

one

User Manual

EN54-16 and EN54-4 Voice Alarm and Public
Address Certified System **LDA ONE**



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SAFETY INSTRUCTIONS

Please, read carefully these safety instructions.

1. Save this User Manual for future reference.
2. The equipment must be connected to a bipolar power cut-off switch according to the low voltage regulation and must be accessible for disconnection.
3. The equipment should not be exposed to water or splashing and objects filled with liquids should not be placed on the equipment. Do not use liquid or spray detergent for cleaning. Do not expose this equipment to humid areas.
4. No flame sources, such as lighted candles, should be placed on the equipment.
5. Install this equipment on a safe surface. If you do not place the equipment on a safe surface, it may fall and be damaged.
6. Cover grills serve for ventilation. **DO NOT COVER THE GRILLS.** Leave 5 cm on each side for proper ventilation.
7. The equipment should only be opened by qualified or trained personnel.
8. The equipment must be connected to an outlet with protective earthing.
9. Pay attention to the connection polarity when operating the equipment with a direct current (DC) power source. The reversed polarity connection can cause damage to the equipment, or to the power supply.
10. If any of these situations originates, let technical staff check the equipment:
 - a) The power cord or plug is damaged.
 - b) Liquid has infiltrated inside the equipment.
 - c) The equipment has been exposed to moisture.
 - d) The equipment has not worked well or does not get it working following the instruction manual.
 - e) The equipment has been dropped and damaged.
 - f) If the equipment has obvious signs of damage.
11. The wiring must be carried out only by trained personnel. Disconnect the audio inputs and outputs while making connections or disconnect the equipment from the power supply. Be sure to use the proper cables to make the connections.

1 INTRODUCTION

LDA ONE PAVA system is certified according to the requirements of EN 54-16 and EN54-4, ensuring a safe and controlled emergency evacuation. Its high performance, versatility and audio quality make it a powerful and affordable music and voice distribution system for all types of installations. Manual for FW version 01.00.02.01 onwards.

This user manual is valid for the following equipment and accessories of the series:

- ONE 500. PAVA Central module
- Battery Charger. EN54-4 battery management module
- LDATFL2. End of Speaker line Device
- LDAMPS-8Z. 8+ zone microphone.
- LDAVAP-1. Voice Alarm Panel with optional zone selection.

Other accessories:

- Installation support for rack and wall.

1.1 General description



Illustration 1: Control panel

1.1.1 Luminous indicators

State indicators show in every moment the working condition of the equipment or system. They are located at the left side of the screen.

a) PWR: “POWER”. Green

On: when the equipment is powered from any of the possible power sources.

b) EMG: “EMERGENCY”. Red

On: when the equipment is in an emergency operating state (voice alarm), either because of a manual or automatic activation from the CIE (Fire Control and Indication Equipment) from any of the available emergency inputs.

Simultaneously, when the indicator is turned on, a continuous audible warning will be issued. This warning tone can be silenced by the button “BACK”.

c) FLT: “FAULT”. Yellow

On: when the equipment is in failure state. This indicator activates automatically after detecting failure in any of the supervised functions.

Simultaneously when the indicator is turned on, an intermittent audible warning will be issued. This warning can be muted by the "BACK" control. It will also stop when the emergency microphone is used.

d) PA: “PUBLIC ADDRESS”. White

On: The system is not in emergency state.

1.1.2 Controls

a) Scroll controls

They are at the right side of the display. They allow the user to move around the Use and Configuration menus. The central button is the function **ENTER/OK**, that can be used to accede to the menu and the operations that need confirmation.

b) Direct access controls

- i) OK: Makes the indicator test by pressing the button for 2 seconds .
- ii) RESET/RST: Pressing this button for 2 seconds allows the user to restart the operating condition of the equipment when it is in either emergency or fault state.
- iii) BCK:
 - Menu navigation: go up one level / return. Pressing this button for 2 seconds returns to the initial screen and restarts the access level.
 - Mute function of acoustic alarm when it is sounding.

1.2 User profiles. Access levels. Password

Access levels define the following user profiles that can operate with the equipment/system. Each access level has different permissions to different menu options, with level 1 being the lowest and level 4 with the greatest number of available options.

Generally, access levels allow to:

- Level 1(L1): EN54 element visualization and use of PA System(*)
- Level 2(L2): System management and emergency functions. Password: **0002**
- Level 3(L3): System configuration and advanced functions. Password: **0003**
- Level 4(L4): Accessible only by the manufacturer.

Each screen that needs access to the user level required for the function to which you want to accede will require it. A higher level user or password will be able to access lower level functions.

To accede with a certain level of access or to configure the access mode, the Login menu is used. You can select between access mode by confirmation, or 4-digit password access.

Login has a validity time of 5 minutes. It can be reduced by pressing the “BACK” button during 2 seconds, and it will go back to the start screen as a level 1 user.

(*) PA Block: An access for the password can be configured for PA controls where the functions volume, routing, etc. are. (See 3.4)

2 INSTALLATION

The equipment allows the installation in wall or rack, and in vertical or horizontal orientation. Installation accessories are available to facilitate the installation procedure.

To fix the equipment to the supports, 4 of the 8 outside screws of the equipment shall be removed. From each pair of screws the one that is closer to the side where the support will be placed is removed. The clamping wings are inserted through the corresponding perforations and the screws that fix the equipment are placed preventing it from falling.

2.1 Orientation change

To change the orientation, the 4 screws that fix the front of the equipment to the chassis are removed. This way, the front is released, and the orientation can be changed so that the controls are accessible according to their final position.



Illustration 2: Front fixation and interior view

2.2 Inputs and outputs

In this chapter, the connectors of the ONE series are described.

The enclosure has 7 pre-cut holes for the entry and exit of the wiring, easily removed with a screwdriver. Its size is 36mm, which matches the size of the racors for 32mm tubes.

2.2.1 Power supply

The equipment has redundant power supply according to EN54-4 thanks to the battery charger accessory. The AC power supply range is universal type 90-240 V ~ input and frequency 50 or 60Hz, with integrated Power Factor Correction (PFC).

The backup source consists of a battery that is installed internally with the included battery charger by activation.

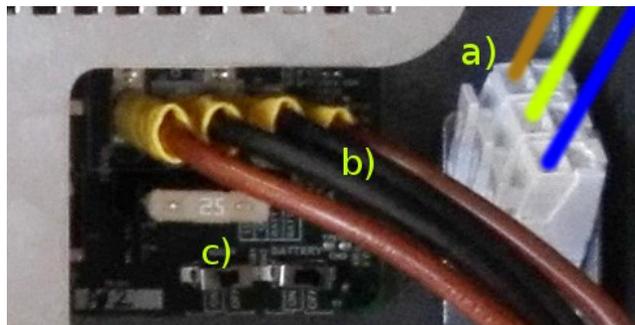


Illustration 3: Power connections

a) Main power input

The power connection is made directly by wiring it to the interior of the equipment, it must include the power disconnection elements externally. To manipulate the equipment, the external power must be disconnected.

