SPXOne

SOUND LEVEL LIMITER & AUDIO PROCESSOR

USER MANUAL

Web Configuration

Configuration, monitoring and maintenance of the SPXOne from any web browser, over Ethernet or Wi-Fi.



FIRMWARE 2.1.0 DOCUMENT SPX-UM-WEB-EN REVISION 1.0 DATE 11 / 2026

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GLOVE SYSTEMS S.L.
WWW.GLOVESYSTEMS.ES

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Type approval

The SPXOne complies with the Spanish noise regulations of the autonomous communities and of the municipalities.

The **SPXOne** is type-approved in Spain as a sound limiter-recorder under the noise regulations of the autonomous communities and the municipal noise protection ordinances, and it meets all the requirements they specify.

Castilla y León	Ley 5/2009, de 4 de junio, del Ruido de Castilla y León (Noise Act of Castilla y León).
Andalucía	Decreto 6/2012, de 17 de enero, Reglamento de Protección contra la Contaminación Acústica en Andalucía (Andalusian noise pollution regulation).
Other autonomous communities	Regional noise and noise pollution regulations.
Municipalities	All municipal ordinances on environmental protection against noise and vibration.

The functions these regulations require from limiter-recorders —sound level limiting, logging of levels and events, time control, sealing of the connections and communication with the server— are described in the corresponding chapters of this manual.

DOWNLOADS

The type approval certificates and all other SPXOne documentation are available in the downloads section of the Glove Systems website: **www.glovesystems.es/downloads**

NOTE

Sound level limits, schedules and other settings are set by the regulations that apply to each venue and, where applicable, by its activity licence. Installation, calibration and sealing must be carried out as those regulations require.

1 Important safety information

Read these instructions before installing or operating the equipment and keep them for future reference.

Symbols used in this manual and on the equipment



Dangerous voltage. The lightning flash with arrowhead within an equilateral triangle alerts the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



Attention. The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a situation which, if not avoided, could result in damage to the equipment, loss of data or incorrect operation.



NOTE

Additional information that helps you to get the best results from the equipment.

Important safety instructions

1. Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions.
2. Do not use this apparatus near water. Do not expose it to dripping or splashing, and do not place objects filled with liquids, such as vases or glasses, on the apparatus.
3. Clean only with a dry cloth. Disconnect the apparatus from the mains before cleaning.
4. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions, leaving enough space around the unit for ventilation. When mounted in a rack, make sure the rack is ventilated.
5. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
6. Do not defeat the safety purpose of the polarized or grounding-type plug. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
7. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where it exits the apparatus.
8. Only use attachments and accessories specified by the manufacturer. Use only the power supply provided with the unit or one with the rating indicated on the rating label.
9. Unplug this apparatus during lightning storms or when unused for long periods of time.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
11. The mains plug or appliance coupler is used as the disconnect device; it shall remain readily operable after installation.
12. Connect the apparatus only to a mains supply with the voltage and frequency indicated on the rating label. Where a protective earth is required, connect it only to a mains socket outlet with a protective earthing connection.
13. Do not open the enclosure. There are no user-serviceable parts inside.
14. Operate the apparatus within the ambient temperature and humidity range specified by the manufacturer, in a non-condensing environment and indoors only.

WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Do not remove the cover. The rating label with the electrical characteristics of the unit is located on the enclosure.

Hearing protection and sound levels

The SPXOne controls the sound level of an installation, but it does not replace the responsibility of the operator to protect the public, the staff and the neighbourhood. Prolonged exposure to high sound pressure levels can cause permanent hearing loss.

- Set the limits according to the regulations in force at the installation site (environmental noise, occupational exposure and public venue regulations).
- Some functions of the SPXOne generate **pink noise** through the audio outputs at high level (calibration, verification and the pink noise generator of the microphone screens). Warn the people present before starting them and do not stay close to the loudspeakers.
- Settings changed while **Direct mode** is on are applied but not saved: they are lost at the next reboot or power off. Switch it off when the adjustments are finished (see chapter 9).

Radio equipment (Wi-Fi)

The SPXOne includes a Wi-Fi radio module (IEEE 802.11 b/g/n, 2.4 GHz band, external antenna) used for the network connection and for the built-in access point. Use only the antenna supplied with the unit.

- **RF exposure:** this equipment complies with the radio-frequency exposure limits set forth for an uncontrolled environment. It should be installed and operated with a minimum distance of **20 cm** between the radiator (antenna) and any person's body.
- The transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.
- Turn off or do not install the equipment where the use of radio equipment is prohibited (e.g. medical facilities, aircraft, areas with explosive atmospheres) and keep it away from implanted medical devices, according to the recommendations of their manufacturers.
- Metal racks and enclosures reduce the range of the Wi-Fi signal. Use the Ethernet connection whenever possible in fixed installations.

Network security

- Change the configuration password after installation (`SETTINGS > PASSWORD`) and keep it confidential. Anybody who knows the password can change the limits of the installation. Use 4 to 7 characters combining letters, digits and symbols (see chapter 16).
- Connect the SPXOne to the local network of the installation. Do not expose its web interface directly to the internet (do not open port 80 of the router to the SPXOne).
- The built-in Wi-Fi access point is intended for installation and maintenance. Use it only when needed and disconnect your computer from it when you finish.
- Always close the session with `LOGOUT` when you finish the configuration.

2 Regulatory information

Compliance statements for the European Union and the United States of America.

European Union

CE

This product bears the CE marking in accordance with the applicable European Union directives.

Simplified EU declaration of conformity. Hereby, Glove Systems S.L. declares that the radio equipment type **SPXOne** is in compliance with Directive 2014/53/EU (Radio Equipment Directive). The full text of the EU declaration of conformity is available at the following internet address: www.glovesystems.es/downloads.

The equipment has been designed to comply with:

- Directive 2014/53/EU (RED) — including the safety, electromagnetic compatibility and efficient use of the radio spectrum requirements.
- Directive 2011/65/EU and amending Directive (EU) 2015/863 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).
- Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

RADIO CHARACTERISTICS	VALUE
Technology	Wi-Fi, IEEE 802.11 b/g/n (20 MHz), DSSS and OFDM modulation
Frequency band	2412 – 2472 MHz (channels 1 – 13)
Maximum radio-frequency power	18.36 dBm (802.11g) · 802.11b: 17.14 dBm · 802.11n: 17.85 dBm
Antenna	External swivel antenna, omnidirectional, vertical polarization: Fanstel ANT060 (Mouser ref. 308-ANT060). 2.4 – 2.5 GHz, 6 dBi gain, 50 Ω, VSWR ≤ 2.0, SMA connector, 195 mm long
Radio module	Espressif ESP-WROOM-02U — EU-type examination certificate B20061513 (Notified Body 1313): EN 300 328, EN 301 489-1/-17, EN 62368-1, EN 62311

This equipment may be operated in all EU member states.

United States of America

FCC compliance statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Radio module

FCC AUTHORIZATION	VALUE
Contains FCC ID	**2AC7Z-ESPWROOM02U** (Espressif ESP-WROOM-02U, single modular approval)
Equipment class	DTS — Digital Transmission System, FCC Part 15, Subpart C (15C)
Frequency range	2412 – 2462 MHz (channels 1 – 11)
Output power	0.187 W peak conducted

RF exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Contains FCC ID	2AC7Z-ESPWROOM02U
Responsible party (USA)	**[name and address — to be confirmed]**
Electrical rating	See the rating label on the enclosure.

Disposal



The crossed-out wheeled bin symbol on the product or its packaging indicates that this product must not be disposed of with household waste. At the end of its life, take it to a collection point for the recycling of electrical and electronic equipment, according to the local regulations. Correct disposal protects the environment and human health. In the United States, dispose of the equipment according to federal, state and local regulations for electronic waste.

