

ambient SYSTEM logo on the left. Three status LEDs (green, white, red) with corresponding icons (circle, triangle, square) in the center. On the right, the smartVES logo and model number SMART-DU1604.

ambient SYSTEM logo on the left. A horizontal display window in the center. On the right, three status LEDs (green, white, red) with icons, three control buttons (left arrow, down arrow, up arrow), and the model number SMART-PA2650.

ambient SYSTEM logo on the left. A horizontal display window in the center. On the right, three status LEDs (green, white, red) with icons, three control buttons (left arrow, down arrow, up arrow), and the model number SMART-PA2650.

ambient SYSTEM logo on the left. A horizontal display window in the center. On the right, three status LEDs (green, white, red) with icons, three control buttons (left arrow, down arrow, up arrow), and the model number SMART-PA8080.

ambient SYSTEM logo on the left. Three status LEDs (green, white, red) with icons. A central LCD screen displaying "10:18:53" and "2020-03-19" with a "lock" button. On the right, the smartVES logo and model number SMART-CU-11LCD.

ambient SYSTEM logo on the left. Three status LEDs (green, white, red) with icons. On the right, the smartVES logo and model number ABT-CU-11LT.

A large black perforated speaker grille. The ambient SYSTEM logo is centered on the grille. The model number ABT-PF4 is printed in the bottom right corner.

Public Address & Voice Evacuation System

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Scalable Intelligent PA & VES

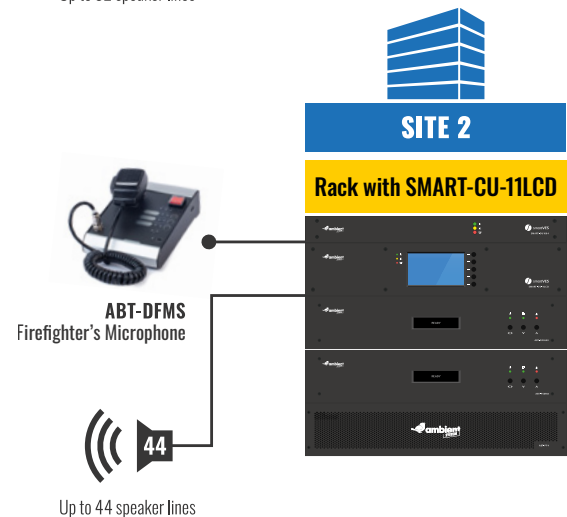
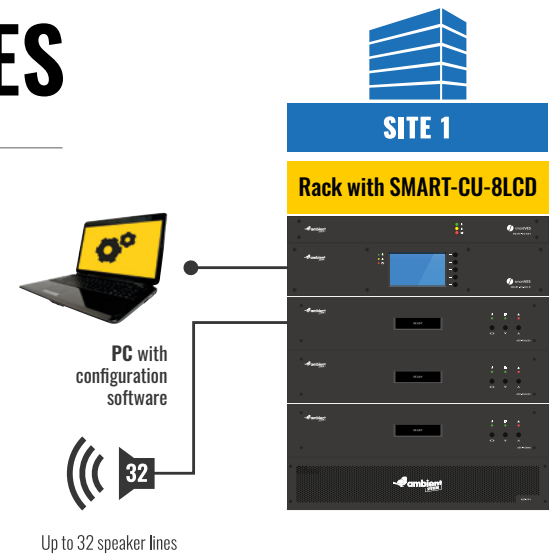
The smartVES system has been designed to offer exceptional versatility and it is therefore equally suitable for medium-range buildings as well as complex commercial structures such as train stations, airports, refineries, sport stadiums, shopping malls etc. The system's architecture is based on proven fibre-optic Ethernet connectivity between control units and other elements of the system thus enabling digital transmission of voice messages, including public address functions and music.

Its modular structure allows tailoring the design to meet clients' specific requirements with regard to design and development.

The main role of smartVES is to effectively warn the public of eminent danger thus allowing efficient evacuation. As the system works seamlessly with the Fire Alarm systems; its warning and informative functions can be either triggered automatically via the fire alarm system or manually using fireman microphones. The audible alarm system is designed to cover all areas of a building to reach its occupants in the event of an emergency.

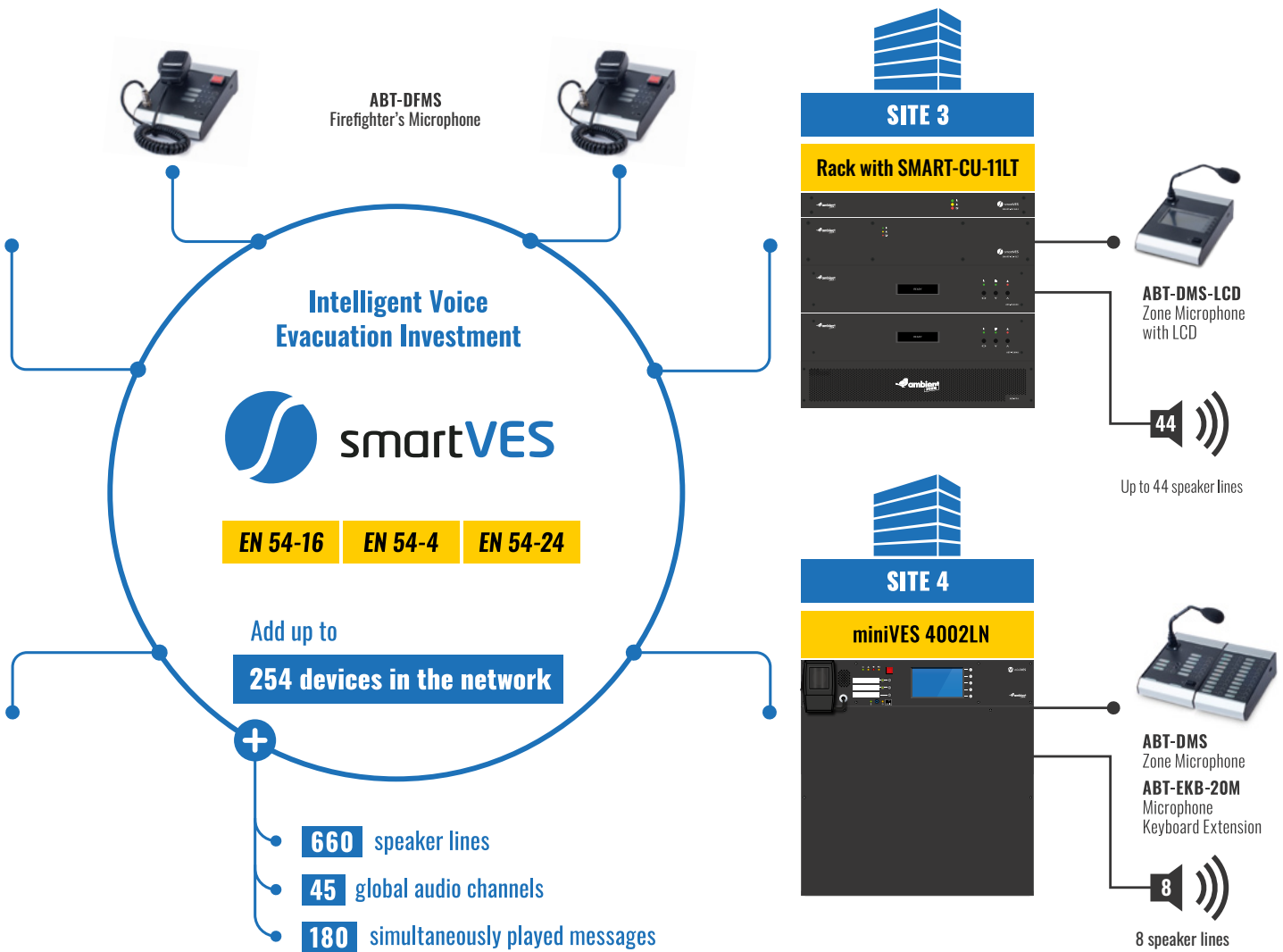
The system fully complies with a European mandatory standard EN-54-16 (Fire detection and fire alarm systems; Components for fire alarm voice alarm systems; Voice alarm control and indicating equipment), which is also recognised in numerous countries outside of the European Union (e.g. Latin America, several of African and Asian countries).