There is a three-pole 1.5-2.5mm cable connector marked for Phase, Neutral and Ground. The cable can be inserted and removed thanks to the push button.

b) Battery connection

For the battery connection, the needed cable is included for connection to the compatible terminals, the recommended battery models.

c) Battery installation

Before installing the battery it is recommended to switch off the equipment using the switches in the supply circuit(c). This system allows to mount the battery safely and avoiding unwanted short circuits.

The equipment has a cavity for 12V sealed lead-acid batteries with a maximum size of 167 (height) x181 (width) x76 (depth) mm.

The equipment consumes 9Ah of battery for 24h of inactivity and 8Ah for each hour of evacuation at maximum power. With the recommended battery brand YUASA NP17-12I we have 17Ah to cover the reservation needs.

Additionally, a 25 Amps safety fuse is available for the battery input located on the supply plate.

Battery assembly

Unscrew the fixing part and release the flange that holds the cable for transport, see the points marked with arrows in the image.

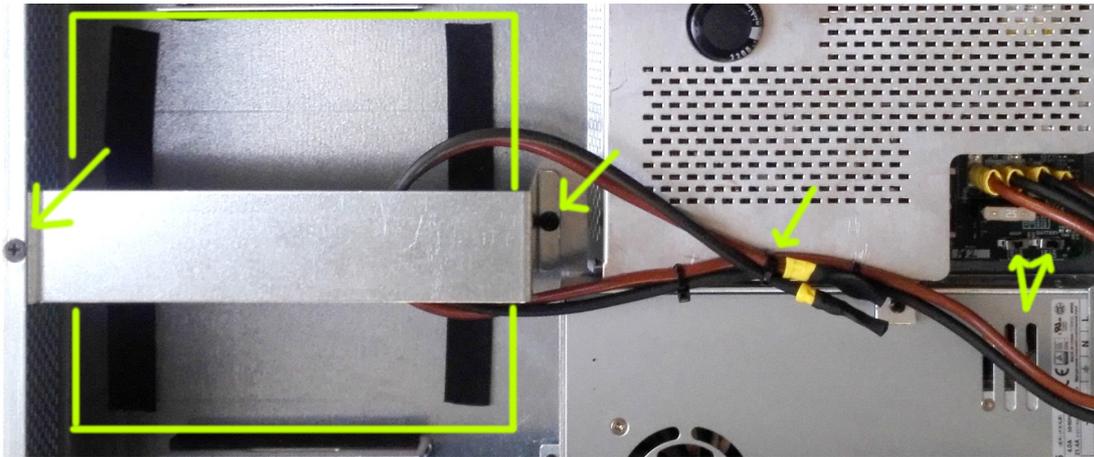


Illustration 4: Battery installation

2.2.2 Fire central interface

The emergency activation interface is indicated for interconnecting with fire control and indication equipment. All input connections are supervised in the event of failure in the transmission line. Said interface is composed of three sections.

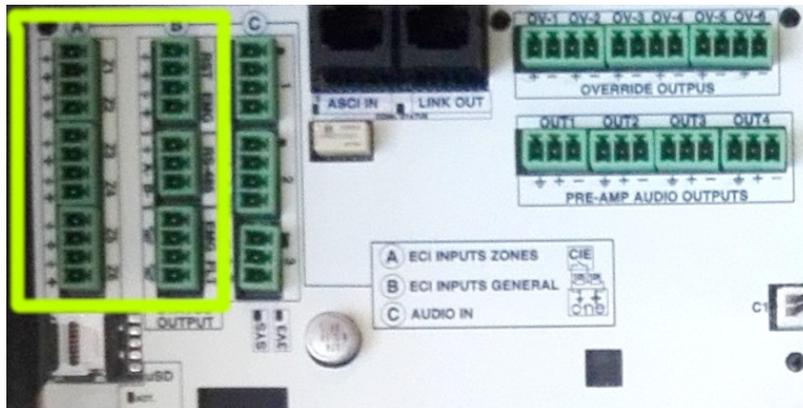


Illustration 5: Fire Central Interface

Connection is made using female euroblock connectors given with the equipment. The cable section range for each pole of this connector is: 0,14 → 1,5mm² (30 → 14 AWG).

Inputs are activated when the dry contact is voltage free. (**N.O.**, normally open)

a) Zone emergency activation inputs

These inputs are connected the same way as the general entrance to allow link supervision.

Default function: When the input of one the zones Z1...Z6 is activated, the state of general emergency will get activated and the list of evacuation messages for these zones will start to be played. The rest of zones will play the list of alert messages that can be configured in the configuration menu.

If the contact is deactivated, the reproduction of the messages will be paused, but a restart operation will be needed to go back to the inactivity mode or PA.

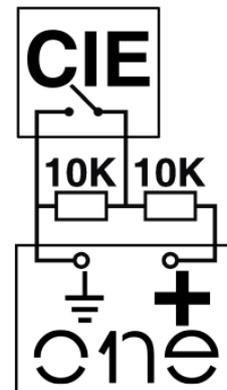


Illustration 6: Supervised CIE connection

b) General emergency activation input

Supervised inputs for voltage-free dry contact connection (N.O.): Restart and Emergency.

So that the link can be supervised, the connection of the dry contact to the equipment must be carried out by means of two external 10K Ω resistors (supplied with the equipment), placed at the output of the fire panel as indicated in the illustration 6.

Function: When the general emergency entrance (EMG) is activated by means of a contact closure (0V), the equipment will automatically change from working mode to an emergency state, and emitting the voice evacuation message through all zones of the system. When the reset input (RST) is activated, the equipment will exit the emergency operation mode and return to the idle state (PA).

It can be configured so the EMG input makes the combined function. See 3.2.3

NOTE: To avoid non-desired activation problems the system does not allow the alarm activation inputs to complete the sequence EMG, RST, EMG instantly. The second consecutive activation will leave about 2 seconds of margin.

c) State output

These outputs are dry contacts that indicate if the equipment is in emergency or failure state when they are closed. (N.O.)

They allow a maximum current of 350mA and a voltage of 350V.

d) RS-485/MODBUS Interface

Communication port on RS-485 half-duplex base for communication with fire control panel. It needs to be connected by 2 twisted wires (A, B) plus a GND wire.

This port is habitually not activated, it needs a firmware actualization.

2.2.3 Speaker line outputs, zones

The equipment has **6 zone outputs**. Each line connection has two terminals + and – for the speaker connection in 100V or 70 V speaker lines.