Manufacturer

Manufacturer	Glove Systems S.L.
Postal address	C/ Chopos 4, 47620 Villanubla (Valladolid), Spain
Web	www.glovesystems.es
Product	SPXOne — sound level limiter and audio processor

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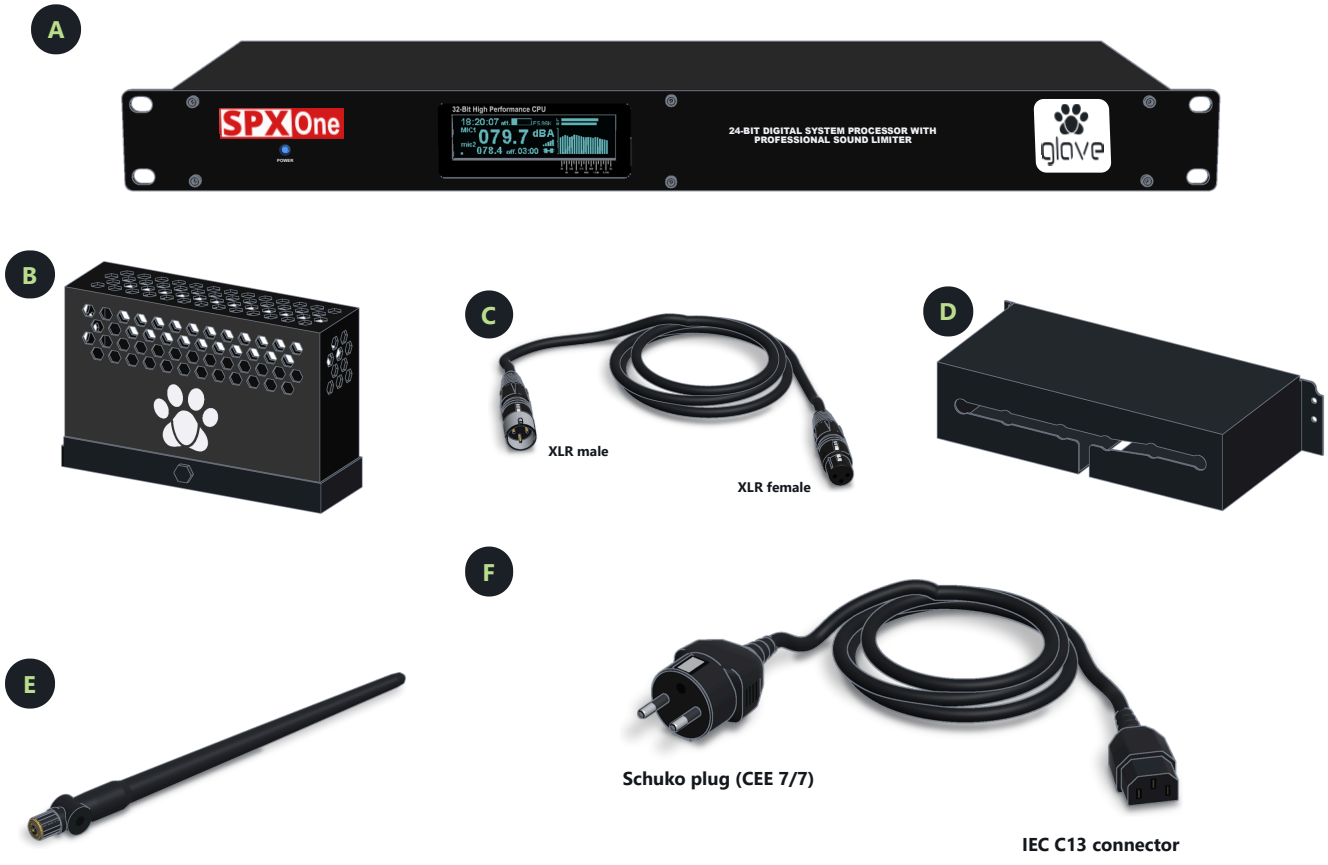
3 Introduction

What the SPXOne does and how this manual is organized.

The SPXOne is a professional sound level limiter and audio processor for venues, bars, restaurants, event rooms and any installation where the sound level must be kept under control. It processes the audio signal, measures the sound pressure level in the room with one or two measurement microphones and attenuates the signal in real time so that the configured limits are never exceeded.

The SPXOne includes a **built-in web server**. Its complete configuration can be carried out from any computer, tablet or smartphone with a web browser, without installing any software, through the Ethernet network of the installation or through Wi-Fi. The web interface offers the same functions as the SPXOne Control desktop application: audio configuration, calibration, limiter, schedule control, sound level meter, data logger download, network configuration and firmware update.

Package contents



Contents of the SPXOne package.

	ITEM	QTY.
A	**SPXOne unit**: sound level limiter and audio processor, 19" rack, 1U.	1
B	**Measurement microphone** (sensor) with ½" capsule, in its protective housing. See *Measurement microphone* in chapter 4.	1

C	**Microphone cable**, 10 m, **XLR male – XLR female** (female end to the sensor, male end to INPUT SENSORS).	1
D	**Seal cover for the audio connections**. See *Sealing the audio connections* in chapter 4.	1
E	**Wi-Fi antenna**, external, swivel, SMA connector (Fanstel ANT060: 2.4 – 2.5 GHz, 6 dBi, 195 mm). It screws onto the **WiFi** connector of the rear panel.	1
F	**Power cord**, 1.5 m: **Schuko (CEE 7/7)** plug with protective earth – **IEC 60320 C13** connector.	1

Check the contents when you open the package. If any item is missing or damaged, contact your dealer. Keep the packaging to transport the unit. If the Schuko plug of the supplied power cord does not suit the mains sockets of your country, use a cord with an IEC 60320 C13 connector and the mains plug of your country, with protective earth.

About this manual

This manual describes the web configuration interface of firmware version 2.1.0. Screen names, buttons and options are written as they appear on the screen, for example `SETTINGS` or `OK`. The path to a screen is written with the symbol >, for example `SETTINGS > DATE / TIME`.

The screenshots show an example installation. The values on your device will be different.

Requirements

ITEM	REQUIREMENT
Web browser	Current version of Google Chrome, Microsoft Edge, Mozilla Firefox or Apple Safari, with JavaScript enabled.
Device	Computer, tablet or smartphone. The interface adapts to the screen size; a screen of at least 1280 pixels wide is recommended for the spectrum and schedule screens.
Connection	Ethernet: computer in the same local network as the SPXOne. Wi-Fi: the SPXOne access point, or the Wi-Fi network the SPXOne is connected to.
Internet	Not required for configuration. Required for the server link, time synchronization and the online firmware update.
Password	Configuration password of the SPXOne (supplied by the installer).

NOTE

Only one configuration session can be open at a time. While the SPXOne is being configured from SPXOne Control or from another browser, the web interface shows the message *Device busy*, and vice versa. The view mode is always available.

4 Panels and connections

Front and rear panel, display, installation and connection of the SPXOne.

The SPXOne is a 24-bit digital system processor with professional sound limiter in a 19" rack enclosure of one unit height (1U). All the connections are on the rear panel. The front panel shows the status and the measured sound level at a glance.

Front panel



Figure 1 — Front panel.

NO.	ELEMENT	DESCRIPTION
1	POWER indicator	Lit while the SPXOne is powered on.
2	Display	OLED display, 256 × 64 pixels: time, sound level, attenuation, input levels, spectrum and status indicators. See *Display* below.
3	Rack mounting holes	Four holes for mounting in a standard 19" rack.