The smartVES system comprises control devices, multi-channel amplifiers, fireman and zone microphones and 20-key extension keyboards. The system enables digital scaling of communications between all elements of the system and other integrated safety systems.



MAIN PARAMETERS OF THE SMARTVES SYSTEM:

- » **Compliance with EN 54-16, EN 60849**
- » **45 global audio channels**
- » **Up to 254 units in the network**
- » **Up to 32 GB SD flash memory card designated for playback and recording messages (48 kHz, 32 bit)**
- » **Number of simultaneously played messages dependent on the number of xCtrLine-44 & xCtrLine -2 cards in the system**
- » **Intercom function between all microphones**
- » **External audio inputs in all control units and zone microphones**
- » **Up to 12 secured amplifiers fully supported**
- » **Cost-efficient solution allows for up to 4 messages to be played simultaneously thanks to 4 common 100 V audio buses in each control unit**
- » **DSP with implemented 3 band parametric EQ on all inputs on control units, 8 band parametric EQ, delay lines, audio limiter and feedback eliminator on each of the audio outputs**
- » **Wide choice of bridgeable Class D amplifiers (8 × 80 W, 8 × 160 W, 4 × 160 W, 2 × 650 W, 1 × 650 W)**



ELEMENTS OF THE INTEGRATED SMARTVES SYSTEM

smartVES Devices

SMART-CU-8LCD	Stand-alone control unit with 8 control slots and touch screen GUI
SMART-CU-11LT	Control unit with 11 control slots
SMART-CU-11LCD	Control unit with 11 control slots and touch screen GUI
SMART-PAXXX/E	Power amplifiers
SMART-PSM48/E	Power supply manager
SMART-DU1604	Adaptive audio processor
SMART-AMAP-6	Adaptive microphone aggregation point
SMART-ANSM-01	Adaptive noise sensing microphone
SMART-xCtrlLine-44	Speaker line control card

smartVES Exchangeable modules

ABT-xNET-1Gb/WAN/RS	Communication card
ABT-xLogIN-8f	Logical input card for function slot
ABT-xLogIN-8c	Logical input card for control slot
ABT-xLogOUT-8f	Logical output card for function slot
ABT-xLogOUT-8c	Logical output card for control slot
ABT-xAudIO-4/8-RS	Audio card 4 IN / 8 OUT AUDIO / RS485
ABT-xCtrlLine-2	2 Loudspeaker line control card

SMART-CU-8LCD

EN 54-16

EN 54-4

1438-CPR-0948

CONTROL UNIT



SMART-CU-8LCD Control Unit (CU) is a matrix mixer of the input signals which routes signals to four 100V internal audio buses, a 45-channel digital system buses or directly to audio outputs in a unit.

Additional, it is equipped with the unique feature – dual (redundant) processor card (2x ABT-xCPU). SMART-CU-8LCD is prepared to serve the role of the main controller of the smartVES system and it has a master function with regard to the remaining devices.

CU is equipped with the slots on the rear panel for connecting four input modules, output audio modules or logic modules: ABTxAudio-4/8-RS, ABTxAudio-8, ABT-xLogIN-8f, ABT-xLogOUT-8f and up to 8 modules of loudspeaker line control or logical inputs / outputs: ABT-xCtrlLine-2, ABTxLogIN-8c, ABT-xLogOUT-8c.

LCD colour and touch display gives a direct access to the managerial function and monitoring of the whole system. SMART-

CU-8LCD is a matrix mixer of the input signals which routes such signals to four 100 V internal audio buses,

a 48-channel digital system buses or directly to audio outputs in a unit.

CHARACTERISTICS

- » **EN 54-16 // 1438-CPR-0948 certified system**
- » **Fully network-based system allowing for configuration, control and diagnostics via Ethernet**
- » **A possibility of managing up to 254 devices in the network**
- » **8 slots available for any configuration of loudspeaker control cards, control inputs and outputs cards**
- » **Additional 4 slots dedicated only for audio input/output cards and control input/output cards**
- » **Built in 2 control inputs and outputs**
- » **Up to 12 secured amplifiers supported**
- » **8 messages played simultaneously into different zones / 32 messages locally**
- » **2x1Gbit ports available for system extension**
- » **1x POE port Up to 32 GB SD flash memory dedicated for playback and recording messages (48 kHz, 16 bit)**
- » **DSP implemented on each ABT-xAudio-4/8-RS card with 3 band parametric EQ on 4 inputs, 8 band parametric EQ, delay lines, audio limiter and feedback eliminator on each of the audio outputs**
- » **SMS protocol allows smartVES system integration with other producers devices**

SMART-CU-8LCD	
Electrical	
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 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 minutes of 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 568A by the Ethernet protocol
Environmental	
Operating temperature	-5°C / +40°C
Operating humidity	15% to 80% (non-condensing)
Storage temperature	-20°C / +70°C
Storage Humidity	15% to 80% (non-condensing)
Mechanical	
Finish Case Material	Finish Case Material: Steel The front panel is made of metal plate painted black
Dimensions	482 (W) × 85 (H) × 325 (D) mm
Mounting	19" – rackmount
Weight	Up to 8 kg (depends on configuration)
Accessories	
Accessories	2 brackets and 4 screws for rack, 8 caps for free slots

SMART-CU-11LCD / 11LT

EN 54-16

EN 54-4

1438-CPR-0948

CONTROL UNITS



SMART-CU-11LCD

SMART-CU-11LT Control Unit (CU) is a matrix mixer of input signals which it routes to 4 100V internal audio buses, a 45-channel digital system buses or directly to audio outputs in a unit. SMART-CU-11LT is designed to work for small PA & VE systems or as an extension unit in more complex systems. It means that the CU can function independently as the central unit of a small system or be part of a large complex system for which it represents another level of either territorial extension (operation in a remote structure) or functional extension (operation of further fire zones and loudspeaker lines in such a structure). The modular design of the CU and its flexibility enables optimisation of equipment and cost efficiency regardless of size / number of structures, their location and connectivity.