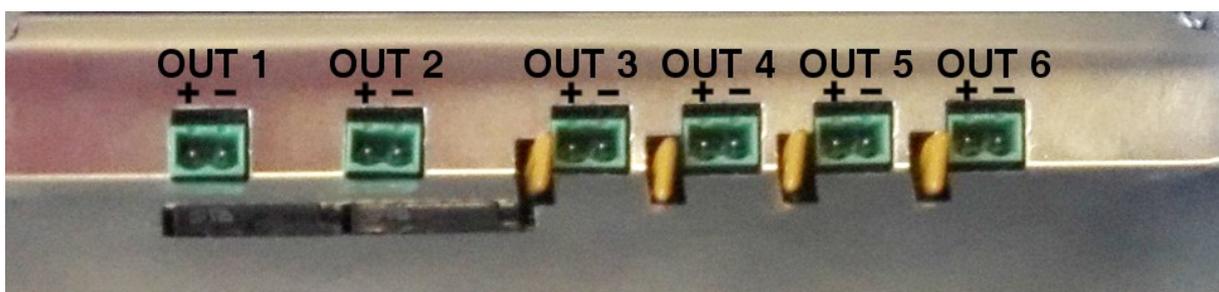


Illustration 7: Speaker line outputs

The total power of the equipment can be distributed in the departures of zones according to the design of the installation without exceeding the maximum limit per output: Zones 1 and 2 500W, Zones 3,4,5,6 120W.

The connection is made by means of a 2-pin female euroblock connector and 5.08mm pitch (supplied with the equipment). The cable section range for each pole of this connector is: 0.5 → 2.5mm² (22 → 12 AWG).

NOTE: Output voltage (up to 100 V) can be dangerous, so a correct isolation of the speaker lines is necessary. Test that there are not short circuits, fake contacts or ground

derivations in any of the lines.

a) Backup amplifier

Backup amplifier does not need connection because it gets connected internally automatically.

2.2.4 Audio source inputs

The system integrates 3 inputs for background music and/or microphones. See the audio inputs configuration for further details. At the side of each input there is a luminous audio signal indicator that activates with signal over -40dBV.

The audio input connection is made by euroblock connectors that allow cable sections between 0,14 → 1,5mm² (30 → 14 AWG). Input impedance 10Kohm.

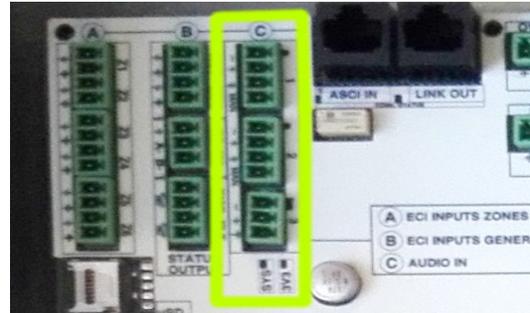


Illustration 8: Audio Source Inputs

a) #1 and #2 Inputs

Inputs for background music or priority signal. They allow an activation trigger for each dry contact or signal level, with zone routing configuration. Input level 1Vrms. Balanced audio.

b) #3 Input

Configured as a background music input, because it does not have activation trigger. Input level 1 Vrms, balanced audio.

c) #4 Input, intern mixer

The system has a #4 input that has no external connector, because it is a mixer integrated in the DSP that uses the 3 inputs.

2.2.5 ACSI microphones and devices input

This input allows the connection of up to 8 compatible devices such as MPS-8 microphones or VAP-1 emergency management panels.

The ACSI input integrates audio, communications and power allowing the emergency devices to be fed directly from the integrated backup source.

The connection is made using standard UTP network cable T568B. The connection is made by bus, with a maximum connection length of 1000m.

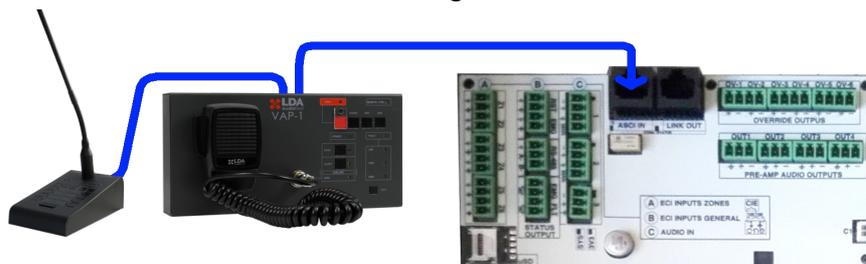


Illustration 9: PA system devices connection

This input has a signal indicator LED for audio tests and a state LED that will indicate that there are connected devices.

2.2.6 LINK output

This connector is intended for the future interconnection of ONE devices. It will be able to form a system of up to 24 zones.

It integrates 2 audio channels and communications between units.

The cable used is the same as in the ACSI connector, allowing up to 500m between devices.

2.2.7 Pre amplified audio outputs. PRE-AMP OUTPUTS

ONE has 4 outputs at 1 Vrms (line level) to connect external equipment as backing amplifiers.

These outputs can be configured to obtain the same audio as the zones or as recording output of the messages of microphones in evacuation.

Connection is made by 3-contact Euroblock type connectors and 3,81 mm pass (given with the equipment). Cable section range for each pole of this connector is: 0,14 → 1,5mm² (30 → 14 AWG). The maximum output load is 10Kohm.

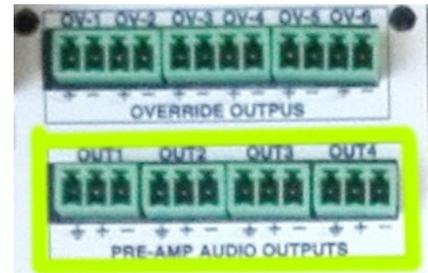


Illustration 10: Pre-amplified outputs

2.2.8 Attenuator cancellation output, OVERRIDE

In the control board there are 6 attenuator override outputs for public address lines. In idle state they have a voltage of 0V. In active state, each output has a voltage of 24V DC and 20mA of maximum current. Each exit has two poles.

Connection is made using 2-contact Euroblock female connectors and 3,81 mm pass (given with the equipment). Cable section range for each pole of this connector is: 0,14 → 1,5mm² (30 → 14 AWG).

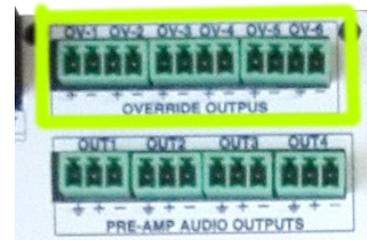


Illustration 11: Attenuator cancellation output

2.2.9 Internal connections

There are some connection ports for internal wiring. Some of them must not be manipulated by the user.

