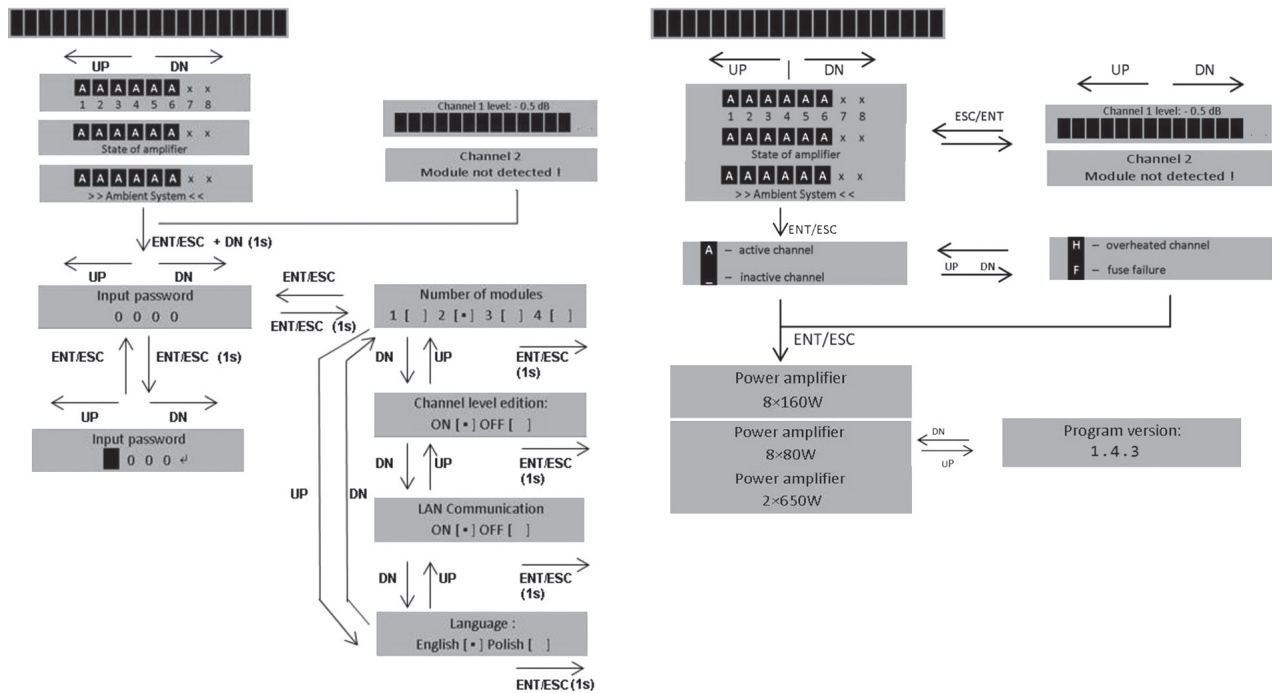
6.1.3.2 Front panel operation

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

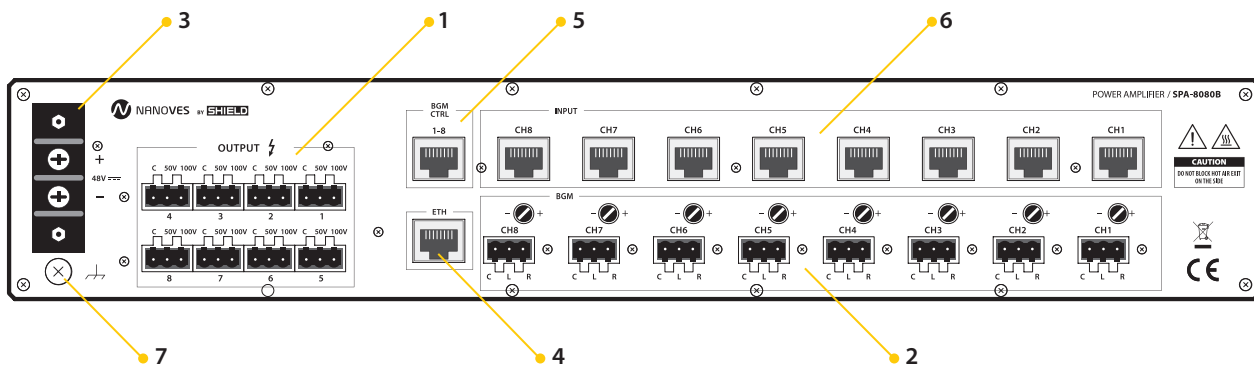
VOLUME CHANGE – select the amplifier channel by arrows, than press "EXIT" button to set a new volume setup. Confirm by "EXIT" button.

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.

6.1.3.3 Rear panel

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



Drawing 37. Rear panel of SPA-xxxxB Amplifier

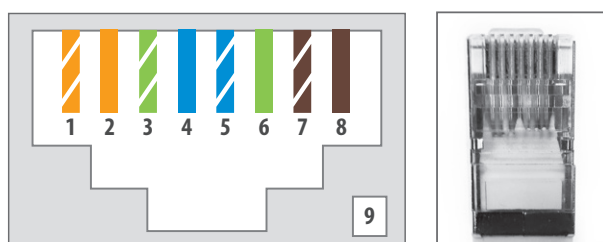
1. **Loudspeakers' lines output**
Speakers' lines output connectors are used to connect up to eight speaker lines to the unit. The user needs to ensure that connected speakers' lines impedance is equal or higher than the rated value allowed for the amplifier. Channels' numbers are marked with digits form 1 to 8.
2. **BGM stereo inputs with sensitivity level regulators (optional)**
Regulators provide smooth change of the inputs sensitivity level in range of -87 dB to 0 dB (0 dB = 1 V). Turning the dial clockwise increases the input sensitivity, while decreasing the sensitivity occurs with turning it in the opposite direction.
3. **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.
4. **ETH communication connector (optional)**
ETH communication connector is used for remote controlling of the amplifier's state and regulation of the sound volume level.
5. **BGM control**
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 Fig. 5.

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 2 muting signal
8	BMG 8 muting signal
9 (not shown in the figure)	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.

6. 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 from 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 cabel

Numer wyprowadzenia	Znaczenie
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*** (not shown in the figure)	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.

7. Signal ground terminal

6.1.3.4 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.

“Ground lift” feature

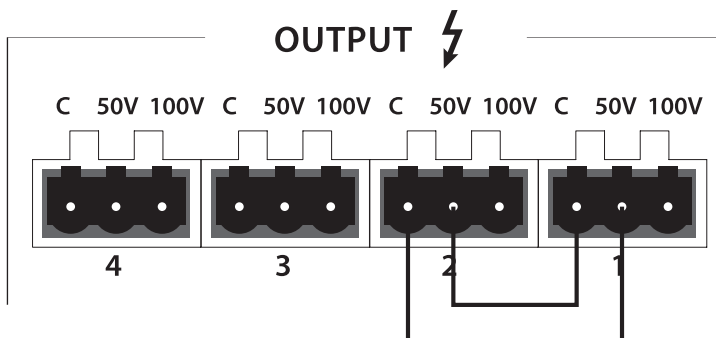
Each of the audio input connectors is equipped with the ground-lift option. There is a jumper on the PCB inside that enables choosing the way of connecting terminal shield with the amplifier’s ground; there is a possibility of a direct connection or through the ground-lift circuit that minimizes possible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

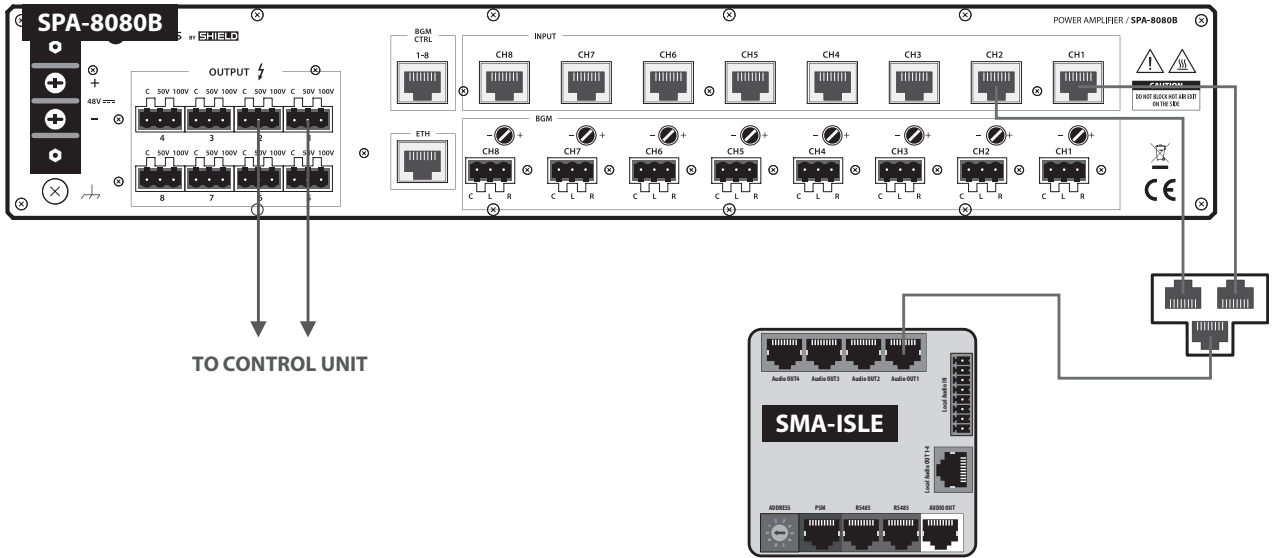
6.1.3.5 Bridging

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 Fig. 6.



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 Fig 7. To bridge 4 channels use 3 splitters.

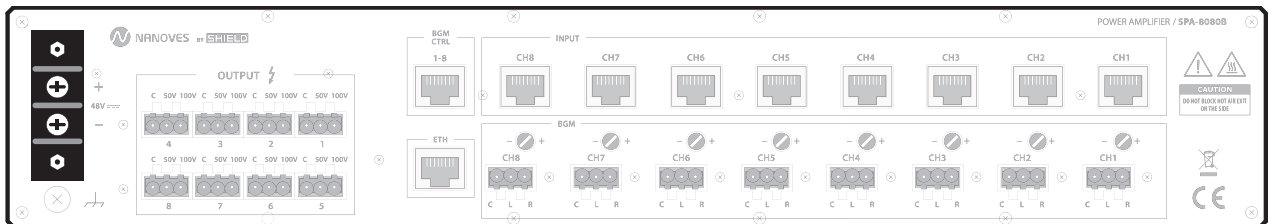


Drawing 40. Way to bridge two channels together

6.1.3.6 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

6.1.3.7 Technical details

Table 12. Technical specification of SPA-8080B

Model	SPA-8080B
Specifications	
Type	Class D
Audio channels	8
Possible configurations	8x 80 W 6x 80 W + 1x 160 W 4x 80 W + 2x 160 W 2x 80 W + 3x 160 W 4x 160 W 2x 320 W
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	15 kg
Dimensions (W x H x D)	440 mm x 80 mm x 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 k Ω (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 SPA-8160B

Model	SPA-8160B
Specifications	
Type	Class D
Audio channels	8 (4 for SPA-8160B Power Amplifier [4CH])
Possible configurations	8x 160 W 6x 160 W + 1x 320 W 4x 160 W + 2x 320 W 2x 160 W + 3x 320 W 4x 320 W 2x 640 W 4x 160 W (for SPA-8160B Power Amplifier [4CH]) 2x 320 W (for SPA-8160B Power Amplifier [4CH])
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	18,6 kg
Dimensions (W x H x D)	440 mm x 80 mm x 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 SPA-2650B

Model	SPA-2650B
Specifications	
Type	Class D
Audio channels	2 (1 for SPA-2650B Power Amplifier [1CH])
Possible configurations	2x 650 W 1x 1300 W 1x 650 W (for SPA-2650B Power Amplifier [1CH])
Output voltage standards	50 V 100 V
Supply voltage	DC
Weight	15 kg
Dimensions (W x H x D)	440 mm x 80 mm x 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)

6.1.3.8 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.

6.1.3.9 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 in sec. 7.1. and transported by covered means of transport. Protect the equipment against moving, oriented as indicated on the package.

6.1.3.10 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.

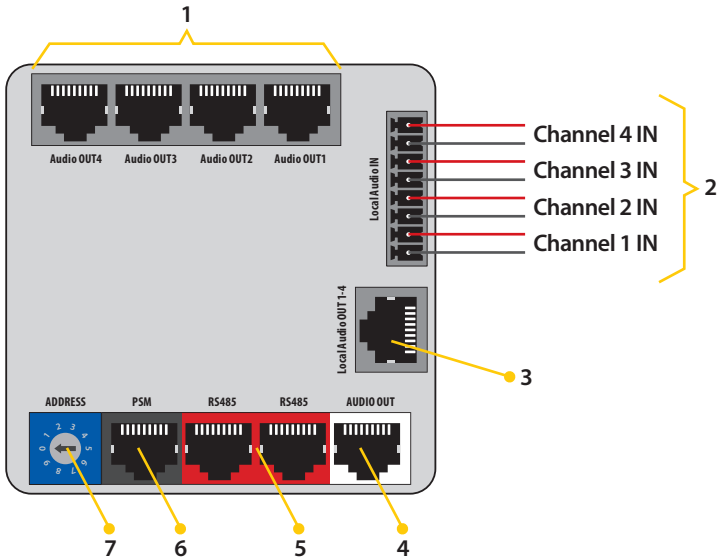
In compliance with the directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), it is inadmissible to dispose the worn-out amplifier together with other (municipal) waste, as there are criminal sanctions provided for it. The 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.

6.1.4 SMA-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. SMA-ISLE



Drawing 43. SMA-ISLE connection isle connectors diagram

1. **Amplifier outputs** – RJ-45 connector to connect 4 amplifier channels
2. **Local AudioIN** – 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. **AUDIO OUT** (RJ-45) output to connect AUDIO IN 1-4 on audio card in VASCU
4. **Local AudioOUT** – RJ-45 connector to connect output signals to function card.
5. **PSM** – RJ-45 connector to connect power supply manager.
6. **Address settings** – element to assign address to devices. The number of addresses is contained in the range 0-F (16 addresses).
7. Isle address (within on control unit) must be unique. When it is necessary to connect to one Control Unit more than one connection isle, it is advisable to connect isles in series (RS485 port).
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.

6.1.5 SPS-M48 Power Supply Manager

SPS-M48 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.

As a source of energy distribution, the Manager uses external modules of 800 W SPS-48800 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. SPS-M48 co-operates with maximum 4 modules of SPS-48800 Units, ensuring safe connection for the purpose of parallel operations and monitors the output parameters of each Power Supply Unit. SPS-M48 co-operates with the 4x12V 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.

SPS-M48 ensures uninterruptible switching to back-up power supply in case of mains power decay or failure of SPS-48800 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:

- » **1x SPS-M48** – Power Supply Manager
- » **4x SPS-48800** – Power Supply Unit
- » **1x SPS-F4** – Power Supply Unit Frame

6.1.5.1 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:

- » SPS-M48 power supply manager module/ SPS-48800 power supply module/ SPS-F4 power frame module;
- » users manual;
- » cables type IEC 60320 C13;
- » technical documentation;
- » a plastic bag with output connectors and fuses.

6.1.5.2 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 from 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.

6.1.5.3 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

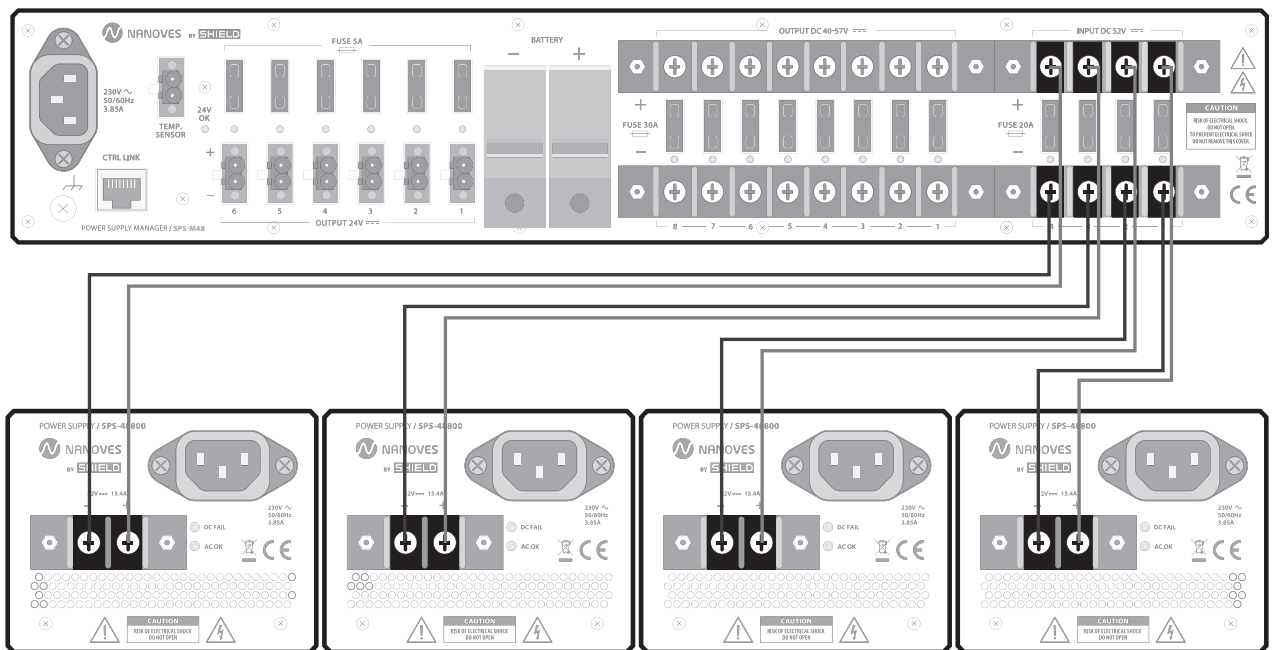
Power supply manager unit will mount in the rack 19" IP30. Power supply units SPS-48800 are placed in the dedicated SPS-F4 power frame which provides easy and stable mounting in the rack.

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

- » 1x SPS-M48 – Power Supply Manager
- » 4x SPS-48800 – Power Supply Unit
- » 1x SPS-F4 – Power Supply Unit Frame

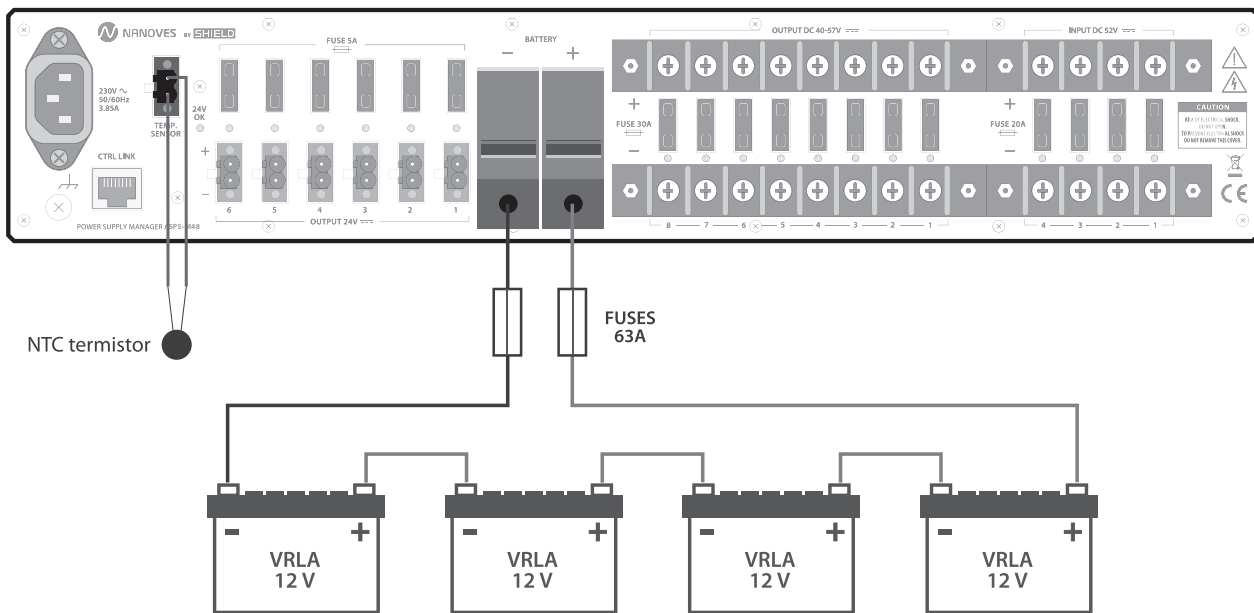
Connecting

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 SPS-M48. 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 SPS-48800 and power supply manager SPS-M48

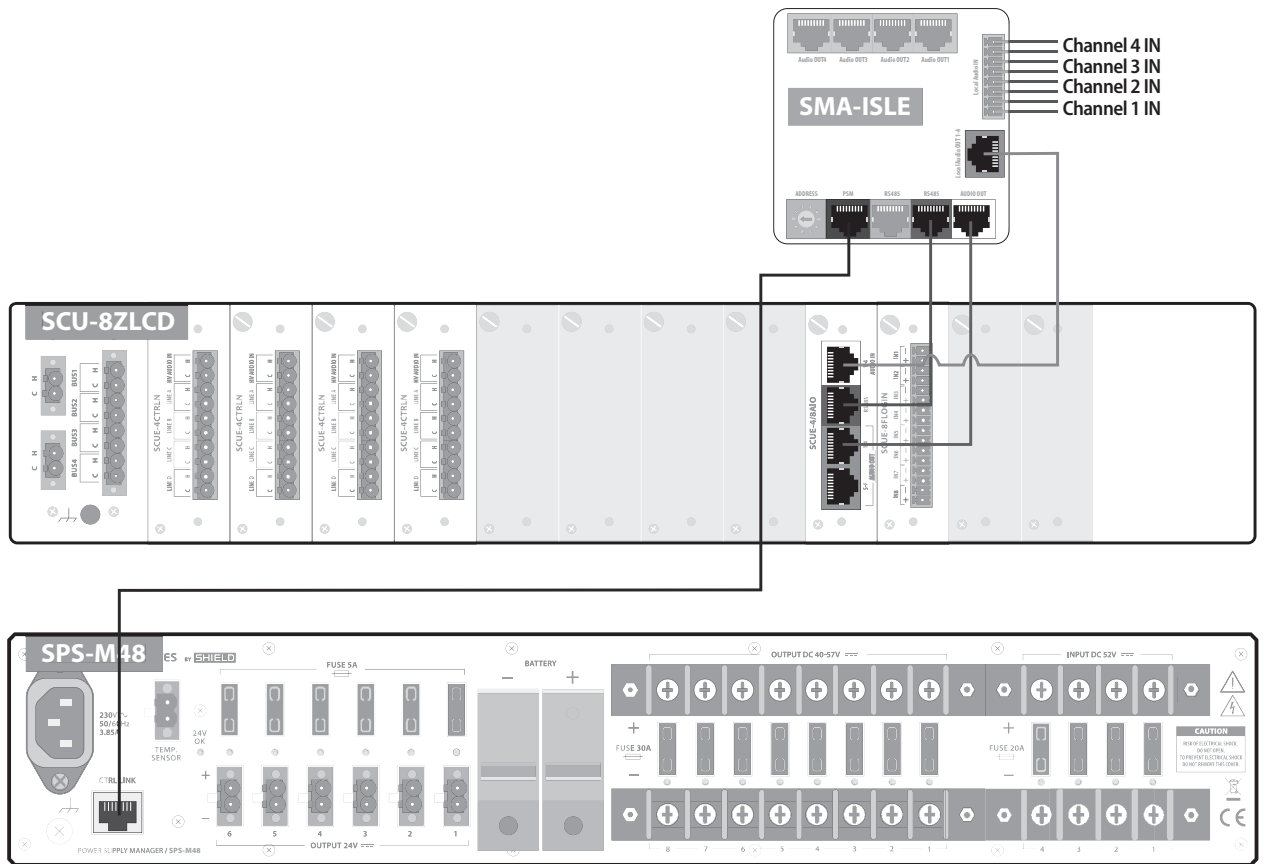
Your next step is to connect in series four VRLA 12 V batteries with fuses to terminals placed on the rear panel of SPS-M48, as shown in figure below. Be sure of proper connection (polarity) between batteries and terminals. Connect also a thermistor temperature sensor to a "TEMP. SENSOR" terminal and 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 SPS-M48

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

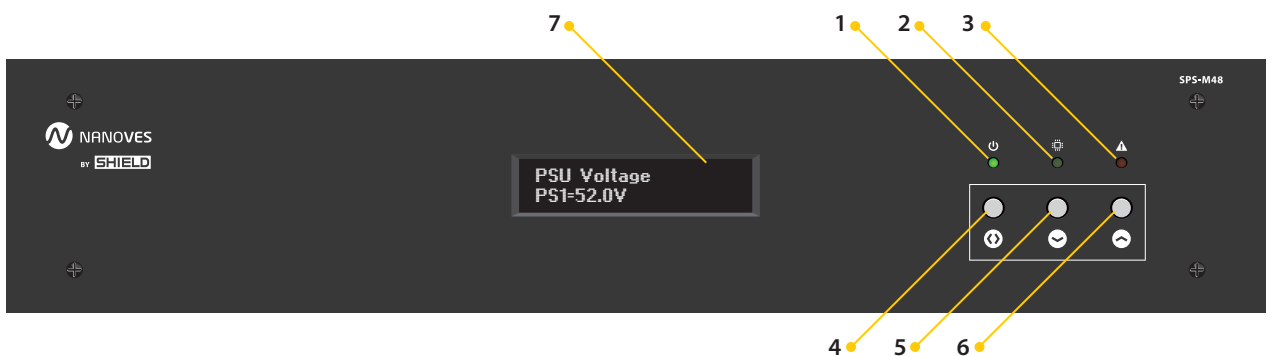
Details concerning configuration, front panel operations and menu navigation are described in relevant User Manual.



Drawing 46. Connection between Power Supply Manager SPS-M48 and Control Unit by audio/RS interface SMA-ISLE.

6.1.5.4 Front panel

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



Drawing 47. Front panel of SPS-M48 Power Supply Manager

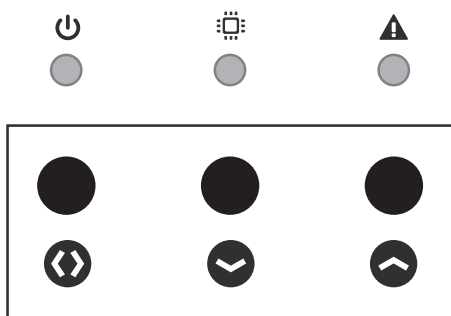
1. **Power**
Green LED indicates supply connection.
2. **Active**
Green LED indicates proper operation and indicates long-press button.
3. **Fault**
Yellow LED indicates a system failure.

4. **Entry/Exit button**
Menu navigation 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.

6.1.5.5 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. Fig. 2 and Fig. 3 present 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 the figure.

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: R_s – measurement results, R_{max} – parameter depending on the battery capacity selected in the service mode menu. R_s value should not exceed R_{max} , (when R_s goes above R_{max} 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 R_s measurement result

BATTERY CONDITIONS – from the main level of menu, using arrows, choose option “Battery conditions” to display conditions of connected battery bank.

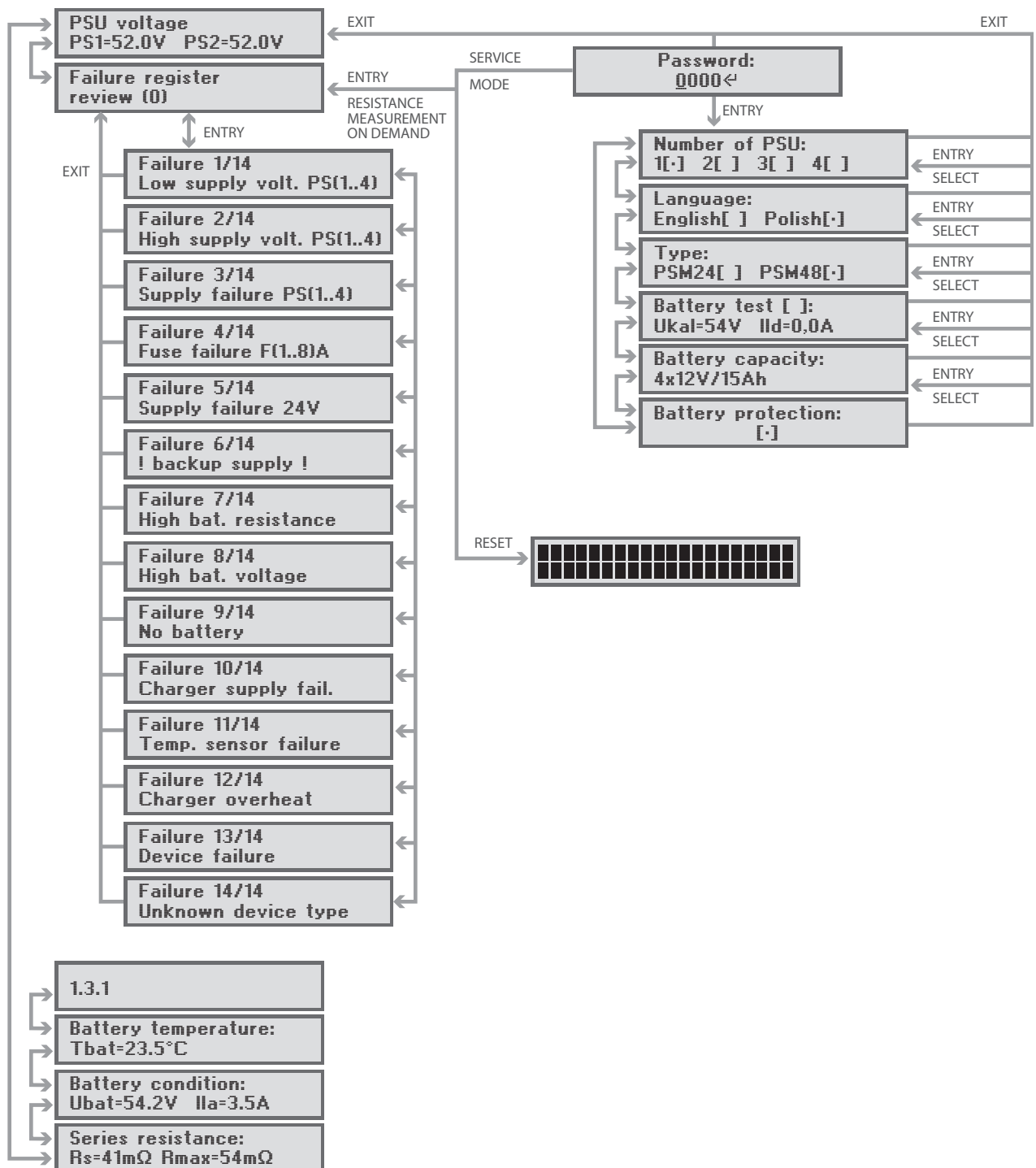
CHARGING PARAMETERS – from the main level of menu, using arrows, choose option “Battery conditions” to display parameters of charging connected battery bank.