In the event of losing connectivity with a networked master unit, SMART-CU-11LT is able to perform fire alarm scenarios independently thanks to the configuration recorded locally. While attached to the main communication ring of the system, SMARTCU-11LT can control amplifiers and power supply managers as well as receive alarm and digital signals; and send them to other system devices. SMART-CU-11LT Control Unit distributes audio signals to indi-

vidual zones and ensures that individual zones function properly. It also controls the condition of loudspeaker lines and amplifiers. If a fault is detected, it sends the signal to the system and automatically switches to a backup amplifier.

The CU is equipped with an SMART-cAudio-4/12 card offering 4 symmetrical line audio inputs and 12 symmetrical outputs to lead audio signals out to external devices or amplifiers of the smartVES system. Further-

more, SMART-CU-11LT can be equipped with an LCD touch screen with a control module, which allows easy access to management functions and monitoring of the whole system – such extended configuration is included in SMART-CU-11LCD Control Unit.

CHARACTERISTICS

- » **Compliance with EN 54-16**
- » **Network-based system allowing configuration, diagnostics and management via Ethernet**
- » **Managing up to 254 devices on the network**
- » **11 slots available for any configuration of loudspeaker control cards and control input / output cards**
- » **Built-in audio card with 4 inputs and 12 audio outputs**
- » **Up to 12 messages played simultaneously in different zones**
- » **Up to 32 GB SD flash memory designated for playback and recording messages (48 kHz, 16 bit)**
- » **1 x POE port**
- » **Support of up to 12 secured amplifiers**
- » **Built-in 2 control inputs and outputs**
- » **2 x 1 GB ports available for system extension**
- » **Integrated DSP with implemented 3 band parametric EQ on all inputs on control units, 8 band parametric EQ, delay lines, audio limiter and feedback eliminator on each of the audio outputs**

	SMART-CU-11LT	SMART-CU-11LCD
Electrical		
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 minutes of messages	
LCD display	None	4.5" Resistive LCD touchscreen
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	
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 / EIA 568A by the Ethernet protocol	
Environmental		
Operating temperature	-5°C / +40°C	
Operating humidity	15% to 80% (non-condensing)	
Storage temperature	-20°C / +70°C	
Storage humidity	15% to 80% (non-condensing)	
Mechanical		
Finish case material	Finish Case Material: Steel / The front panel is made of metal plate painted black	
Dimensions	482 (W) × 85 (H) × 325 (D) mm	
Mounting	19" – rackmount	
Weight	Up to 8,4 kg (depends on configuration)	
Accessories	2 brackets and 4 screws for rack, 8 caps for free slots	

SMART-PAx / E Series

EN 54-16

POWER AMPLIFIERS



The Amplifiers are designed for perfect integration into the Ambient System solutions. Thanks to their flexibility, they can also be used for any other Public Address and Voice Evacuation applications. These amplifiers have been developed to meet the specific requirements of the EN 54-16 standard for safety installations.

The SMART-PAXXXX/E is a family of 2U, rack mountable, 8-channel (SMART-PA8080/E, SMART-PA8160/E), 4-channel (SMART-PA4160/E), 2 channel (high power SMART-PA2650/E) and 1 channel (SMART-PA1650/E) class-D transformer isolated power amplifiers for 50 V and 100 V distributed loudspeaker systems. Amplifier SMART-PA8080/E can deliver up to 8 × 80 W, for SMART-PA8160/E and SMART-PA2650/E delivering power increases respectively to the 8 × 160 W and 2 × 650 W. In a bridged mode amplifier channels are

combined and can deliver 4 × 160 W for SMART-PA8080/E, 4 × 320 W for SMART-PA8160/E and 1 × 1300 W for SMART-PA2650/E. These amplifiers have 48 VDC input which allows to connect with battery backup system for maximum availability and durability in an voice evacuation system. The SMART-PAXXXX/E amplifiers are powered from external power supply module SMART-PS48800 working in a block. The current from block is distributed to individual amplifiers through the “power manager” SMART-PSM48 (device includes a battery charger and is in compliance with EN 54-4). The SMART-PAXXXX/E amplifiers are prepared to connect an external audio source by using up to the eight BGM inputs (1 per channel) with the sensitivity level regulation. In the alarm mode the BGM inputs have to be muted by shorting the lines from BGM CTRL to the ground.

CHARACTERISTICS

- » **Front panel indicators include:**
 - › Supply / Active / Fault
- » **100 / 50 Volt available via terminal blocks at the rear**
- » **Output channels can be linked into:**
 - › SMART-PA8080/E, SMART-PA4160/E, SMART-PA8160/E: 4 × 160 W, 2 × 320 W or 4 × 320 W by daisy-chaining 50 V tapping (input on parallel)
 - › SMART-PA2650/E: 1 × 1300 W by daisy-chaining 50 V tapping (input on parallel)
- » **SMART-PAXXXX/E series combines with the SMART-PSM48/E Power Supply Manager (charger and back-up supply)**
- » **At the rear of the SMART-PAXXXX/E you will find: Individual level adjusters / General fault contact (Dry contact) / BGM inputs**

SMART-PA8080/E / 8 × 80 Watt class-D power amplifier
Can be bridge into: 1 × 160 W + 6 × 80 W; 2 × 160 W + 4 × 80 W;
3 × 160 W + 2 × 80 W or 4 × 160 W

SMART-PA4160/E / 4 × 160 Watt class-D power amplifier
Can be bridge into: 1 × 320 W + 2 × 160 W or 2 × 320 W

SMART-PAXXXX/E casings: are 2U high, 19-inch rack mountable.