Rear panel

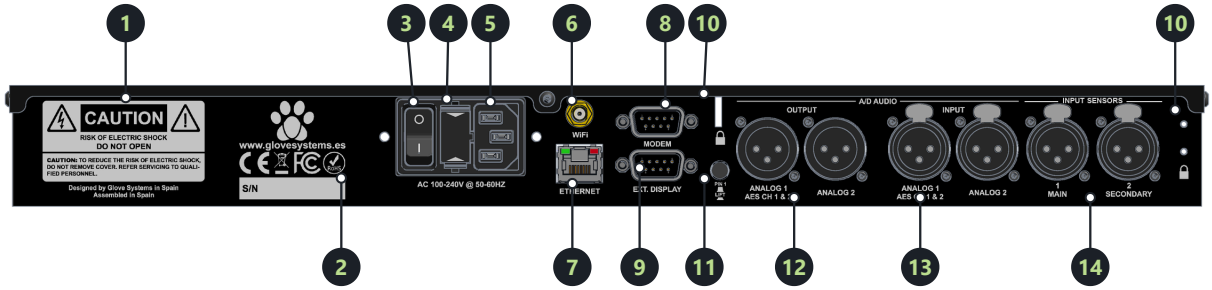


Figure 2 — Rear panel: connectors and controls.

NO.	ELEMENT	DESCRIPTION
1	Safety label	Risk of electric shock. Do not open the unit: there are no user-serviceable parts inside.

2	Identification	Compliance marks (CE, WEEE, FCC, RoHS) and **serial number** (S/N) of the unit. The serial number is also shown in the header of the web interface.
3	Power switch	Switches the SPXOne on (I) and off (O).
4	Fuse holder	Mains fuse drawer, integrated in the power entry module. Disconnect the power cord before opening it and replace the fuse only with one of the same type and rating.
5	Power inlet	IEC 60320 **C14** inlet with protective earth. **AC 100–240 V, 50–60 Hz**. Use the supplied power cord (Schuko – **C13**) or one with an IEC 60320 **C13** connector and the mains plug of your country (with earth).
6	WiFi	Connector (SMA type) for the external Wi-Fi antenna supplied with the unit.
7	ETHERNET	RJ45 network port for the local network (configuration, view mode, server link and time synchronization). The LEDs of the connector indicate link and activity.
8	MODEM	Serial port, **DB9** male connector (9 pins), reserved for accessories and service.
9	EXT. DISPLAY	Serial port, **DB9** male connector (9 pins), reserved for an external display (optional accessory) and service.
10	Sealing points	Marked with a padlock: slot (left) and two screws (right) for the seal cover of the audio connections supplied with the unit, so that any manipulation of the audio and microphone connections can be detected. See *Sealing the audio connections*.
11	PIN 1 LIFT	Push button that lifts pin 1 (shield) of the audio connectors from the chassis ground, to eliminate hum caused by ground loops.
12	OUTPUT	Balanced audio outputs, XLR male: **ANALOG 1 / AES CH 1 & 2** (analog output 1, or digital AES/EBU output with both channels) and **ANALOG 2**.
13	INPUT	Balanced audio inputs, XLR female with latch: **ANALOG 1 / AES CH 1 & 2** (analog input 1, or digital AES/EBU input with both channels) and **ANALOG 2**.
14	INPUT SENSORS	Measurement microphone inputs, female XLR connectors with latch: **1 MAIN** (MIC 1) and **2 SECONDARY** (MIC 2).

NOTE

To release a cable from a connector with latch, press the **PUSH** tab while pulling the plug.

Display

The front display shows the main screen during normal operation. The diagram shows all the information that the main screen can display (the values are an example).

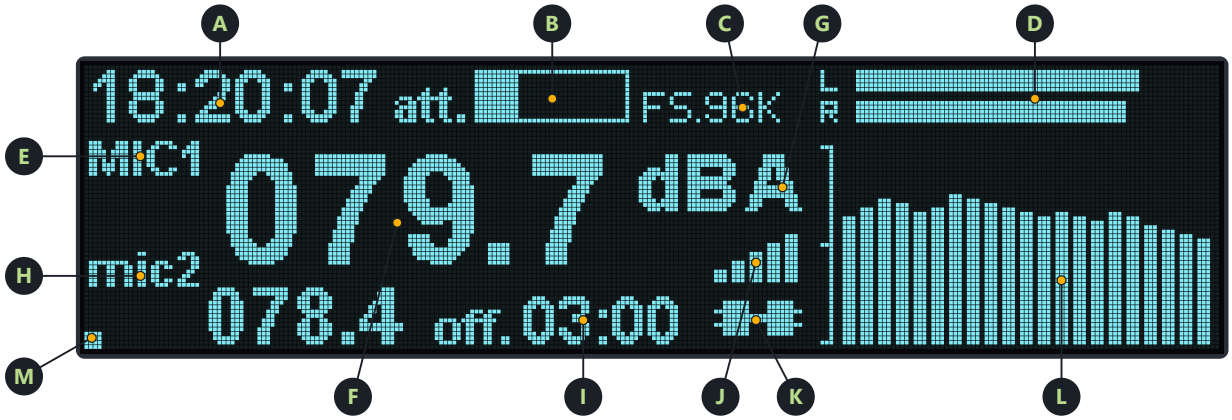
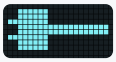
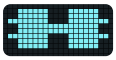
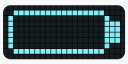
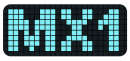


Figure 3 — Main screen of the display (256 × 64 pixels).

	INDICATION	DESCRIPTION
A	Clock	Time of the SPXOne (hh:mm:ss).
B	att.	Attenuation applied by the limiter (average of both channels). The bar fills from left to right up to 50 dB.
C	FS	Sampling frequency of the audio input: 32K, 44.1K, 48K, 88.2K or 96K.
D	L / R	Level of the audio inputs (channel 1 = L, channel 2 = R).
E	MIC1 / MX1	**MIC1**: the large reading is the sound level measured by microphone 1. **MX1**: the reading is the maximum level allowed in room 1 (when *Level on display* is off in `SETTINGS > DISPLAY`).
F	Main reading	Sound level of microphone 1 (or maximum level of room 1), with one decimal. Blank when the microphone is not detected.
G	dBA / dBC	Frequency weighting of the measurement (`SETTINGS > SOUND LEVEL METER`).
H	mic2 / mx2	Shown only when microphone 2 is enabled: sound level of microphone 2 (**mic2**) or maximum level of room 2 (**mx2**).
I	off.	Closing time of the current day of the schedule control (**--:--** if there is none). Shown only when the schedule control is on. Without microphone 2 it is shown in the place of the mic2 reading.
J	Wi-Fi	Wi-Fi connection and signal level (0 to 4 bars). See the table of indicators.
K	Network	Ethernet connection and link with the server. See the table of indicators.
L	Spectrum	Spectrum of the input signal in 21 bands (1/3 octave, 50 Hz – 5 kHz), from 20 to 100 dB.
M	Communication	Small square that lights while data are exchanged with SPXOne Control, the web interface or the server.

Status indicators

INDICATOR	MEANING
	Network cable connected.
	Network cable connected and link with the server established. The symbol flashes while a configuration session is open or data are being sent to the server.
	Wi-Fi connected to the server, with the signal level (0 to 4 bars). It flashes while a remote session through Wi-Fi is open. With the network cable connected it is shown above the network symbol.
	Wi-Fi active, without link with the server (hollow bars).
	Flashing: the backup battery of the internal clock is low. Contact the technical support.
	The reading shows the maximum level of the room instead of the measured level.
	Closing time of the schedule control.
	Communication in progress.

Other screens

In some situations the display shows a full-screen message instead of the main screen:



Welcome
A configuration session has been opened (SPXOne Control or web interface).