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.

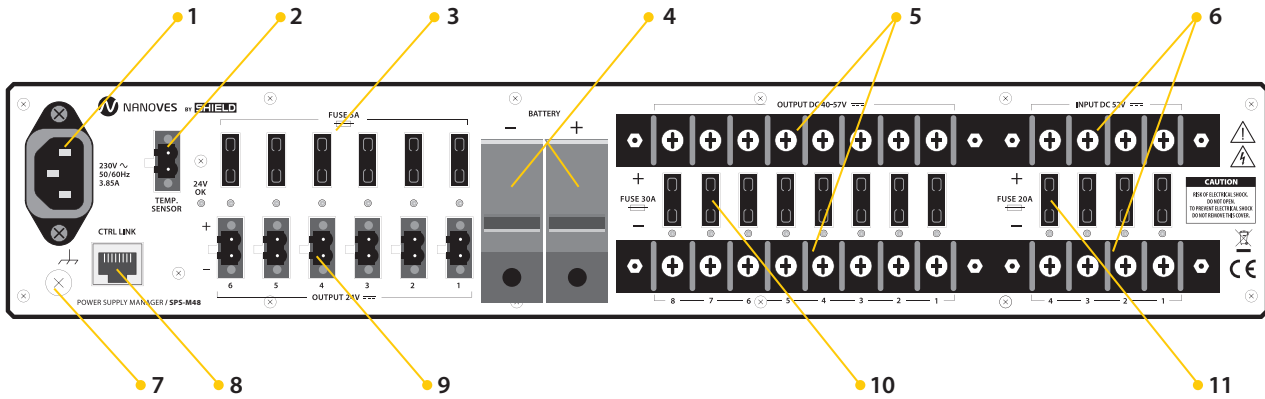
EQUIPMENT RESET – press Arrow Up and Arrow Down buttons simultaneously and hold for approx. 3 s. The system will reset and indicators tested.



Drawing 49. Power Supply Manager menu structure block diagram

6.1.5.6 Rear panel

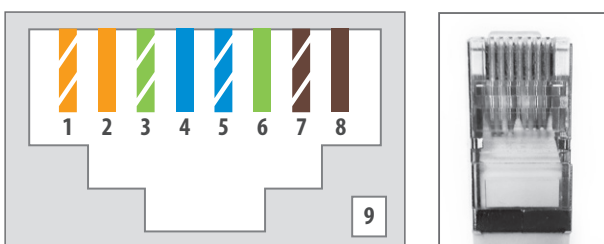
The figure below presents rear panel with markings of the terminals used.



Drawing 50. Rear panel of SPS-M48 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)**
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: 2x screwed fuse 63 A DIN splint \varnothing 15 mm, \varnothing A 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 SPS-48800 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 cable shown in the figure below using the T568B straight-trough cable shown in the figure on the right (view from top).



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

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.

Details concerning configuration, front panel operations and menu navigation are described in relevant User Manual.

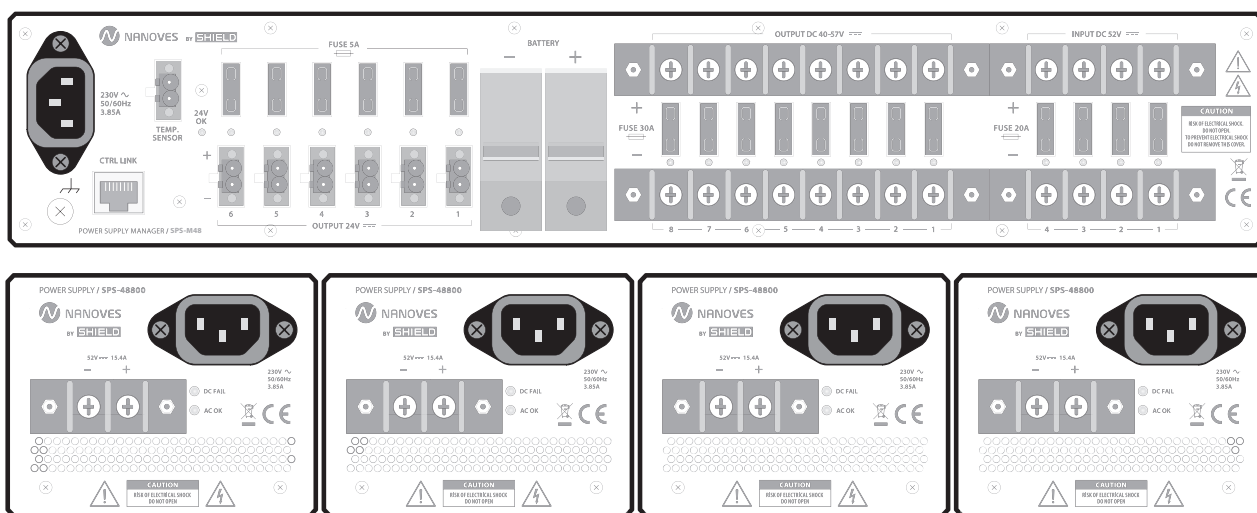
Table 15. Technical specification of SPS-M48

Model	SPS-M48
Electrical	
AC power supply	230 V AC +10% -15%, 50/60 Hz, 3,85 A Wire with IEC 60320 C13 3x0,75 mm ² coupling (supplied with the unit)
Power consumption	885 W
Efficiency at rated load	> 90%
AC input protection	T6,3 A/250 V 5x20 mm slow-blow fuse (accessed when casing is open)
Protection from electric shock	class I (PN-EN 60065)
Current consumption (surveillance DC)	120 mA
DC inputs	4, M4 bolted terminal DEGSON, 13 mm raster, dedicated power supply unit (SPS-48800)
DC input protection	4x slow-blow protection 20 A 80 V DC

DC outputs	8x 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) 6x 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)
DC output protection	48 V outputs: 8x 30 A 80 V DC fuse 24 V outputs: 6x 5 A 32 V DC fuse
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 4x12 V batteries connected serially
Charging circuit protection	20 A, 80 V
Battery circuit protection	2x 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) x 85 (H) x 443 (D) mm
Weight	7,2 kg
Accessories	power supply cord IEC 60320 C13 1,5 m temperature sensor

6.1.5.7 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 SPS-M48 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

Details concerning configuration, front panel operations and menu navigation are described in relevant User Manual.

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.

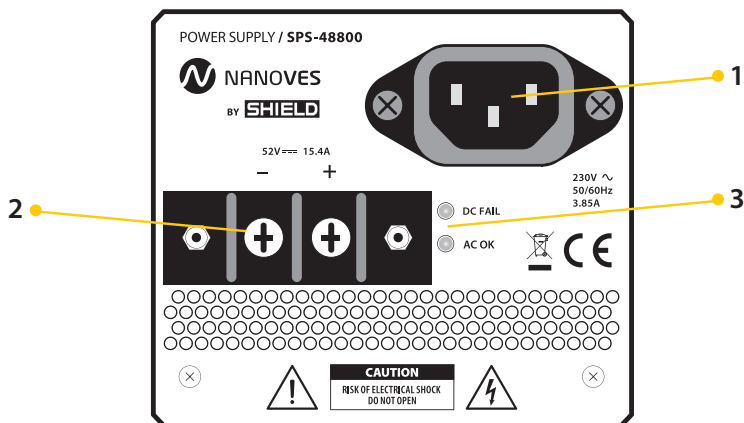
6.1.6 SPS-48800 Power Supply Unit

SPS-48800 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 SPS-48800 power supply unit as an independent device and it is not necessary to mount it in SPS-F4 frames and rack cabinets.

6.1.6.1 Rear panel

Figure presents the rear panel of SPS-48800 Power Supply Unit module.



Drawing 53. Rear panel of SPS-48800 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.

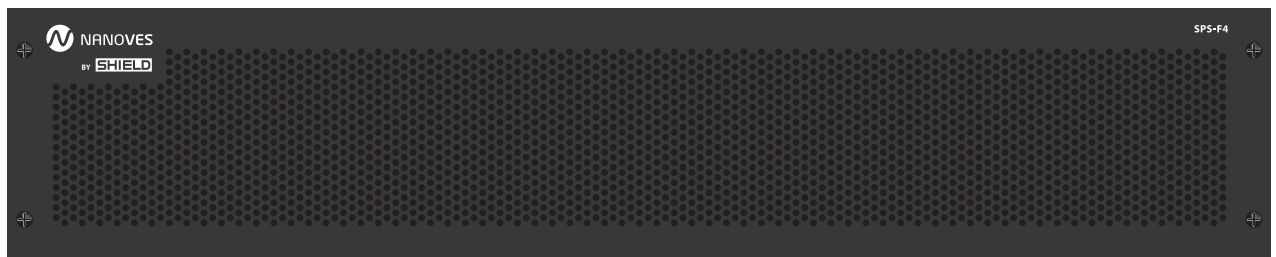
DC FAIL	lights red if output voltage is not available (e.g. overload)
AC OK	lights green if AC voltage is enough for proper operation

Table 16. Technical specification of SPS-48800

Model	SPS-48800
Electrical	
AC power supply	230 V AC +10% -15%, 50/60 Hz, 3,85 A Wire with IEC 60320 C13 3x0,75 mm ² coupling (supplied with the unit)
Power consumption	885 W
Efficiency at rated load	> 90%
AC input protection	T6,3 A/250V 5x20 mm slow-blow fuse (accessed when casing is open)
Protection from electric shock	Class I (PN-EN 60065)
DC output	M4 bolted terminals DEGSON, 13 mm raster, 52 V DC, 15,4 A
Mechanical	
Dimensions	85 (W) x 95 (H) x 395 (L) mm
Weight	2,6 kg
Accessories	Power cord IEC 60320 C13 1,5 m

6.1.7 SPS-F4 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 SPS-48800 may be mounted in the frame, with the use of two attached bolts.



Drawing 54. Front panel of SPS-F4 Power Supply Unit Frame

6.2 External devices

6.2.1 SMA-FM 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".

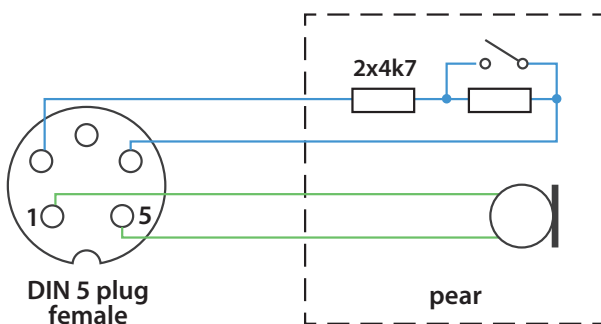
The microphone is supplied locally by the certified fire cord (48 V) or remotely by PoE.

It has programmable functional buttons which can be assigned given functions. It is also possible to connect max. 5 extensions of SMA-EKB-20M with additional functional buttons. Up to 253 fireman microphones can operate in a single system. The communication with control units occurs in Ethernet network via optical fiber connections 1000BASE-X or 10/100/1000BASE-T/TX. The support of LUA scripts defines module performance, support of RS485 interface protocol, processing data send through LAN network, and controlling audio track, keyboard LED lights and keyboard extensions.

An optional system function is "CPU-OFF" function. The system enters the status allowing transmission of voice message from the unit which calls this functions to all alarm zones. "CPU-OFF" switch triggers immediate and direct message transmission to all zones without any impact of control unit (even during central processor failure).

The microphone automatically detects and signals button damage and audio signal track from microphone capsule (only) to the control unit.

It is possible to connect keyboard extension by 10-pin seat on the right side wall. The microphone is equipped with 2 connectors to SFP modules, 2 LAN 10/100/1000 ports, 1 LAN 10/100 port, 1 RS485 port.



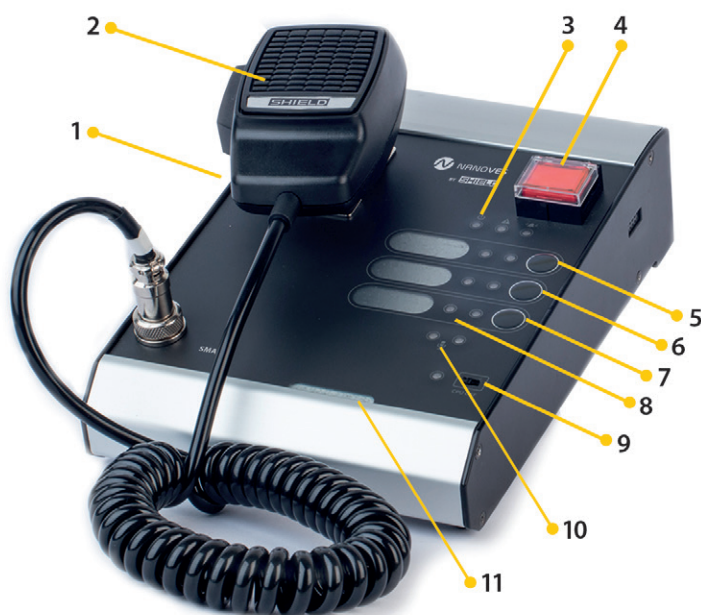
Drawing 55. Microphone pins diagram

Main features:

- » Built-in 2 contact inputs and 2 relay outputs
- » POE or external feeder based power supply
- » Black-box function – recording all announcements played back during an alarm
- » Built-in SFP modules and CAT5e for simplicity of implementation of the loop topology
- » RS 485 for communication with external systems
- » Intercom function between all fireman and zone microphones

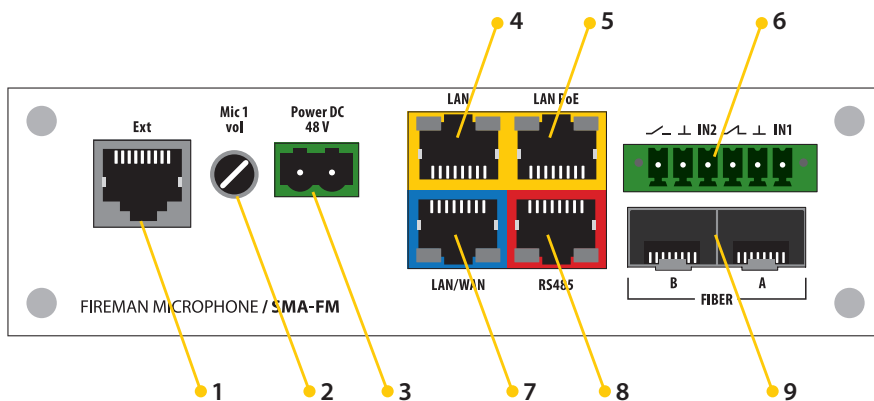
Main system functions:

- » 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. SMA-FM 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. Slot to insert the plates with descriptions of buttons



Drawing 57. Upper panel of fireman microphone

1. **RJ45 socket** to connect microphone extension SMA-EKB-20M
2. **Microphone control level adjustment** from -6 dB to +6 dB
3. **2-pin socket to connect power supply** in accordance with PN-EN54-4
4. **RJ45 socket to support LAN connections**
5. **RJ45 socket to support LAN with PoE connections** – it is possible to supply microphone directly from the Control Unit via one cable CAT5 (data + voltage)
6. **Phoenix-type connector, two parametric 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**
8. **RJ45 socket** in accordance with RS485 transmission standard
9. **Two optical-fiber connectors** for SFC module, SC/LC connector

SMA-FM fireman microphone consists of the SCUE-NET-1Gb/WAN/RS communication card supplied with the fireman microphone keyboard module, extension support module and power supply module.

Table 17. Technical data of SMA-FM fireman microphone

Model	SMA-FM
Power source	via LAN PoE or local power supply complies 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
Degree of protection	31
Transmission medium	fiber, UTP Cat. 5e
Number of parametric inputs	2
Number of relay outputs	2
Connector type for logic input/output	screw 3.5mm, 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 (@1m, 1W)
Frequency response (3dB)	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	15x25 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)
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) x 55 (H) x 210 (D) mm
Accessories	connector with screw terminals 6 pins, the distance between the partitions 5.08 mm

6.2.2 SMA-ZM zone microphone

Zone microphone serves 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.

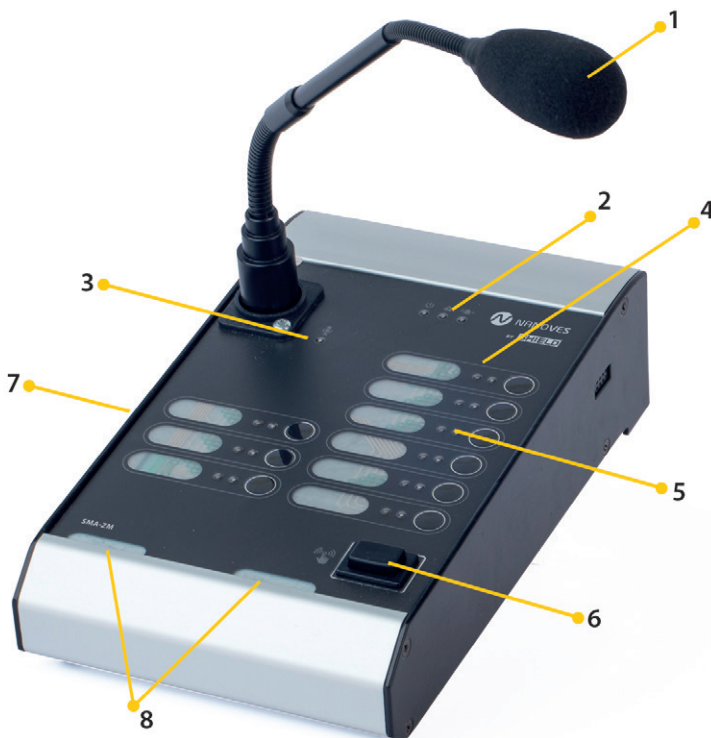
It is equipped with programmable function keys which can be used to assign functions as required. All operational parameters can be programmed e.g. assignment of zones to various keys, naming of zones and zone groups, determining priorities, setting up access rights to announcements, volume controls, ‘push to talk’ key, music on/off and music routing. Furthermore, LEDs on the SMA-ZM 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 SMA-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.

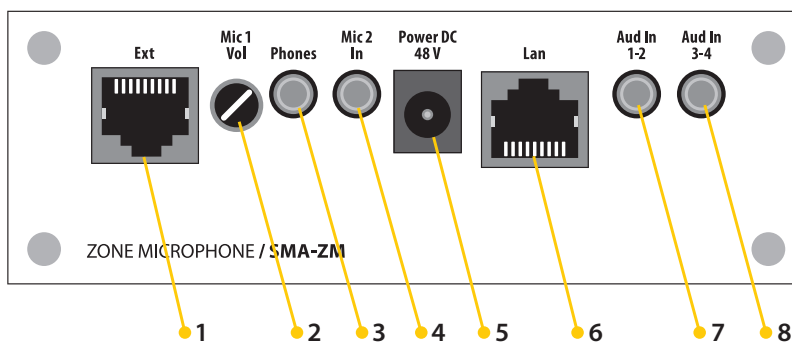
Main features:

- » 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
- » Implemented intercom function
- » Power supply via POE



Drawing 58. SMA-ZM zone microphone

1. **Microphone**
2. **LED indicators** for: Power [green] (Power), Failure [yellow] (Fault), Evacuation [red] (EVAC)
3. **Active microphone diode** – the diode signals readiness for sending 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. Seats to insert the plates with descriptions of buttons



Drawing 59. SMA-ZM zone microphone connectors diagram

1. **RJ45 socket to connect microphone extension SMA-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 SCUE-NET-1Gb/WAN/RS communication card has been supplied with PoE support)
7. **2 Audio IN inputs**
8. **2 Audio IN inputs**

Table 18. Technical data of SMA-ZM zone microphone

Model	SMA-ZM
Power supply	via PoE (RJ45) or by additional input power supply 48 V / 15 W DC connector 5,5 / 2,1 mm
Degree of protection	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 (@1m, 1 W)
Frequency response (3dB)	450 Hz ... 8 kHz
Output for headphones (headset)	mini-jack 3,5 mm
Audio Inputs	
Input type	single-ended, 4x bgm
Frequency response	50 Hz ... 18 kHz (@3dB)
ADC resolution	32 bit
Sampling frequency	48 kHz
Connector	2x mini-jack 3,5 mm
Microphone input	
Input, connector type	balanced inputs, XLR
Condenser microphone, gooseneck	
Frequency response	100 Hz ... 10 kHz
Sensitivity	-45dB
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) x 55 (H) x 210 (D) mm
Weight	1,4 kg

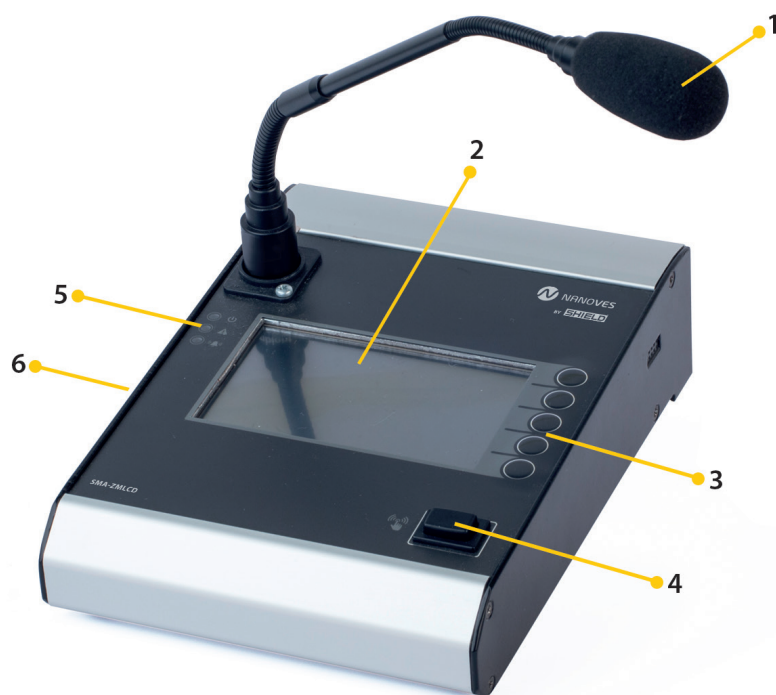
6.2.3 SMA-ZMLCD – zone microphone with LCD

For intuitive and easier operation, SMA-ZMLCD 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. SMA-ZMLCD 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. SMA-ZMLCD 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.

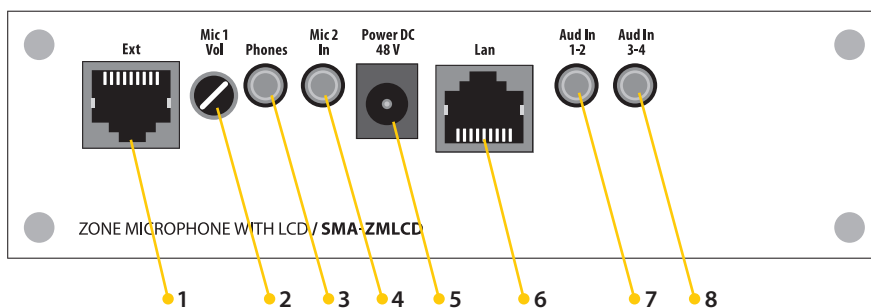
Main features:

- » 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 SMA-ZMLCD 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
 - b. ENTER – ENTRANCE button– press to select microphone in the menu
 - c. ↑ - up-arrow button – press to navigate in microphone menu
 - d. ↓ - down-arrow button – press to navigate in 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. SMA-ZMLCD zone microphone connectors diagram

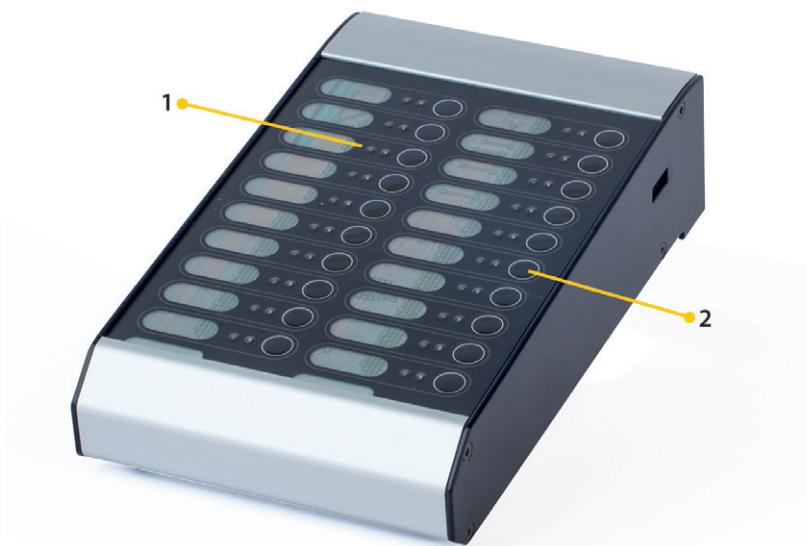
1. **RJ45 socket to connect microphone extension SMA-EKB-20M**
2. **Digital potentiometer**
3. **Headset 1/8" jack socket**
4. **Headset mic 1/8" jack socket**
5. **Power point 48 V**
6. **Communication port** with control unit and possibility of supplying microphone via LAN PoE port (works only when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

Table 19. Technical data of SMA-ZMLCD zone microphone

Model	SMA-ZMLCD
Power supply	via PoE (RJ45) or by additional input power supply 48V / 15W DC connector 5,5 / 2,1 mm
Degree of protection	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 (@1m, 1 W)
Frequency response (3dB)	450 Hz ... 8 kHz
Diameter	50 mm
Output for headphones (headset)	mini-jack 3,5 mm
Audio Inputs	
Input type	single-ended, 4x bgm
Frequency response	50 Hz ... 18 kHz (@3dB)
ADC resolution	32 bit
Sampling frequency	48 kHz
Connector	2x 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) x 55 (H) x 210 (D) mm
Weight	1,4 kg

6.2.4 SMA-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 call microphone visual and sound signaling test.



Drawing 62. SMA-EKB-20M microphone extension

- 9. **LED indicators** – freely programmable; RGB left diode, green right diode
- 10. **Functional buttons** – freely programmable

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

Model	SMA-EKB-20M
Power supply	RJ45 from DFMS or DMS
Degree of protection	IP 31
Keyboard and controls	
Number of keys	20
Number of LED	20x RGB + 20x 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 x 25 mm
Dimensions	120 (W) x 55 (H) x 210 (D) mm

6.2.4.1 Functional buttons performance

Every functional button can be associated with any VAS function which can be used by the user via a button. 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

6.2.4.2 Functional buttons signaling

Functional buttons signaling depends on its function.

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

- » **Message sending indicator:**
 - › Green diode flashes – when verbal message is sent via fireman microphone “live” in the given zone.
 - › Green diode lights regularly – when in the given zone the following is reproduced:
 - In normal mode – verbal message from zone microphone, music background or alarm canceling.
 - › Red diode flashes – when in the given zone a warning message informing about danger is reproduced.
 - › Red diode lights regularly – when in the given zone an automatic evacuation message forcing persons in this zone to leave the plant immediately is reproduced.
 - › Yellow diode flashes – in case of system failure.
 - › Yellow diode lights regularly – when failure was accepted or when zone of the zones has been locked (optional function from PN-EN 54-16 norm).
 - › Blue diode flashes – when intercom communication is requested.
 - › Blue diode lights regularly – when intercom communication is activated.
 - › Red diode flashes – when microphone message is being recorded.
 - › Diode lights regularly – when recorded message is played out.
 - › Cyan diode flashes – when audio monitoring from the given zone is active.
 - › Magenta diode flashes – when voice alarm status is delayed (optional PN-EN 54-16 norm, point 7.4).
- » **Availability/zone selection indicator** – green diode lights once the button applicable to a given zone has been pushed to signal zone selection and send microphone messages or reproduce message saved in system memory.

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

- » **Failure indicators:**
 - › Flash (microphone extension diode) and lights (collective failure diode) with yellow – signals system failure.
 - › Sound signal is generated at the same time (on microphones and Control units with LED displays: SCU-8ZLCD and SCU-11ZLCD).
 - › Failure must be confirmed by pressing button next to flashing diode.
 - › Once it has been pressed, diode lights regularly until the failure has been eliminated.

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

7. *Assembly instructions*

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 SPS-F4 power supply unit frame which can take up to 4 SPS-48800 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.