SMART-PA8160/E / 8 × 160 Watt class-D power amplifier
Can be bridge into: 1 × 320 W + 6 × 160 W; 2 × 320 W + 4 × 160 W;
3 × 320 W + 2 × 160 W or 4 × 320 W

SMART-PA1650/E / 1 × 650 Watt class-D power amplifier

SMART-PA2650/E / 2 × 650 Watt class-D power amplifier
Can be bridge into: 1 × 1300 W

	SMART-PA8080/E	SMART-PA4160/E	SMART-PA8160/E	SMART-PA1650/E	SMART-PA2650/E
Power supply					
Nominal DC input voltage	48 V				
DC input voltage range	42 – 57 V				
DC fuse rating (internal)	6× 7.5 AF-H	2× 15 AF-H 2× 7.5 AF-H	4× 15 AF-H 2× 7.5 AF-H	1× 15 AF-H 2× 7.5 AF-H	2× 15 AF-H 2× 7.5 AF-H
Overall power efficiency nominal DC input max. output power at 1 kHz	80%				
Power consumption (48 VDC)					
Standby	0.2 A	0.18 A	0.2 A	0.15 A	0.15 A
Active	0.7 A	0.43 A	0.7 A	0.23 A	0.33 A
Max. nominal current	20 A	19 A	38 A	19 A	38 A
Amplifier					
Continuous nominal output power per channel, all channels driven into nominal load at 1 kHz 30°C ambient	80 W 125 Ω / 100 nF	160 W 62 Ω / 200 nF	160 W 62 Ω / 200 nF	650 W 15.4 Ω / 200 nF	650 W 15.4 Ω / 200 nF
Nominal balanced input level for 100 V output at 1 kHz and nominal load	1 V				
Balanced input level trim range for 100 V output at 1 kHz and nominal load*	0.95 – 3 V				
Max. balanced input level	3 V				
Input impedance at 1 kHz	22 kΩ				
Input common mode rejection at <1 kHz	>61 dB				
Frequency response (-6 dB)	75 Hz – 20 kHz 125 Ω / 100 nF	75 Hz – 20 kHz 62 Ω / 200 nF	75 Hz – 20 kHz 62 Ω / 200 nF	75 Hz – 22 kHz 15.4 Ω / 200 nF	75 Hz – 22 kHz 15.4 Ω / 200 nF
S/N ref nominal power at 1 kHz 22 Hz – 22 kHz	>85 dB 125 Ω / 100 nF	>85 dB 62 Ω / 200 nF	>85 dB 62 Ω / 200 nF	>85 dB 15.4 Ω / 200 nF	>85 dB 15.4 Ω / 200 nF
Crosstalk between channel 50 Hz – 20 kHz nominal load	< -70 dB 125 Ω / 100 nF	< -70 dB 62 Ω / 200 nF	< -70 dB 62 Ω / 200 nF	< -70 dB 15.4 Ω / 200 nF	< -70 dB 15.4 Ω / 200 nF
Connectivity					
DC input socket	DG58C-A-2P13				
Audio output socket	3 pin PHOENIX 5.08 mm				
Nominal output voltage taps	50 / 100 V				
Mechanical					
Front panel width	482 mm				
Back panel width	445 mm				
Height	88.5 mm				
Net Weight	15 kg	13 kg	18.6 kg	10.8 kg	15 kg
Gross weight (including packaging)	16.2 kg	14.2 kg	19.8 kg	12 kg	16.2 kg
Packaging dimensions	150 × 530 × 610 mm				

* Available only for SMART-PA Eseries

SMART-PSM48/E / PS48800 / PF4

POWER SUPPLY EQUIPMENT



SMART-PSM48/E Power Supply Manager is designed for distribution of DC Power Supply from Power Supply Units (PSU) and a back-up battery. The unit controls battery charging and distributes power supply to all Voice Evacuation System (VES) equipment at max. 60 A. When the system uses battery back-up, the power supplied is 3.2 kW (48 V). The unit complies with the EN 54-4 VES standards and also EN 12101-10 Smoke and Heat Control System standards. As a main source of energy distribution, the manager uses external modules 800 W (SMART-PS48800)

for 48 V. SMART-PSM48E power supply manager uses internal power converter for 24 V equipment. As a source of standby power supply it uses the battery bank of the capacity of up to 200 Ah.

SMART-PSM48/E cooperates with the 4 x 12V VRLA battery bank. It maintains the bank in charged condition, ensures temperature compensation of charging parameters and monitors serial resistance of the battery and its wiring as specified in Exhibit No.A2 to the EN 54-4 Standard.

SMART-PSM48/E cooperates with up to 4 modules of SMART-PS48800 Power Supply Units. The manager ensures safe connection for the purpose of parallel operations and monitors the output parameters of each power supply unit.

SMART-PS48800 is designed for assembling in a dedicated SMART-PF4 Power Supply Unit Frame. The elements of the system are designed for assembling in a Rack 19" IP30-type.

EN 54-4

SMART-PS48800



SMART-PF4



	SMART-PSM48	SMART-PSM48E
Electrical		
Maximum configuration	1 × SMART-PSM48 – Power Supply Manager 4 × SMART-PS48800 – Power Supply Unit 1 × SMART-PF4 – Power Supply Units Frame	1 × SMART-PSM48E – Power Supply Manager 4 × SMART-PS48800 – Power Supply Unit 1 × SMART-PF4 – Power Supply Units Frame
AC power supply	230 VAC + 10%-15%; 50/60 Hz	
Max. nominal power consumption	885 W / 3.85 A	
Efficiency at rated power	> 90%	
DC input	4; bolted terminals; dedicated power supply unit SMART-PS48800	
DC input protection	4 × 20 A 58 V DC	
DC outputs	8 × 48 V, each output max. 30 A (total for all 8 outs max. 63 A)	8 × 48 V, each output max. 30 A (total for all 8 outs max. 63 A) 6 × 24 V, each output max. 5 A (total for all 6 outs max. 6,25 A)
Summary maximum DC output load (24 V and 52 V)	3200 W	
Battery (type)	4 pieces, VRLA 12 V 15–200 Ah	
Charging current	max. 14 A	
Charging voltage	54,6 V ± 0,6 V (at 25°C)	
Maximum resistance of wiring and fuses	10 mΩ	
Maximum total serial resistance of wiring, fuses, and batteries	28 – 100 mΩ	
Environmental		
Operating temperature	-5°C up +40°C	
Mechanical		
Dimensions	482 (W) × 85 (H) × 443 (D) mm	
Weight	7,2 kg	
SMART-PS48800		
Electrical		
AC power supply	230 VAC +10% -15%, 50/60Hz, 3.85 A Wire with IEC 60320 C13 3 × 0,75 mm ² coupling (supplied with the unit)	
Maximum power consumption	885 W / 3.85 A	
Efficiency at rated power	> 90%	
AC input protection	T6.3 A/250 V 5 × 20 mm slow-blow fuse (accessed when the casing is open)	
Protection from electric shock	Class I (EN 60065)	
DC output	52 VDC; max. 15.4 A	
Mechanical		
Dimensions	85 (W) × 95 (H) × 395 (D)	
Weight	2,6 kg	
Accessories		
Power supply cord	IEC 60320 C13 1,5 m	

SMART-DU1604

EN 54-16

EN 54-4

1438-CPR-0948

ADAPTIVE AUDIO PROCESSOR



The SMART-DU1604 is a central processing unit, simultaneously processing up to 16 audio streams corresponding to 16 loud-speaker zones and up to 4 independent streams from system microphones.