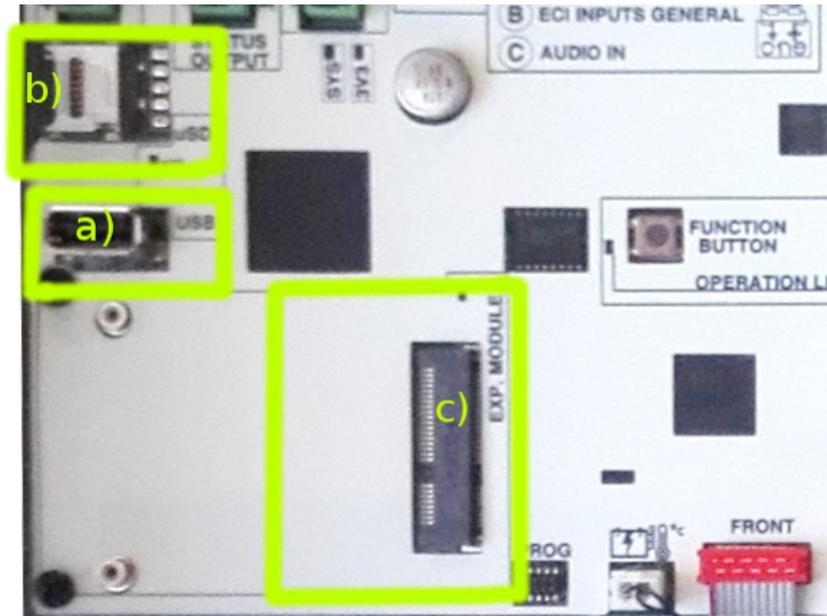


Illustration 12: Other internal connections

a) USB

USB connector A type for external memory connection (PEN-DRIVE) that allows to import messages, actualize firmware and import and export configurations or Logs.

b) Micro-SD card connector

This connection is used for software amplification as the installation of the EN54-4 battery charger.

c) Expansion bay

This connector us an expansion bay expected for future system ampliatiions. Its future options will be to provide the simple or redundant Ethernet connection equipment and redundant control loop for interconnected ONE equipment.

d) Function button

Keeping the function button pressed for 3 seconds it makes a reset software of the equipment.

3 CONFIGURATION AND COMMISSIONING

Once made the needed connections, the elements and options used in the system should be configured.

3.1 Power supply

Before activating system power, test previously service commutators that unable AC source inputs and battery, see Illustration 3.

Connect the equipment to the electrical network. It should turn on correctly. The front power indicator lights up and the firmware version will appear on the display during startup. Then, the start screen will appear.

3.1.1 Install battery charger

The battery charger activation card must be installed, if available, before powering the equipment.

The memory card includes the battery charging software. It is installed in the micro SD (b) card connector . Move the metal part following the OPEN arrow and get up. Place the card, lower the metal tab and move in the opposite direction LOCK to fix it. When the equipment is turned on, the option to activate the charger and battery monitoring must appear in the configuration menu.

3.2 Automatic Configuration. Autoset.

The automatic configuration function saves much of the configuration work of the ONE system. The operation of the automatic configuration system makes the adjustments according to what is detailed in the following sections. Any configuration can be subsequently edited manually.

It is released by pushing OK in the option "Run AutoSetup" in the menu **Configuration/System/AutoSetup**

This configuration verifies the elements follow EN54 requirements as described in the following sections.

3.2.1 Date and time

The automatic system tests the configured date, if it is previous to 2010 it will ask the user to adjust it manually..

In the case of interconnected systems(v2), master time will get distributed automatically to the slaves.

3.2.2 Zones and speaker lines. Zones

The system checks automatically the loudspeaker lines, looking for the ones that are being used. They must be connected in order since when the equipment detects a line with impedance higher than the measurement range (600 Ohm), it considers that neither this line nor the following ones will be used.

When the user wants to use a line with high impedance (more than 600 Ohm), a end of line terminal (LDATFL2) in order to let the equipment recognize it as a zone in use. All the detected zones are configured with active line supervision, but this can be changed from the menu **Configuration/Zones**.

Using the active line supervision volume controllers cannot be used, because the input impedance varies depending on the adjusted level.

3.2.3 CIE Interface (Fire Detection Central)

The system checks that the inputs are connected correctly with the specified terminators (2.2.2). When it detects the end of line (EOL) devices the supervision of the general input and/or the connected zone inputs will get activated. If the EOL devices are not detected they will remain active without supervision, working in dry contact mode.

3.2.4 Battery

Battery management depends on the installation of the charger accessory EN54-4. The system checks if the microSD card is installed with the charger module. In this case, the system will check that there is an installed battery, checking the voltage and the internal impedance. Minimum working voltage is 10,5 V with a maximum impedance of **100mOhms**.

3.2.5 ACSI devices

Connected ACSI devices always are automatically detected after some seconds. Using the automatic configuration they remain installed in the system so that a failure will appear later if any Voice Alarm Panel (VAP) or microphone (MPS) get disconnected.

It should also be tested that the devices addresses are correctly configured and that the end of line device of the last bus device is active.

3.2.6 Audio inputs

Default Configuration: #1 and #2 inputs active by activation and #3 input active in every zone.

3.2.7 Backup amplifier

The backup amplifier is activated automatically and amplifier supervision too. It will show failure if in any moment any of them stops working or does not offer the gain level calibrated in the fabric.

3.2.8 Evacuation messages. Messages

System will ask the user if it wants to import messages, asking for the DATAxx directory to import them. Number xx is chosen between 00 and 99.

Import folders are:

..\DATAxx\EVAC for evacuation.

..\DATAxx\ALERT for alert.

All the messages in each folder can be imported until the space is filled. Reproduction order will be alphabetical. If the name coincides, the intern message is overwritten.

Important NOTE: File names should have a maximum of 8 characters with no spaces nor special characters (symbols) with the “.wav” extension.

File format is monochannel 16 bits PCM with sampling at 24 or 48 Khz

LDA offers a free tool to convert audio files.

3.3 Manual configuration

Configuration menu allows to adjust manually the system parameters, such as equipment number, zones, input and volume configuration, DSP adjustments, battery, messages, firmware, etc.

3.3.1 Audio Inputs

a) Inputs #1 and #2 configuration:

- **Vumeter:** Input audio level indicator. (de -100 a 0 dBV)
- **PA Volume:** Volume adjustment in PA mode.
- **VA Volume:** Volume adjustment in evacuation mode from -100 to 12dB
- **Trigger Mode:** These inputs can be configured with 3 trigger modes. TTL maneuver for dry contact normally opened, noise gate (VOX) or always on.
- **Trigger Level.** Adjusts the activation level for the noise gate (VOX).
 - The user should consider that in “Always on” mode the source with higher priority will occupy all the zones where it is selected.
- **Eq. Enable, Eq Settings:** These commands allow to activate and configure the parametric equalizer at the input.
- **Compressor:** It activates a limiter compressor to improve dynamic range in the input.
- **Override:** When a priority input is activated, it activates the override outputs of the zones that it is routed to.
- **Label:** It allows to configure a name for this input.

b) Input #3

It is expected to be used as BGM input. The menu is similar to the previous ones, except for the priority adjustments.

c) Mixer input, MIX. Input #4.

The mixer is a tool that allows to work with priority sources not cutting background music.

As inputs #1 and #2, it allows the use of an override, level adjustment, and also:

- **Volume:** Selects the input level of each source.
- **Inputs:** Which sources enter the mixer
- **Mix Fade:** It configures the attenuation of lower priority sources when the source of priority is activated.