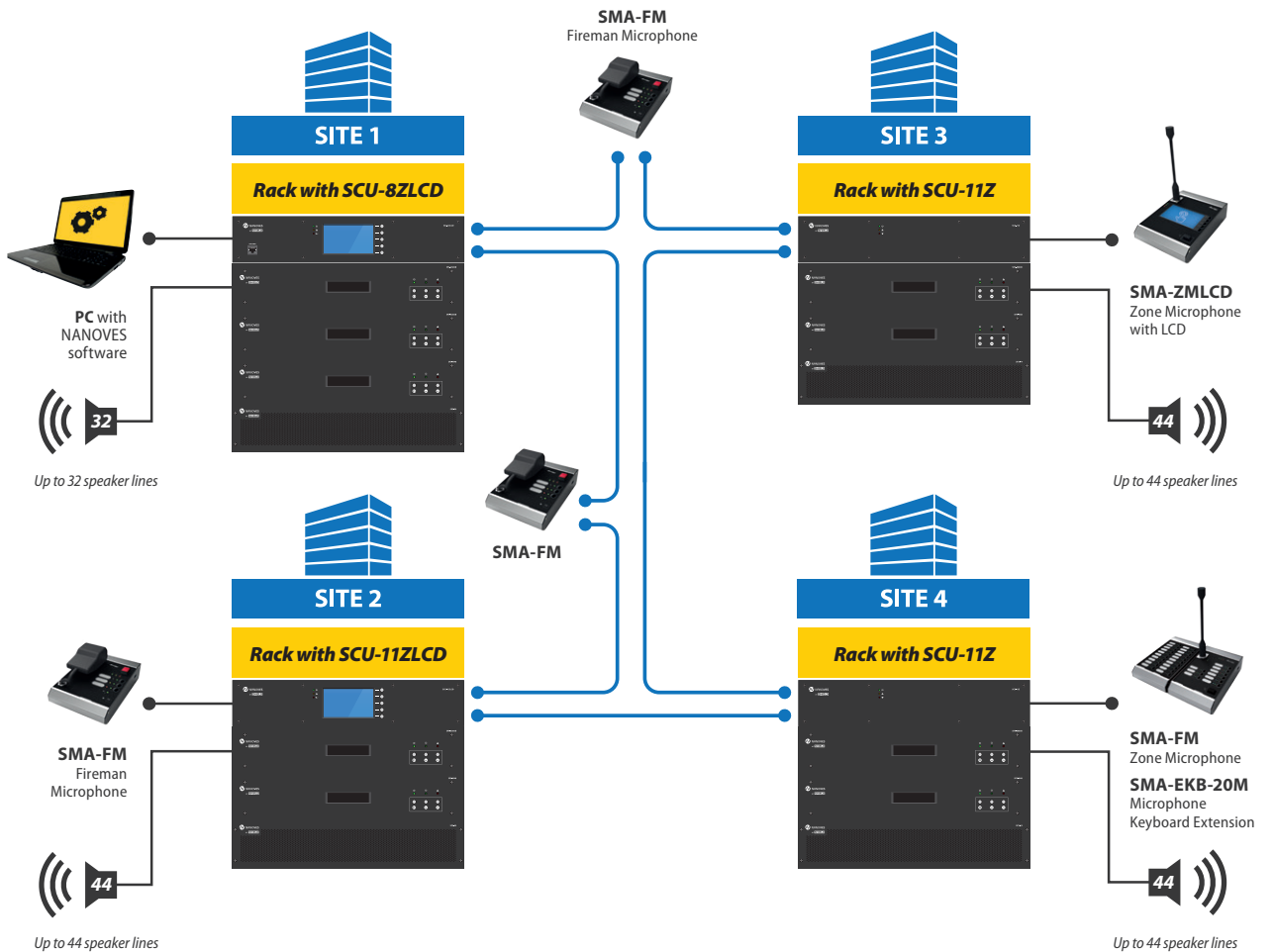
7.1 Information on limiting damage consequences

In order to avoid problems with Voice Alarm System Central Unit, it is advisable to get familiar with the passages 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.

7.2 General connection diagram

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



Drawing 63. General connection diagram

7.3 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 plant,
- » other VASCU elements,

must be carried out by suitably-trained and qualified persons 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: storage batteries must be connected before the system start-up.

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

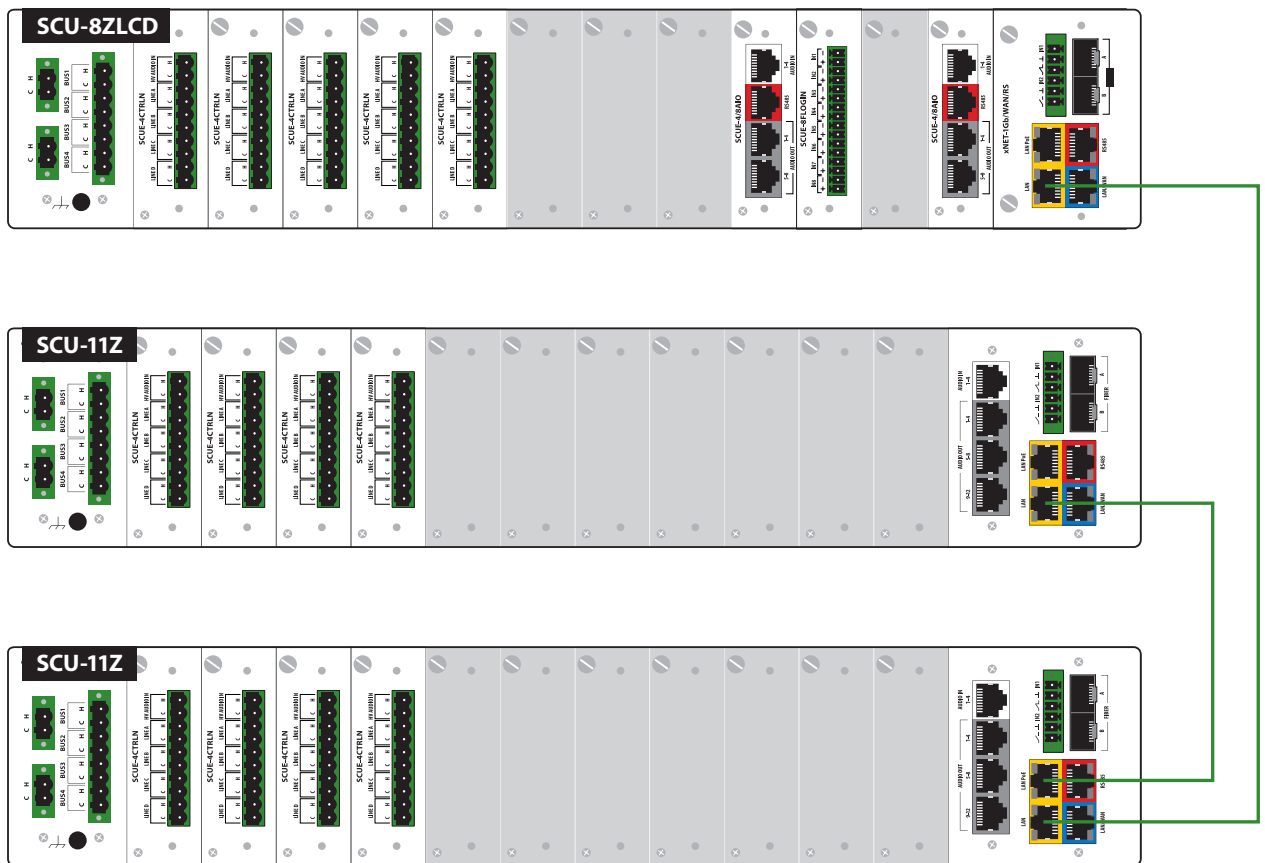
When you make sure all connections have been carried out properly, you can supply power.

7.3.1 Control units

This section presents examples of control units connection diagrams.

7.3.1.1 CHAIN typology

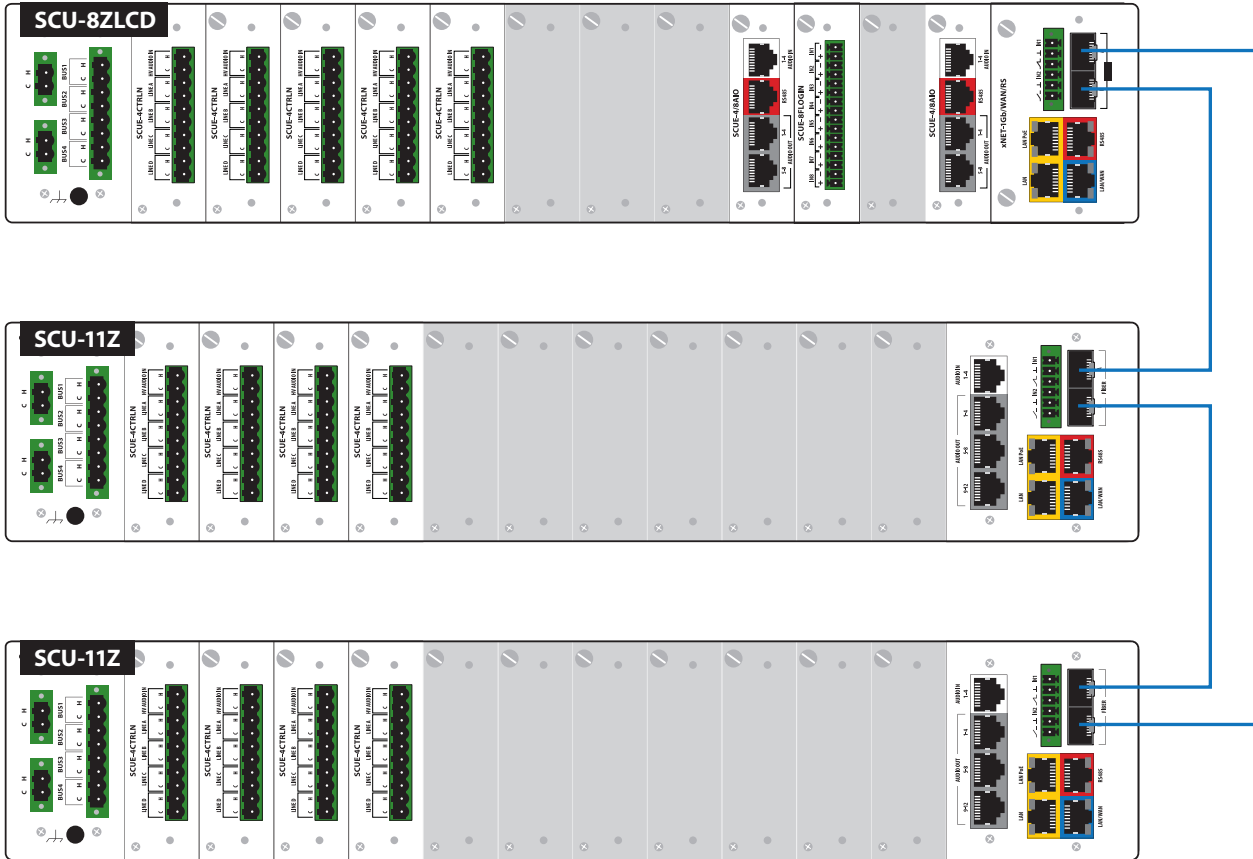
In CHAIN typology, the connection is not redundant. Connecting units in this system does not guarantee efficiency operation of the system in the event of communication cable damage. According to PN-EN 54-16 norm, connections between VAS control units in the distributed system must be redundant. Connections in CHAIN typology are applied in RACK cabinets, and in the system not responsible for sending evacuation messages.



Drawing 64. Example of CHAIN typology control units connection

7.3.1.2 RING typology

In RING typology, the connection between system elements is redundant. The wires do not have any tips, but form a ring. In the event of cable/communication optic fiber damage, the system still functions by using the remaining part of the ring.

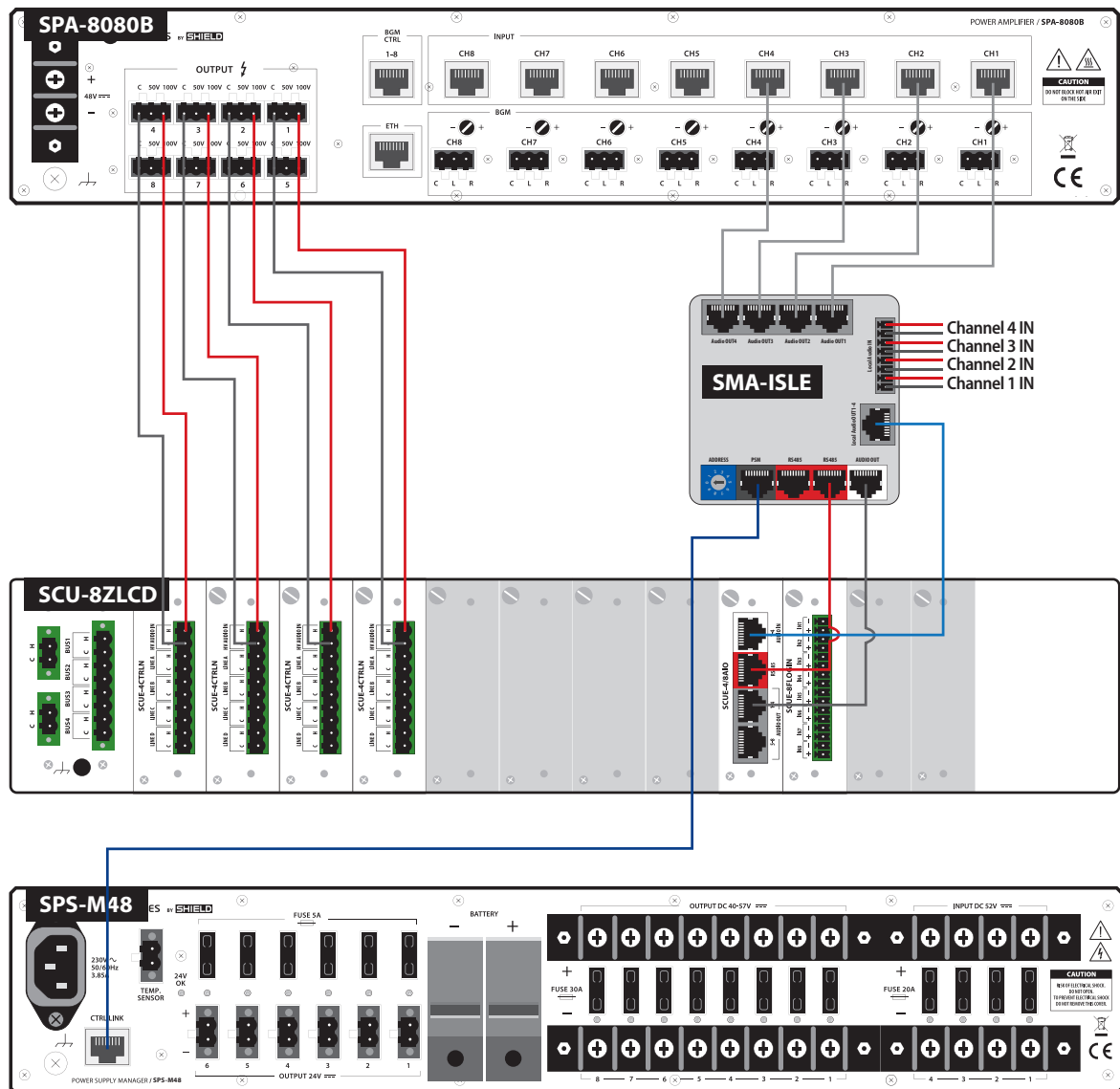


Drawing 65. RING typology control units connection (fiber connection)

7.3.2 Amplifiers

7.3.2.1 Individual connection without backup amplifier using SCU-8ZLCD

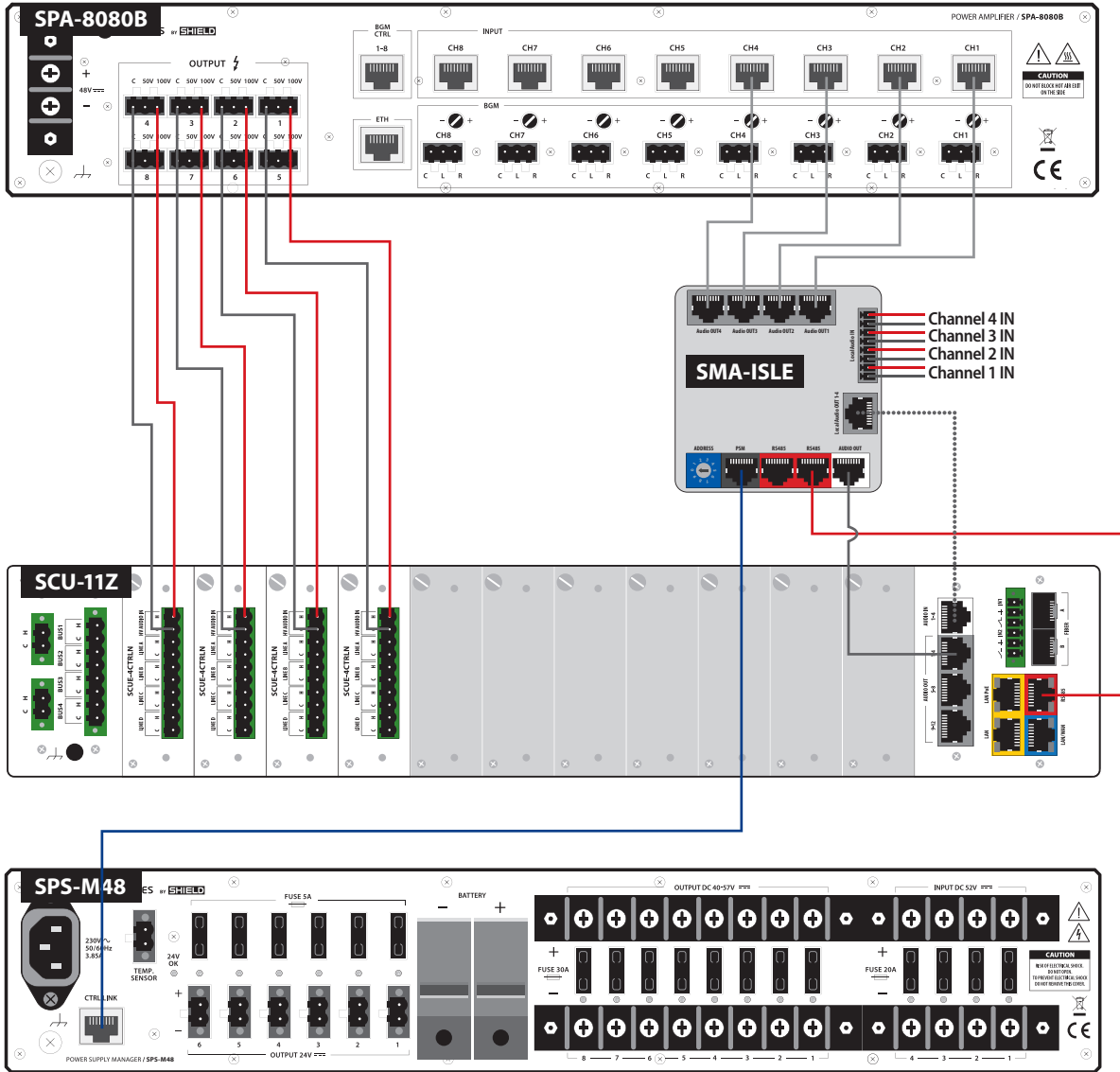
Individual connection of each of the amplifier channels with control cards without backup amplifier.



Drawing 66. Amplifier individual connection with SCU-8ZLCD

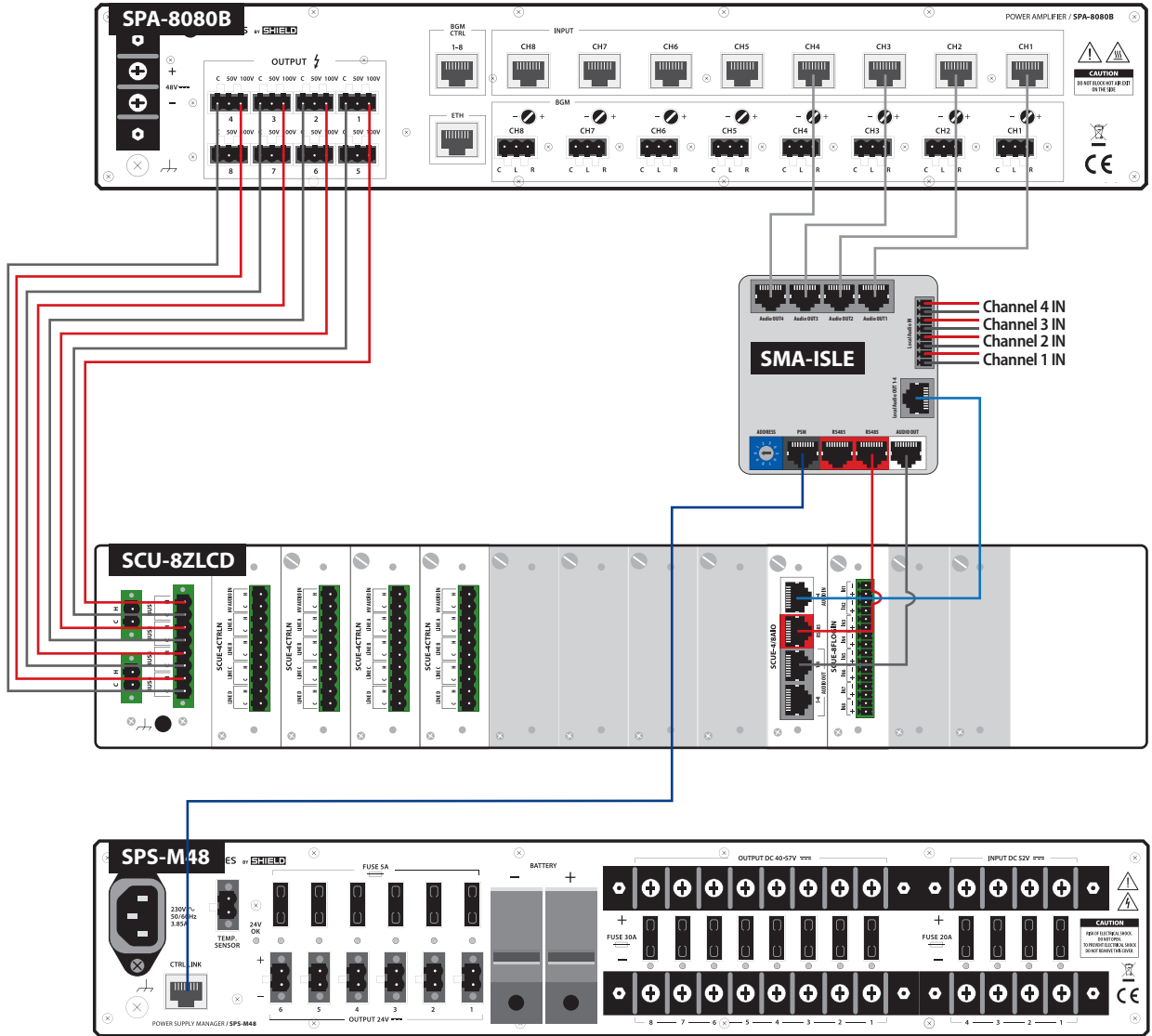
7.3.2.2 Individual connection without backup amplifier using SCU-11Z / SCU-11ZLCD

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



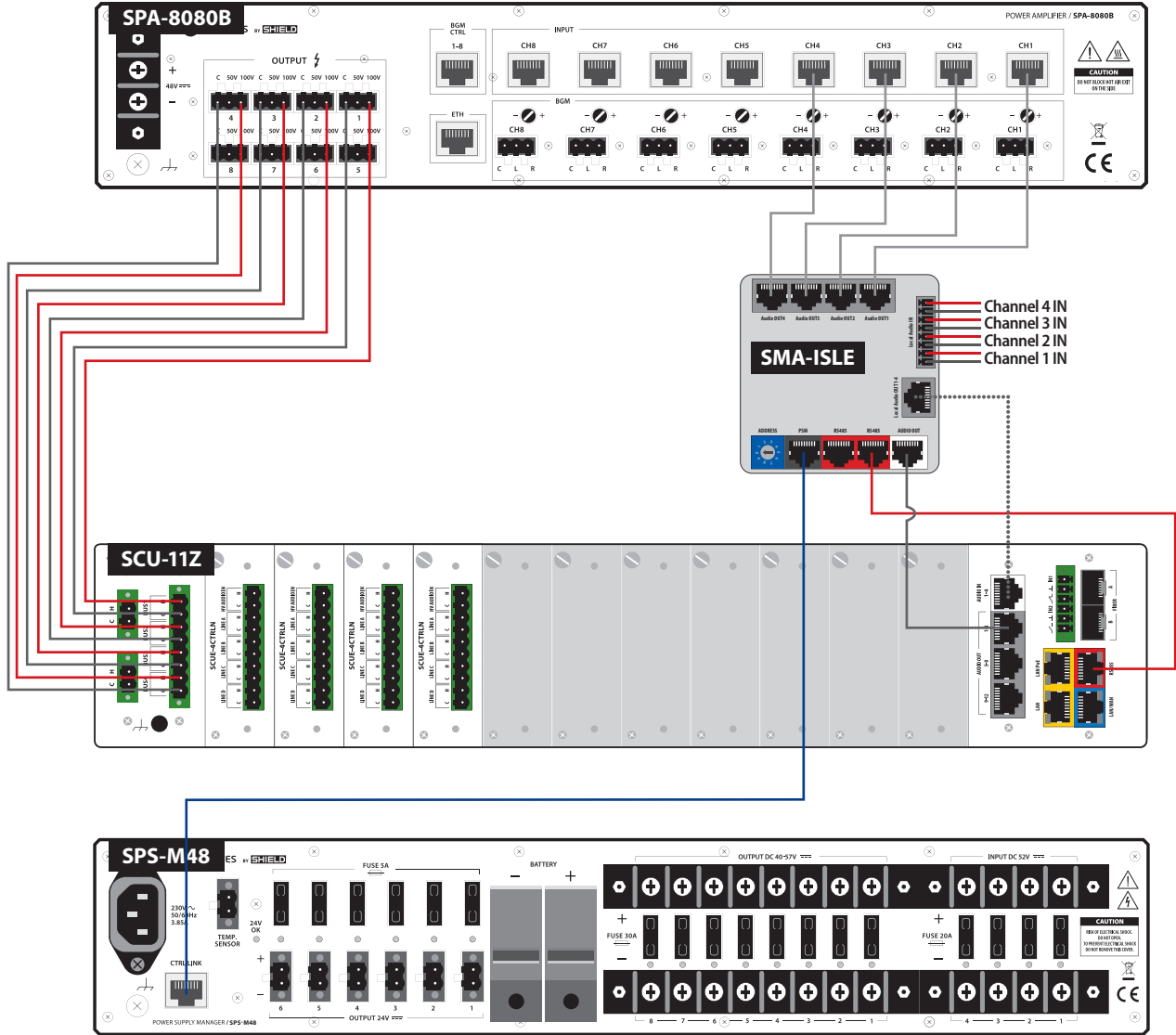
Drawing 67. Amplifier individual connection with SCU-11Z / SCU-11ZLCD

7.3.2.3 Connection with 100 V internal buses using SCU-8ZLCD



Drawing 68. Connection with amplifier redundant channels using SCU-8ZLCD

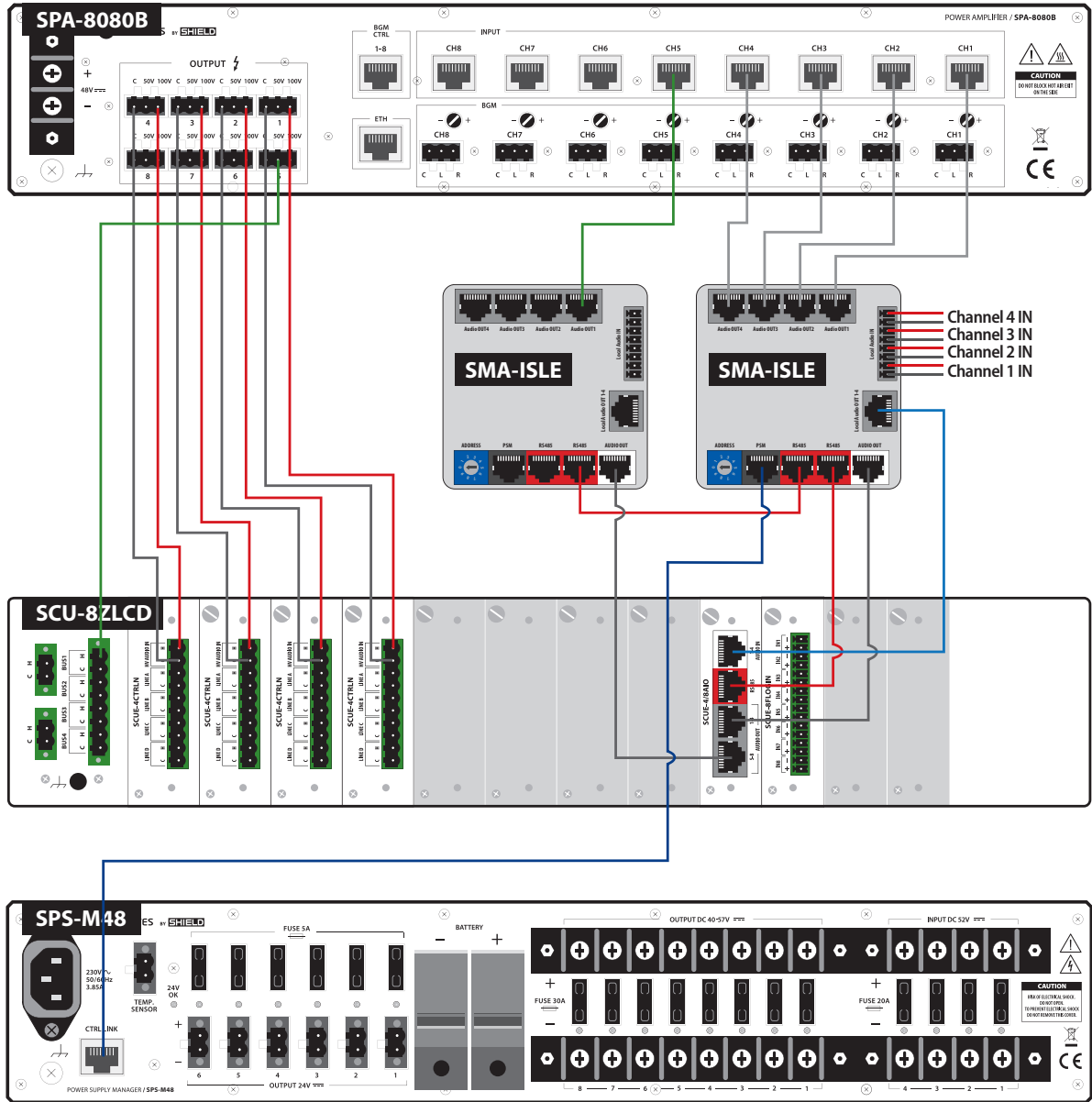
7.3.2.4 Connection with 100 V internal buses using SCU-11Z / SCU-11ZLCD



Drawing 69. Connection with amplifier redundant channels using SCU-11Z / SCU-11ZLCD

7.3.2.5 Individual connection with backup amplifier using SCU-8ZLCD

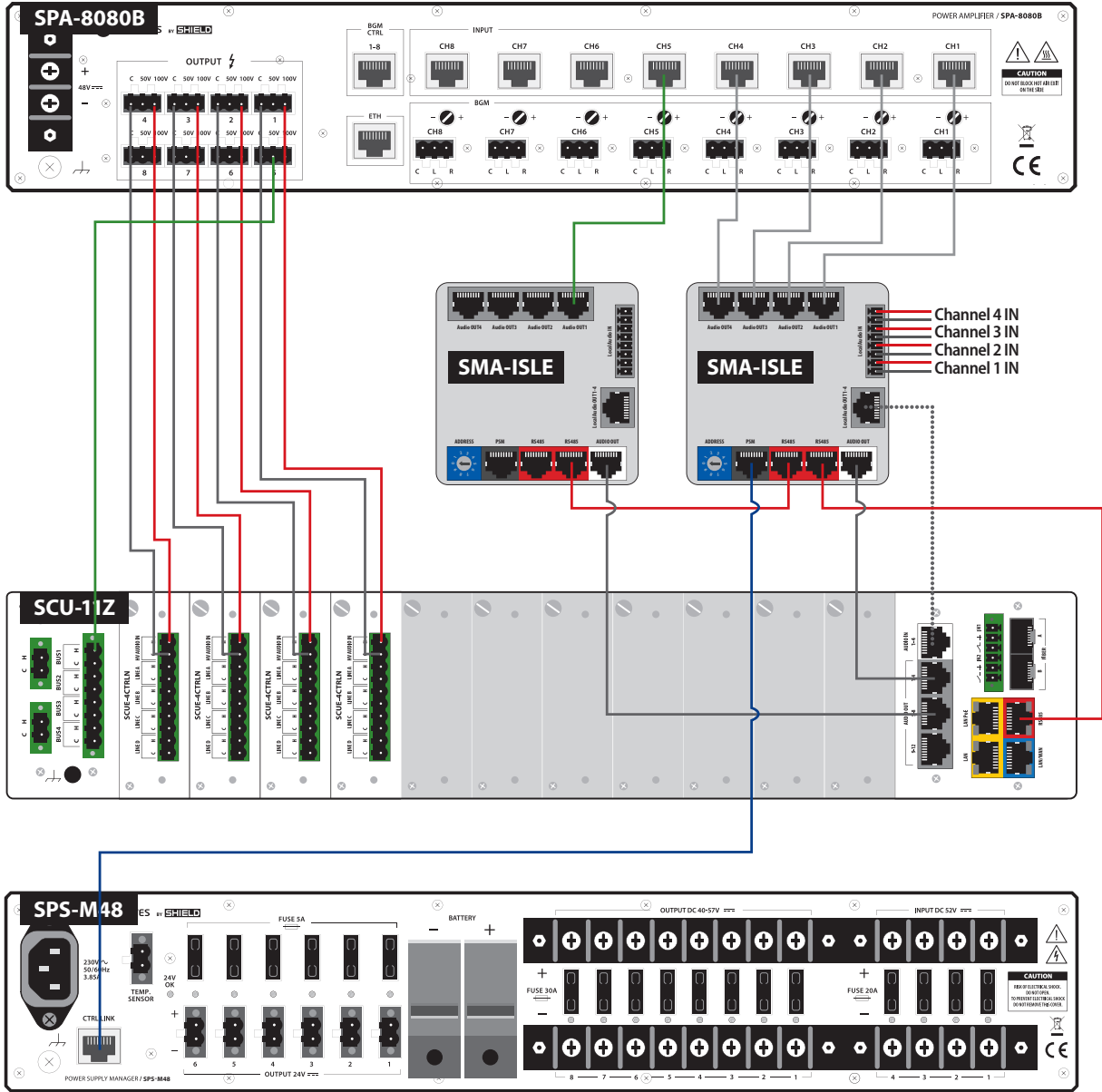
Individual connection of each of the amplifier channels with control cards with backup amplifier (possible to connect up to 4 backup channels/amplifiers).