Goodbye
The configuration session has been closed.



Closing Time — NO SOUND
The closing time of the schedule control has been reached: the audio output is muted until the next opening time.



Reserved date ON — NO SOUND
The reserved date set by the dealer has been reached: the audio output is muted. Contact your dealer.



Downloading...
The data logger is being downloaded.



Erasing Memory
The data logger is being erased (restore factory settings).



System Integrity OK
Start-up: the internal check of the configuration and of the system has been passed.



ERROR — System Integrity fail
Start-up: the internal check has failed. Contact the technical support.

To extend the life of the OLED display, a screen saver switches off the image after a period without activity; it is reactivated automatically. The brightness of the display is set in `SETTINGS > DISPLAY` (intensity 1 – 15).

Measurement microphone

The SPXOne measures the sound level with the measurement microphones (sensors) connected to **INPUT SENSORS**. One microphone is supplied with the unit; a second one can be added to measure a second room or a second point (MIC 2). The ½" capsule is protected by a perforated metal housing that is fixed and sealed in its position, so that the measurement cannot be manipulated.

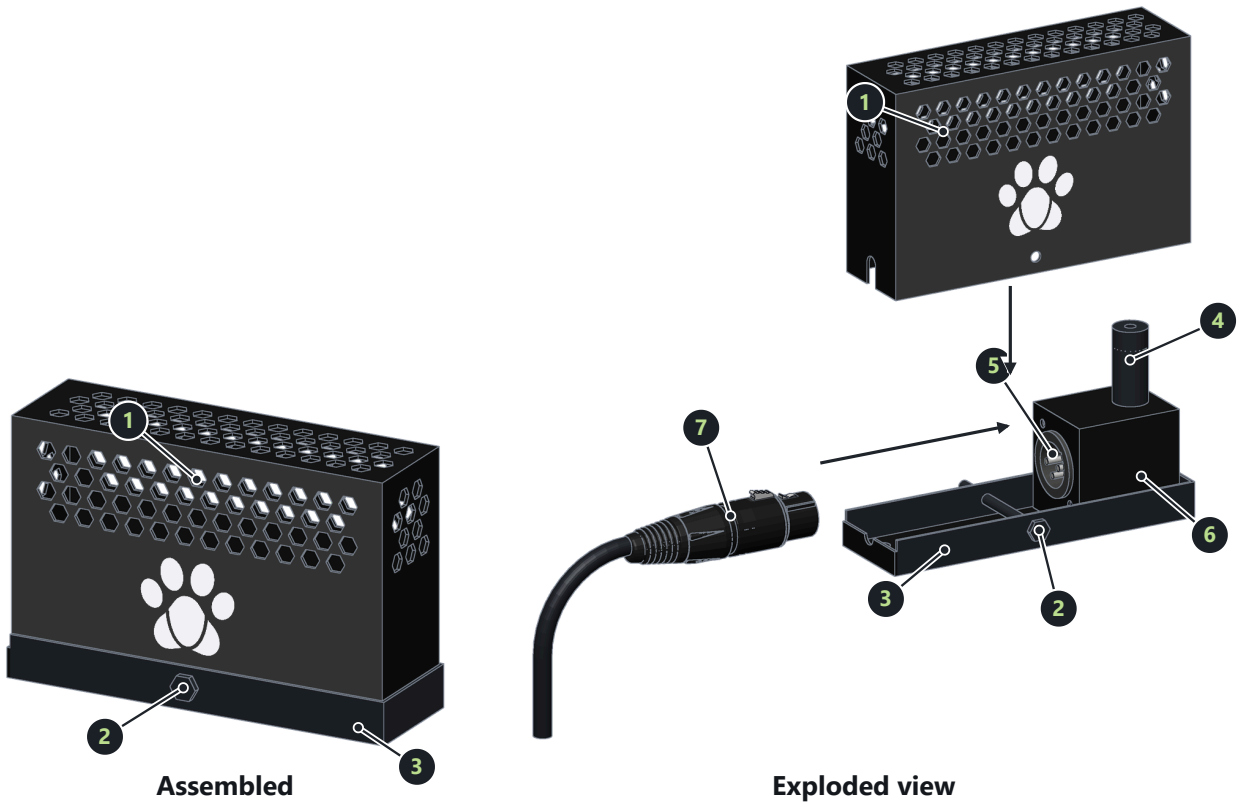


Figure 4 — Measurement microphone (sensor).

NO.	ELEMENT	DESCRIPTION
1	Protective housing	Perforated metal cover: lets the sound reach the capsule and protects it against knocks and manipulation.

2	Fixing / sealing screw	Through bolt with nut that fixes the housing to the base. It can be sealed so that the microphone cannot be opened without the seal being broken.
3	Base	U-shaped mounting base of the sensor, fixed to the wall or ceiling at the measurement position.
4	Capsule	½" measurement microphone. Measurement range 40 – 120 dB.
5	Connector	XLR male panel connector (Neutrik NC3MD) of the sensor, for the microphone cable.
6	Internal support	Block that holds the capsule holder and the connector inside the housing.
7	Microphone cable	10 m cable, XLR male – XLR female, supplied with the unit: connect the female end to the sensor and the male end to **INPUT SENSORS** (**1 MAIN** for MIC 1, **2 SECONDARY** for MIC 2).

NOTE

Install the microphone in the position defined in the acoustic study: in the room, away from the loudspeakers and out of reach of the public. Do not cover the perforations of the housing. After installing or moving a microphone, adjust its offset and calibrate the SPXOne again (chapter 6).

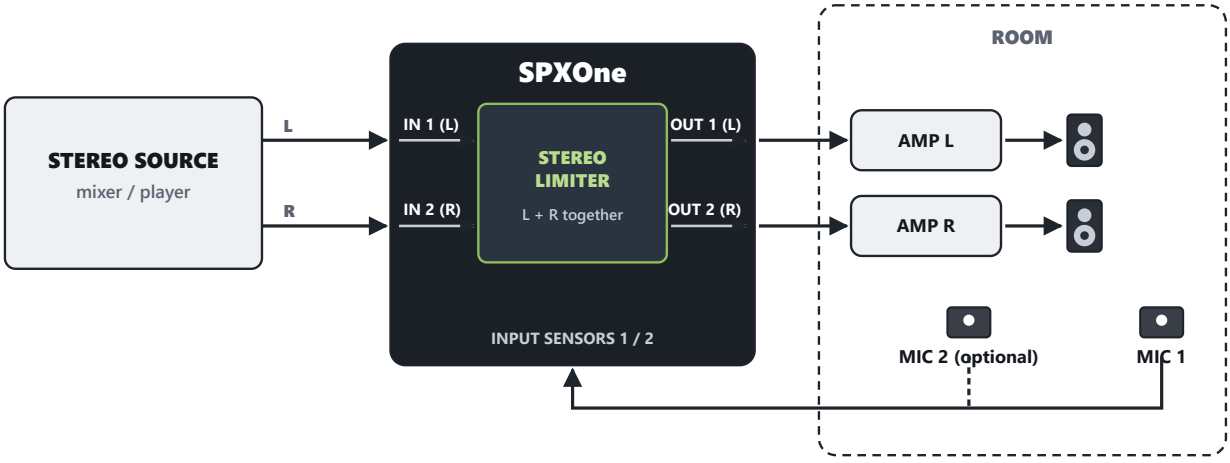
Installation

- Install the SPXOne in a 19" rack with four screws and suitable washers. In mobile racks or with long cables, support the rear of the unit.
- The enclosure has ventilation grilles on both sides: do not block them and leave free space at the sides of the unit.
- Do not install the unit directly above amplifiers or other equipment that produces heat.
- Screw the Wi-Fi antenna to the WiFi connector and use its swivel joint to orient it vertically. Metal racks reduce the range: if necessary, use an extension cable to place the antenna outside the rack.
- Install the measurement microphones in the positions defined in the acoustic study, away from the loudspeakers and out of reach of the public.