Priorities (higher to lower priorities): Source #1, Source #2, MIX source, Source #3.

3.3.2 Audio Outputs

In this menu amplifier outputs, preamp outputs and LINK connection for slave equipment are configured

a) Amplifier

Amplifier output manages the main amplifier and backup amplifier at the same time.

- **Master PA Vol, Master VA Vol, Mute:**
- **Eq Enable y Eq Settings:** It allows to activate and configure parametric equalizer at the input.
- **Loudness.** It activates the automatic equalization isophone system adapted to human ear.
- **Advanced.** Advanced configuration parameters of the amplifier-
 - **Amplifier N.** It allows to activate or deactivate the amplifier supervision and visualize the gain (19 kHz) and temperature gain.
 - **Common config.** The failure detection parameters and the 70 V lines mode can be configured.

b) Pre-Out

Pre-amplified outputs can be used for external amplifiers for zone power boost or emergency alarm recorder. Each output has independent volume adjustment.

- **PA Volume, VA Volume, Mute.**
- **Link to zone.** It configures the zones where it gets integrated, to receive the same audio as this zone.
- **VA Rec-Out:** Recording output is assigned to output **Pre-out 4**, so it plays voice messages emitted to the zones in evacuation mode.

c) LINK-OUT

Projected for systems ONE v2. It will be able to select a source connected to the master in order to send it to the slaves.

3.3.3 Zone configuration. Zones

For each zone you can individually configure your label and line supervision parameters.

- **Supervision:** Enables or disables line / zone supervision
- **Line Status:** Indicates if the status of the system is correct or faulty.
- **LastMeas Z:** Reports the impedance value of the last measurement.
- **Nominal Z:** It is the impedance value saved at the time of calibration.
- **Nominal Z mute:** Same as the previous one but calibrated by the measurement system in Mute or low power. (Both values may differ slightly due to the use of two independent measurement systems)
- **Calibrate:** Start a new calibration of the line. **NOTE:** It should only be done when the user is sure that the line is OK. The equipment has a maximum limit of measurement (600 Ohms), when the impedance exceeds that limit it will dial 9999. A line terminator should be used in those cases.
- **Lower Tol% y Upper Tol%:** They are the limits of variation allowed in percentage with respect to the impedance calibrated to indicate open or short circuit.
- **Label:** It allows to add the zone label.

3.3.4 Import and edit messages. Messages

To edit evacuation and alert messages, the system has these options.

- **Storage:**
 - **View Playlists:** It allows the user to consult how the playlists have been and the order in which they will be played. It also allows you to delete the messages one by one.
 - **Import MSG:** To import messages from the USB memory. A DATAxx folder is chosen from 01 to 99. The files must be in the predefined location, they must also have the correct format:
 - File .wav PCM monochannel 16 bits, 24 o 48kHz
 - ..\DATAxx\Messages\EVAC\ for evacuation.
 - ..\DATAxx\Messages\ALERT\ for alert.
 - Messages with the same name will be replaced, messages with different names will be added.
 - **Backup:** The user can make a backup of the actual messages, they will be saved in the folder DATAxx\.....
 - **Erase:** It allows to erase all the messages in the intern memory.
- **Player Slot N:** Message players configuration.
 - **Vumeter, VA Volume, Eq. Enable, Eq. Settings.**
 Player/Slot 1 It plays **Evacuation messages**
 Player/Slot 2 plays **Alert messages**

3.3.5 PAVA microphones. ACSI devices

In order to customize the configuration and monitor the ACSI devices they must be installed in the system previously, by means of AutoSetup or menu **ACSI/Install**.

Each bus address is installed indicating the type of device. Devices installed in the system will be monitored and failure will be marked if they are disconnected. The priority of the devices will depend on the bus address configured and the type of device. Addr 1 is the highest priority adress. VAP emergency microphones have higher priority than MPS microphones.

- **Monitor:** It indicates the user if the system has detected automatically a microphone.
- **Install:** It allows the user to install devices for their supervision.
- **MICs Config:** Parameter configuration
 - **Vumeter:** Indicates signal level in the common input (only take into account when the device is active)
 - **Volume:** Input level adjustment between -100 and +12dB for each device.
 - **Override:** It configures the activation of override outputs for PA microphones. In VA the outputs of the zones in emergency are always activated.
 - **Label:** It allows to edit a label for this device.
- **Input Config:** ACSI devices audio parameter adjustment.
 - **Eq. Enable, Eq. Settings, Compressor.**

3.3.6 CIE Inputs

Allows the configuration of the dry contact inputs as well as the activation and configuration of the RS-485 MODBUS bus for operation with integrated fire control panels.

- **Input Status:** It visualizes the state of each input.
- **Inputs Config:** It configures the activation and supervision of each input independently.
 - **Enable:** Activates each input function.
 - **Supervision:** Activates input supervision. See 2.2.2 b
 - **N/C Mode:** Changes Input polarity to normally close mode.
 - **Alert mode:** Associated input activates Alert message instead of emergency.
 - **Zone Id:** It assigns the zone that will be affected by this input Zx.
- **CIE AutoAlert:** Activates the playback of Alert messages automatically.
- **CIE AutoReset:** With this active parameter the system leaves emergency when releasing the input dry contact that activated it.
- ***RS485 Conf.** It configures the communication port parameters
- ***RS485 AutoSend.** It activates supervision mode, each minute the system sends and should receive a command from the central unit. If it does not, it activates the link failure with fire central.
 - **(*)RS-485 options need firmware actualization.**

3.3.7 Battery charger. Battery

In the battery menu you can deactivate the battery monitoring, the integrated charger and monitor the battery status.

These menu options are only available if the charging accessory is installed.

- **Monitor:** In this section we can see battery state: voltage, impedance, charger state, charge current and temperature.
- **Charger Enable:** It enables or disables the battery charger.
- **Supervision:** It enables battery state supervision and failure detection.
- **Temp Sensor:** It enables battery temperature sensor supervision.
- **Faults Levels:** The minimum voltage of the battery and the maximum impedance can be adjusted. Default values: 10,5 V and 100 mOhms. It is not recommended to modify those values.
- **Advanced:** Advanced parameters of the charger are adjusted, only for expert users

a) Funcionamiento y monitorización

In order to help the user in the diagnostic of the battery state, the system has the "Monitor" menu.

- **Voltage:** It indicates the actual voltage of the battery.
- **Impedance:** Battery impedance measured.
- **Chg status:** Charger status. It indicates the actual state of the charge:
 - **Disabled:** Disabled charger.

- **Bulk:** Phase of maximum intensity of load when it is possible to reach 80% of the load in the shortest time. It has a limit of 24h, if the system fails to complete this stage it will indicate a fault “Chg timeout”.
- **Absorption:** In this phase the charging current decreases progressively until the battery reaches 100% charge. It also has a limit of 24 hours according to regulation.
- **Float:** Battery is totally charged and this is the state to keep it 100% charged. This voltage will be between 13 and 13.8V normally.
- **Current:** It indicates the current charged in this moment.
- **Temperatura:** Temperature value of the battery sensor in Celsius degrees.