Drawing 70. Connecting back-up amplifier

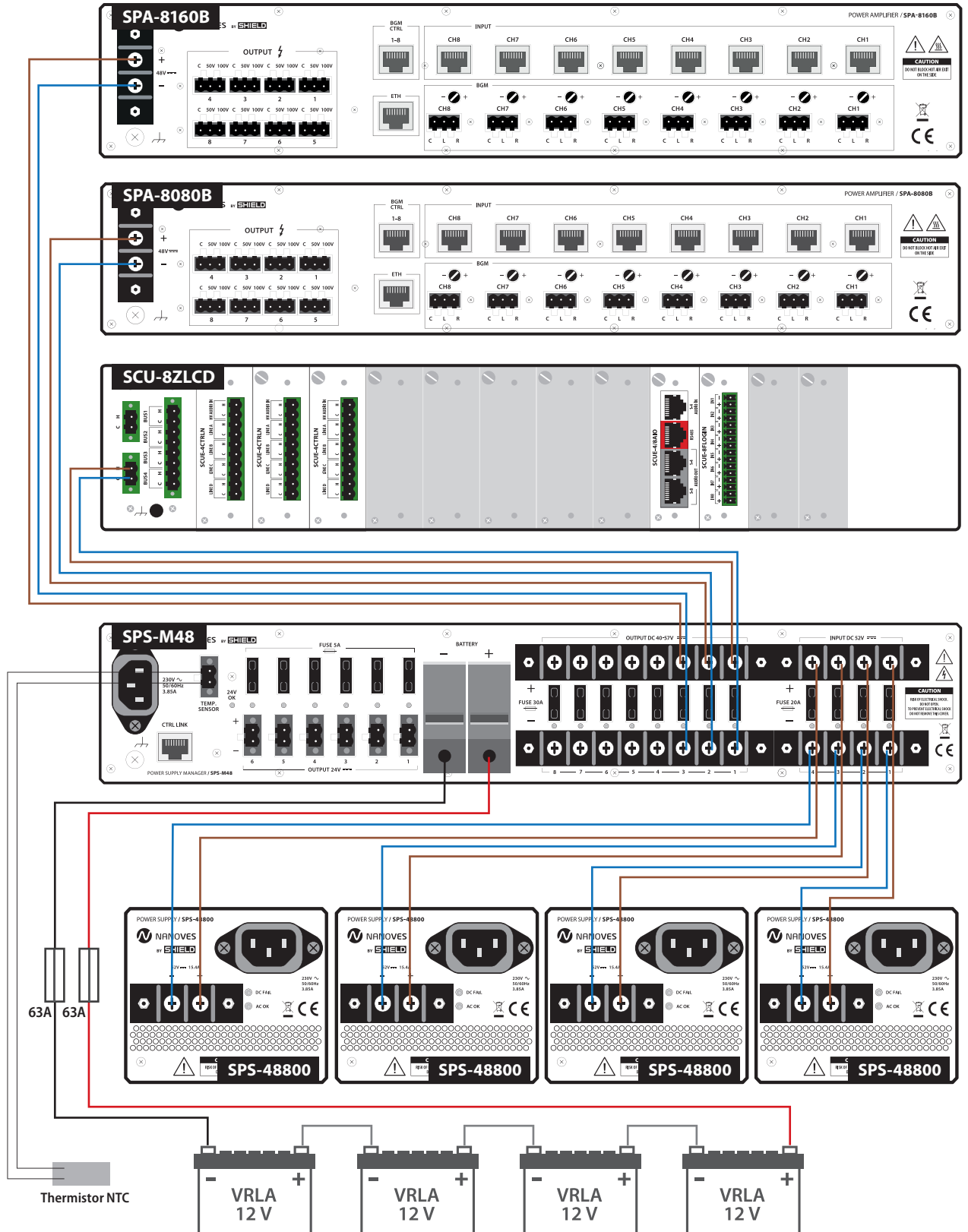
7.3.2.6 Individual connection with backup amplifier using SCU-11Z / SCU-11ZLCD

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



Drawing 71. Connecting back-up amplifier

7.3.3 Power supply



Drawing 72. Power supply diagram

7.3.3.1 Storage batteries

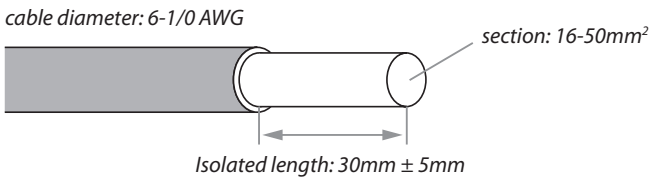
It is necessary to protect batteries from short-circuit while connecting wires. Short-circuit may lead to system failure. Follow this manual to assure safety while connecting.

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.

Prepare cable tips:

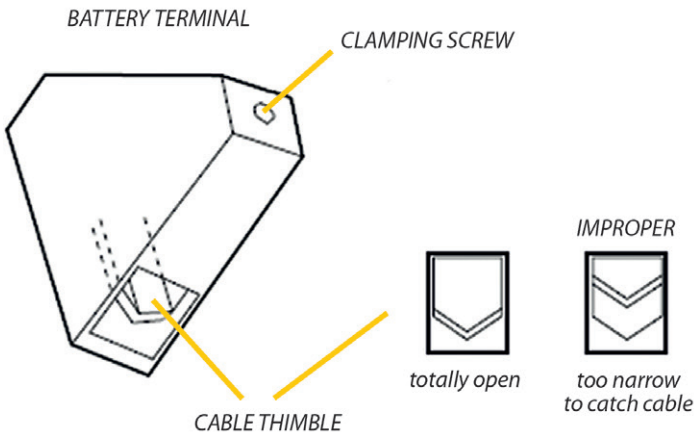
To assure a proper connection between battery terminals and cables, make sure you use a cable with a suitable diameter and prepare its tip, as below.



Drawing 73. Preparing cable tips

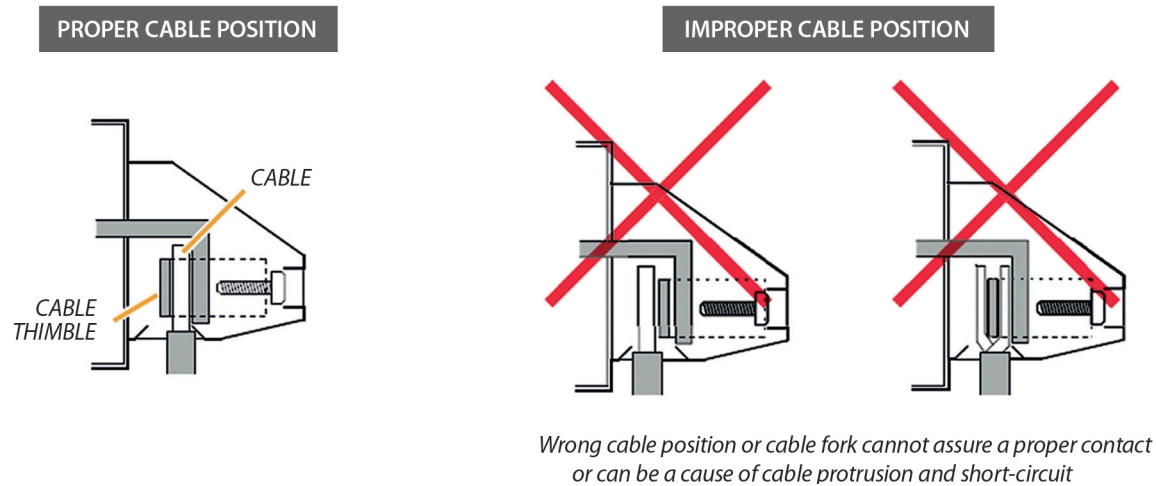
Remarks concerning connecting cables to battery terminals

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



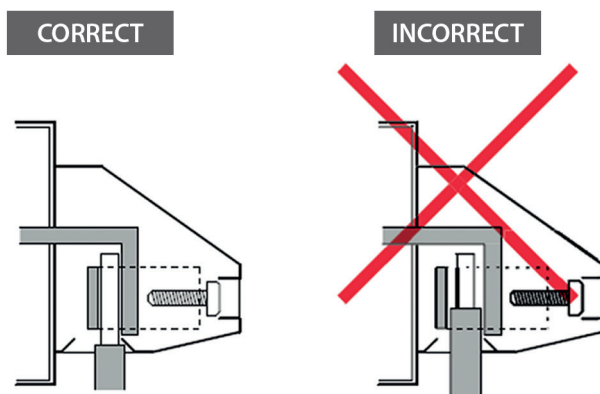
Drawing 74. Completely open Power Supply Manager terminal

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



Drawing 75. 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 76. Correct connection of storage battery cables

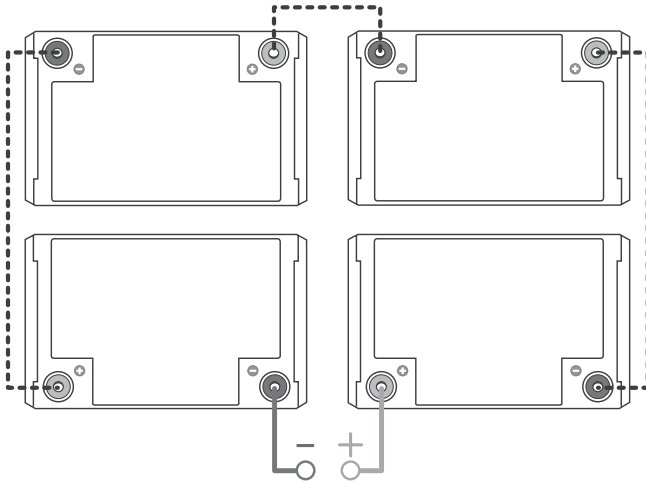
Connecting batteries

- » Wait over 10 seconds after feeder cable was unplugged from AC socket located on SPS-M48 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.

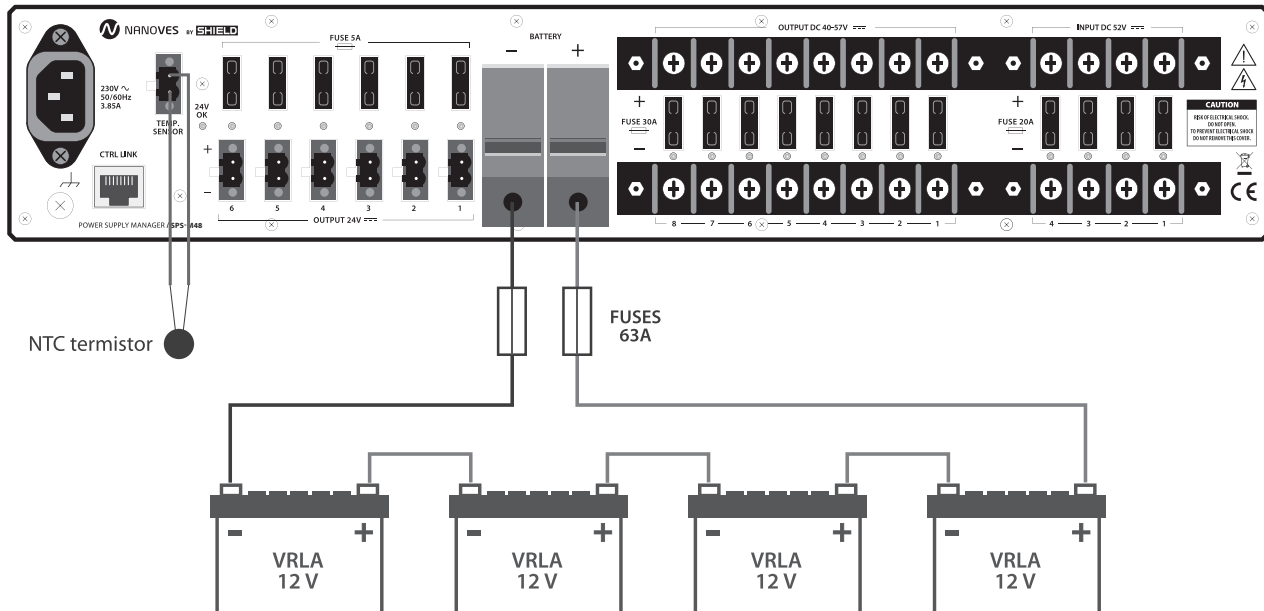
Disconnecting batteries

- » Make sure battery supply is not used. To do so, check LED on SPS-M48 front panel which signals such state of affairs.
- » Unscrew negative terminal of SPS-M48 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 SPS-M48 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 77. 4x12 V DC VRLA storage batteries connecting diagram



Drawing 78. Method of connecting storage battery batteries to power supply manager

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

Thermistor installation:

A thermistor, attached to SPS-M48 rear panel, is intended to compensate temperature changes when charging batteries. Place the thermistor between two batteries.

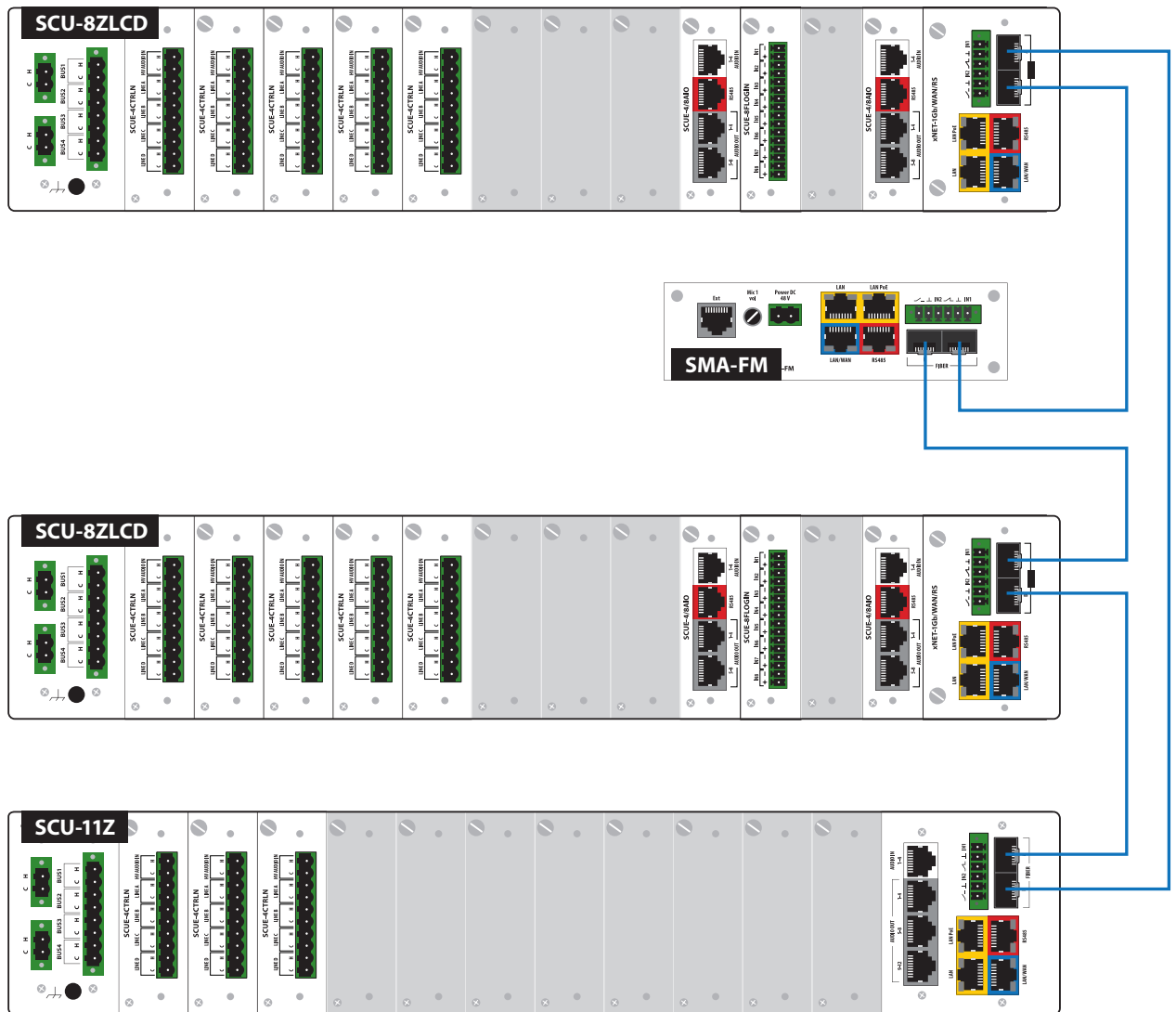
NOTE: the thermistor cable can be extended by several meters; no problems arise.

NANOVES 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 VAS NANOVES central unit is provided with power, it is necessary to perform standard inspections specified in the chapter – Maintenance and service – page 114.

7.3.4 Microphones

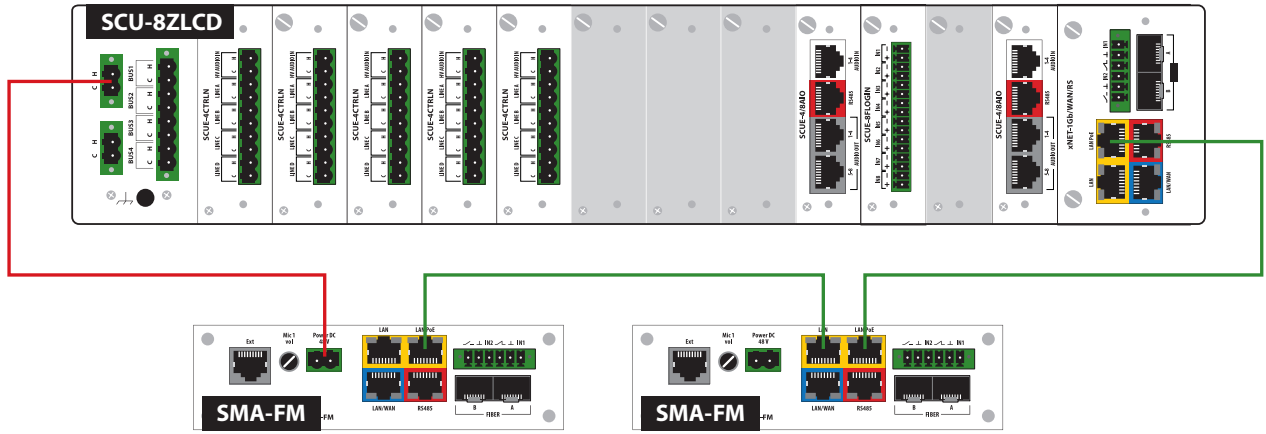
7.3.4.1 Fireman microphone RING-type optic fiber connection



Drawing 79. Fireman microphone optic fiber connection – RING typology

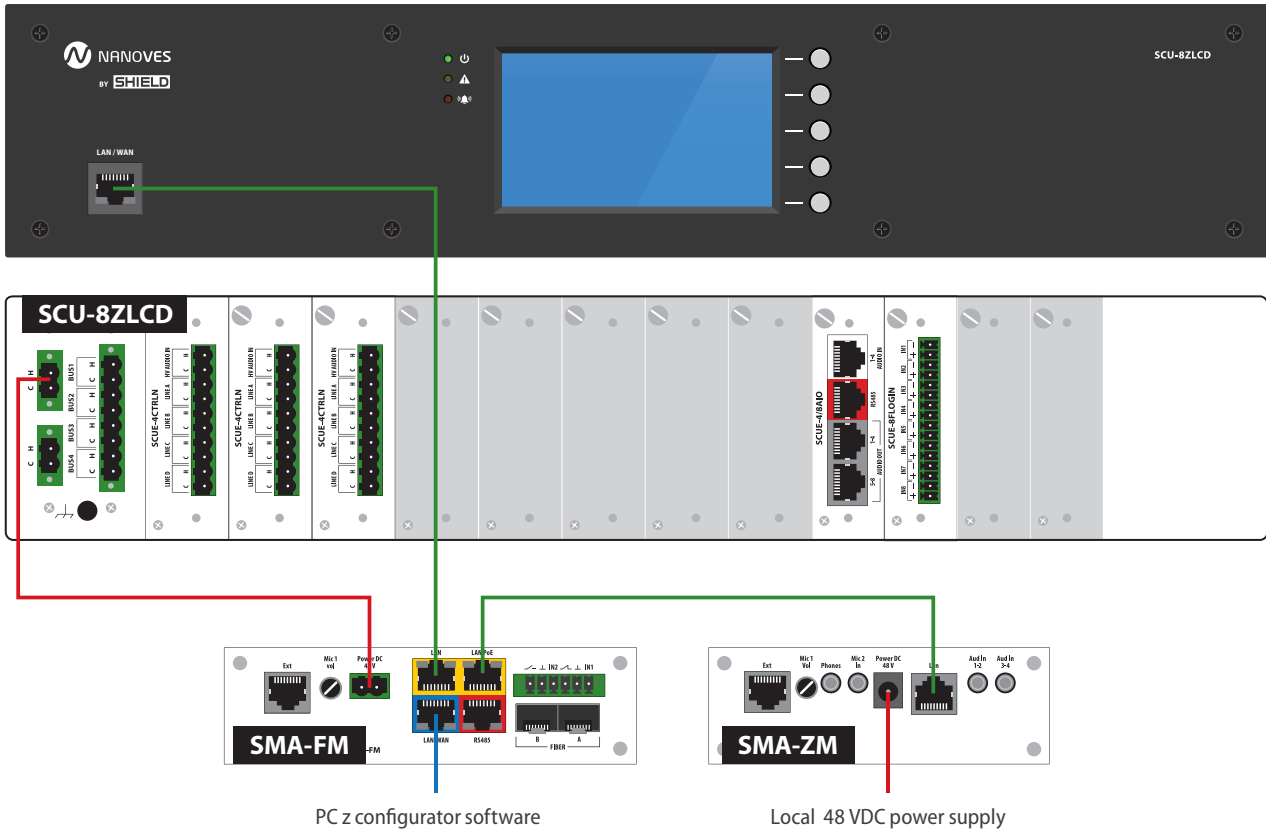
7.3.4.2 Fireman microphone CHAIN-type cable connection

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 80. Fireman microphone cable connection – CHAIN typology

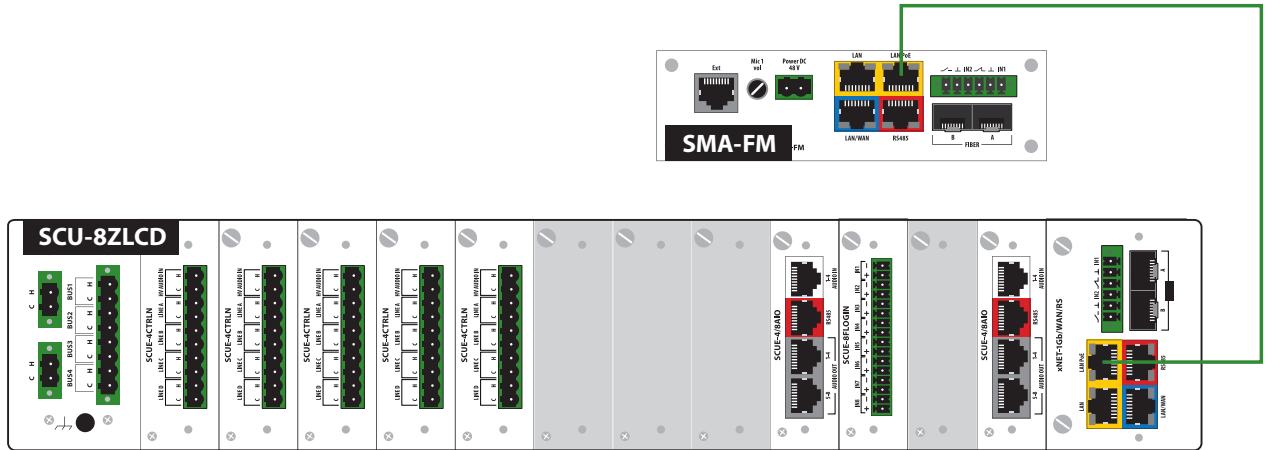
7.3.4.3 Fireman and zone microphone cable connection via LAN/WAN slot on panel



Drawing 81. Fireman and zone microphone cable connection via LAN/WAN slot on panel

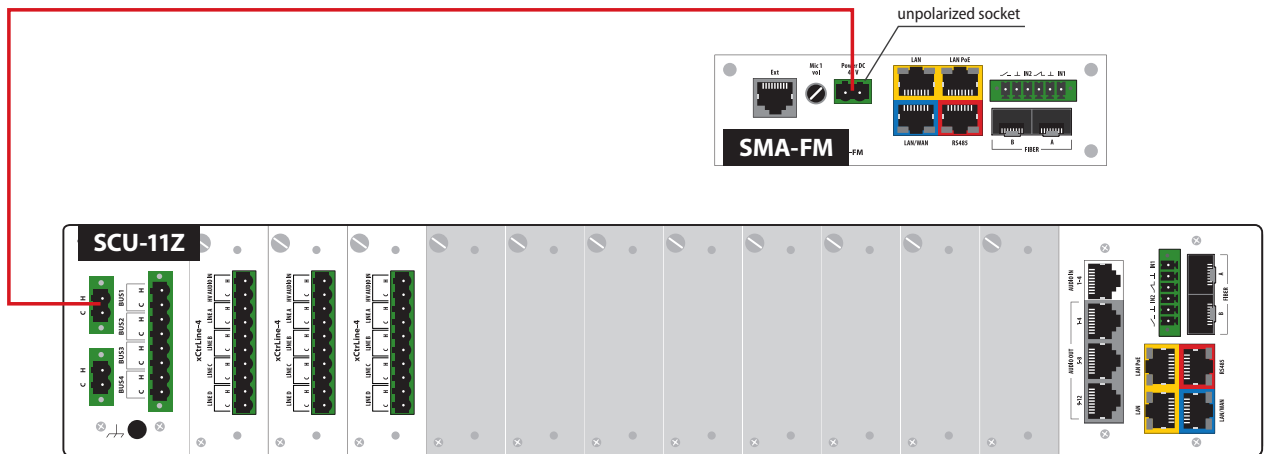
7.3.4.4 Supplying fireman microphone

1. Via LAN PoE in SCU-xx Control Units



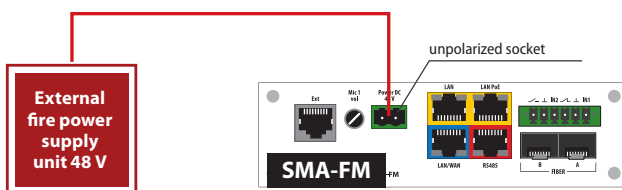
Drawing 82. Supplying fireman microphone – LAN PoE

2. Via supply output in SCU-xx Control Units, or in SPS-M48 power supply manager



Drawing 83. Supplying fireman microphone – supply output

3. Via external fire power supply unit 48 V



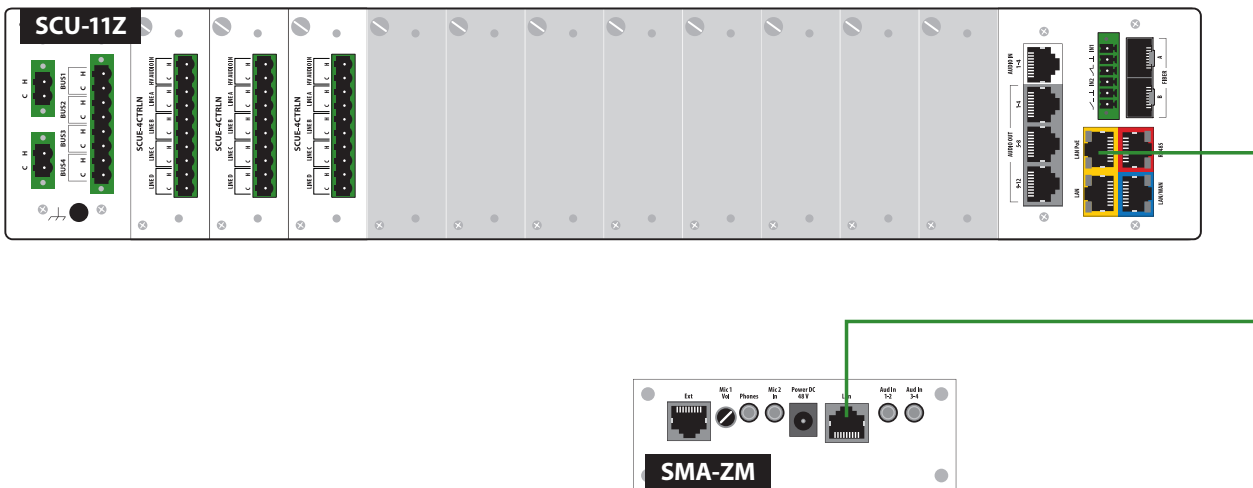
Drawing 84. Supplying fireman microphone – fire power supply unit

7.3.4.5 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.