Connections

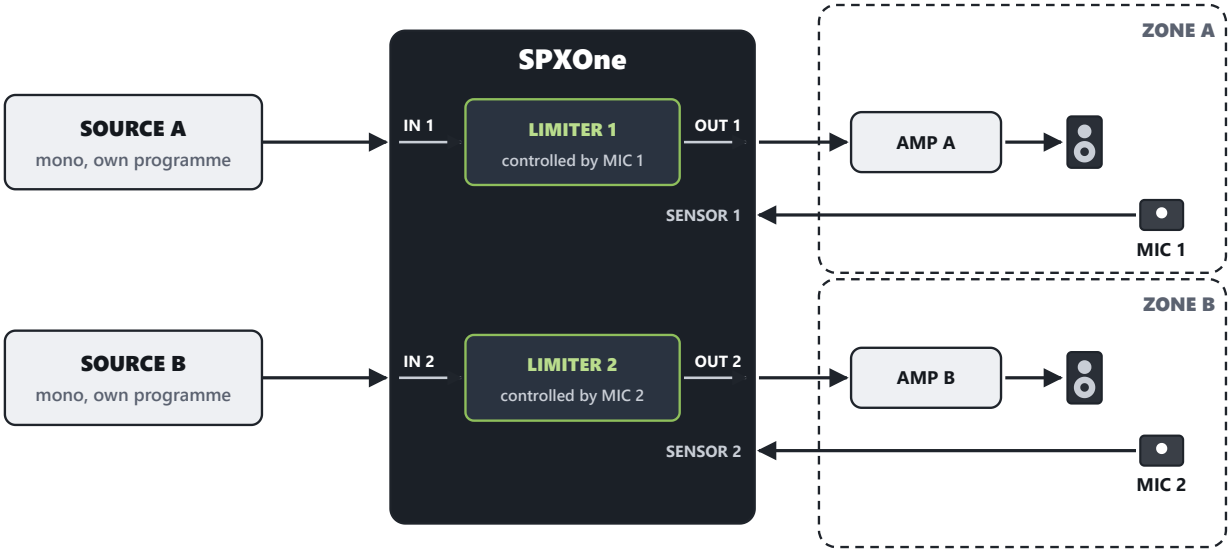
The SPXOne has two audio channels. How they are connected depends on whether the venue has **one stereo source** or **two different sources**:

One stereo source (one room)



The left (L) and right (R) outputs of the mixer or player are connected to **INPUT 1** and **INPUT 2**, and **OUTPUT 1** and **OUTPUT 2** to the amplifiers of the same room. Both channels carry the same programme and are limited together as a stereo pair, so the stereo image is kept. MIC 1 measures the room; MIC 2 is optional (a second point of the room or a neighbouring room). Presets *Stereo Limiter + 1 Microphone* or *Stereo Limiter + 2 Microphones* (chapter 14).

Two different mono sources (two limiters)



Each input receives a different mono programme, for example two rooms or zones with their own music. Each channel works as an independent limiter, controlled by its own microphone: **INPUT 1 → OUTPUT 1** is limited according to MIC 1 (zone A) and **INPUT 2 → OUTPUT 2** according to MIC 2 (zone B). Preset *2 Limiters (Input 1 & Input 2) + 2 Microphones* (chapter 14); calibrate with the option *Both* (chapter 12) and set the maximum level of each room in `LIMITER`.

	ONE STEREO SOURCE	TWO MONO SOURCES
Sources	One source, L and R of the same programme	Two different sources (one per channel)
Limitation	One stereo limiter: both channels are attenuated together	Two independent limiters: each channel has its own attenuation
Microphones	MIC 1 (MIC 2 optional)	MIC 1 for channel 1 and MIC 2 for channel 2 (both required)
Maximum level	Room 1 (and room 2 with MIC 2)	Room 1 for channel 1, room 2 for channel 2
Preset	Stereo Limiter + 1 or 2 Microphones	2 Limiters (Input 1 & Input 2) + 2 Microphones
Inputs	Analog 1 + 2, or AES (both channels in one cable)	Analog 1 and Analog 2 (one source in each connector)

Connection steps

1. With all the equipment switched off, connect the outputs of the mixer or audio source to the **INPUT** connectors of the SPXOne.
2. Connect the **OUTPUT** connectors to the amplifiers or powered loudspeakers.
3. Connect the measurement microphones to **INPUT SENSORS**: the main microphone to **1 MAIN** and, if used, the second microphone to **2 SECONDARY**.

4. Connect the Ethernet cable and/or the Wi-Fi antenna, and the power cord.
5. Switch on the SPXOne first and the amplifiers last. To switch off, follow the reverse order.

XLR PIN	BALANCED ANALOG SIGNAL	AES/EBU DIGITAL SIGNAL
1	Shield / ground	Shield / ground
2	Hot (+)	Data (+)
3	Cold (–)	Data (–)

For a digital AES/EBU connection, select the type *AES* in **AUDIO INPUT** and/or **AUDIO OUTPUT** (chapters 9 and 10) and use 110 Ω digital audio cable. The two channels of the AES/EBU signal travel through the connector **ANALOG 1 / AES CH 1 & 2**.

> **CAUTION**
> Connect only the measurement microphones supplied or approved by Glove Systems to the INPUT SENSORS connectors. Changing the microphones, their position or the audio connections requires a new calibration (chapter 12).

> **WARNING**
> Connect the SPXOne only to a mains socket outlet with protective earth. Before replacing the fuse, switch off the unit and disconnect the power cord.

Sealing the audio connections

The seal cover supplied with the SPXOne covers the audio and microphone connectors of the rear panel. Once installed and sealed, the cables cannot be disconnected or changed without breaking the seal, so any manipulation of the installation can be detected.