Using digital audio processing tools, the SMART-DU1604 dynamically maximises the speech intelligibility parameter. This is done through a number of algorithms implemented in the unit. Among the main ones are the adaptive filtering algorithm and the temporal transposition of the speech signal. In addition, the SMART-DU-1604 is equipped with real-time algorithms responsible for calculating parameters such as: signal-to-noise ratio (SNR); speech comprehension index (STI); reverberation time (RT).

The SMART-DU1604 processes the audio signals picked up from the environment by the 16 SMART-ANSM-01 microphones and modifies the signals transmitted simultaneously to the 16 speaker zones in real time.

An additional element realised by the SMART-DU1604 unit is the auto-calibration, which makes it simple and quick to set up, with most settings selected in a fully automated manner.

CHARACTERISTICS

- » **Certified system EN 54-16:2011 No. 1438-CPR-0948**
- » **2 inputs and 2 logic outputs programmable on board**
- » **2x 1Gbit ports available for system expansion**
- » **1xPOE 1Gbit**
- » **2x SFP connectors for redundant fibre connection**
- » **High quality 48kHz audio processing 32bit resolution**
- » **Powerful processor processing 20 input streams, 20 audio output streams and 16 SMART microphones ANSM-01**

SMART-DU1604	
Electrical	
Power supply	48 V DC (operating range 40-57 V DC), connector with M2.5 screw terminals, distance between partitions 5.08 mm
Power consumption	Up to 17 W
Number of digital audio inputs	20
Sampling frequency	48kHz
Audio resolution	32 bit
Audio format	PCM
Number of digital audio outputs	20
Communication card	<p>Long-distance communication between devices:</p> <ul style="list-style-type: none"> > 1000BASE-X over fibre, > 2 ports to ensure redundant connection. <p>Communication between devices installed next to each other:</p> <ul style="list-style-type: none"> > 1000BASE-TX / RJ45 over CAT5E cables - 2 ports available on the rear panel of the device, > 100BASE-TX / RJ45 over CAT5 cables - 1 port available on the rear panel for connection to an external network, connection to configuration software.
Fibre optic module - type of connector / type of fibre optic cable	SFP type modules / SC/LC type connectors Multimode or single-mode fibre E 30 or E 90, OM or OM2
Communication with the PC	PC (commissioning software): RJ45 connector, twisted pair connections in TIA / EIA568A standard via Ethernet protocol
Mechanical parameters	
Finishing	Housing material: steel / Front panel made of metal plate painted black
Dimensions	482 (W) × 44 (H) × 325 (D) mm
Mounting	19" rack-mounted teletechnical cabinet
Weight	4,3 kg
Accessories	2x power connector 1x connector for inputs, logic outputs
Storage and working environment	
Ambient temperature during operation	-5°C / +40°C
Ambient humidity during operation	15% to 80% (without condensation)
Storage temperature	-20°C / +70°C
Ambient humidity during storage	15% do 80% (without condensation)
IP degree of protection	20
Compatibility	
Device compatibility	SMART-ANSM-01, SMART-AMAP-6, SMARTVES, miniVES, midiVES

SMART-AMAP-6

ADAPTIVE MICROPHONE AGGREGATION POINT

- ✓ *Wide operating temperature range*
- ✓ *IP66-rated housing*
- ✓ *Powered by PoE or an external power supply*
- ✓ *Compatible with the smartVES device network*
- ✓ *Up to 6 controllers in a network*
- ✓ *Each controller supports up to 6 SMART-ANSM-01 microphones*



The SMART-AMAP-6 is a device whose purpose is to process signals from measurement microphones and transmit them in digital form to the SMART-DU-1604 units. The SMART-AMAP-6 interface allows up to 6 monitored measurement microphones to be connected. The measured

parameters of the background noise and system loudspeakers are used by adaptive filtering algorithms in the assigned zones. The SMART-AMAP-6 is a networked device and can be powered via the POE of the system switch or central unit, as well as from an external 34-58VDC power supply.

Dedicated low-noise microphone amplifiers compatible with the SMART-ANSM-01 available in the SMART-AMAP-6 enable correct operation of measurement microphones at distances of up to 400 metres.

SMART-AMAP-6	
Electrical	
Power source	PoE (RJ45), or via 2-pin connector
Number of audio inputs	6 differential channels
Power consumption (typical/maximum)	4.5 W / 7 W
Supply voltage range	34V - 58VDC
Sampling frequency	48 kHz
Measuring bandwidth	200 Hz - 9 kHz @3 dB
Differential input impedance	4000 Ω @1kHz
Range of measured values (for corresponding input voltages)	56 dBSPL (1.5mVRMS) - 120 dBSPL (3VRMS)
Phantom power supply	30 VDC
Mechanical parameters	
Dimensions	200 x 125 x 90 mm
Weight	1.2 kg
Colour	white
Housing material	Aluminium
Connectors	<ul style="list-style-type: none"> > 6x 3-pin connector type 15EDGVC-3.5 > 1x RJ45 > 1x Phoenix MSTBVA 2-pin screw - 5.08 mm raster
Storage and working environment	
Operating temperature range	-5°C to +50°C
Ambient humidity	5% to 95% non-condensing
IP degree of protection	54 // 66 - with additional gland sealing
Compatibility	
Device compatibility	SMART-ANSM-01, SMART-DU1604, miniVES, midiVES
Used cables	
LAN cable types used	Category 5e F/UTP twisted pair, up to 100 m between control unit / switch and SMART-AMAP-6
SMART-ANSM-01 microphone inputs	2-core microphone cable 2x0.22mm ² with spiral copper shield, max. conductor resistance: 86 Ohm/km - connection up to 300 metres or 3x16AWG, unshielded up to 400 metres

SMART-ANSM-01

ADAPTIVE NOISE SENSING MICROPHONE

- ✓ *Wide range of measurement dynamics*
- ✓ *Discreet and elegant design*
- ✓ *Compact size*
- ✓ *Cable length of 3 meters included*
- ✓ *High resistance to weather conditions*



The measurement microphones are an integral part of the smartVES system. Their purpose is to test the level and frequency characteristics of sound at an object in the range of 100Hz-10kHz (+/- 2dB) with sound levels from 50dB

to 120 dB SPL. The microphone's specially designed electronics ensure stable measurement performance with long connection cables of up to 300 metres. In addition, the dedicated housing provides easy installation and an aesthetically

pleasing and unobtrusive appearance giving the microphone the ability to be used in many facilities where a small housing with multiple application possibilities is expected for functionality reasons.