3.3.8 Load/Save. Save and charge configuration.

The configuration system can be saved or charged.

- **Export Sys CFG:** The system sends a copy of the system configuration to the USB memory. Selecting the number will save the parameters in the \DATAxx folder. If there is a previous configuration, it overwrites the previous data.
- **Import Sys CFG:** It imports the data from folder DATAxx from the USB memory.

3.3.9 System. System configuration

System general parameters configuration:

- **Info:** Shows system information, FW version, serial number...
- **AutoSetup:** Launches the automatic system configuration by EN54. See details at section 3.2 Automatic Configuration. Autoset.
- **Software Reset.** Restarts the system and internal processors.
- **Factory Reset:** Returns the system to its Factory configuration. It deletes all the parameters configured by the user, except for the logs.
- **FW_Update:** Allows to actualize firmware version by a file in USB memory.
 - NOTE: File must be in the root directory and be called **fw.bin** or **update.bin**
- **Erase Logs:** Makes a failure and emergency logs erase.
- **Logs Interval:** It allows to configure the time of permanence of the entries of the logs. You can choose the days of permanence or show the complete history.
- **Zones Numer:** Indicates the number of zones that the system has, disabling the outputs that are not being used.
- **Date/Time:** Configures date and time for a correct working of failure and emergency logs.

3.4 Login. Gestión de usuarios

Login submenu allows to introduce the password to use the system. Otherways, the user will be asked to introduce it automatically.

In the **Access Config** section passwords for each level are personalized. A password for PA (L1) management can be added and passwords for access levels L2 and L3 can be modified or deleted.

3.5 Advanced configuration

Some configuration parameters are not available in the menu because they are not usual. Contact with support system for further information. Some of these parameters are:

Modify supervision times of speaker lines or amplifiers.

SD Cards use for prerecorded messages.

Configure audio sources allowed in EMG state or in battery.

4 SYSTEM USE

4.1 Main screen

Main screen will show relevant information depending on the state as specified in EN54 norm.

It will show the message **PAVA System <Ready>** by default.

When the emergency or failure state gets activated, it will show automatically the appropriate login screen.

4.2 Emergency management. VA Operator.

When entering the emergency menu, the level 2 access password will be requested, see user configuration (1.2). This menu allows manual control of the emergency system to perform the installation tests.

These actions require level 2 access, default password 0002.

4.2.1 Launch evacuation and alert

In order to launch evacuation, the user accedes to the menu **Launch EVAC** selecting either all the zones or the zone/s individually. Zones also can be put in alert mode by selecting them in the menu **Launch ALERT**.

One zone can be put on Alert and Evacuation at the same time, the priority system will automatically put the zone in evacuation. When the user deactivates the evacuation status, the system will get to Alert mode. In all cases the live messages from emergency microphones have higher priority than the prerecorded messages.

Enter EMG option puts the system in emergency state, deactivating PA Audio Sources (except microphones), but does not replay any evacuation message.

4.2.2 Stop voice announcement. Silencing

Silence Zones: When silencing any or all of the zones, the reproduction of the evacuation and warning messages in the selected zones is disabled, but keeping the evacuation status in the affected zones.

4.2.3 Unable emergency state and restart

The option **Reset Zones** allows a restart of the alarm condition in the selected zones.

Reset System throws a global restart that can be done from the front button (pressing it during 2 seconds)

Note: If the emergency was activated remotely, it will activate again after a few seconds. If the failures persist, they will be reactivated within the time required by regulation.

4.2.4 System monitor. VA Monitor

Indites the state of each of the zones.. It will show one of the possible states (**PA-Idle, EVAC, ALERT, EMIC, Silenced**).

4.3 PA management. PA Operator

In this menu the usual PA settings can be made. While the system is not in use for evacuation it can be used as a warning system and / or ambient music.

4.3.1 Volume adjustment

The volume of the inputs and output amplifier (master) can be adjusted in this menu. The adjustment range of the inputs is -100dB to + 10dB. The amplification range is -100dB to 0dB

The general volume can also be adjusted using the up and down buttons directly from the main screen.

4.3.2 Matriz

The **Matrix** menu manages PA sources and their routing.

In each zone, the sources that are allowed are activated. They can all be activated at the same time since the priority level of the available sources and amplifiers will determine which source is activated in each case.

Example: ZONE 1

In 1: Yes

In 2: Yes

In 3: Yes

In 4 MIX: No

The active source in this case by default is source #3, since sources 1 and 2 will be waiting for the activation of their maneuver. In case of configuring source 1 as BGM, this configuration will not make sense since source 1 will always be activated and will not let sources #2 or #3 enter.

4.3.3 Monitor

PA system monitoring menu. We can visualize the state of the zones (**Zones**) to know which source (**Source**) is actually assigned to each zone currently, we can also see the level of the output signal (**Vumeter**) and the label of the zone (Lab).

In the input submenu (**Sources**) we can see the signal level entering each moment and the input level.

Each possible input source has an associated number regardless of the function or priority it has.

1. Input source 1. BGM o MIC
 2. Input source 2. BGM o MIC
 3. Input source 3. BGM
 4. Input source 4. MIX
 5. ACSI bus, Microphones.
 6. Message player 1: Evacuation
 7. Message player2: Alert.
- Source 0. Mute. No assigned source.

4.4 System monitor. SYS MONITOR

In this menu are the fault and emergency logs, as well as internal error logs and system monitoring data. The information in these menus is read-only and can be accessed by any level 1 user.

Failure and emergency logs will be shown in the main screen since a new input is registered until manual operation by the user or 5 minutes after the registration. If the system comes back to normal state the main screen LOG will disappear but it will be accessible from the menu for 2 days. The complete log (up to 100 entries) can be viewed depending on the chosen configuration(3.3.9).

Log visualization in the screen follows the same structure in all the cases:

- Upper line:
 - Information from the actual list: **FLT, EMG o SYS**
 - **Number** of visualized input/Total inputs in the LOG.
 - Input selection can be changed with the right or left buttons.
- Lower line: Keys up and down change information.
 - Event description.
 - State: (just for failure LOG) indicates if it is active or has been solved.
 - Activation or deactivation date.
 - Hour of the activation/deactivation.
 - Internal code of the registered input.

See ANNEX A for each input detail.

4.4.1 Emergency log. EMG_LOG

Registers the events of emergency entry, reproduction of evacuation and warning messages, operations from fire panel, etc.

4.4.2 Fault log. FLT_LOG

Informs about detected failures following monitorization required by EN54 norm

4.4.3 System log. ERR_LOG

It registers system events or supervision information not required by the EN54 norm, but that can be useful for system analysis.

5 FAILURE INDICATION RESOLUTIONS

This chapter explains the most common possible fault indicators. In most cases the failures indicated here will be triggered by an error in the configuration of the equipment, so it is recommended to check the configuration chapter in each case.