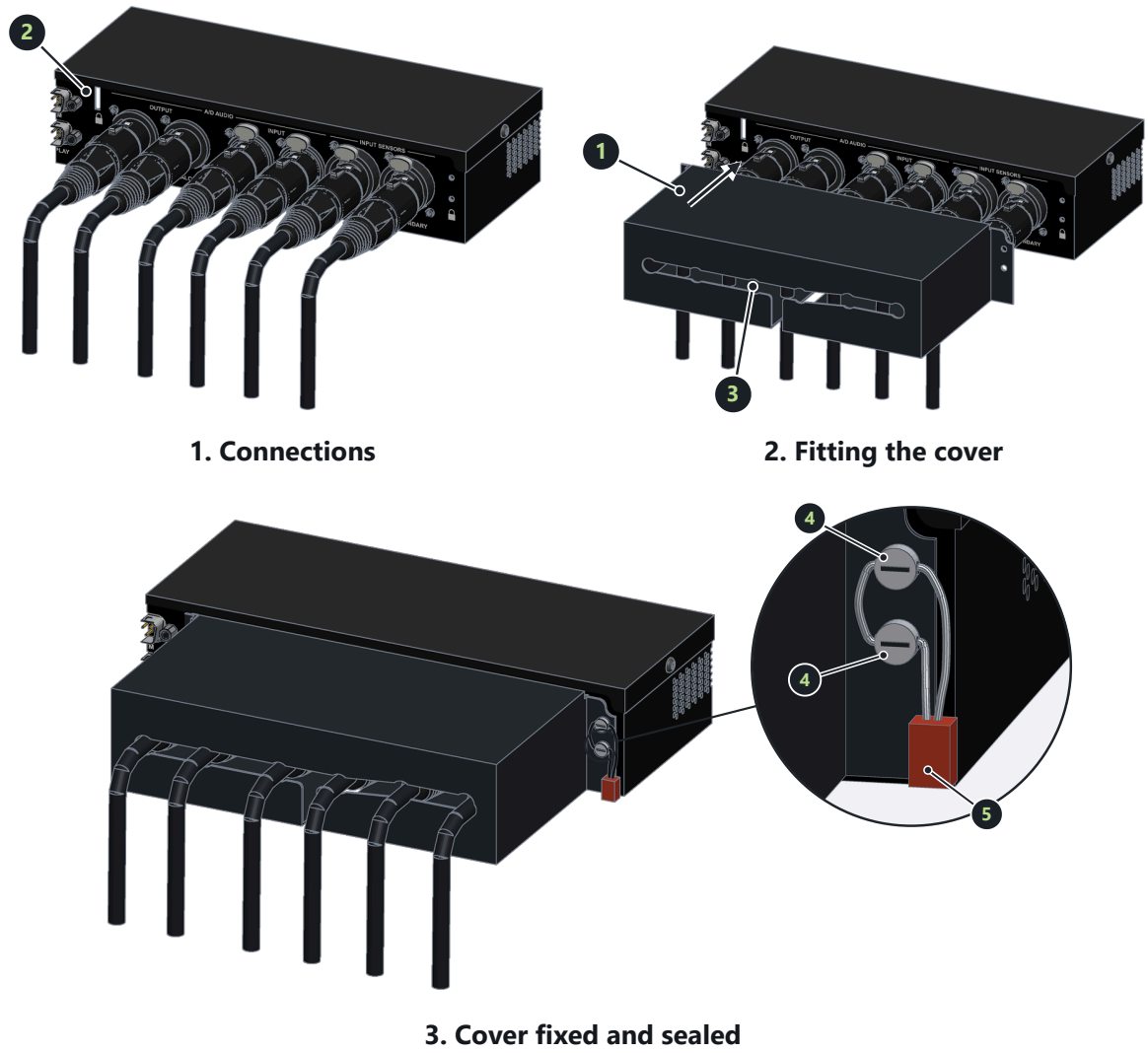


Figure 5 — Seal cover of the audio connections: connections, fitting the cover, cover fixed and sealed.

1. Connect all the audio and microphone cables (OUTPUT, INPUT and INPUT SENSORS) and check that the installation works correctly.
2. Place the cover over the connectors, passing the cables through the long slot of the back wall of the cover (3).
3. Insert the tab of the left side of the cover (1) into the slot marked with the padlock (2), next to **PIN 1 LIFT**.
4. Fix the ear of the right side of the cover to the rear panel with the two screws (4).
5. Pass the seal wire through the holes of the screw heads and close the seal (5).

> **NOTE**
> Seal the connections after the commissioning of the SPXOne (chapter 6). To change a connection, the seal must be broken; after the change, check the calibration and seal the cover again.

5 Getting started

Connect to the SPXOne, log in and get to know the interface.

Connecting through Ethernet

1. Connect the Ethernet port of the SPXOne to the switch or router of the installation and power on the unit.
2. From a computer connected to the same network, open the web browser and type the address of the SPXOne. You can use:
   - its **network name**: `http://SPXOne-XXXXXXX`, where `XXXXXXX` are the last 7 characters of the serial number (for example, S/N E102611000 → `http://SPXOne-2611000`). Name resolution depends on the computer and the network;
   - or its **IP address**, assigned by the router (DHCP) or configured as static in **SETTINGS > NETWORK**. The router's list of connected devices shows the address assigned to the SPXOne.
3. The **view mode** screen opens. Press **CONFIG** to go to the configuration.

Connecting through Wi-Fi

The SPXOne creates its own Wi-Fi access point so that it can be configured without any other network:

ACCESS POINT	VALUE
Network name (SSID)	`SPXOne-XXXXXXX` (last 7 characters of the serial number)
Password	`spxone123`
Web address	`http://192.168.4.1`

1. On your computer, tablet or smartphone, connect to the Wi-Fi network `SPXOne-XXXXXXX` with the password above.
2. Open the browser and go to `http://192.168.4.1`.
3. When the SPXOne is connected to the Wi-Fi network of the installation (see **LINK > WIFI ACCESS**), it can also be reached from that network at `http://<IP address>` (shown in the WIFI ACCESS screen) or at `http://spxone-XXXXXXX.local` on devices that support *.local* names.

> **NOTE**
>
> The SPXOne has a single Wi-Fi radio. While a device is connected to its access point, it does not retry the connection to the installation network by itself; pressing **CONNECT** in **WIFI ACCESS** makes it try immediately. When it connects, the access point moves to the channel of the installation network and your device may be disconnected for a few seconds: if the page stops responding, connect to `SPXOne-XXXXXXX` again.

Login

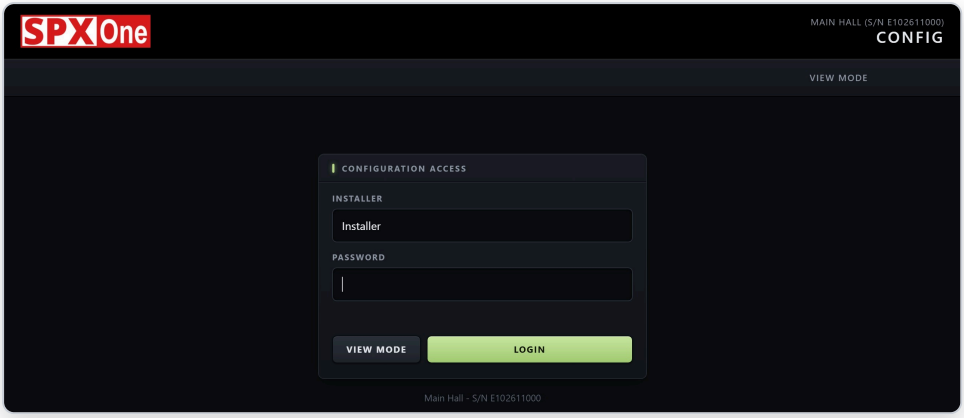


Figure 6 — Configuration access screen.

1. In **Installer**, type your name or the name of your company (optional). It is recorded in the access log of the device and the browser remembers it for the next time.
2. Type the configuration **Password** and press **LOGIN** or the Enter key.
3. If the password is correct, the **Home** screen opens. Otherwise the message *WRONG PASSWORD* appears.

The session remains open while the configuration page is open in the browser. If the browser is closed or loses the connection with the SPXOne for about one minute, the session is closed automatically and the password is requested again.

> **NOTE**
> The password has 4 to 7 characters and is case sensitive. The installer name and the password must not contain the characters `,` (comma) or `;` (semicolon).

Interface layout

All the configuration screens share the same layout:

ELEMENT	FUNCTION
Header	SPXOne logo, device name and serial number, and the name of the current screen.
HOME	Returns to the Home screen.
BACK	Returns to the previous screen without saving the changes of the current screen.
Clock	Time of the SPXOne.
VIEW MODE	Opens the view mode (display screen). The configuration session remains open.
LOGOUT	Closes the configuration session.
OK / CANCEL	**OK** sends the changes of the screen to the SPXOne and returns to the previous screen. **CANCEL** discards them.
Messages	A short message at the bottom of the screen confirms each operation (*Saved*). Error messages are shown in red and include a reference code (see chapter 19).

The function keys of the menus show their current state in a second line and with a coloured indicator: **green** = correct, **red** = action required, **amber** = in progress. Keys of functions that are not available with the current configuration are dimmed.