OUTDOOR ENCLOSURE



CEILING-MOUNTED HOUSING



	SMART-ANSM-01
Frequency response	100Hz - 10kHz (+/- 3dB)
Ambient noise measurement range	50 – 120 dB SPL
Output dynamic range	0,7 (50dB) – 3650mV (123 dB)
Directional characteristic	omnidirectional
Power supply	32VDC / 5mA
Signal-to-noise ratio (S/N)	60dB
Output	analogue, balanced
Dimensions	Ø 34.0 × 130.0 mm
Weight	187 grams
Colour	black
Housing material	PA66 GF UL94 V0 / Halogen-free
Connector	3-pin screw connector
Cable	3 metres 2x0.22mm ² PVC with screen
Temperature	-40 °C to +55 °C
Ambient humidity	5% to 95% non-condensing
Degree of protection of the enclosure	IP65
Compatibility	SMART-AMAP-6

ABT-M01N

MICROPHONE

- ✓ *Daisy chain connection up to 6 mics*
- ✓ *Simple Cat5e interconnection*
- ✓ *AUX input with dedicated volume control*
- ✓ *Microphone gooseneck with LED red ring indication*



The ABT-M01N is a one button analog microphone with built in AUX input, push to talk key and LED indicating the ready-to-speak status with AUX active status. Microphone can be daisy chained with up to 6 microphones. Number of connected microphones depends on the total length of the Cat5e cable and supply voltage.

To operate the device press the MIC ON button, the MIC LED will start blinking green for the time of matrix activation. When MIC LED is green and red ring on the gooseneck lights up, microphone is ready for live announcement. On the other microphones connected in the chain, AUX LED and MIC LED are blinking indicating that live announcement is being broadcast on

other microphone. When finished transmitting the message release the MIC button to deactivate the gooseneck microphone.

Only one microphone can have AUX input active. To use it please connect device to 3,5mm jack socket market as AUX and select AUX button to create connection. Green led on AUX indicates that microphone has active AUX input, on the other microphones in the chain AUX LED is blinking green. Microphone always has the higher priority over the AUX. When AUX is activated on selected zones on one microphone it is possible to select different zones for live broadcast on other microphones. Deactivation of the MIC will activate previously selected zones with AUX.

CHARACTERISTICS

- » *Active MIC / AUX in use information between microphones*
- » *Wide range of operating voltages*
- » *Long connection distances: up to 730 metres for 1x M04N powered by 48VDC, up to 390 metres for 1x M01N powered by 24VDC, up to 240 metres for 6 x M01N*

ABT-M04N

MICROPHONE STATION

- ✓ *Daisy chain connection up to 6 mics*
- ✓ *Simple Cat5e interconnection*
- ✓ *AUX input with dedicated volume control*
- ✓ *Microphone gooseneck with LED red ring indication*



The ABT-M04N is a 4 button analog microphone with built in AUX input, push to talk key and LED indicating the ready-to-speak status with AUX active status. Microphone can be daisy chained with up to 6 microphones. Number of connected microphones depends on the total length of the Cat5e cable and supply voltage.

To operate the device first select the Zones by pressing designated buttons and then press MIC button. The Mic LED will start blinking green for the time of matrix activation. When Mic led is green and red ring on the goose neck lights up, microphone is ready for live announcement. On the other microphones connected in the chain, AUX LED and MIC LED are blinking indicating that live announcement is being broadcast on other microphone. When finished

transmitting the message release the MIC button to deactivate the gooseneck mic.

Only one microphone can have aux input active. To use it please connect device to 3,5mm jack socket marked as AUX, select the zones to which AUX signal will be transfer and select AUX button to create connection. Green led on Aux indicates that microphone has active aux input, on the other microphones in the chain AUX LED is blinking green. Microphone always has the higher priority over the AUX. When aux is activated on selected zones on one microphone it is possible to select different zones for live broadcast on other microphones. Deactivation of the MIC will activate previously selected zones with AUX.

CHARACTERISTICS

- » **Active MIC / AUX in use information between microphones**
- » **Wide range of operating voltages**
- » **Long connection distances: up to 700 metres for 1x M04N powered by 48VDC, up to 390 metres for 1x M04N powered by 24VDC, up to 320 metres for 6 x M04N**

Microphones

EN 54-16



ABT-DFMS
FIREFIGHTER MICROPHONE

A smartVES fireman microphone is a monitored external device working with Control Units in a redundant communication ring. It can thereby perform a superior function of a system control unit, too. A fireman microphone can be used to activate alarm messages as well as general public announcements, to choose individual zones and to broadcast live voice messages. It is equipped with programmable function keys which can be used to assign functions as required. Up to 5 ABT-EKB-20M keyboard extensions with additional function keys can be attached to a fireman microphone.

A CPU switch enables immediate and direct broadcasting of announcements to all zones without any involvement of the control system even during a failure of the central processor. The microphone is able to automatically detect a key failure and an audio path from the microphone capsule (inclusive) to the Control Unit.

A fireman microphone is also equipped with an intercom function and is able to communicate with other microphones in the system.

CHARACTERISTICS

- » **Monitored microphone and connection of the microphone module to the system**
- » **A dedicated evacuation key**
- » **3 fully-programmable keys with a possibility of connecting up to five 20-key extensions**
- » **Built-in 2 contact inputs and 2 relay outputs**
- » **POE or external feeder based power supply**
- » **Black-box function – recording all announcements played during an alarm**
- » **Built-in SFP modules and CAT5e for simplicity of implementation of the loop topology**
- » **RS485 for communication with external systems**
- » **Intercom function between all fireman and zone microphones**



ABT-DMS-LCD
ZONE MICROPHONE WITH LCD

This microphone performs the same role as an ABT-DMS zone microphone. In order to facilitate its operation and to make it more intuitive, the microphone is equipped with an LCD touch screen.

CHARACTERISTICS

- » **4.5" LCD touch screen for fast and clear matricing and system management**
- » **Ability to select zones and messages to be played (pre-recorded or 'live') and other audio input**
- » **Monitored connection of the unit to the system**
- » **5 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**

ABT-EKB-20M
MICROPHONE KEYBOARD EXTENSION

Each extension attached to a fireman microphone or a zone microphone offers additional 20 function keys which can be programmed as required.



ABT-DMS
ZONE MICROPHONE

This zone microphone is used to activate general public announcements, to choose individual zones and to broadcast live voice messages. It can be connected directly to a selected Control Unit or via an additional Ethernet switch. A zone microphone can be powered locally (48 V) or from a Control Unit via POE.