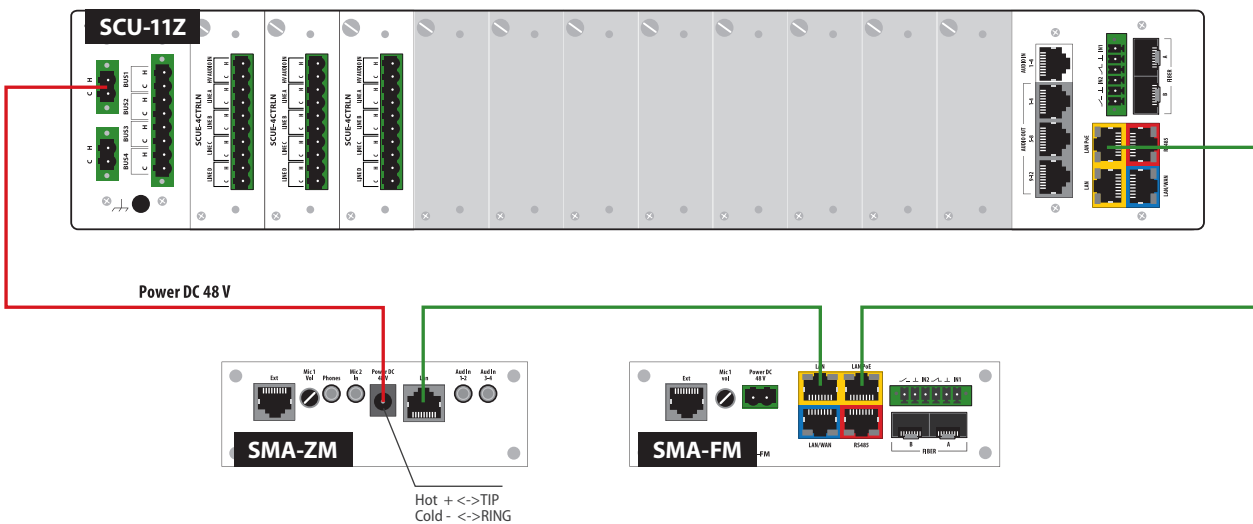
1. LAN PoE connection.

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



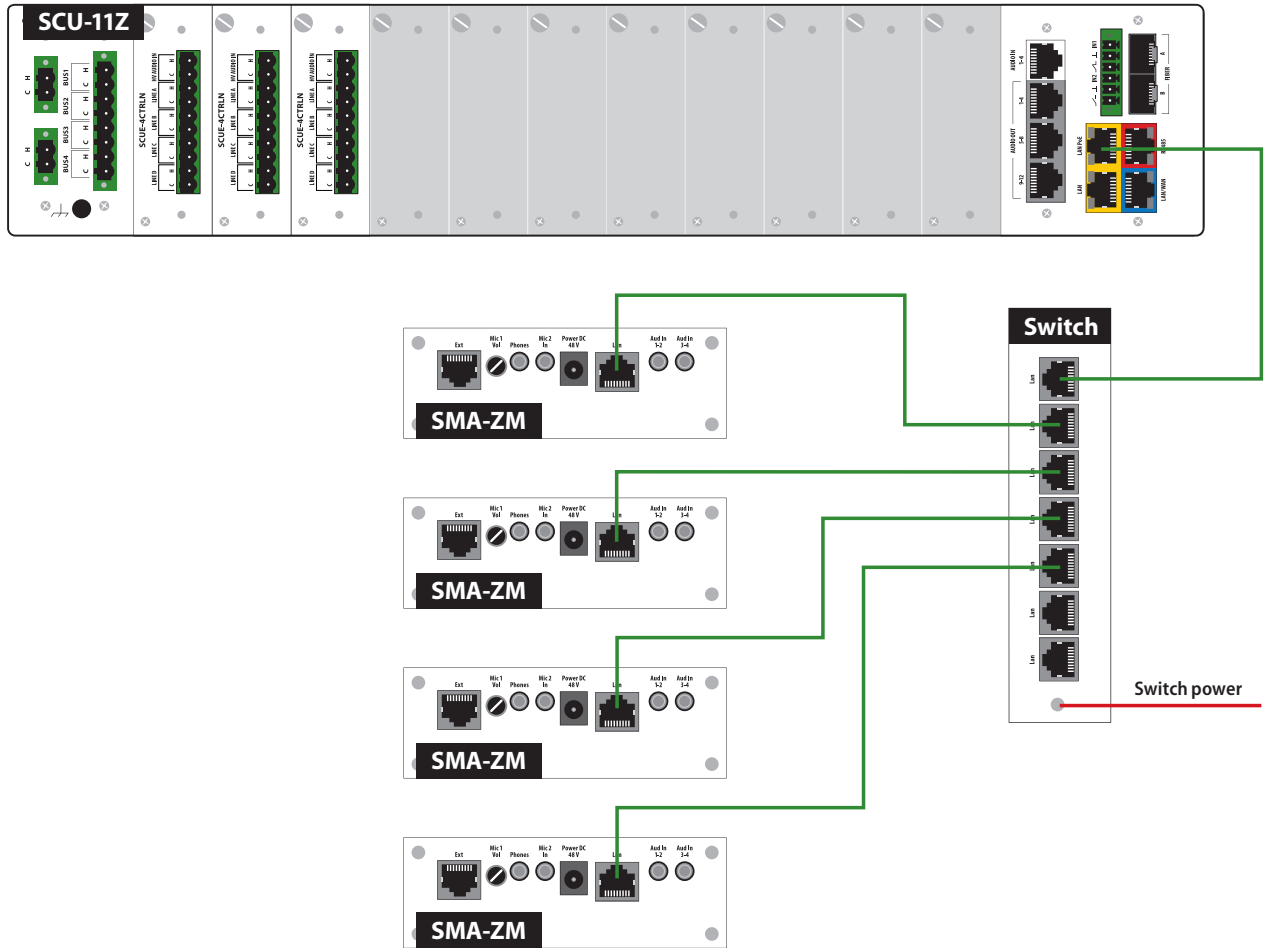
Drawing 85. Connecting zone microphone

2. Connecting via SMA-FM fireman microphone. In this case it is required to provide additional power supply from the external power supply unit or SPS-M48 power supply manager.

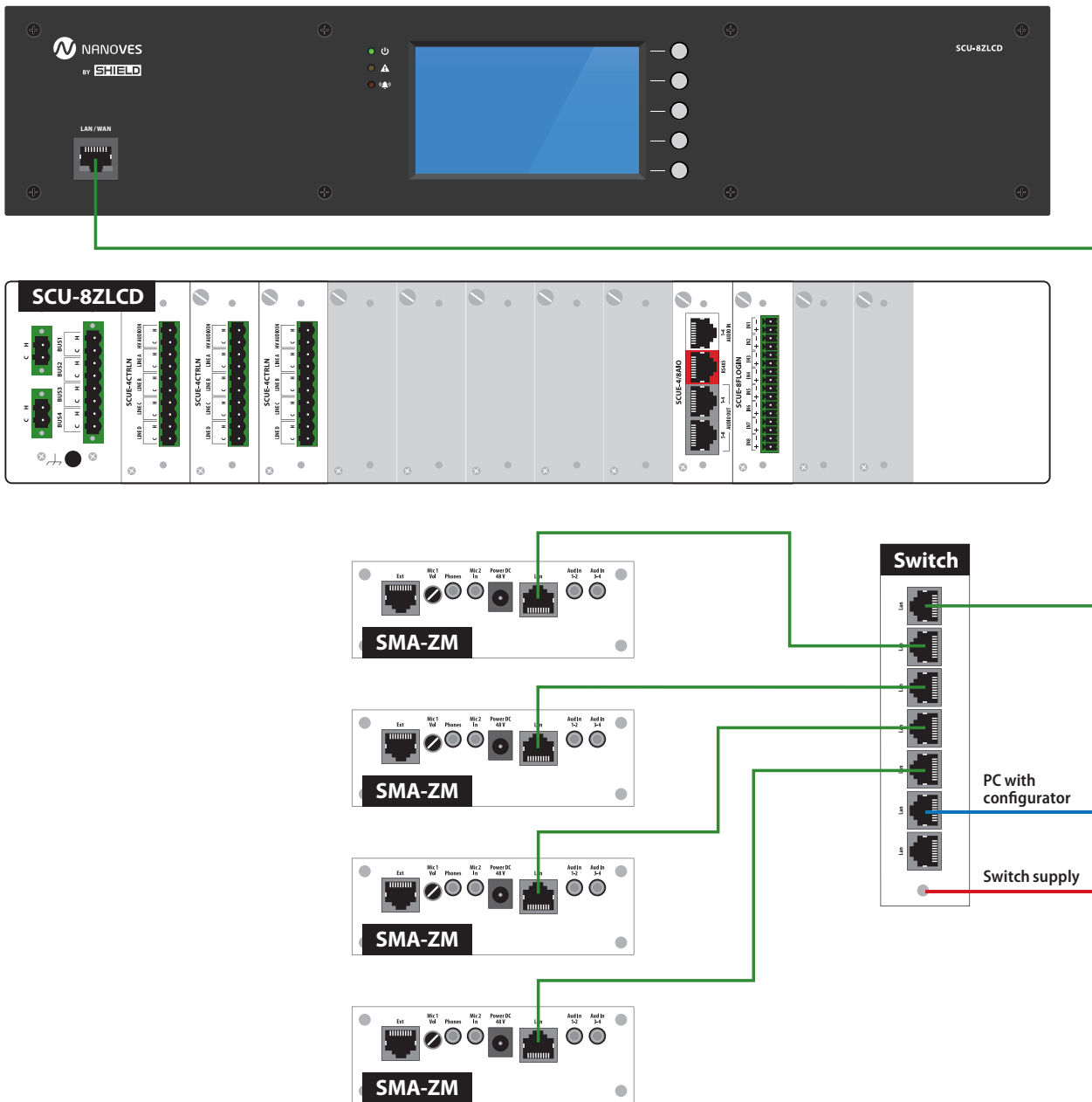


Drawing 86. Connecting zone microphone, fireman microphone

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



Drawing 87. Connecting zone microphone – switch



Drawing 88. Connecting zone microphone – switch (connected to SCU-8ZLCD front panel)

List of certified switches:

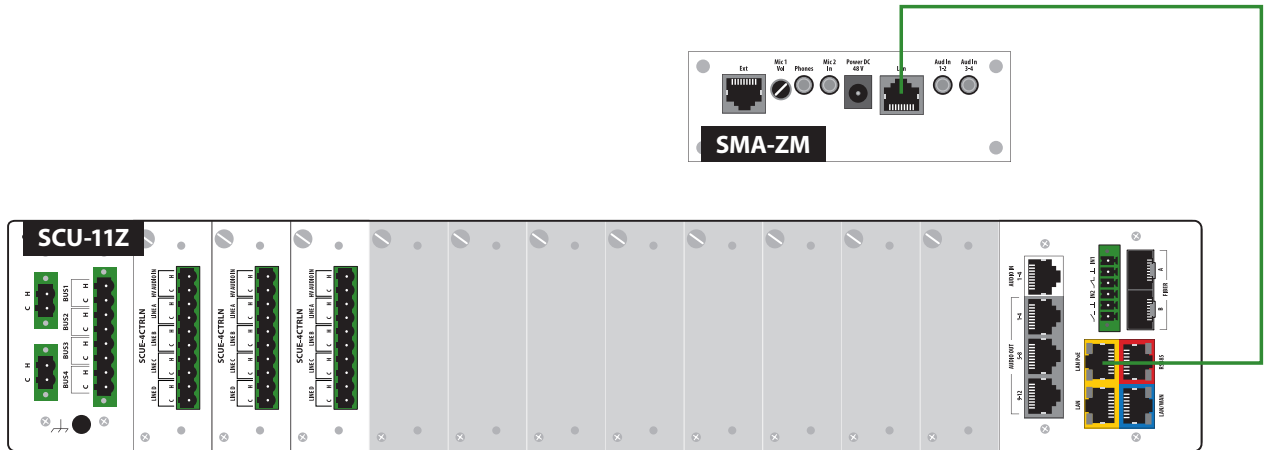
- » NETGEAR – Prosafe Gigabit Plus series with PoE
- » CTC Union Technologies – IGS Gigabit Ethernet Managed Switch series
- » CTC Union Technologies – IFS Fast Ethernet Managed Switch

7.3.4.6 Supplying zone microphones

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

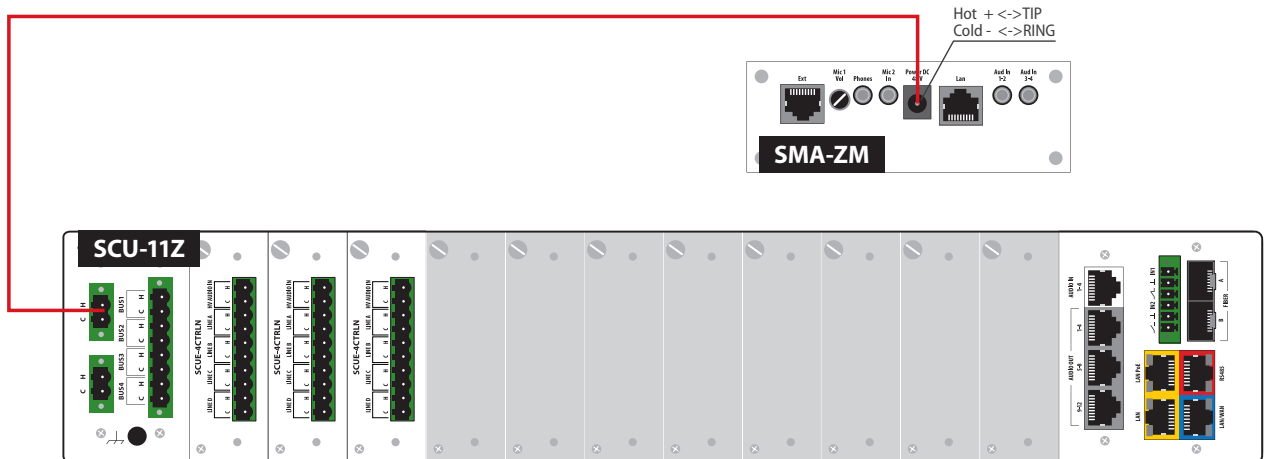
Supplying zone microphone:

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



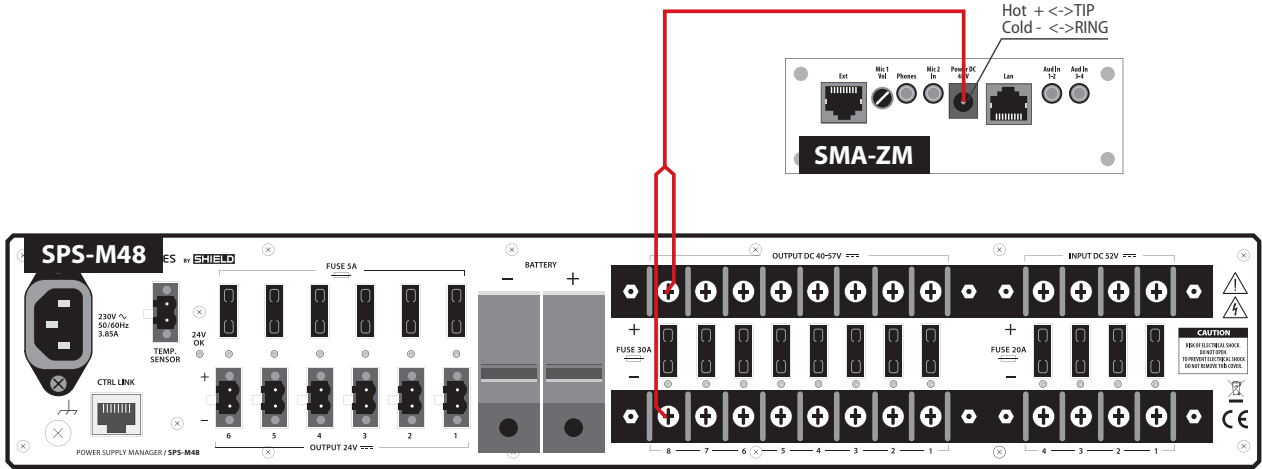
Drawing 89. Supplying zone microphone – LAN PoE

2. **Via supply output in SCU-xx Control Units**



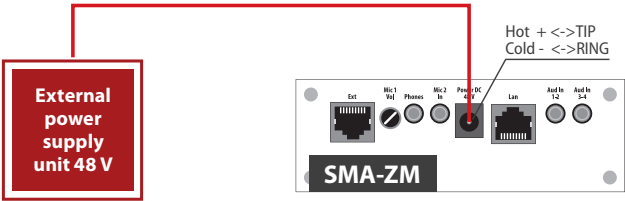
Drawing 90. Supplying zone microphone – supply output of central unit

3. Via supply output in SPS-M48 power supply manager



Drawing 91. Supplying zone microphone – supply output of power supply manager

4. Via external power supply unit 48 V



Drawing 92. Supplying zone microphone – fire power supply unit

7.4 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 SHIELD 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 SHIELD employee responsible for VAS start-up.

Loudspeaker lines

Please check if loudspeaker lines have been made in accordance with 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 SHIELD employees

The sound system must be prepared according to the instructions above. Before the team responsible for VAS system start-up arrives, fax (fax: 58 344 45 95) information that "system is completed and ready for start-up" along with start-up date. 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 comprehensibility testing

Pursuant to provisions of PN-EN60849 norm, each Voice Alarm System (VAS) installation must be followed by speech comprehensibility 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 RASTI speech comprehensibility – 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 SHIELD 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.

8. Operation modes – diode colors

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

Table 21. Colors signaling on the system microphones depending on the function assigned




FUNCTION	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		✓	●				
Interkom					●	✓	
Record Message			●	●			
Failure Delete	✓		●	●		✓	
Failure Accept	✓		●	●			
Standby	✓	✓		●	●	✓	

Table 22. 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 › impedancji failure › switch to work LOOP	●	●		✓	
Zone failure confirmed	●	●		✓	
Emergency message playback	●				✓
Warning message playback	●			✓	
Voice message from a fireman microphone		●		✓	
Voice message (slowly from a zone microphone, BGM)		●			✓
Service message playback			●		✓
Zone mute		●	●		✓
Cache			●	✓	
Standby		●	●	✓	

Table 23. LED colors on the control unit front panel

Graphic symbol	Color		Control Unit SCU-8ZLCD / SCU-11Z/LCD
		green	POWER
		yellow	FAILURE
		red	ALARM

8.1 Normal mode

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

8.2 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.

A diode 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.

8.3 Failure mode

In case of damage related to one of the system modules, the system switches into failure mode, and information about failure is displayed in the Control Unit and microphones. FAILURE yellow diode glows. If the microphone is programmed as "Confirm failure" button, the acoustic signaling device also signals the failure. When failure is signaled, press the button marked as "confirm failure" to dampen sound signaling, and the system detects that the failure has just been accepted/confirmed by the Operator (this event is recorded in the event log). The failure diode goes out when the system damage is eliminated and "Failure delete" button is pressed.

8.4 Lock mode

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

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

9. Instruction for performing tests and trials

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

9.1 Instruction for performing basic functions

9.1.1 Alarm status

Activating alarm status

Lift red button flap (alarm button "Activation and Evacuation") and press it. Green LED indicators will emit light in all sound system zones. The system enters alarm status and automatically activates all zones. In this status, 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 status applies until the button marked as "cancel alarm" is pressed.

Cancelling alarm

During alarm status, press "Cancel Alarm" button. VASCU enters supervision status, all alarm messages are deadened and music matrixes are restored.

Sending evacuation message

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

Sending warning message

Activate alarm and select zones. A green diode next to zone name means the zone is ready for sending. 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 sent in given zones in a continuous way, until the button "cancel alarm" is pressed.

Sending verbal message via microphone

Activate alarm and select zones you wish to speak in. A green diode next to zone name means the zone is ready for sending. Lift microphone, press and hold "Press and Speak" 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 sent in given zones. Next, press "Evacuation" button – warning message will stop, and evacuation message will be sent because has a higher priority. The latter has a higher priority. Then, press "Press and Speak" button – all automatic messages will stop and verbal message "live" will be available via fireman microphone.

Sending automatic messages via microphone in various zones

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

Sending verbal messages when control processor is faulty – CPU OFF

Set CPU OFF position of the switch on the front panel. Diode CPU OFF will emit green light. Press “Push to talk” button and speak to the microphone.

▲ NOTE! When the switch is in the CPU OFF position, reproducing alarm messages recorded in the cabinet memory does not work. The processor is omitted. A direct connection between devices is created: microphone → amplifiers → loudspeakers. Speech to the microphone is audible in the entire system. Amplifiers operate at maximum amplification – watch out for high level SPL.

9.1.2 Failure status

A flashing yellow FAILURE diode means that one of VAS central unit elements and loudspeaker line is damaged. On SCU-8ZLCD, SCU-11ZLCD and SMA-FM the system failure will be indicated by the acoustic signal. When the damage is signaled, press “confirm failure” button to deaden sound signaling, and the system will remember that the failure was confirmed by the Operator (this event will be recorder in the event log). The failure diode 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.

9.1.3 Controlling storage battery batteries of the backup power

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

9.2 Instructions for performing tests

Instructions for performing tests which confirm proper efficiency of 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 messages 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 messages to one or several areas at a time, in accordance with established way of alarming.
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 signaling various messages to sound system zones is properly signaled on fireman microphone.
8. Reproduce 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 damage of a single amplifier causes switching into back-up amplifier and if in the zones supplied by the back-up amplifier, a message is audible.
12. Check if the system identifies and signals the failure of loudspeaker line properly (short-circuit, open-circuit, loudspeaker line earthing).
13. Check if the damage signaling in the system occurs within max. 100 seconds.
14. Check if "CPU OFF" switch works properly on the fireman microphone – it is a switch responsible for omitting processor circuit.
15. Carry out storage battery batteries test. Press "battery level" button and check if the indicator shows proper battery level.
16. Check optical signaling of battery charging.
17. Switch off basic power and check if the system works properly on the backup battery power supply:
 - › Check if the system performs all functions related to sending alarm messages reproduced from the memory,
 - › Check if it is possible to send voice messages to particular zones via the fireman microphone,
 - › Check if the system 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 basic power failure.

10. Operation instructions

10.1 Control Unit

It is possible to navigate in SCU-8ZLCD and SCU-11ZLCD 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,
- » call 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 fault.

The passage 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.

10.2 Fireman microphone

Activities described below can be taken by authorized persons 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 diodes will emit light next to selected zones.
- » Press "Push to Talk" button, hold the button and speak to the microphone. To finish sending messages, release the button.
- » Once the verbal message sending has finished, a diode informing about microphone status 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 sending messages, release the button.
- » Once the verbal message sending has finished, a diode informing about microphone status will go out.
- » To return to normal mode, press "cancel alarm" button.

Calling warning message to desired 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.
- » Diodes for selected zones will emit light on the microphone.
- » Press "Warning" button. To deactivate message sending, press "Clear" button.
- » To return to normal mode, press "cancel alarm" button.

Calling warning message to all zones

- » Open red "Evacuation" button flat and press it. At this moment VASCU will switch into alarm mode. Next, press "all zones" button.
- » Diodes for all zones and diode at "all zones" button will emit light on the microphone.
- » Press "warning" button. To deactivate message sending, press "clear" button.
- » To return to normal mode, press "cancel alarm" button.

Calling evacuation message to desired fire zones

- » Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode.
- » Press selected zones button. You can choose more than one zone. Diodes located next to chosen zones will emit green light.
- » Press "Evacuation" button. To deactivate message sending, press "clear" button.
- » To return to normal mode, press "cancel alarm" button.

Calling evacuation message to all zones

- » Open red "Evacuation" button flap and press it. At this moment VASCU will switch into alarm mode. Next, press "all zones" button.
- » Diodes for all zones and diode at "all zones" button will emit light on the microphone.
- » Press "Evacuation" button. To deactivate message sending, press "clear" button.
- » To return to normal mode, press "cancel alarm" button.

Mute

- » In alarm mode it is possible to dampen warning and/or evacuation message. To do so, choose zone and press "mute" button. There will be no messages in this location.
- » You can choose all zones and press "mute". Then, messages for the entire system will be deadened.
- » Remember that alarm mode is active all the time – (diode emits light at ALARM description on the microphone), contacts, controls and settings assigned to the alarm scenario are maintained. Dampening operation is recorded in the event log.
- » Choose zone and call warning or evacuation action to send messages again.
- » To return to normal mode, press "cancel alarm" button.

10.3 Zone microphone

Sending voice messages to a desired zone

- » Press chosen zone button. You can choose more than one zone. Diodes located next to selected zones emit green light.
- » Press “Push to Talk” button. Holding the button, 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 the gong (sound preceding the message). Once it has been played, an icon signaling its activeness will emit light on the microphone panel.
Note: While sending messages from the fireman microphone, the gong is not emitted.
- » The verbal message can be sent via the microphone until the diode starts emitting light. To finish sending messages, release button.
- » Once the verbal message has finished, diodes of selected zones will go out. The diode informing about active microphone is inactive.

Sending verbal messages to all zones

- » Press “all zones” button.
- » Diodes for all zones and diode at “all zones” button will emit light 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 the gong (sound preceding the message). Once it has been played, an icon signaling its activeness will emit light on the microphone panel.
Note: While sending messages from the fireman microphone, the gong is not emitted.
- » The verbal message can be sent via the microphone until the diode starts emitting light. To finish sending messages, release button.
- » Once the verbal message has finished, diodes of selected zones will go out. The diode informing about active microphone is inactive.

Select source of sound – 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.

10.4 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 recorded 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. Buttons serve to navigate in the menu, as specified below.

11. Maintenance and service

11.1 Activities before VAS system maintenance works

11.1.1 Initial procedures for system testing

Arrange with the building administration a date of performing VAS system maintenance works, inform the plant administrator about activities and range of performed works, as well as about potential inconveniences during VAS inspection.

11.1.2 Procedures for beginning of 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, and inconveniences arising from system testing procedures.

Inform FACIE monitoring center about remote alarm or damage signal transmission.

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

All repairs must be carried out by qualified technicians or engineers. To send repair request, contact the device manufacturer.

The manufacturer shall not be held responsible for any damage arising from unauthorized modification or repair.

VAS central unit safety control and electric controls:

- » 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.

Set of amplifiers:

- » Check general physical condition of the set, along with tips, check for loose connections;
- » Check all power amplifier performance.
- » Check back-up storage battery condition, along with recording block voltages unrelated to charging devices and try to unload in order to specify max. capacity.
- » Check charging devices performance, along with troubleshooting.
- » Inspect generator module of recorded messages and check output signal in terms of its quality, along with proper efficiency inside the system.
- » Check connected preamplifiers /mixers. Save and compare settings with previously recorded data. Note any deviations, note any changes at this stage.

- » Check fire signaling central unit interface together with customer's engineer.
- » Check all correction efficiency. Save and compare settings of control elements with previously recorded data. Note and investigate all deviations.
- » While informing about evacuation, with equivalent load, (if main loudspeakers cannot be used), check output level of each power amplifier. Save and compare with previous data.
- » Check automatic system defect monitoring and test by causing failure.

Loudspeakers:

- » Measure total speaker load for each circuit, save and compare with previous results. Inspect all unexpected changes.
- » Perform subjective sound monitoring and audibility tests in all areas with prohibited access. Save sound pressure levels (SPL).

Microphone control devices:

- » Control condition and proper operation of switches/touch-fields.
- » Check microphone physical condition.
- » Send test message or, if forbidden, use monitoring loudspeaker to gain access to results.

Backup modules:

- » Check all backup module located in the amplifier set or in other areas.

System condition:

- » In case of dusty central unit interior, it is advisable to clean it with a vacuum cleaner, compressed air. It must be dry, water must not be used.

Plant changes:

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

Operation book:

- » After you finish all actions, enter maintenance results to the operation book.

Sheets:

- » After finishing works, get a relevant person signature to confirm that the system has been in the satisfying condition. Protocol including all recommendations.

11.2 Service works

11.2.1 Daily review

All abnormalities are usually identified by service personnel who operates 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 operation book on a regular basis.