Numeric values are changed with the `–` and `+` buttons or by typing the value. Options are selected with segmented buttons; the selected option is highlighted in green.

6 Commissioning

The four steps to leave an SPXOne configured.

After installing and connecting the SPXOne (chapter 4) and opening the web interface (chapter 5), follow these four steps **in this order** to leave the SPXOne configured. Each step depends on the previous one.

Before you start: select the preset of the installation (chapter 14), configure the inputs and outputs and their gains (chapters 9 and 10) and install the microphones in their final position. Have a calibrated sound level meter at hand.

1 Microphone offset adjustment

HOME > MIC 1 (and MIC 2 if used)

Adjusts the reading of the SPXOne microphone to the reading of a calibrated sound level meter.

1. Place the calibrated sound level meter next to the microphone of the SPXOne, with the same frequency weighting as the SPXOne (**SETTINGS > SOUND LEVEL METER**).
2. In the **MIC 1** screen, switch on the pink noise generator of the SPXOne (**PINK NOISE ON**) and set its **Level** so that the noise is clearly above the background noise.
3. Compare the level shown in the **MIC 1** screen with the measurement of the sound level meter and adjust **Offset** until both readings are the same. The offset is applied immediately.
4. Switch off the pink noise and press **OK**. Repeat with **MIC 2** if it is used.

2 Calibration

HOME > CAL

With the room **in silence**, carry out the automatic calibration: select the mode and the option and press **START** (chapter 12). The SPXOne emits pink noise and measures the relation between the audio signal and the sound level in the room.

3 Maximum level

HOME > LIMITER

Set the maximum sound level allowed in the room (and in room 2 if MIC 2 is used), select the mode *Quick* and press **OK** (chapter 13).

4 Smart Offset adjustment

HOME > SETTINGS > LIMITATION ALGORITHM

Smart Offset corrects the excess of level caused by the dynamics of the music. It does not compress the signal and it does not modify the limitation algorithm. Set the value to **2 – 3** and press **OK** (chapter 16). The **Smart offset** field is shown with the *Smart* correction.

TIP

When the four steps have been completed, the **CAL** and **LIMITER** keys of the Home screen show *CALIBRATED* and *LIMITATION OK*. Then seal the audio connections (chapter 4) and, if required, configure the schedule control, the link with the server and the device data (chapters 15 and 16).

CAUTION

Repeat the steps from step 1 whenever a microphone is replaced or moved, and from step 2 whenever the sound system, the gains or the preset are changed.

7 View mode

Full-screen display of the sound level, for the venue staff or for monitoring.

The view mode is the first screen that opens when you connect to the SPXOne. It does not require a password and it does not allow any change, so it can be left open permanently on a tablet or screen of the venue. It adapts to the size of the screen.

The header contains the **CONFIG** button (configuration access), the **MODE 1** / **MODE 2** selector, the audio format (input type and sample rate of the system, e.g. *ANALOG @48kHz* or *AES @96kHz*), the clock of the SPXOne and the name of the device. The indicator next to the clock is green while data are received; if the SPXOne stops sending data for more than 5 seconds it flashes red and the message *NO DATA FROM DEVICE* appears.

Mode 1 — Sound pressure level



Figure 7 — View mode, Mode 1.

- **SPL**: sound pressure level (LEQ 1 s) of the selected microphone, in large digits.
- **Status**: *NORMAL* (green), *WARNING* (amber, more than 2 dB above the limit) or *OVER LIMIT* (red, more than 5 dB above the limit). In warning and over-limit state the reading flashes.
- **LIMIT**: maximum level currently applied (it includes the increment of the schedule control).
- **Level bar**: segmented meter from 40 dB with green, amber and red zones, the limit mark and a 2-second peak hold.
- **LEQ 1'** and **LEQ x'**: equivalent levels over 1 minute and over the measurement time of the sound level meter.
- **ATTENUATION**: attenuation applied by the limiter. With a stereo configuration, or when two microphones are used (calibration option *Both*), the attenuation of channels CH1 and CH2 is shown separately.

Mode 2 — Analysis



Figure 8 — View mode, Mode 2.

- Top row: SPL, LEQ 1', LEQ x' and attenuation.
- **EMISSION SPECTRUM**: spectrum in 1/3 octave bands from 50 Hz to 5 kHz measured by the selected microphone.
- **INPUT (dBFS)**: level of the audio inputs CH1 and CH2, with the same scale as the configuration screens (from −120 dBFS), numeric reading and *OVER* indicator (input saturation).
- **SPL vs LIMIT (60 s)**: evolution of the level (SPL) and of the limit (LIMIT, dashed) during the last minute.

Mode 2 refreshes the data many times per second. Mode 1 refreshes once per second.

Microphone selector

When the SPXOne works with two microphones (calibration option *Both*), the **MIC 1** / **MIC 2** selector appears in the title bar of the sound pressure level module. All the values of the selected microphone (SPL, LEQ, limit, spectrum and evolution) are shown. In installations with one microphone the selector is not shown.

8 Home screen

Overview of the device status and access to all the functions.

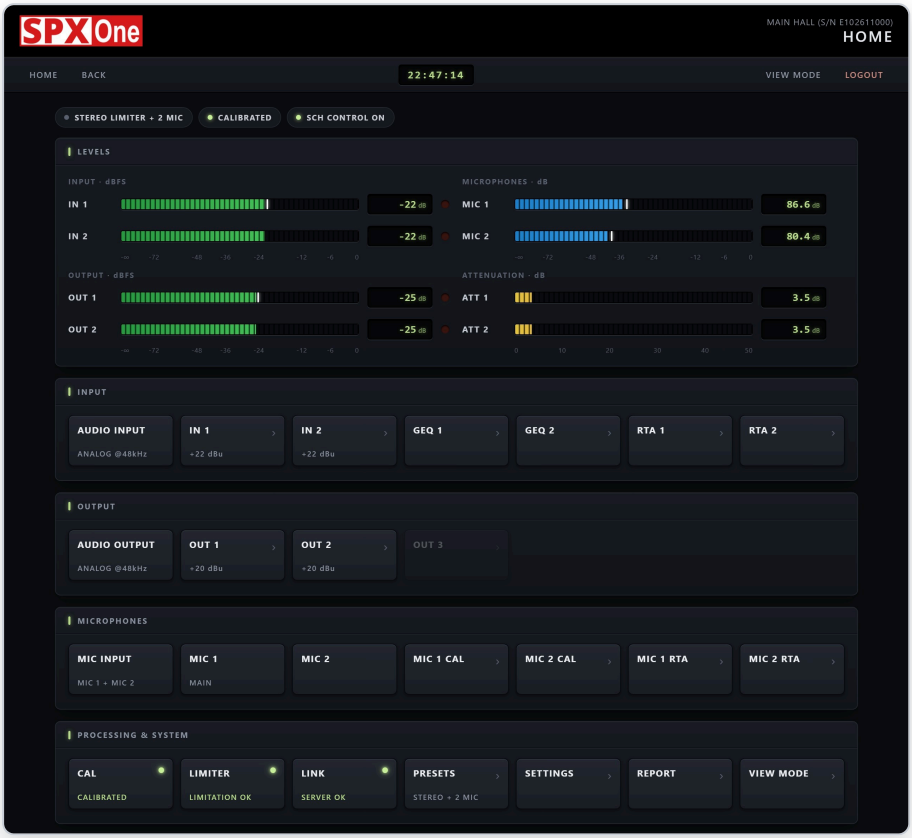


Figure 9 — Home screen.

Status indicators

The top line shows the active preset and the general status: *Calibrated / Not calibrated*, *Sch control on / off*, *Direct mode on* (changes are applied but not saved) and *No mic 1 / mic 2 signal* when a microphone is not detected.