It is equipped with programmable function keys which can be used to assign functions as required. All operational parameters can be programmed e.g. assignment of zones to various keys, naming of zones and zone groups, determining priorities, setting up access rights to announcements, volume controls, 'push to talk' key, music on/off and music routing. Furthermore, LEDs on the ABT-DMS provide information about existing fault on the system, any faults in a specific speaker zone, evacuation mode on and type of announcement in the zone (BGM, PA, EVAC, Warning, fireman microphone).

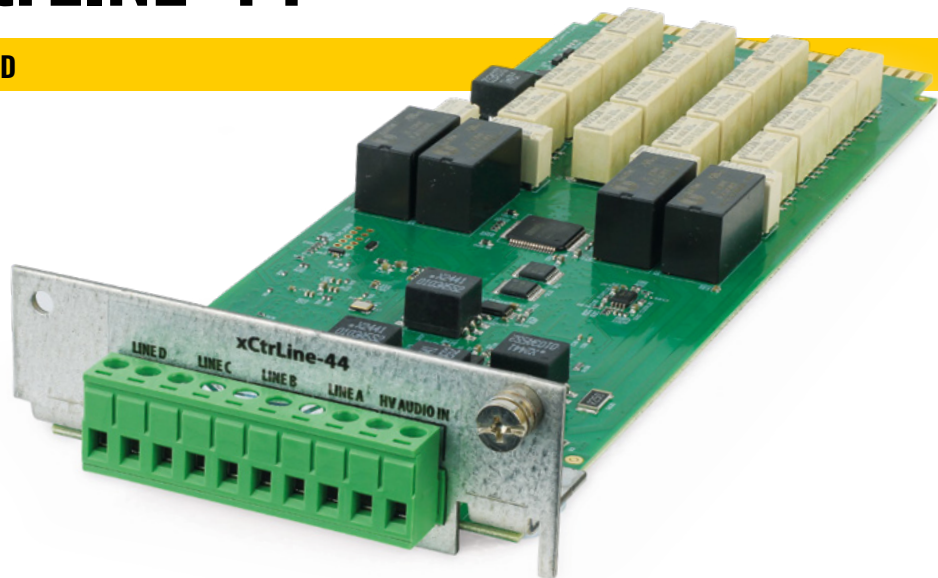
Up to 5 ABT-EKB-20M keyboard extensions with additional function keys can be attached to a zone microphone. Similarly to a fireman microphone, it is also equipped with an intercom function and is able to communicate with other microphones in the system.

CHARACTERISTICS

- » **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**

SMART-xCtrLINE-44

SPEAKER LINE CONTROL CARD



The smartVES system uses the new SMART-xCtrLine-44 loudspeaker line control cards, which allow full freedom of routing independent voice messages from the system BUS audio buses, to each of the 4 outputs of the card. The SMART-xCtrLine-44 allows the connection and any configuration (AB

/ loop / individual zone) of up to 4 loudspeaker circuits and the simultaneous emission of different audio content to each of them. Improved compared to previous versions of the control cards, the measurement of loudspeaker line impedance has been extended to a range from 1kHz to

20kHz which enables precise measurement of the load on the loudspeaker lines. In addition, line measurement can be performed using three methods: impedance, loop with short-circuit isolators as well as with EOL end-of-line modules.

	SMART-XCTRLINE-44
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	2 A
Maximum measured voltage	200 V
Accuracy of measurement	Up to 5%
Operating temperature	-5°C to 40°C
Operating humidity	15% to 80%
Storage temperature	-20°C to 70°C (non-condensing)
Storage humidity	5% to 95% (non-condensing)
Dimensions	70 × 215 × 30 (mm)
Accessories	Screw terminals 10 pins, the distance between the partitions 5.08 mm

Exchangeable Modules

EN 54-16

ABT-xCPU CPU CARD



The card integrates SMART-CU8 and SMART-CU8LCD Control Units with other elements of the smartVES system. CPU controls the whole network traffic and manages audio routing, digital matrix (8×8) as well as all DSP functions. ABT-xCPU enables remote access to the configuration parameters of each element of the system.

ABT-xNET-1Gb/WAN/RS COMMUNICATION CARD



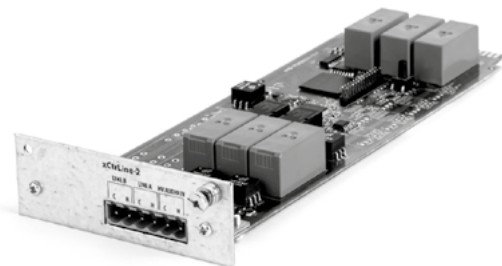
ABT-xNET is a communication card, which offers two independent 1 GB network switches; switch no 1 is designed solely for data transmission in connection with the base functionality of the smartVES system i.e. operations of the emergency sound system and AVB whereas switch no 2 is used for remote connections. This card operates under TCP/UDP/PTP/DHCP protocols and assures CPU-OFF based audio data exchange by means of a protocol developed by Ambient System. Furthermore, the card has an RS485 port enabling seamless integration of the smartVES system with any other systems (e.g. FAS) by means of exchangeable libraries with protocol descriptions. The card also includes POE splitter functionality to provide power to fireman microphones among others.

ABT-xAudio-4/8-RS 4 AUDIO INPUT / 8 AUDIO OUTPUT CARD



This audio input/output card is designed for a function slot of ABT-CU-8/LCD Control Unit. It offers 4 line audio inputs (via an RJ45 connector) and 8 symmetrical outputs to lead audio signals out via RJ45 connectors to external devices or amplifiers of the smartVES system. The card is also equipped with an RS485 interface through which the smartVES system can be controlled or integrated with devices offered by other producers.

ABT-xCtrLine-2 2 LOUDSPEAKER LINE CONTROL CARD



This card is designed for a control slot in every Control Unit; it offers 2 independent loudspeaker line outlets (A and B). Lines can be measured either by the impedance or loop methods. The card detects failure of the amplifier and switches the 100 V signal between internal buses and individual amplifier input on the card.

ABT-xLogOUT-8f / ABT-xLogOUT-8c

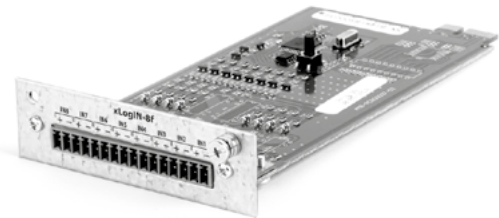
LOGICAL OUTPUT CARD FOR FUNCTION / CONTROL SLOTS



The logical output card has 8 relays i.e. 4 × normally-closed (NC) and 4 × normally-open (NO). All of them are fully programmable in terms of NC/NO functioning as well as function correlation.