11.2.2 Inspection once per 6 months

- ✓ Have a conversation with VAS system users concerning system operation remarks.
- ✓ Check operation book 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, diodes and indicators work properly.
- ✓ Perform storage battery test. Press "Battery level test" button and check if SPS-M48 tests storage batteries. If the battery level is poor, the failure indicator will emit yellow light.
- ✓ Check network and battery fuses condition.
- ✓ Check connectors and earthing connections condition.
- ✓ Check storage batteries in terms of corrosion and ventilation.
- ✓ Check if the battery charger works properly.
- ✓ Switch off basic power supply and check battery power system operation:
 - › check if the system performs all functions related to sending alarm messages recorded in memory,
 - › check if fireman microphone can send 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 basic power failure.
- ✓ Check if information about VAS failure is sent to FACIE central unit and if this connection is parametrically supervised 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 sent 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 – switch of the processor circuit omit function.
- ✓ Reproduce 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 supervised.
- ✓ Check if VAS system stops performing any functions unrelated to warning when the alarm is captured.
- ✓ Check if VAS system disconnects all secondary systems when the alarm is captured.
- ✓ 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 way of alarming.
- ✓ Check if damage of a single amplifier triggers switch into back-up amplifier and if the message is audible in the zone supplied from the back-up amplifier.
- ✓ Check if the system identifies and signals speaker line failure properly (short-circuit, open-circuit, earthing of loudspeaker line).
- ✓ Check if damage signaling in the system occurs no longer than 100 seconds.
- ✓ 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 arrangements requiring changes related to location of loudspeakers or change of their number and proper system element operation (possible dirt, paints or mechanical damage).
- ✓ Check if various message sending signaling to sound system zones is properly signaled on fireman microphone.
- ✓ Check ventilator condition.
- ✓ Check supply voltage condition on all inputs and outputs of power supply management unit.
- ✓ Switch off backup power supply. Measure voltage at terminals from the battery and from the charger.
- ✓ Check if control cards indicators of speaker lines work properly.
- ✓ 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.

11.2.3 Annual inspection

All service works included in the 6-month inspection apply, 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 above parameters below the required values by PN-EN 60849 norm.
- ✓ Check if impedance of particular loudspeaker lines is in accord with the design data.
- ✓ Check alarm message scenarios sent by FAS
- ✓ Measure storage battery capacity – if the capacity dropped below 80% of the design capacity, storage batteries must be replaced with new ones.
- ✓ Safety control must be carried out frequently, max. every 12 months; the manufacturer recommends to take maintenance actions every 6 months.

11.2.4 Manufactures remarks

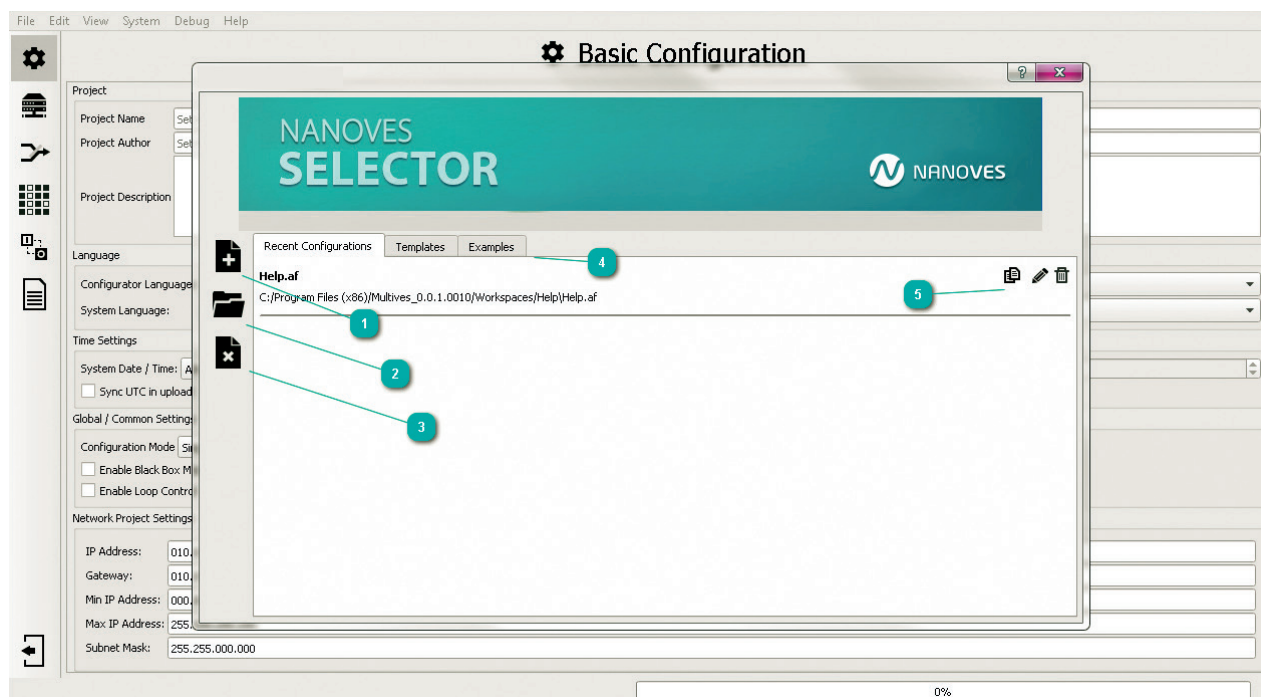
Please note that SHIELD is not responsible for results of unauthorized repairs.

Any repairs of the equipment should be made by the SHIELD or a service centre authorized by the SHIELD.

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

12. NANOVES Configuration Software

12.1 Welcome screen



1 New configuration file localization

A folder needs to be created and selected dedicated only for the project for which we create a configuration file.

Caution: Do not select an existing file with data, as these will be deleted!

2 Selection of configuration file from dedicated location

3 Creating new project without recording without saving

4 Recent and template configuration file window

5 Project cloning, changing and deleting project nomenclature

12.2 Basic Configuration

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

The **Project** field contains basic information on configuration of the NANOVES 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 singular 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 language version of the software used to configure the NANOVES system – [Configuration Language](#). System Language defines the language version of all available GUI touchscreens 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.

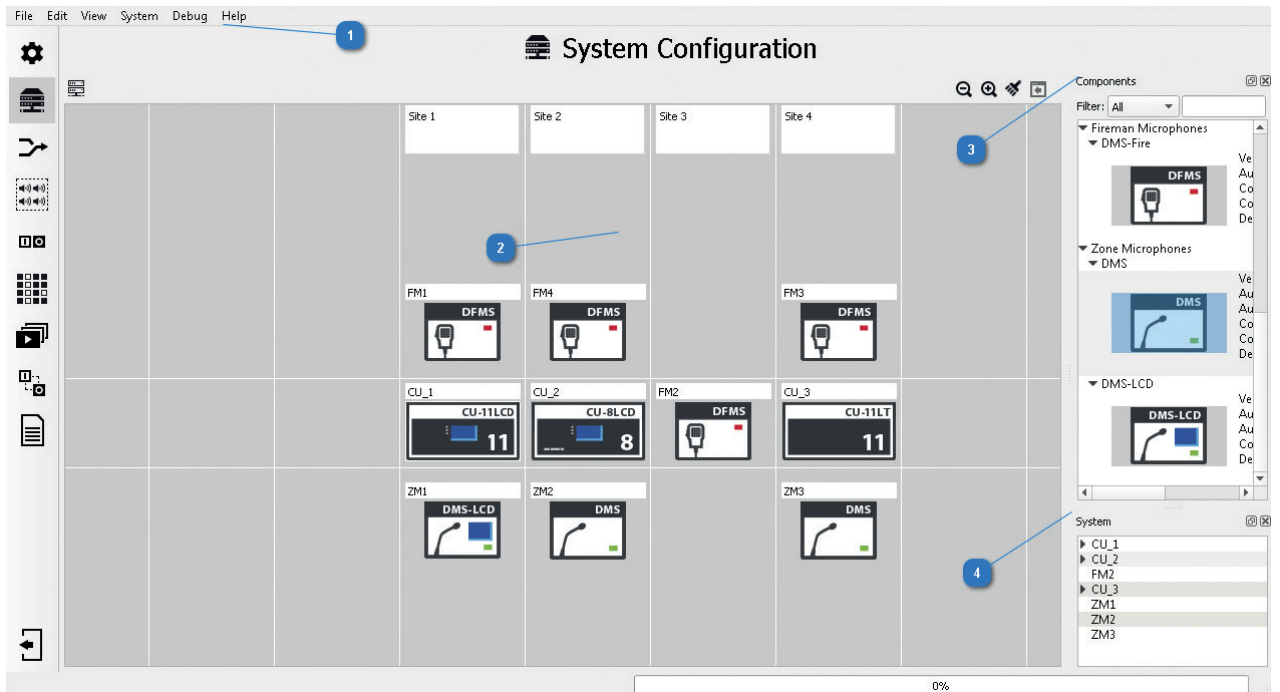
4 Global Settings

In [Global Settings](#) you can choose one of the configurator's modes. The **Advanced** mode, unlike the **Simple** mode, is able to create speaker zone groups, logical input / output groups, timers and scenarios. Additionally, in the Advanced mode, in editing logical outputs, it is possible to set individual diode operation on zone microphones. The [Enable Black Box Mode](#) option – it is a window for accepting the fireman microphone audio registration function while the system is in the alarm mode. The [Enable Loop Control](#) option – accepting this option results in switching on reporting of all error as detected in the [fibre-optic loop](#).

5 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 NANOVES 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 of SHIELD. The settings should be changed prior to adding the first device to the workspace.

12.3 System Configuration



1 Main Menu bar File, Edit, System

2 Workspace.

The [System Configuration](#) tab is one of the most important items in the NANOVES system configuration software. The main window, called [Workspace](#), has vertical and horizontal line which are connected to each other by means of Cat5 copper wires and found within one location (one casing), which can be assigned an individual name in the upper part of each vertical field. On the other hand, the field contained between two horizontal lines in the central part of the means that elements located within this field are connected by means of a redundant supervised fibre-optic link and found in various locations. In addition, all elements located upwards from the “fibre-optic link” are monitored – the system supervises and detects all faults in these devices, whereas in the bottom part are located zone microphones which are unsupervised.

3 Components

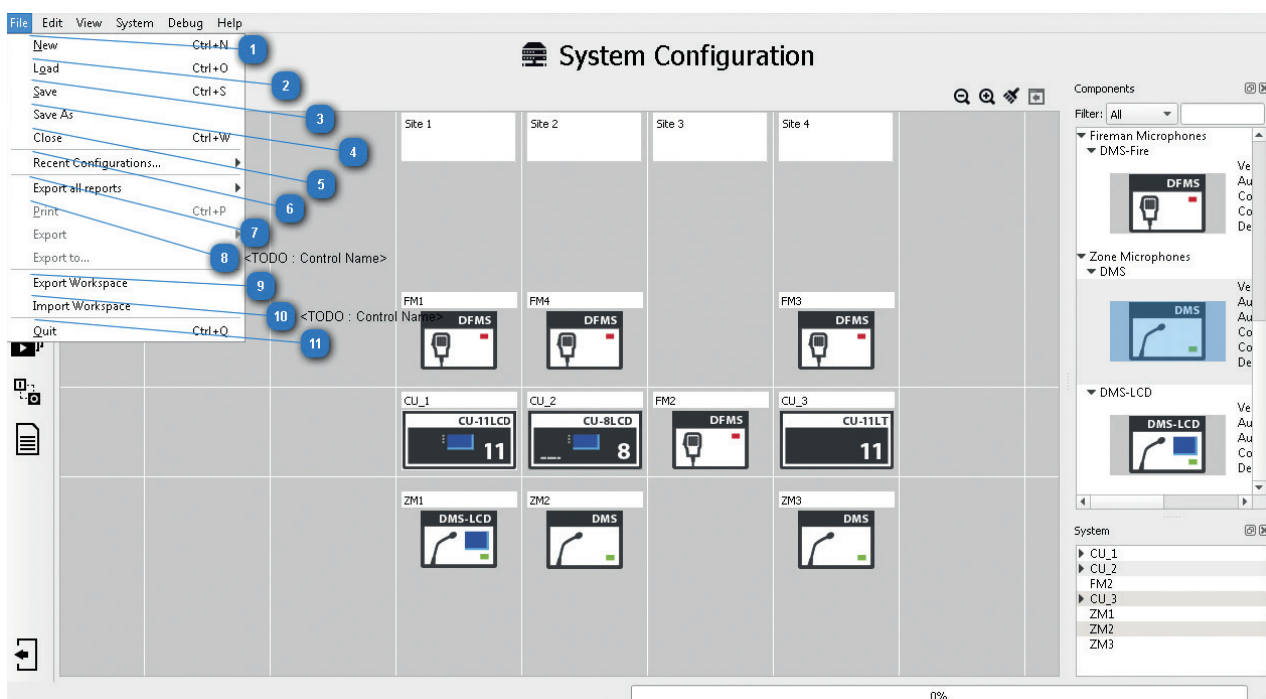
In the top right part of the work field there is the tab to select all available elements of the NANOVES system – [Components](#). The first element to choose and draw into the appropriate field, as marked by the configurator, is the control unit. This is what system designing should start with. In order to add an element into the work field, the [System Managers](#) list is to be dropped down by clicking on the triangle icon by the name System Managers, then move the mouse cursor over any element from the list and holding down the left mouse button drag the cursor into the [Workspace](#) field. 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 activity 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, in the System tab appears the name of the unit, as added, 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 NANOVES system is available in the following tabs: [DFMS](#), [DMS](#), [xCtrlLine-4](#), [xLogIN-8c](#), [xLogOut-8c](#), [AUDIO-4/12](#)

12.3.1 File



1 New

This results in creating 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" icon. Creating a new or selecting an existing folder is the first thing to do to be able to go on with 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 enables recovery of an earlier configuration of the system. The configuration file has the extension *.af.

3 Save

This saves a configuration in the created folder Workspace.

4 Save as

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

5 Close

This closes the current configuration file.

6 Reset Configurations

In the configuration software it is possible to recover up to 10 recently used configurations from the list.

7 Export all reports

Generating tables from the Reports tab in any of the following formats HTML, PDF, XML, ODF.

8 Print

Printing 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.

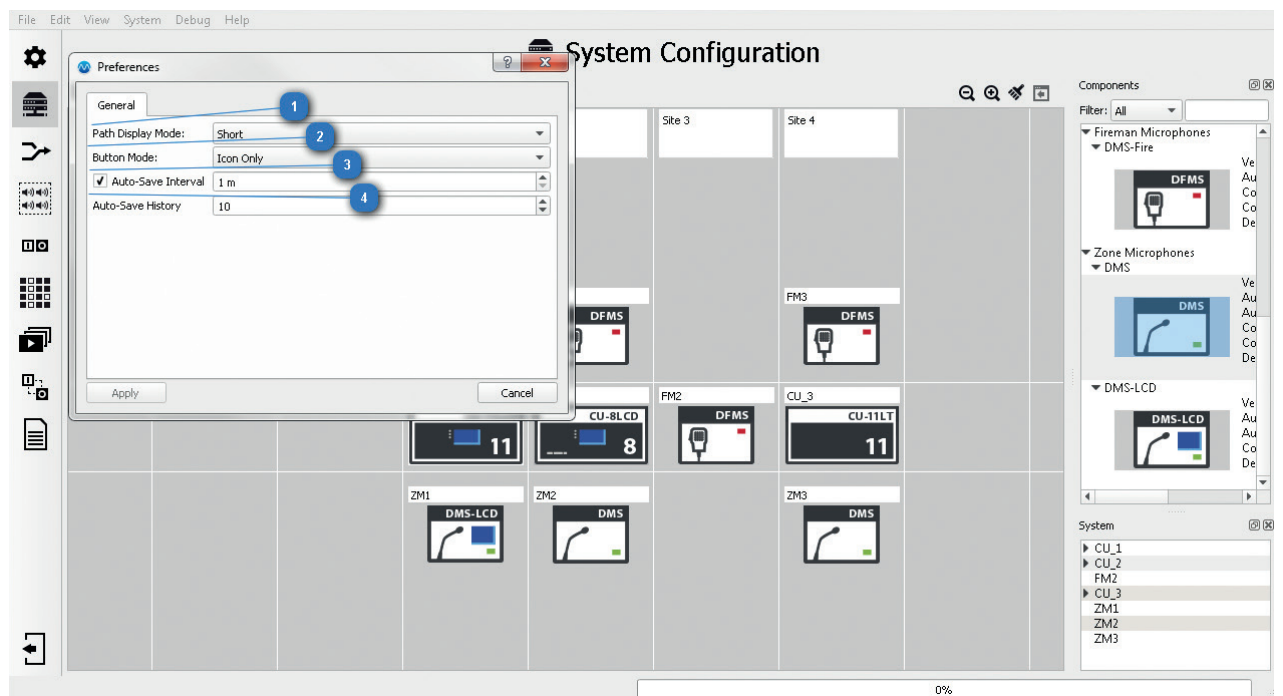
10 Import Workspace

Automatic decompression of a *.afz file and loading the complete configuration of the system.

11 Quit

Closing the NANOVES system configuration software.

12.3.2 Edit



1 Path Display Mode:

The NANOVES system component name display mode refers to logical input / output cards, control cards, audio inputs and audio outputs. In the Full Path mode, the name displayed consists of the name of the unit in which a given element is located, followed by a full stop and the name of the card, where the value in the brackets with # means the number of the slot in the unit in which a given card is located, and at the end, also preceded by a full stop, the name of the component is displayed. Here is an example of the full name of a control unit audio output – SM1.cCPU-Audio-4/12(#12).AO1 which means Audio Output 1 found on Integrated Audio Card 4/12 in Unit SM1.

Short Version – displays the name of a component only

2 Button Mode:

This enables individual adjustment 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

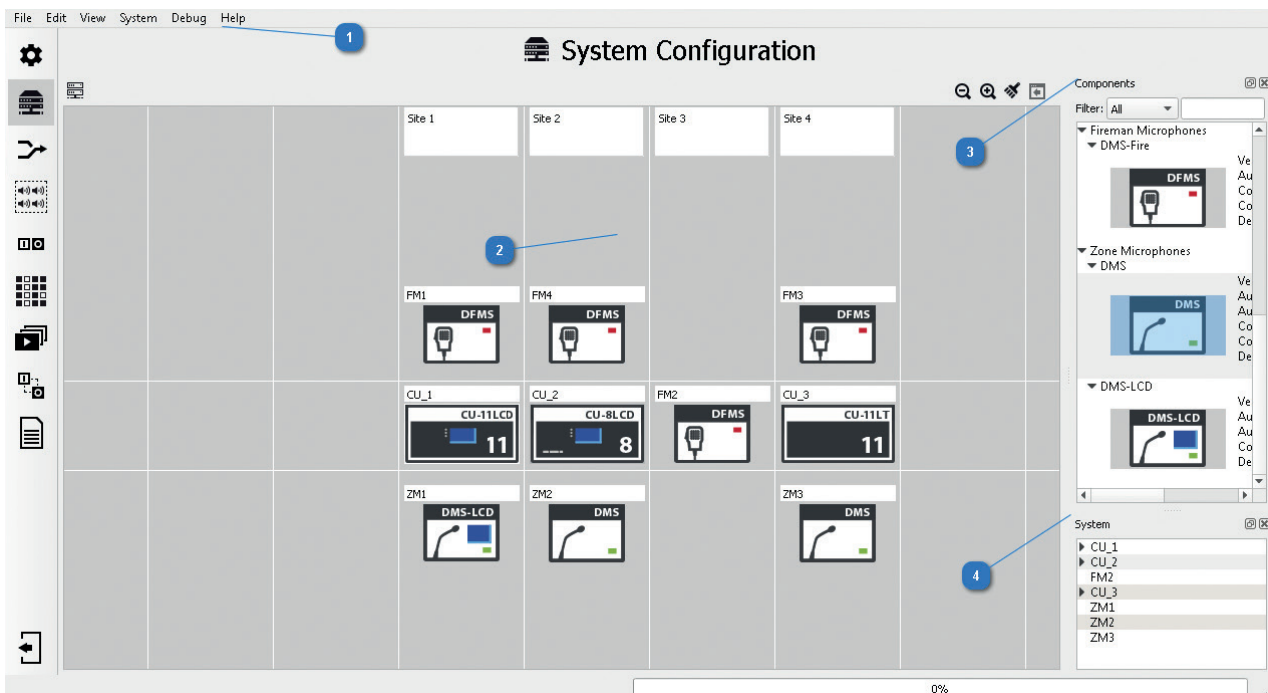
3 Auto-Save Interval

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

4 Auto-Save History

A quantitative declaration of the ability to read versions which have been saved automatically. 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.

12.3.3 System



1 Verify Configuration

The configurator checks the configuration, as created, for its correctness. 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 Upload (PC -> System)

This allows to send a configuration, as created, from a PC on which the software is installed to the System to which the PC is connected. Prior to sending the configuration to the system, the software performs automatic verification of the configuration. [Upload full configuration](#) – sending the entire configuration from the PC to the system, together with audio files in the

PCM format. Loading of a full configuration must be made for the first time, every successive configuration change which do 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 [Download \(System -> PC\)](#)

This allows to download the current full system configuration or the configuration before the current one, from the RAM into a computer with the configuration software installed on it.

4 [Recreate Topology](#)

This is the function of recreating the system architecture. The system is able to identify what card is 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 [Connection Settings](#)

This window allows the system to connect with a PC. If the DHCP server is configured correctly, then in the window [Connection Settings](#) the system server should appear of whose name is identical to the name of the unit to which we are connected. It must be remembered that automatic IP address acquisition should be set on the network interface controller of the computer connected to the NANOVES system. In case a DHCP server is missing, select from the settings the option of IP address automatic acquisition, the NANOVES system will detect the lack of a DHCP server and, using the AutoIP protocol, will assign an address from the special address pool 169.254.x.x to the communications card of the control unit and the computer network interface controller connected to it.

The [Remote](#) option – this allows the configurator to connect to the NANOVES global server. All units worldwide connect to the global server which have access to the Internet and server connection accepted by the owner of the system. Via the NANOVES global server, the SHIELD 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 loaded the configuration, the [Connection](#) window will have a message displayed of configuration loading completion and two identical configuration versions existing on the PC and the NANOVES system.

6 [Restore to Factory Default](#)

The function of total clean-up of configurations, logs and audio files from all elements combined into the NANOVES system. All system memory cards are formatted and device IP addresses are assigned from the 169.254.x.x range. The [restore to factory default](#) packages remain operative irrespective of the intra-system IP addresses adopted, because these are UDP packages.

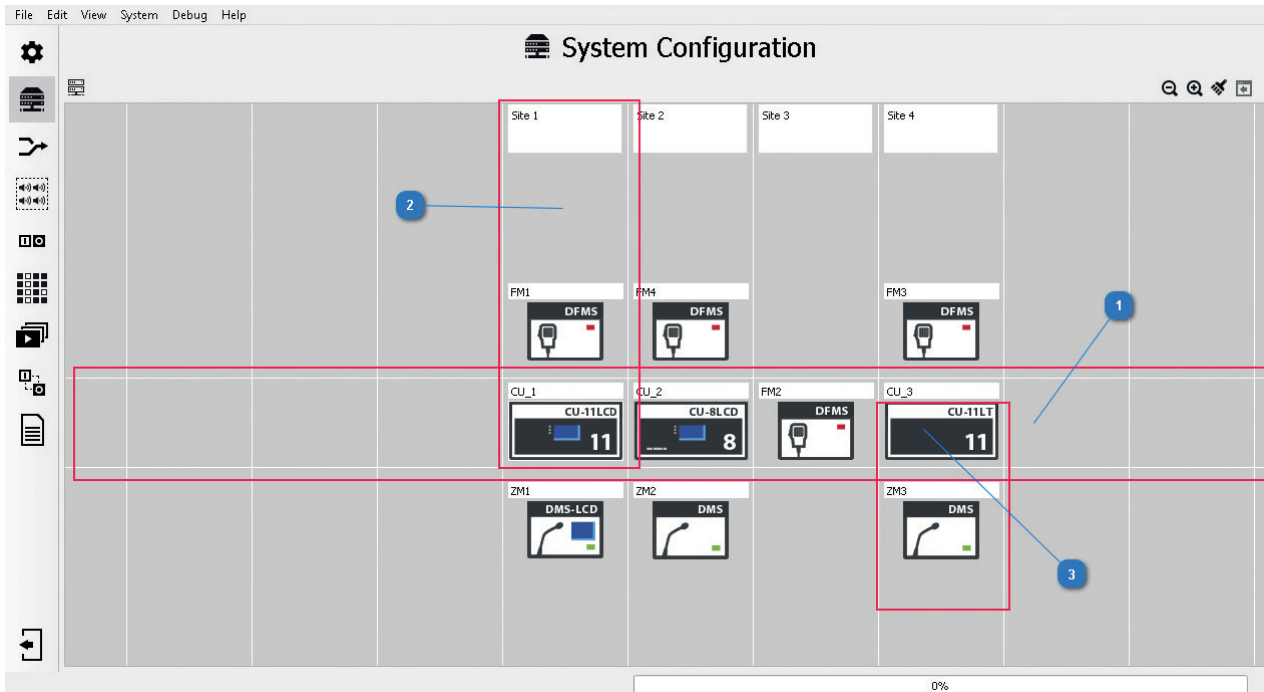
7 [Change Password](#)

This allows to change a previously established password needed for loading of a configuration onto the system. Authorization of the change can be made through provide the old password or using a token. The token is displayed on the GUI of the control units CU-11LCD and CU-8LCD.

8 [Sync system UTC with local](#)

The function of synchronization of the NANOVES system real-time clock with the one of the computer on which the configuration software has been installed.

12.3.4 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.

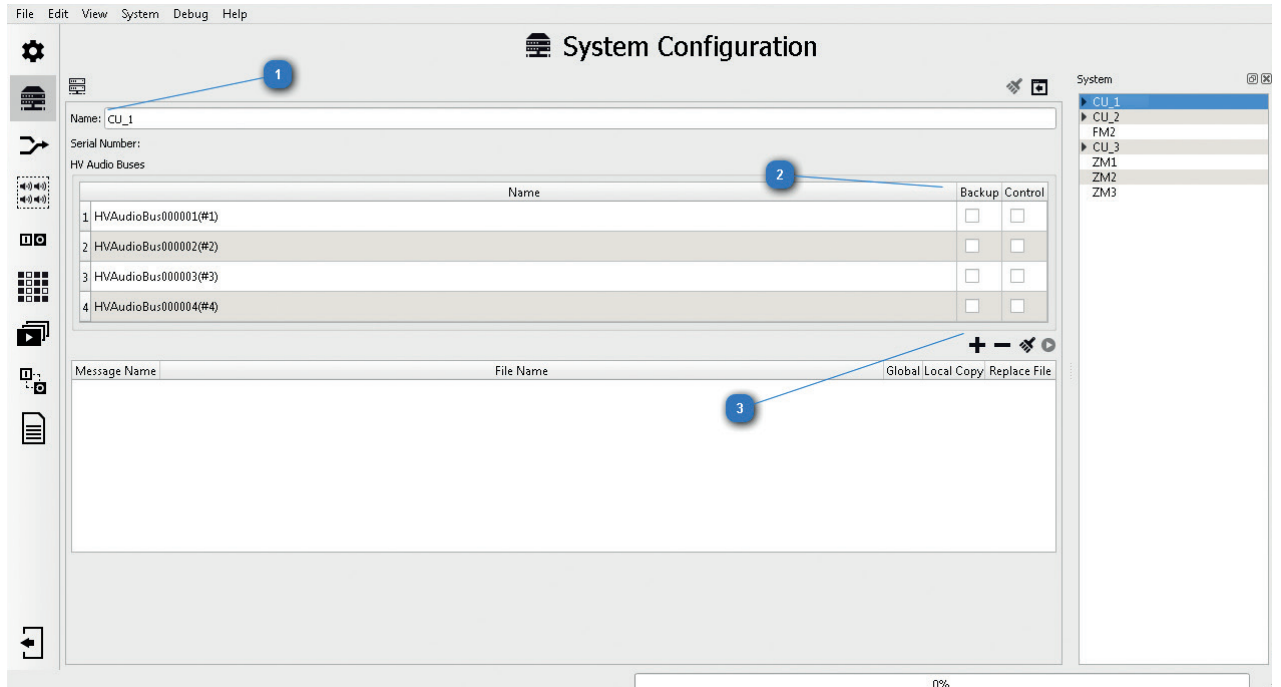
2 Vertical line of system component connection by means of Cat5 UTP cable – monitored

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.

12.3.5 Go to configuration CU






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 48kHz 16bit format which is used by the NANOVES 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  serves to delete all messages held on the list. The  is used to hear audio files on a computer on which the configuration software is installed, before these are loaded into the system.

12.3.6 DFMS

Name: DFMS000001 (1)

Serial Number: B15W04500366

Audio Inputs

	Name	Type	Attenuation	Level Meter
1	AI000001(#1)	Mic	0.00 dB	
2	AI000002(#2)	Mic		

Logical Inputs

	Name	Events
1	Emergency	Events
2	Key2	Events
3	Key3	Events
4	Key4	Events

	Name	Mode	Default	Events
1	LI000001(#1)	Contact	NO	Events
2	LI000002(#2)	Contact	NO	Events

Logical Outputs

	Name	Relay Type	Mode
1	LO000013(#20)	NC	Normal
2	LO000014(#21)	NO	Normal

Extension Configuration

This is the main editing window for all elements of the DFMS fireman microphone

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 NANOVES 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 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.