NOTE: See log error section.

5.1 Speaker lines

The system will indicate a fault in the loudspeaker line in case a short circuit or open circuit has been detected or the impedance has changed by more than 15%.

The measurable load range is between 20 and 600 Ohms. In the zone menu, you can see the calibration measure established for each line. In case of error at the time of calibration this number will be 0 or 9999 to indicate that the calibration is out of range.

If this fault occurs, check the line indicated in the system fault log. To do this, please disconnect the line and measure its impedance, between the terminals of the cable and between each of the ground terminals with an impedance measuring device. Check that the values correspond to the expected according to the number and power of the existing speakers in the line. If any of these measurements is outside the expected values, leave the line disconnected, and check the status of the line and speakers until the problem is detected.

5.2 Transmission line with CIE

The system will indicate a transmission failure with the CIE when the transmission path is detected as short-circuited or disconnected.

If this fault occurs, check that the connection between the system and the CIE has been made correctly according to the installation instructions. To debug the fault, disconnect the two ends of the cable connected between the ECI and the equipment, and measure between the terminals of the cable with a multimeter on the k Ω scale. If the result of the measurement is 0, the line is in short circuit. If the result is 1 (inf), it means that it is open. If the result is 20k Ω in that case the line is correct. In either of the first two cases, replace or repair the transmission line.

5.3 Protection devices

The system will indicate a protection failure when any of the internal protection devices of the equipment are active.

If this fault occurs, the amplification channels that have the protection indicator on have overheated. In this case, check that the ventilation of the equipment is adequate, by testing that the air inlets and outlets are not blocked. The equipment has been protected to prevent a serious breakdown. It is possible that if the equipment is turned off, it will work again after several minutes. Avoid this operating mode as it can cause serious damage. To avoid damaging the equipment, deactivate the voice alarm zones where the fault occurred, and notify the support/eparations service.

5.4 Power supply

The system will indicate a power failure in either of these two situations:

- Main power: A fault has occurred in the main power supply (AC power). If this fault has occurred, check that the network power reaches the

equipment. If so, check the output of the AC / DC source, it should give 15V. In this case verify that the disconnect switches are ON.

- Redundant power: The equipment monitors the charger and the battery. It can register failures related to these devices. To take this failures into account, it should be considered that the battery has a shorter life time than the system.

If the battery is continuously discharged, the device will indicate a battery failure and will not charge it until a minimum voltage level is reached in the battery. In the monitoring menu you can see the current battery voltage. If this voltage is below 10.5V the battery will not charge. To try to recover the battery you must use a specific charger and always under supervision.

5.4.1 Supply indicators (advanced):

Internal check (only for experts): In AC, 2 green led indicators will light continuously. One is in the center of the power plate and another one on the control board with the 3V3 marking indicating that there is feeding.

An amber led in the center of the board (left frame) of power means:

Flashing: the current limiter is activated

Fixed: The power of the amplifiers is deactivated. It can happen because the lid of the equipment is open or by a protection by temperature.

In the battery input area (right side of the picture) there is a green LED that is activated when the equipment is being powered by the battery.

5.5 System

System will indicate a memory failure when a software execution or memory problem occur. If after some restarts the problem persists, please notify support/reparations service.

6 MAINTENANCE INSTRUCTIONS

The equipment requires a reduced continuous periodical maintenance.

Periodicity of the maintenance shall be adjusted depending on the installation conditions of the equipment. As minimum it is recommendable to establish a maximum period of one year.

Operations:

- Check the error log searching for fault events.
- Clean the air inlets and outlets of the equipment with a vacuum cleaner.
- Check equipment connections and ground connection.
- Perform system tests, evacuation simulation, etc. to verify the correct functioning of the entire system.
- The battery must be changed every 3 years or when there are malfunctions or indications of failure

7 TECHNICAL CHARACTERISTICS

Model	ONE-500
Power	100 - 240V~ 50/60Hz
Consumption	320W max / 100W at 1/8 output power /40W repose AC/
Frequency response	80 - 20000Hz +/-1dB
Signal/Noise relationship	SNR <90dB, A weighing (Main Amplifier)
Distortion	<1% following IEC 60268 -15dB. <0,01% in pre-amplified outputs
Gain adjustment	-100dB +10dB, 1dB steps
DSP	Integrated - 48 kHz, 28 bits - 172 Mhz
BGM Audio Inputs	Up to 3 x balanced audio 1 Vrms. 10 KÙ, 3 Pin, tipo Euroblock
Priority audio inputs	2 x balanced audio 1 Vrms. 10 KÙ, 4 Pin, Euroblock type (GPIO)
General Control (CIE)	2 x control I/O, 0-5 V, 100 Ù, in audio inputs PRIO
LDA Bus ACSI	1 x balanced audio 1 Vrms. 10 KÙ, RJ-45 female, total 1000m
Conectivity ACSI Link	2 x balanced audio 1 Vrms. 10 KÙ, RJ-45 female, total 500m
Preamplified Audio Outputs	4 x balanced audio 1 Vrms. 100 Ù, 3 Pin, Euroblock type
Attenuator Control	6 x override 24V DC, 6 x 30mA, 2 Pin, Euroblock type
Emergency control inputs	8 x 0 - 5V DC, supervised inputs, 2 Pin, Euroblock type
Emergency control outputs	2 x dry contact output, N.O., max 60V DC 130mA, 2 Pin, Euroblock type (4 pin connector)
Virtual matrix	15 x 24 max
Amplifier	2 x 500W class D @ 70 / 100V. Min charge. 20 Ù
Backup amplifiers	1 EN 54-16 backup amplifier with automatical priority
Speaker line outputs	6 x 100V audio. Minimum impedance 20 Ù 500 W (outputs 1 y 2), 80 Ù 120W rest, 2 Pin tipo Euroblock.
Output power	500 W(Pink noise 1/8) . 200 Wrms following EN-54-16
Protection	Overheat, infrasound, short circuit, slow start, overload
Emergency power	Battery housing for 181x76x167mm, up to 22Ah battery
Battery Charger	Integrated, intelligent load of up to 3 A
Screen	LCD retroilluminated LCD 2 files x 16 characters
Working conditions	From -5 °C to +45 °C / 23 °F to 113 °F From 5% to 95% relative humidity (no condensation)
Finish	Materials: Fe y AL Colors: RAL7016 y RAL9005
Weight	7.5 Kg / 15.76 lb (Battery not included)
Sizes (A x H x P)	453mm x 88mm x 455mm / 18.2" x 3.46" x 18"
Accesories	Male Euroblock type connectors, installation screws, 4 x rubber adapter.

7.1 EN54-16 functions

ONE system controller implements all the mandatory functions contemplated in EN-54/16 norm. It also includes the following optional certified functions.