ABT-xLogIN-8f / ABT-xLogIN-8c

LOGICAL INPUT CARD FOR FUNCTION / CONTROL SLOTS



The logical input card has 8 independently-programmable control inputs which may receive signals from other systems in order to trigger a desired reaction of the smartVES system. Inputs of an ABT-xLogIN-8f card offer two modes of work i.e. a non-potential mode (short-circuited / open-circuited) and a voltage mode where the card enables monitoring of short-circuiting and open-circuiting of cables connected to inputs.

ABT-ISLE AUDIO INTERFACE / RS485



The ABT-ISLE is both a communication module enabling integration with external systems via RS485 protocol, and an audio signal splitter.

Address settings – Number of addresses in the range of 0-F (16 addresses).

Local AUDIOIN – 4 input channels on the 8 pin connector. For easier and faster connection of audio sources, Phoenix-type connectors can be used. LOCAL AUDIO IN jack (8 pin connector Phoenix) is bridged with LOCAL AUDIO OUT (RJ-45).

Output amplifiers – RJ-45 connector for the 4-channel amplifier. // Local AUDIOOUT – RJ-45 connector for input signals to the system // PSM – RJ-45 connector for the link with power manager.

smartVES System Configuration

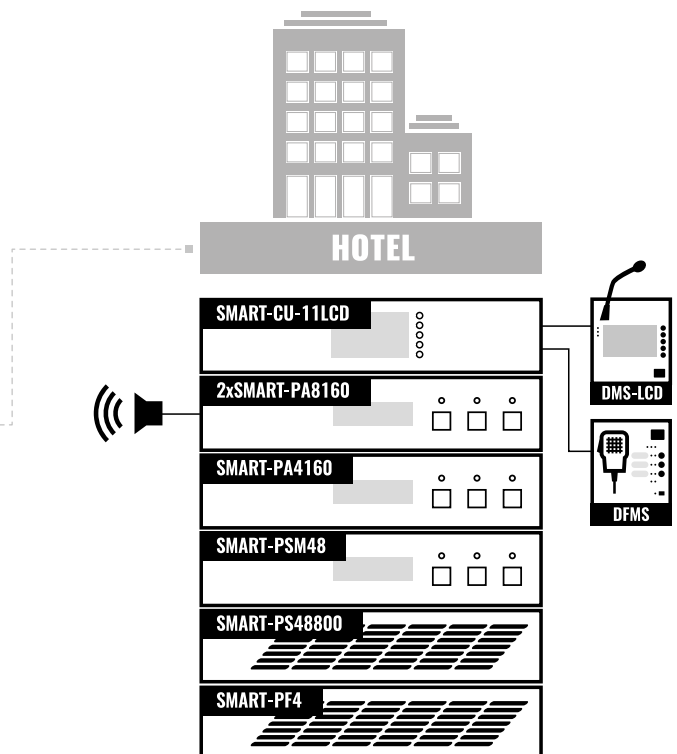
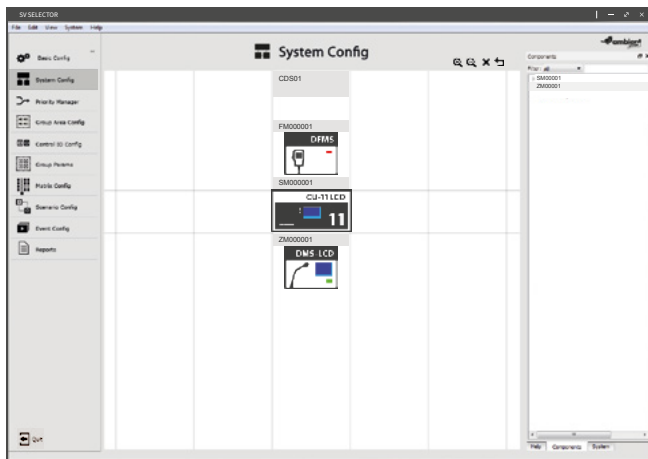
software / system examples

SMARTVES SELECTOR

SmartVES SELECTOR is an essential tool for the smartVES system configuration via PC (Windows). SV SELECTOR allows to select and match Public Address & Voice Evacuation smartVES Systems with a large number of similar or different devices to be configured and managed centrally from a single user interface.

SmartVES SELECTOR supports all IP-based smartVES devices offering control and configuration of control units (SMART-CU-8LCD, SMART-CU-11LT, SMART-CU-11LCD) and microphones (ABT-DFMS Fireman Microphone, ABT-DMS-LCD Zone Microphone with LCD, ABT-DMS Zone Microphone).

EXAMPLE 1 / HOTEL



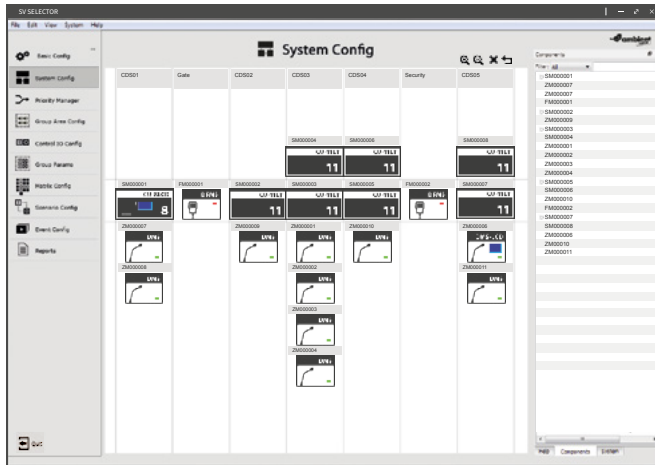
Example of a small smartVES system configuration:

- » 1 building / Hotel
- » 32 × loudspeaker lines (16 AB)
- » 8 × audio channels

with dedicated devices:

- » SMART-CU-11LCD (8 × ABT-xCtrLine-44)
- » 2 × 4 channels 320 W (2 × SMART-PA8160 amplifier)
- » 1 × 2 channels 320 W (1 × SMART-PA4160 backup amplifier)
- » Power Supply Equipment
- » 1 × ABT-DFMS fireman microphone
- » 1 × ABT-DMS-LCD zone microphone with LCD

EXAMPLE 2 / OIL REFINERY



Example of a large smartVES system configuration:

- » 5 buildings (Oil Refinery)
- » 292 × loudspeaker lines (146 AB)
- » 28 × audio channels

with dedicated devices:

- » 1 × SMART-CU-8LCD Control Unit (8 × ABT-xCtrLine-44)
- » 7 × SMART-CU-11LT Control Unit (8 × ABT-xCtrLine-44)
- » 5 × 4 channels 320 W (5 × SMART-PA8160 amplifiers)
- » 4 × 2 channels 320 W (4 × SMART-PA4160 backup amplifiers)
- » Power Supply Equipment
- » 2 × ABT-DFMS fireman microphone
- » 1 × ABT-DMS-LCD zone microphone with LCD
- » 9 × ABT-DMS zone microphone