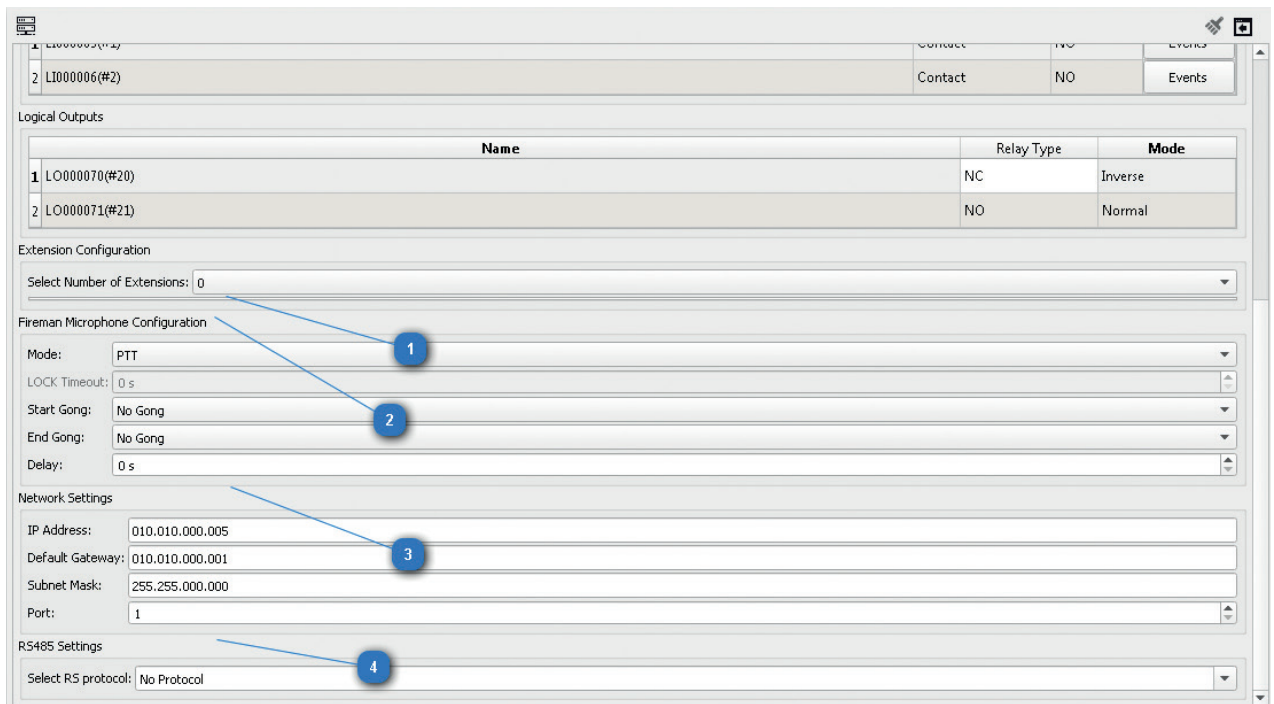
6 Logical Outputs

The [Logical Outputs](#) tag 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.

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](#).



Name	Relay Type	Mode
1 LO000070(#20)	NC	Inverse
2 LO000071(#21)	NO	Normal

Extension Configuration

Select Number of Extensions: 0

Fireman Microphone Configuration

Mode: PTT

LOCK Timeout: 0 s

Start Gong: No Gong

End Gong: No Gong

Delay: 0 s

Network Settings

IP Address: 010.010.000.005

Default Gateway: 010.010.000.001

Subnet Mask: 255.255.000.000

Port: 1

RS485 Settings

Select RS protocol: No Protocol

DFMS fireman microphone editing window – continued

1 Extension Configuration

The connected extension number declaration window. The maximum of 5 20-button extensions can be connected to the microphone.

Following selection of the 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:

Ext1	Ext2	Ext3	Ext4	Ext5	
5	Key5	Events	15	Key15	Events
6	Key6	Events	16	Key16	Events
7	Key7	Events	17	Key17	Events
8	Key8	Events	18	Key18	Events
9	Key9	Events	19	Key19	Events
10	Key10	Events	20	Key20	Events
11	Key11	Events	21	Key21	Events
12	Key12	Events	22	Key22	Events
13	Key13	Events	23	Key23	Events
14	Key14	Events	24	Key24	Events

2 Fireman Microphone Configuration

The [PTT button](#) activation window at the fireman microphone. 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.

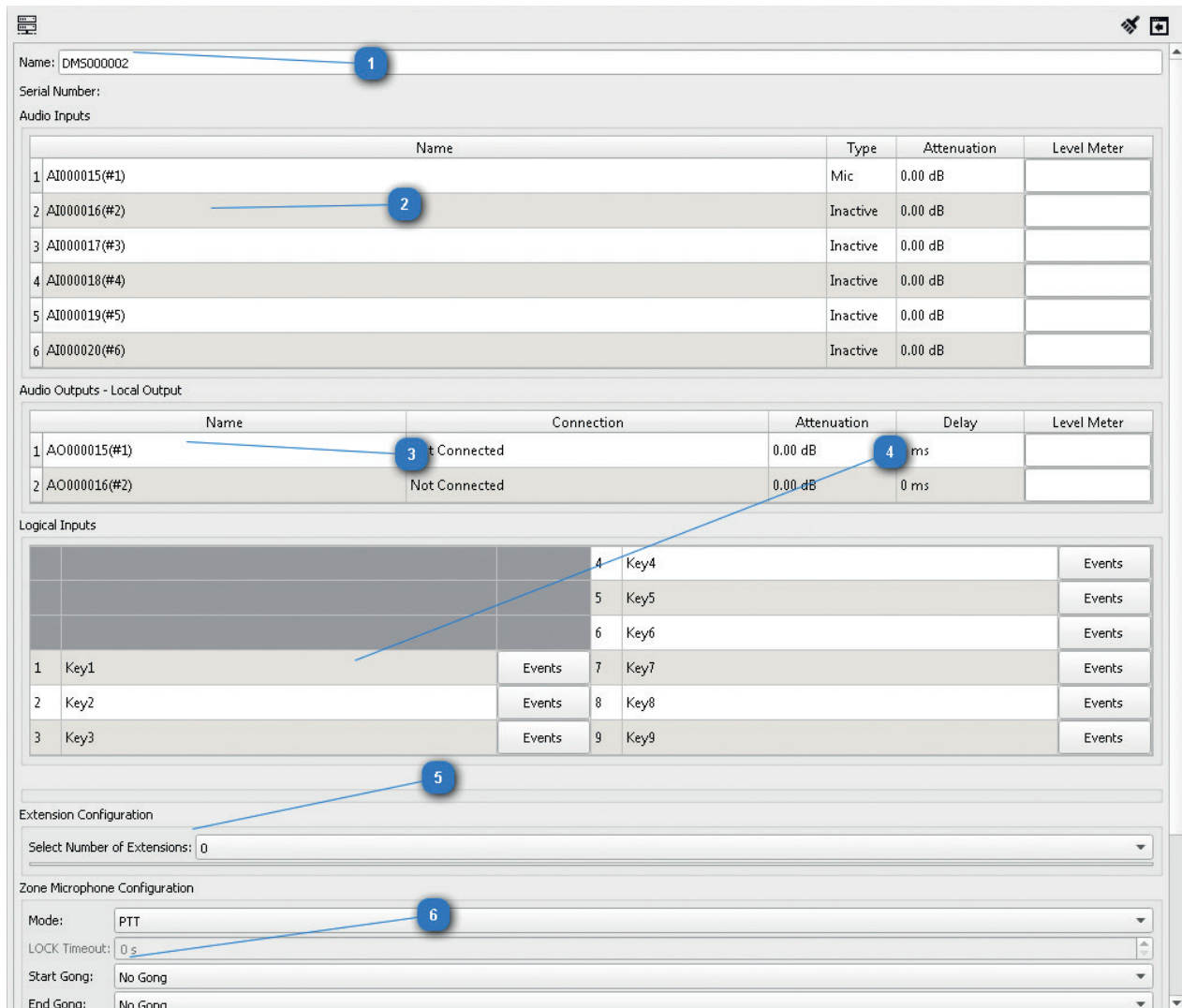
3 Network Settings

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.

4 RS485 Settings

The RS485 port enables communication of the system with peripheral devices. This, however, requires that an appropriate protocol be selected from the list. For instance, in order to select communication with the SMA-ISLE module and PSM, select the IslesPSM protocol and connect the fireman microphone RS485 output to the dedicated input on the SMA-ISLE module via a Cat5 cable.

12.3.7 DMS



Name: DMS000002 **1**

Serial Number:

Audio Inputs

	Name	Type	Attenuation	Level Meter
1	AI000015(#1)	Mic	0.00 dB	
2	AI000016(#2) 2	Inactive	0.00 dB	
3	AI000017(#3)	Inactive	0.00 dB	
4	AI000018(#4)	Inactive	0.00 dB	
5	AI000019(#5)	Inactive	0.00 dB	
6	AI000020(#6)	Inactive	0.00 dB	

Audio Outputs - Local Output

	Name	Connection	Attenuation	Delay	Level Meter
1	AO000015(#1)	Not Connected 3	0.00 dB	0 ms 4	
2	AO000016(#2)	Not Connected	0.00 dB	0 ms	

Logical Inputs

			4	Key4	Events
			5	Key5	Events
			6	Key6	Events
1	Key1	Events	7	Key7	Events
2	Key2	Events	8	Key8	Events
3	Key3	Events	9	Key9	Events

Extension Configuration

Select Number of Extensions: 0 **5**

Zone Microphone Configuration

Mode: PTT **6**

LOCK Timeout: 0 s

Start Gong: No Gong

End Gong: No Gong

This is the main editing window for all elements of the DMS zone microphone

1 Name:

The name 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 on the zone microphone. Item 1 on the above figure, whose generic name is AI000015, is a gooseneck condenser microphone - connector type XLR. As standard, adding a zone microphone always activates the main microphone – using a XLR connector. Item 2 (e.g. AI000016) is a jack TRS 3.5mm type socket located on the SMA-ZM rear panel, intended for electret microphones. In order to activate the input, change the value Inactive into MIC in the [Type](#) window. Items 3,4,5,6 (AI000017-20 on the figure above) are four unbalanced linear audio inputs. Available via two sockets type jack 3,5mm TRS. 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 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 zone microphone.

5 Extension Configuration

The connected extension number declaration window. The maximum of 5 20-button extensions can be connected to the microphone.

Following selection of the 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:

Logical Inputs

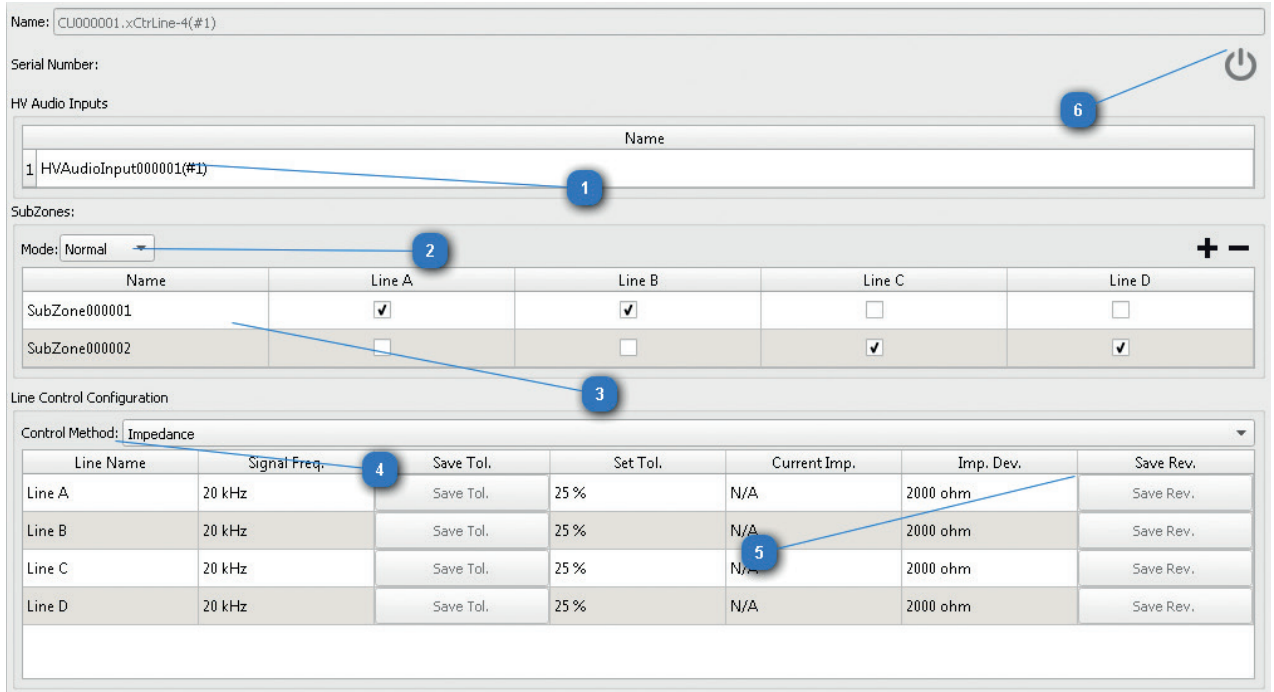
			4	Key4	Events
			5	Key5	Events
			6	Key6	Events
1	Key1	Events	7	Key7	Events
2	Key2	Events	8	Key8	Events
3	Key3	Events	9	Key9	Events

6 Zone Microphone Configuration

The dedicated PTT button activation window placed on the front panel of the zone microphone. 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.

12.3.8 xCtrlLine-4



Name: CU000001.xCtrlLine-4(#1)

Serial Number:

HV Audio Inputs

	Name
1	HVAudioInput000001(#1)

SubZones:

Mode: Normal

Name	Line A	Line B	Line C	Line D
SubZone000001	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SubZone000002	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Line Control Configuration

Control Method: Impedance

Line Name	Signal Freq.	Save Tol.	Set Tol.	Current Imp.	Imp. Dev.	Save Rev.
Line A	20 kHz	Save Tol.	25 %	N/A	2000 ohm	Save Rev.
Line B	20 kHz	Save Tol.	25 %	N/A	2000 ohm	Save Rev.
Line C	20 kHz	Save Tol.	25 %	N/A	2000 ohm	Save Rev.
Line D	20 kHz	Save Tol.	25 %	N/A	2000 ohm	Save Rev.

Control card editing window

- 1 HV Audio Inputs**

The name field enables to assign an individual name to the input intended for connection of a 100V 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 Mode:
[Loop](#) – the system detects short circuit / open line as well as ground leakage.
[Regulator](#) – the volume control mode on the speaker line. This mode requires using End-of-Line modules (EOL). It is possible to use volume regulators with Loop method of the line supervision.
[Normal](#) – supervision over the speaker lines by means of measuring impedance.
- 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. Available options include: Impedance method, EOL module 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 shorts, 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 generated. 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 is at least 12.5 Ω, max 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. With respect to a bridge connection of outputs A+B and C+D, the maximum permissible 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 ohm, max 10k ohm, for measured 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. With respect to a bridge connection of outputs A+B and C+D, the maximum permissible power for each pair is 450 W.

- 6 The on-line mode enables to view the value of impedance, 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.

12.3.9 xLogIN-8c

Name: CU000001.xLogIN-8c(#3)

Serial Number:

Logical Inputs

	Name	Mode	Default	Events
1	LI000005(#1)	Contact	NO	Events
2	LI000006(#2)	Contact	NO	Events
3	LI000007(#3)	Contact	NO	Events
4	LI000008(#4)	Contact	NO	Events
5	LI000009(#5)	Contact	NO	Events
6	LI000010(#6)	Contact	NO	Events
7	LI000011(#7)	Contact	NO	Events
8	LI000012(#8)	Contact	NO	Events

xLogIN-8 logical input editing window

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

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.

12.3.10 xLogOut-8c

Name: CU000001.xLogOUT-8c(#4)

Serial Number:

Logical Outputs

	Name	Relay Type	Mode
1	LO000058(#1)	NC	Normal
2	LO000059(#2)	NC	Normal
3	LO000060(#3)	NC	Normal
4	LO000061(#4)	NC	Normal
5	LO000062(#5)	NO	Normal
6	LO000063(#6)	NO	Normal
7	LO000064(#7)	NO	Normal
8	LO000065(#8)	NO	Normal

xLog-8c logical output editing window

1 Logical Inputs

The Logical Outputs tag 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

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= 100 V, Max IDC= 500 mA, Max DC Power= 10 W

12.3.11 Audio-4/12

New text
Name: CLU000001.cCPU-Audio-4/12(#12)

Serial Number: 8

Audio Inputs

	Name	Type	Attenuation	DSP	Level Meter
1	AI000009(#1) 1	Inactive	0.00 dB	Configure	
2	AI000010(#2)	Inactive	0.00 dB	Configure	
3	AI000011(#3)	Inactive	0.00 dB	Configure	
4	AI000012(#4)	Inactive	0.00 dB	Configure	

Audio Outputs

	Name	Connection	Attenuation	Delay	DSP	Level Meter
1	AO000005(#1)	HVAudioInput000001(#1)	0.00 dB	0 ms	Configure	
2	AO000006(#2)	HVAudioInput000002(#2)	0.00 dB	0 ms	Configure	
3	AO000007(#3)	HVAudioInput000001(#1) 3	0.00 dB	0 ms	Configure	
4	AO000008(#4)	HVAudioBus000002(#2) 4	0.00 dB	0 ms	Configure	
5	AO000009(#5)	HVAudioBus000003(#3)	0.00 dB	0 ms	Configure	
6	AO000010(#6)	HVAudioBus000004(#4)	0.00 dB	0 ms	Configure	
7	AO000011(#7)	Line Output	0.00 dB	0 ms	Configure	
8	AO000012(#8)	Line Output	0.00 dB	0 ms	Configure	
9	AO000013(#9)	Line Output	0.00 dB	0 ms	Configure	
10	AO000014(#10)	Line Output	0.00 dB	0 ms	Configure	
11	AO000015(#11)	Line Output	0.00 dB	0 ms	Configure	
12	AO000016(#12)	Line Output	0.00 dB	0 ms	Configure	

Network Settings

IP Address: 010.010.000.004

Default Gateway: 010.010.000.001

Subnet Mask: 255.255.000.000

Port: 1

Audio-4/12 card editing window

1 Audio Inputs

The [Audio Inputs](#) field contains all available audio inputs locally accessible in the SCU-11Z/LCD control unit. Item 1 on the above figure, whose generic name is AI000015, is a linear input available via a Phoenix connector on the side wall of the SMA-ISLE module. A built-in Audio-4/12 card in the SCU-11Z/LCD units had 4 independent audio inputs available on Phoenix sockets of the SMA-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 **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 NANOVES 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.

5 **Attenuation / Delay**

The window enables to change the value of the amplification of an audio output and set the speaker line delay value. Setting or changing the amplification on an output and the delay value can be done in two ways:

1. by changing the value in a specific **Attenuation / Delay** window and loading the configuration into the system;
2. by changing the parameters in the **Attenuation / Delay** window in the on-line mode.



6 **DSP**

The audio card has an 8-band audio equalizer on each input which is fully configurable and changeable in two ways:

1. by changing the value of the centre frequency, the Q factor of the filter and amplification in the configurator and loading a configuration into the system;
2. by changing the filter parameters in the on-line mode.

7 **Level Meter**

The signal level meter is active only in on-line mode. The maximum level displayed on the meter is equal to 1V RMS on the codec output.

- 8 The on-line mode enables viewing of audio input and output signal levels from the AudIO-4/12 card. In addition, it enables changing of such parameters, as delaying lines, amplification of audio inputs/outputs and EQ settings. 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 . Any parameter changes on the card measurement must be preceded by entering into the on-line mode.

12.4 Backup Amplifiers

Description of backup functionality for NANOVES 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 NANOVES 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 matrixed. This means that the backup system does not switch amplifiers at the moment a fault has been detected, but on being used, i.e. matrixing. 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 NANOVES it takes max 1 second). After dematrixing, 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.

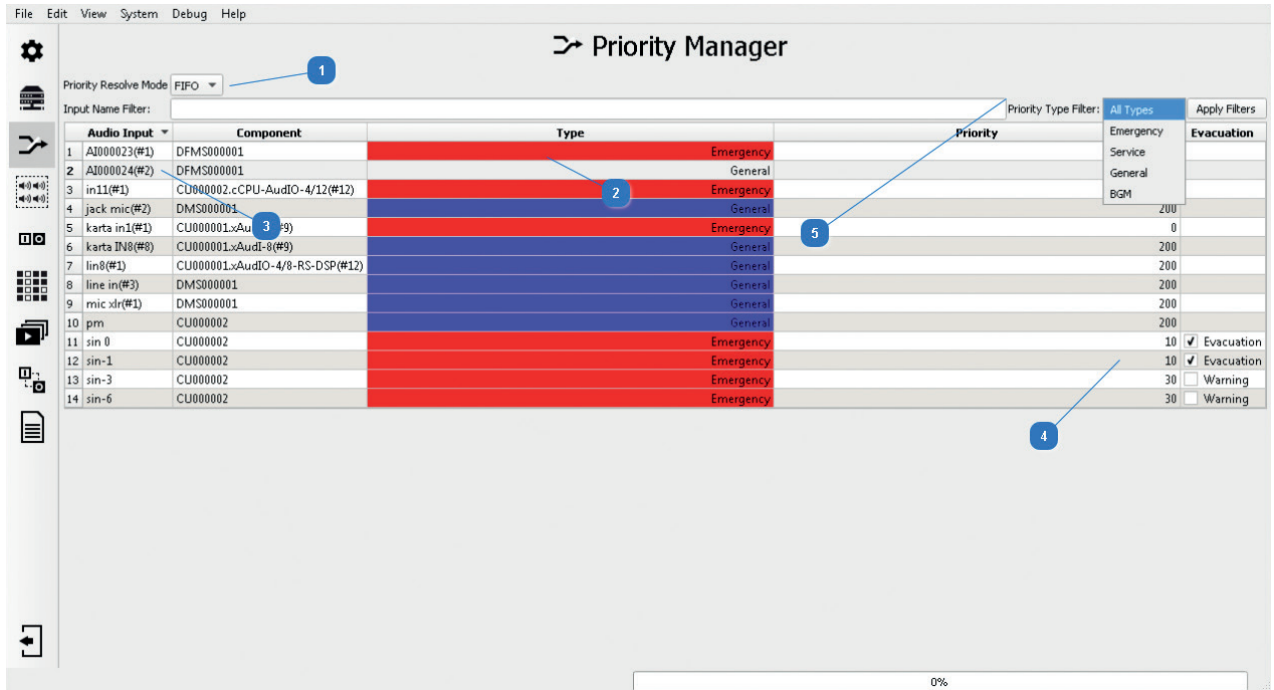
Mode 2 – amplifiers connected to control card individual inputs

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.

12.5 Priority Manager Configuration



Audio Input	Component	Type	Priority	Evacuation
1 AI000023(#1)	DFMS000001	Emergency		
2 AI000024(#2)	DFMS000001	General		
3 in11(#1)	CU000002.cCPU-AudIO-4/12(#12)	Emergency		
4 jack mic(#2)	DMS000001	General	200	
5 karta in1(#1)	CU000001.xAu (#3)	Emergency	0	
6 karta IN8(#8)	CU000001.xAudI-8(#9)	General	200	
7 lin8(#1)	CU000001.xAudIO-4/8-RS-DSP(#12)	General	200	
8 line in(#3)	DMS000001	General	200	
9 mic xdr(#1)	DMS000001	General	200	
10 pm	CU000002	General	200	
11 sin 0	CU000002	Emergency	10	<input checked="" type="checkbox"/> Evacuation
12 sin-1	CU000002	Emergency	10	<input checked="" type="checkbox"/> Evacuation
13 sin-3	CU000002	Emergency	30	<input type="checkbox"/> Warning
14 sin-6	CU000002	Emergency	30	<input type="checkbox"/> Warning

Each zone microphone, fireman microphone or audio input available in the system must have its priority defined in order to provide for 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 consisting in simultaneous transmission to the speaker zone of two or more audio sources of the same priority.

For **FIFO** (First in first out) – in case 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 case Source 1 of Priority X is matrixed on Output Y (speaker zone) and, after some time, Source 2 of Priority X is matrixed on Output Y (speaker zone) too, then Source 2 will expatriate 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 amplifiers which are responsible for transmission of simultaneous messages of the same priorities. In case two equally prioritized messages are executed to various zones supplied by two different amplifiers, Message 1 of Priority (100), Message 2 of Priority (100) too, which was matrixed after Message 1 – when an amplifier failure occurs for the **FIFO** mode: the amplifier which supplies Message 1 will not be expropriated to Message 2 until Message 1 (matrix) has been completed; for **LIFO** – the Message 1 amplifier will be disconnected and assigned as a backup amplifier for Message 2.

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

The NANOVES has 4 priority groups, each of the groups has 99 levels. Prioritizing is in the reverse order of the numbers: the fireman microphone of the Emergency 0 has the highest priority, the lowest priority is BGM 399.

Priority types:

Emergency, range 0-99 – audio sources of priority assigned ranged 0-99 are active only in case the system is in the **Alarm Mode**. The **Emergency** priority can only be assigned to the SMA-FM 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 Matrices. 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 SMA-FM fireman microphones – the **Emergency Priority** NB 0-10 is the highest priority pool reserved only for these devices.
2. Sound messages reproduced from system memory cards for the **Emergency Priority Evacuation** checkbox – these are assigned a value ≥ 10 .
3. Sound messages reproduced 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 Information on audio source to which priority will be assigned

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 reproduced or – in case of audio inputs – specifies the device in which the selected input is located.

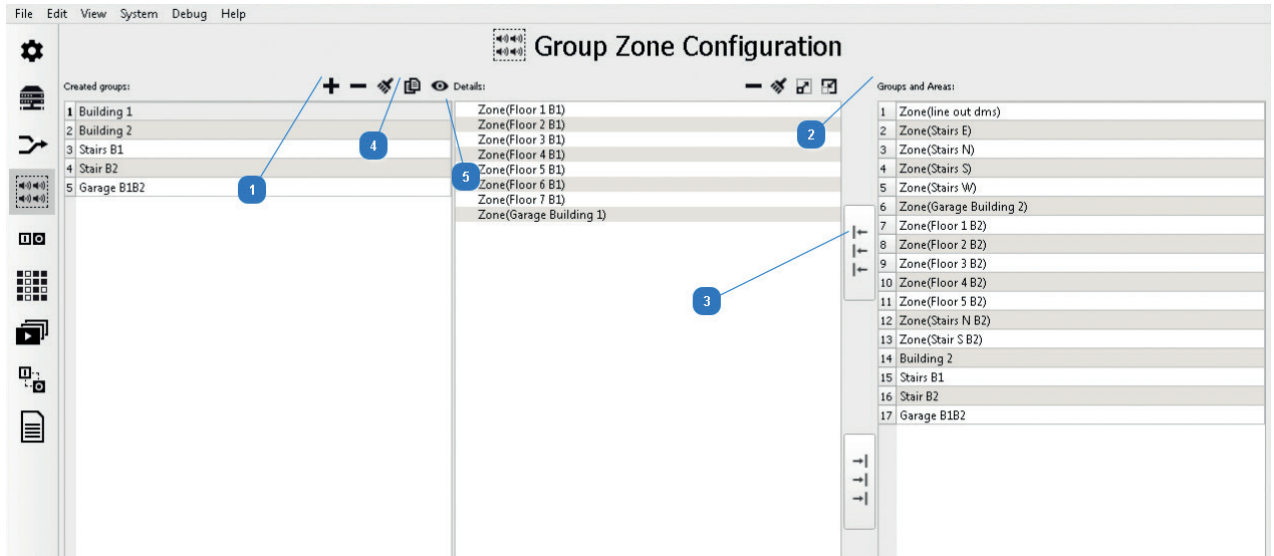
4 Zone retained signalling mode, Evacuation / Warning modes

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 diode will be blinking. Ticking the checkbox is equivalent to changing the mode to **Evacuation** which results in the RGB diode – the red one – being on during a message transmission.

5 Priority group filtration





The filtration functions 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**.

12.6 Group Zone Configuration



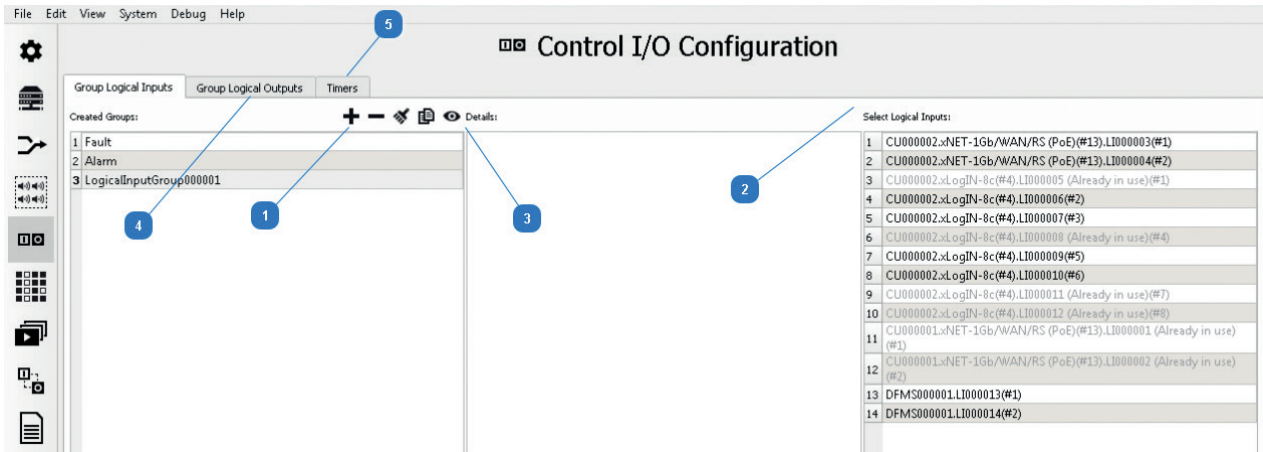
This function is available only from the advanced configurator level – [Basic Configuration](#) – [Configuration Mode](#) – [Advanced](#). This serves to combine any predefined speaker lines/zones into one. A group created in this way has the same functionalities in the system as a single zone.

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 from 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 the graphic form, in one table, all groups which have been created, as well as their members.