1. Audible advice
2. Phase evacuation
3. Voice alarm condition manual silence
4. Voice alarm condition manual restart
5. Voice alarm condition output
6. IEC connection failure indication
7. Voice alarm zones failure indication
8. Voice alarm manual control
9. External control devices interface
10. Redundant power amplifiers

Auxiliar functions

1. Background music program distribution
2. Zone microphones call management
3. I/O independent channel digital audio signal processing
4. Prerecorded message player
5. LDA Sound Enhancer
6. Recording output
7. Attenuator control output
8. Input 3-band per channel parametric equalizer
9. Output 7-band parametric equalizer
10. Loudness compensation

8 ANNEX A: Log content

8.1 Emergency log

ID (hex)	Desc
0001	VA system input (local)
0002	VA system input (remote)
0003	RST of VA system state (local)
0004	RST of VA system state (remote)
0005	ACK of VA system state
0006	EVAC MSG On
0007	EVAC MSG Off
0008	ALERT MSG On
0009	ALERT MSG Off
000A	MIC On
000B	MIC Off
000C	Zone X EVAC activation
000D	All zones EVAC activation
000E	Zone X ALERT activation
000F	All zones ALERT activation
0010	Zone X EMIC activation
0011	All zones EMIC activation
0012	EMG state reset in one zone
0013	EMG state reset in all zones
0014	EMG state silence in one zone
0015	EMG state silence in all zones

8.2 Failure codes

ID (hex)	Desc
03E9	Communication error with motherboard expensor
03EA	Front equipment expensor error
03EB	Mutherboard HUB I2C error
03EC	1 ISL amplifier board expensor error
03ED	LCD frontal screen error
03EE	ADAU motherboard error

03EF	ADC/DAC codec in motherboard error
03F0	Phy ethernet module error
03F1	RTCC error
03F2	Watchdog restart
03F3	User buttons error
03F4	DAM component parameters recovery error
03F5	ONE_SYS component parameters recovery error
03F6	ONE_SYS component parameters recovery error
03F7	SD card error
03F8	SD card format error
03F9	Flash memory error
03FA	Flash intern memory format error
03FB	Host USB port error
03FC	Host USB port format error
03FD	Client USB port error
03FE	Date/time lost error
03FF	ADC CIE conversor error
0400	Z1 CIE input error
0401	Z2 CIE input error
0402	Z3 CIE input error
0403	Z4 CIE input error
0404	Z5 CIE input error
0405	Z6 CIE input error
0406	Z7 CIE input error
0407	Z8 CIE input error
0408	RST CIE input error
0409	EMG CIE input error
040A	CIE link error
040B	ACSI bus power error
040C	ACSI 1 device link error
040D	ACSI 2 device link error
040E	ACSI 3 device link error
040F	ACSI 4 device link error
0410	ACSI 5 device link error
0411	ACSI 6 device link error
0412	ACSI 7 device link error
0413	ACSI 8 device link error
0414	ACSI 1 noise in communications error
0415	ACSI 2 noise in communications error
0416	ACSI 3 noise in communications error
0417	ACSI 4 noise in communications error
0418	ACSI 5 noise in communications error

0419	ACSI 6 noise in communications error
041A	ACSI 7 noise in communications error
041B	ACSI 8 noise in communications error
041C	EMG microphone in ACSI 1 device error
041D	EMG microphone in ACSI 2 device error
041E	EMG microphone in ACSI 3 device error
041F	EMG microphone in ACSI 4 device error
0420	EMG microphone in ACSI 5 device error
0421	EMG microphone in ACSI 6 device error
0422	EMG microphone in ACSI 7 device error
0423	EMG microphone in ACSI 8 device error
0424	Main AC power error
0425	Battery power error
0426	Amplifier 1 gain test error
0427	Amplifier 2 gain test error
0428	Amplifier 1 protection error
0429	Amplifier 2 protection error
042A	Ready error, amplifier 1
042B	Ready error, amplifier 2
042C	Overheat error, amplifier 1
042D	Overheat error, amplifier 2
042E	Temperature sensor error, amplifier 1
042F	Temperature sensor error, amplifier 2
0430	Line 1 supervision shortcut error
0431	Line 2 supervision shortcut error
0432	Line 3 supervision shortcut error
0433	Line 4 supervision shortcut error
0434	Line 5 supervision shortcut error
0435	Line 6 supervision shortcut error
0436	Line 7 supervision shortcut error
0437	Line 8 supervision shortcut error
0438	Line 1 supervision open circuit error
0439	Line 2 supervision open circuit error
043A	Line 3 supervision open circuit error
043B	Line 4 supervision open circuit error
043C	Line 5 supervision open circuit error
043D	Line 6 supervision open circuit error
043E	Line 7 supervision open circuit error
043F	Line 8 supervision open circuit error
0440	Line 1 supervision invalid measurement
0441	Line 2 supervision invalid measurement
0442	Line 3 supervision invalid measurement

0443	Line 4 supervision invalid measurement
0444	Line 5 supervision invalid measurement
0445	Line 6 supervision invalid measurement
0446	Line 7 supervision invalid measurement
0447	Line 8 supervision invalid measurement
0448	Error: battery not detected
0449	Error: non valid battery (battery test failure)
044A	Error: not enough voltage supply in battery
044B	Temperature error in battery
044C	Timeout battery charge error
044D	Error: no evacuation messages installed
044E	Error: some of the evacuation messages are corrupted
044F	Error: no alert messages installed
0450	Error: some of the alert messages are corrupted
0451	Error: "intrusión" detected in the equipment (cover opened)

8.3 System events

ID (hex)	Description
01F5	System Launch
01F6	Equipment error reset
01F7	Log ERR erase
01F8	Log EMG erase
01F9	Log FLT erase
01FA	ACSI bus power fuse reset
01FB	Firmware actualization
01FC	Factory Reset
01FD	Flash memory format
01FE	Factory reset during equipment launch
01FF	Motherboard V1 detected
0200	Motherboard V2 detected
0201	Amplifier board V2 detected
0202	Amplifier board V3 detected
0203	Amplifier board V4 detected

9 ANNEX B: Cable section for speaker lines

The table below shows the recommended maximum distances for 100V loudspeaker lines. The type of cable used for the calculations is of bifilar type with copper conductor. The values shown can be used as a planning guide, being the responsibility of the installer, perform the final calculations appropriate to each case.

The output power of typical amplification channels, with constant voltage 100V in rms watts are expressed in the table. The maximum length for lines of 70V is half of that reflected in the table.

Section			Maximum length (5% power loss)				
AWG	Ø mm	mm ²	60Wrms	120Wrms	240Wrms	480Wrms	960Wrms
7	3,67	10,6	2600	1300	645	320	160
8	3,26	8,35	2050	1025	510	255	130
9	2,91	6,62	1625	810	405	200	100
11	2,3	4,15	1020	510	255	130	65
13	1,83	2,63	645	320	160	80	40
15	1,45	1,65	405	200	100	50	25
17	1,15	1,04	255	130	65	35	15