	Zone(Floor 1 B1)	Zone(Floor 1 B2)	Zone(Floor 2 B1)	Zone(Floor 2 B2)	Zone(Floor 3 B1)	Zone(Floor 3 B2)	Zone(Floor 4 B1)	Zone(Floor 4 B2)	Zone(Floor 5 B1)	Zone(Floor 5 B2)	Zone(Floor 6 B1)	Zone(Floor 7 B1)	Zone(Garage Building 1)	Zone(Garage Building 2)	Zone(Stair S B2)	Zone(Stairs E)	Zone(Stairs N B2)	Zone(Stairs N)	Zone(Stairs S)	Zone(Stairs W)
Building 1	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
Building 1_1	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
Building 2		●		●		●		●		●		●		●	●		●			
Garage B1B2													●	●						
Stair B2																●		●	●	●
Stairs B1															●		●			

12.7 Control I/O Configuration



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

12.7.1 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 closed, In 2 closed, In 3 closed
 101 = 5 In 1 closed, In 2 closed, In 3 closed

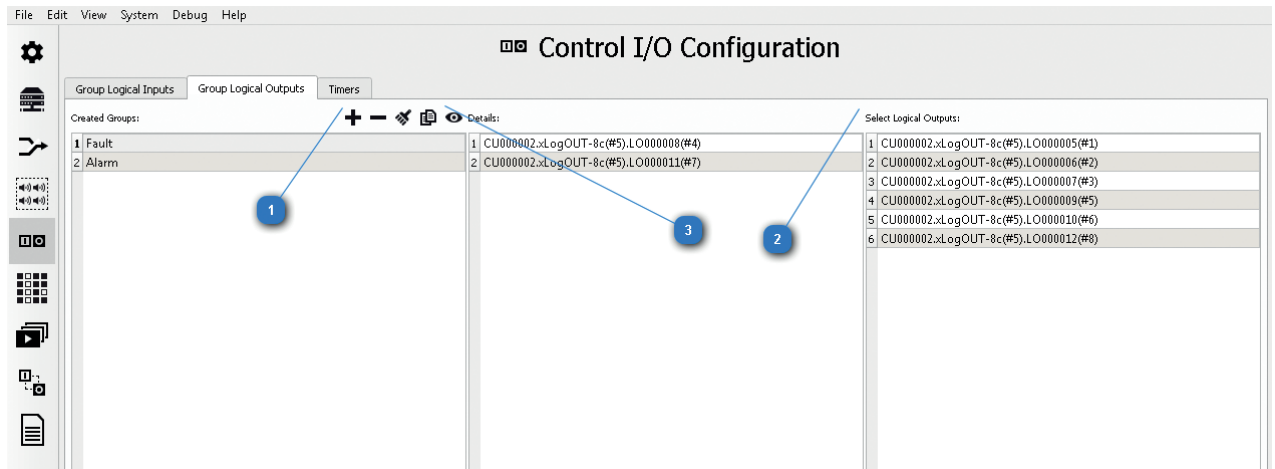
110 = 6 In 1 closed, In 2 closed, In 3 closed
 111 = 7 In 1 closed, In 2 closed, In 3 closed

- 3 **Group element graphic view: Preview Groups** – this is available from 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.

	D1000001	D1000002	D1000003	D1000004	Key000001	Key000002	Key000003	Key000004	Key000005	Key000006	Key000007	Key000008	Key000009	L1000001	L1000002	L1000003	L1000004	L1000005	L1000006	L1000007	L1000008	L1000009	L1000010	L1000011	L1000012	L1000013	L1000014
Alarm														●	●												
Fault																			●					●	●		
LogicalInputGroup000001																											

- 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 NANOVES system, using time dependences.

12.7.2 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 **NQ-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)

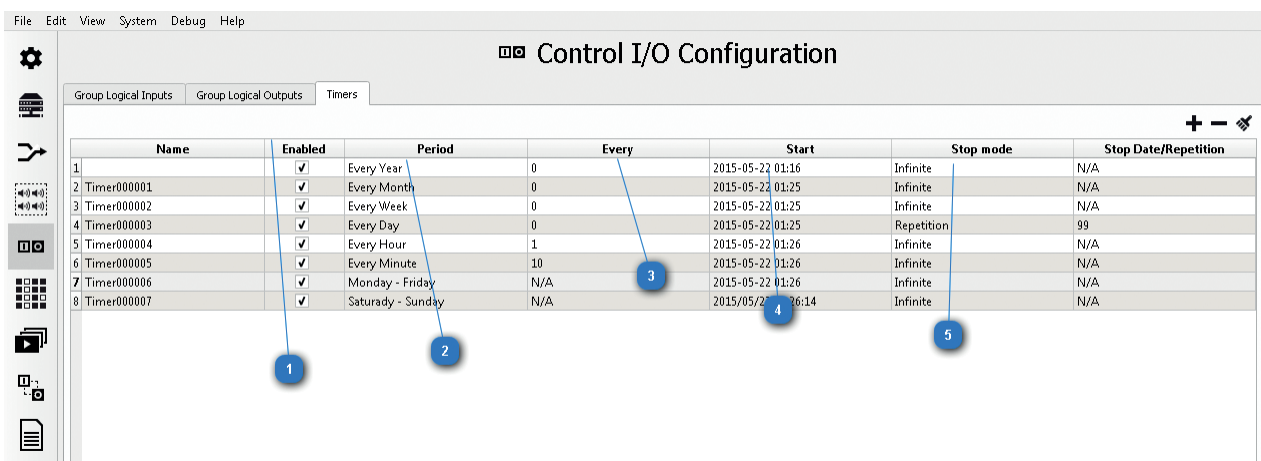
If we have a group of 3 logical outputs, Output 1 – NC Normal, Output 2 – NC Normal, Output 3 – NC Normal, we have the following manipulation options, depending on the State value:

- State = 4 Out 1 closed, Out 2 closed, Out 3 closed (100)
- State = 5 Out 1 closed, Out 2 closed, Out 3 closed (101)
- State = 6 In 1 closed, In 2 closed, In 3 closed (110)
- State = 7 In 1 closed, In 2 closed, In 3 closed (111)

3 Group element graphic view: Preview Groups – this is available from 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.

	LO000001	LO000002	LO000003	LO000004	LO000005	LO000006	LO000007	LO000008	LO000009	LO000010	LO000011	LO000012	LO000013	LO000014	LO000015	LO000016	LO000017	LO000018	LO000019	LO000020	LO000021	LO000022	LO000023	LO000024	LO000025	LO000026	LO000027	LO000028	LO000029	LO000030	LO000031	LO000032	LO000033	LO000034	LO000035	LO000036	LO000037	LO000038	LO000039	LO000040	LO000041	LO000042								
Alarm																																																		
Fault							●			●																																								

12.7.3 Timers



This is a function used to create elements activating given actions in the NANOVES 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 (checkbox)** – 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 – defines the time of a next activation 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.

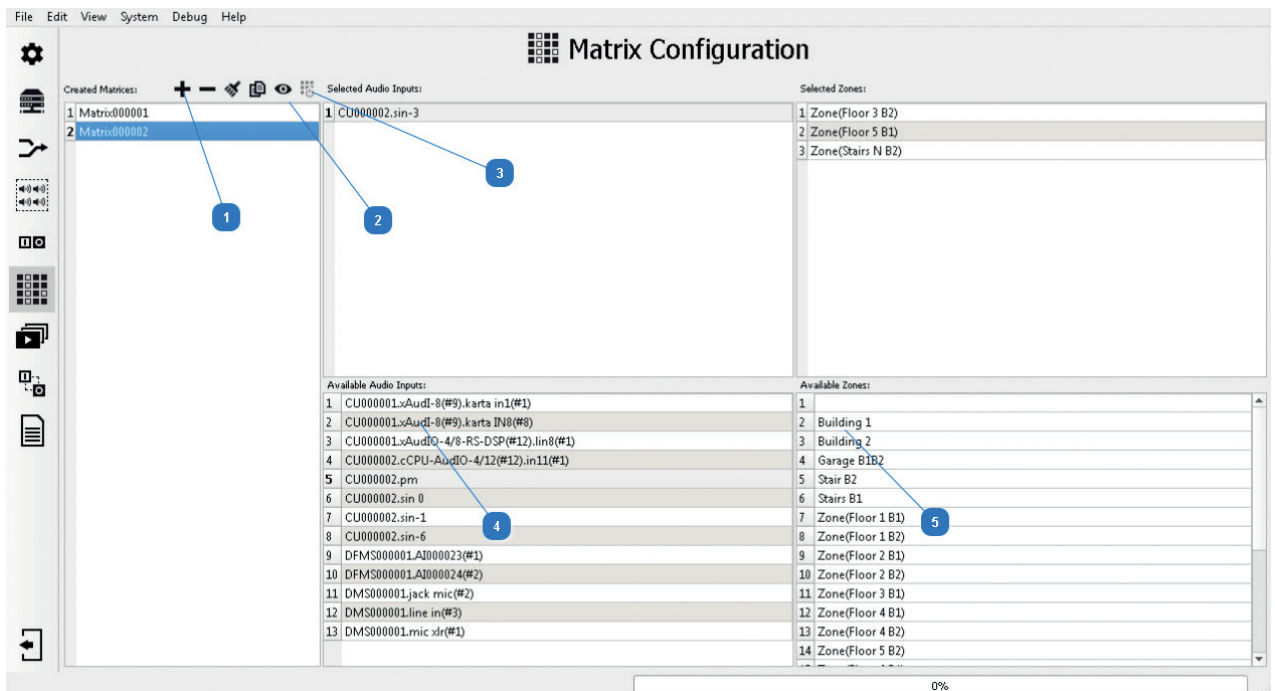
4 Start – defines the exact date and time of the first activation of the timer.

5 Stop – defines conclusion of the operation of the timer in the options, as available:


- › **To date** – the date and time to conclude 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.

12.8 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.

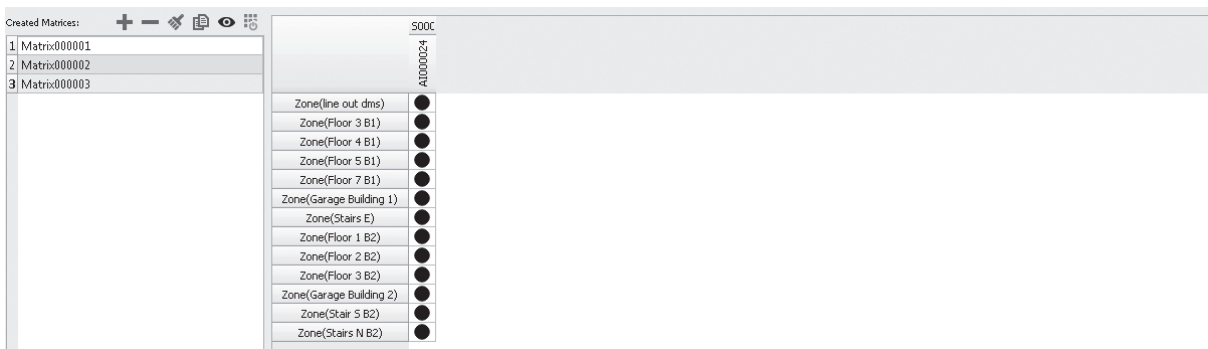
- 1 **Matrix editing tab.** By means of the icon , a new matrix is created with a generic name which can be change by double-clicking of the left mouse button on the matrix name. Creating the first matrix in the system, we activate the available audio source and available speaker zone field.



Icon  results in deleting the marked matrix completely.


Icon  deletes all previously created matrices.

Matrix cloning function: Clone Matrices – this is available from 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 from 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 **Test dynamic matricing** – available from 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 by selecting the “brooms” deletes all connections which have been set.


- 4 **Available Audio Inputs:**

Audio sources available in the entire system.

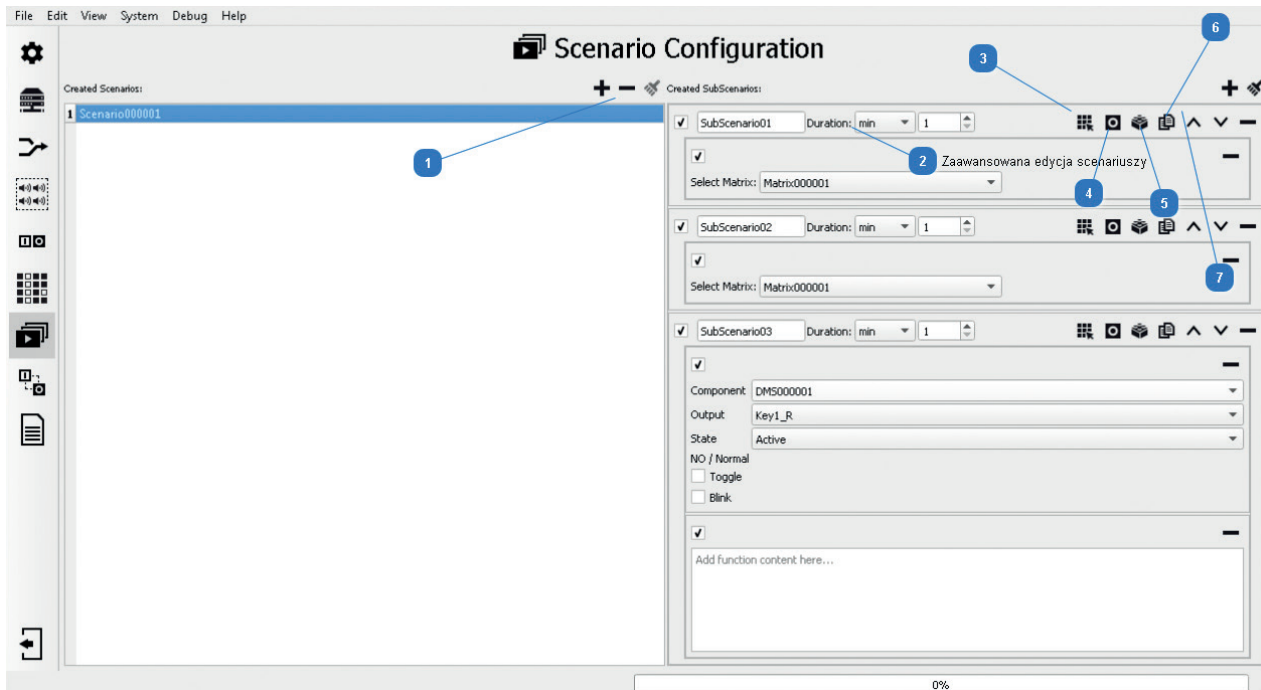
- 5 **Available Zones:**

Available speaker zones, as declared in the system.

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.


12.9 Scenario Configuration




Scenario Configuration – this enables to create an event sequence 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.

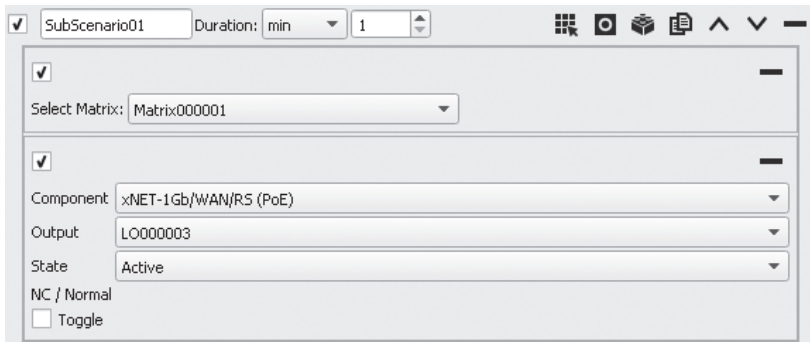
By means of the icon , a new scenario is created, whose generic name can be changed by double-clicking the left mouse button on the scenario name.

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 ** serves to add a matrix or a number of matrices to a subscenario. It must be remembered that after the [Duration time](#) has expired, as counted from activation of a given scenario, the created matrixes are deactivated.
- 4 Icon ** serves to assign available logical (relay) outputs to a subscenario. Having added a logical output, the following windows are to be filled:







Component – select from the list an output card or fireman microphone, a communications card on which the output is located which we want to manipulate.

Output – select from the list of available outputs on the device, from the **Component** tab, the output which we want to manipulate.

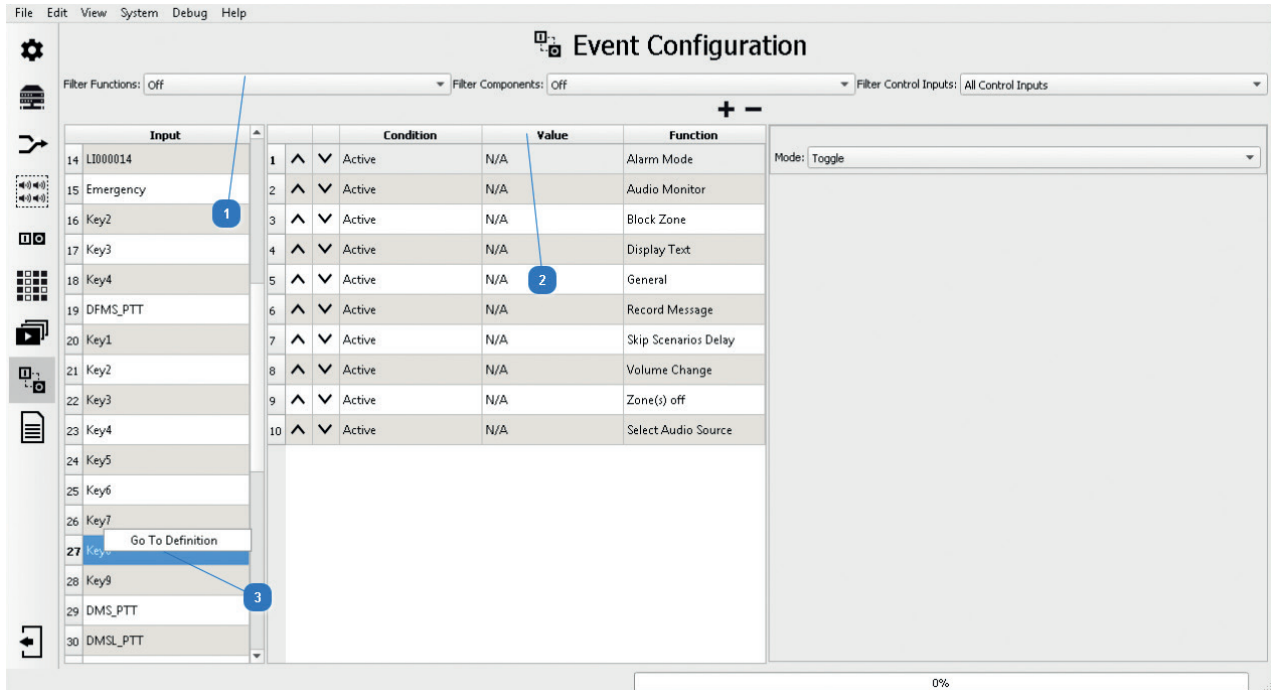
State – allows to determine the final state of the relay contacts following activation. **Active** results in changing the relay state to the opposite one on execution of a scenario. For **Inactive**, the relay does not change its state when the scenario is activated.

NC/ Normal (Invers) – informs of the initial state of a relay before activation of the function. If we have **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 **Add Custom Action**  – an editor window in which one's own system function can be written in the LUA scripting language.
- 6 **Subscenario cloning function: Clone Subscenario** – this is available from 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.
- 7 **Up / Down arrows**   – enable to change the order in which scenarios are executed. The order of subscenario execution by the system is downwards according to the times, as declared in the **Duration** window.

12.10 Event Configuration



Event Configuration – this enables assignment to each logical input and buttons available on fireman and zone microphones of a selected system function, 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 on the system entering the alarm mode.
- » **Error** – will activate an assigned action on detection of an error in the system.
- » **Blocking** – activation of an action on blocking of a single speaker zone.
- » **Backup power** – activation of an action on PSM detecting the 230 AC power failure management unit and transition into the emergency power source.

Assignment of any system function/action triggered by one of the above system states has been created to facilitate state signalling 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 following assignment of [Filter Functions](#) to the device on which a given element from the [Filter Components](#) list is located and using available [Filter control inputs](#).

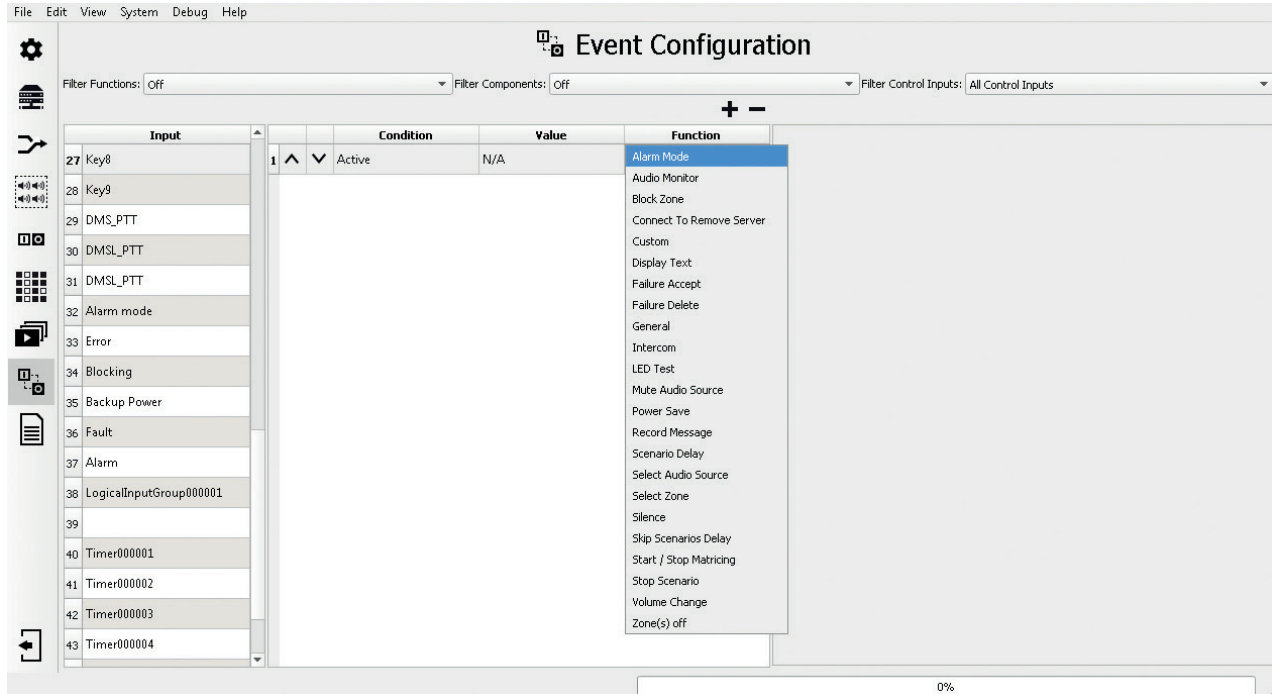
In order to assign a function to any button or logical input:

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.

12.10.1 Functions



Alarm Mode

The alarm mode function results in inputting the system 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 may 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 SMA-ZM and SMA-ZMLCD zone microphones. In order to programme the function in the NANOVES, select a zone from the [Source zone selection](#) window which we want to eavesdrop, 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, irrespective of the source type. The block zone is signalled by a constant, yellow diode on the button programmed as [Zone selection](#) and has the highest signalling priority.

Custom

The window of this non-standard function enables to create, programme one's own function or series of actions which the system is 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 SHIELD in the LUA language implementation instructions or in the NANOVES system.

Display Text

Activation of the display text function opens a dialogue box on a selected and available GUI screen in the system and prompt 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 diode 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 diode 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 testing procedure.

General

This function combines three main functionalities of the NANOVES system: [Scenarios](#) , [Matrices](#)  and [logical outputs](#) , alongside an access to RGB diode 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 diode 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, using one logical input or button on a zone / fireman microphone, one or many matrices defined in the matrix configurator. 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 from the list an output card or fireman microphone, a communications card on which the output is located which we want to manipulate.

Output – enables to select from the available output list on the device, from the **Component** tab, an output which we want to manipulate.

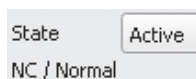
State – allows to determine the final state of the relay contacts following activation. **Active** results in changing the relay state to the opposite one on execution of the **General** for **Inactive**, the relay does not change its state when the **General** is activated.

NC/Normal (Invers) – 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.

LED test

The LED test function activates all diodes on the element to which it is assigned. In addition, activation of this function on the fireman microphone cause activation of 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 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 BMG 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 replaying of the previously disconnected sources.

Record Message

This function is used to record messages from the SMA-ZM, SMA-ZMLCD 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 diode. Replaying of a recorded message via the **Select Audio source** function for which one of the predefined names is assigned from the list: Message1, Message2, Message3, into which messages are recorded.

Scenario Delay

This function cause a time delay in scenario execution. The maximum time to declare a delay in 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 diode blinking.

Select audio source

This function enables easy execution of the [dynamic matricing](#) function. Dynamic matricing consists in 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 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, 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 SMA-FM 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 diode on the microphone at the [silence](#) function button is on), then BMG 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 diode blinks).

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 comprising the scenario, whereas the status of the relay outputs which might have been a part of the scenario remains concordant 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](#).

Volume change

The volume change function controls the levels of only audio outputs in the NANOVES system. The function is activated by dynamic assignment. There are two methods of volume change execution in the configurator:

1. [Change](#) – the level of a signal at an audio output will be decreased or increased by the value declared in decibel in the [Volume](#) window against 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 uses only matricing using common HVaudioBus, then the [Volume change](#) function is not active.

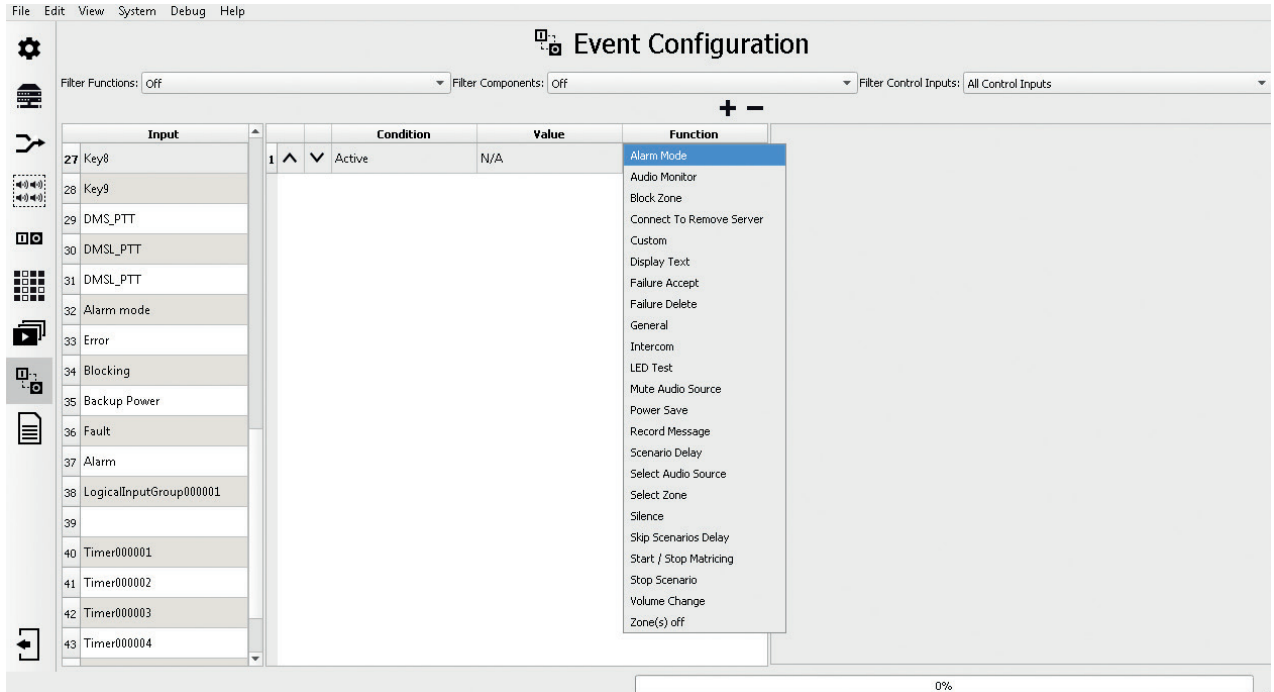
Zone(s) off

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 cause irreversible disconnection of all active sound sources of BGM, General, Service priorities.

External Fault CIN

The [External fault CIN](#) can only be assign 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.

12.11 Reports



In the [Reports](#) tab there is a table containing all of the most important information on the system. The [Audio Routing](#) tab represents the place of assignment of all audio outputs to individual inputs on control cards or one of the 4 100V buses. In addition, it shows which speaker zones are served by the control card and which audio output supplies them. Via the [Go to Definition](#) function available for the Audio Output, Control Cards and HV Audio Bus columns in the [Audio Routing](#), it is possible to make changes in the system in a simple and easy way.

- 1 [Logical output report](#) – this is a list of all logical inputs with information on the way in which to activate NO/NC.
- 2 [Message Reports](#) – lists all messages loaded into the system.
- 3 [Component Report](#) – a quantitative list of all cards, zone/fireman microphones, touchscreens comprising the NANOVES system. In addition, there is a list of the number of available audio inputs and outputs, logical inputs and individual component software versions.
- 4 [System Reports](#) – a list of all failures that occurred and software events during normal operation, The system enables to archive and read 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.
- 5 [Statistic Report](#) – enables displaying of all available service data from diagnostic modules located on SFP slots. This is a unique function which makes 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.

12.12 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, at first activation, successive functions; pressing the button again or reactivating of the logical input results in deactivation. In case of logical inputs, a necessary condition for reactivation of the function in the toggle mode is returning to the input state prior to deactivation.

Dynamic assignment

In order to trigger a function whose activation consists in dynamic assignment, follow the predefined order. The first activity is selection of a zone or many zones by means of the programmed button Select Zone, in this way we highlight which zone(s) the function is to affect, then select the button for the function which we want to execute.

Audio inputs – these are all analogue inputs available in the NANOVES system to which external sound sources can be connected u.

Audio outputs – these are all outputs available in the NANOVES system, whose parameters are compatible with the audio inputs of the amplifiers. Control units are equipped with audio outputs, e.g. SCU-11 has 12 audio outputs, as well as zone microphones which are equipped with 4 outputs.

Audio source – in the NANOVES system, an audio source is both a recorded message, irrespective 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 xCtrlLine-4 /xCtrlLine-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 100V 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 manipulate an element available in the system.

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 NANOVES system with the help of which it is possible to manage and programme 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 expropriated 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 NANOVES system. This language is implemented as the C language library, written according to ANSI C, providing: simplicity, performance and code transferability.

Signalization priority

	PRIORITY (0 - highest)
Block zone	0
Zone failure	
› closing/shorting/opening	
› No EOL	1
› Impedance error	
› Switching into LOOP	
.....	
Zone failure confirmed	1
EVACUATION MESSAGE reproduced	2
WARNING MESSAGE reproduced	2
Word message from fireman microphone	2
Word message from zone or BGM microphone	2
Volume change	3
Audio Monitor	4
Audio Monitor	4

13. Annexes

- » List of certified switches to connect devices in CHAIN typology



14. Certificates

15. 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 stream via computer network.

FACIE

Fire Alarm Control and Indicating Equipment – central part of fire signaling system supplying fire detectors and receiving signals about fire detection in order to call 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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Notes

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