Levels

Real-time meters, refreshed 25 times per second:

- **INPUT** and **OUTPUT** in dBFS (0 dBFS = digital full scale). The red indicator on the right lights when the input saturates.
- **MICROPHONES**: sound pressure level measured by MIC 1 and MIC 2, in dB.
- **ATTENUATION**: attenuation applied by the limiter on each channel (0 to 50 dB).

Disabled channels are shown dimmed. A muted output shows *MUTE*.

Function keys

GROUP	KEYS	SEE
Input	AUDIO INPUT, IN 1, IN 2, GEQ 1, GEQ 2, RTA 1, RTA 2	Chapter 9
Output	AUDIO OUTPUT, OUT 1, OUT 2, OUT 3	Chapter 10
Microphones	MIC INPUT, MIC 1, MIC 2, MIC 1 CAL, MIC 2 CAL, MIC 1 RTA, MIC 2 RTA	Chapter 11
Processing & system	CAL, LIMITER, LINK, PRESETS, SETTINGS, REPORT, VIEW MODE	Chapters 12 – 18

9 Audio inputs

Input type, gain, graphic equalizer and real time analyzer with the limitation curve.

Audio input

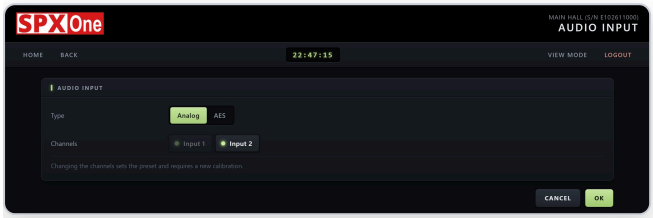


Figure 10 — AUDIO INPUT.

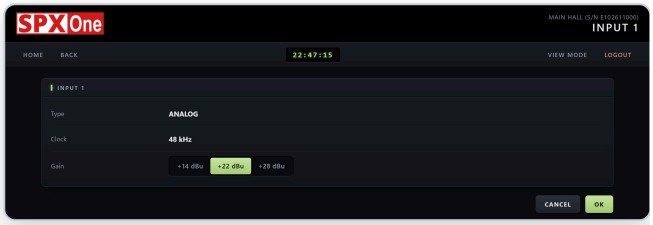


Figure 11 — INPUT 1.

PARAMETER	DESCRIPTION
Type	*Analog* or *AES* (digital AES/EBU input).
Channels	Input 1 is always enabled. Enable *Input 2* for stereo or two-zone installations.
Gain (IN 1 / IN 2)	Analog input sensitivity: +14, +22 or +28 dBu (maximum input level). Select the value closest to the maximum output level of the mixer or source. With AES input there is nothing to configure.
Clock	Sample rate of the system, shown in the **IN 1** / **IN 2** screens and in the **AUDIO INPUT** button (e.g. *ANALOG @48kHz*, *AES @96kHz*). It is not configurable: see the note below.

CAUTION

Changing the input channels changes the preset and requires a new calibration of the SPXOne.

SAMPLE RATE (CLOCK)

The SPXOne works with a single sample rate for the whole system: the inputs and the outputs always use the same clock. With **analog input** the sample rate is always **48 kHz**. With **AES input** the SPXOne follows the sample rate of the source: if the source sends 48 kHz the outputs work at 48 kHz, if it sends 96 kHz they work at 96 kHz, and so on. The current value is shown in the view mode header, in the **AUDIO INPUT** / **AUDIO OUTPUT** buttons and in the **IN** / **OUT** screens.

Graphic equalizer (GEQ 1 / GEQ 2)

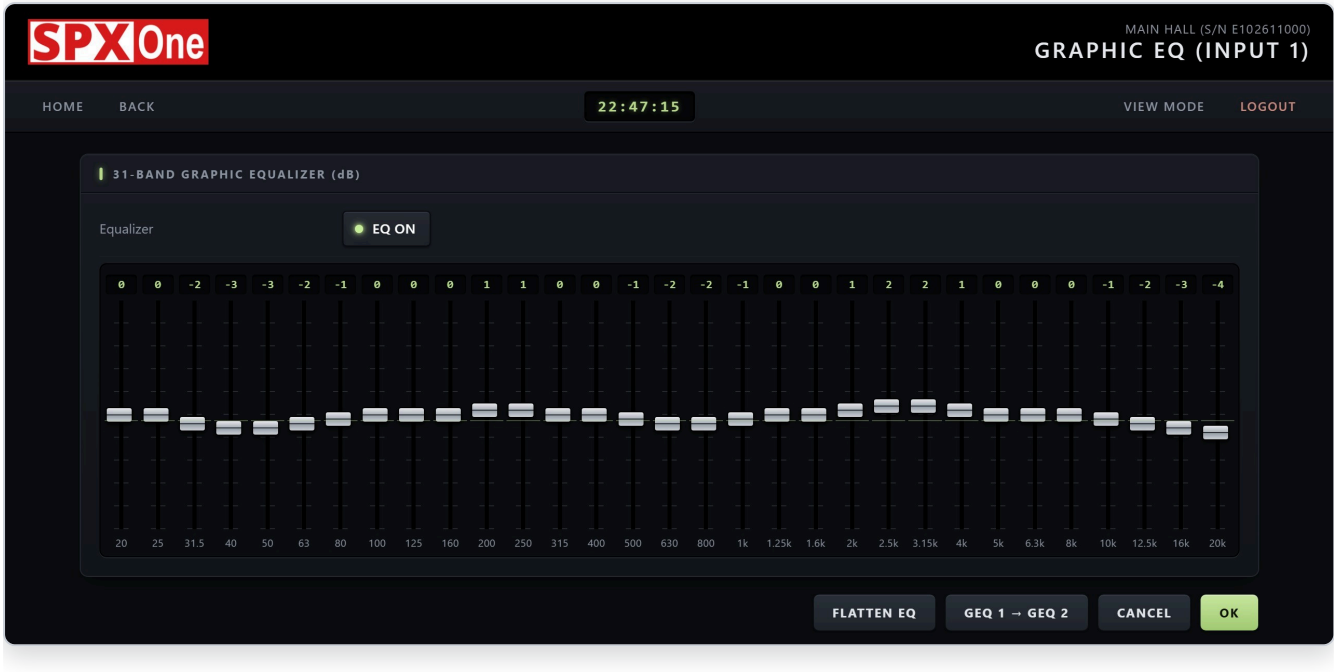


Figure 12 — 31-band graphic equalizer.

31-band graphic equalizer (20 Hz – 20 kHz, ±24 dB) for each input. Move each slider to the required gain and press **OK**. **EQ ON** enables or bypasses the equalizer, **FLATTEN EQ** sets all the bands to 0 dB and **GEQ 1 → GEQ 2** copies the equalizer to the other input.

Real time analyzer and limitation curve (RTA 1 / RTA 2)



Figure 13 — Real time analyzer of input 1.

The RTA screen shows in real time the spectrum of the input signal (blue bars, 50 Hz – 5 kHz) and the **limitation curve** (green line): the maximum level allowed in each band. All changes in this screen are applied immediately.

- **Levels**: level of each microphone, selectable between SPL and LEQ 1', and the current attenuation. **RESET ATT** resets the attenuation of the limiter.
- **MAX ROOM 1 / MAX ROOM 2**: maximum level of each room (the same value as in the LIMITER screen). If the schedule control applies an increment, the resulting limit is shown below.
- **Editing the curve**: drag a point of the green curve to change the limit of that band. **FULL SP** moves the whole curve together. With a band selected, **FLAT** and **PRESET 1 / 2 / 3** apply a predefined shape from that band. **CH1 = CH2** copies the curve to the other input.
- **Correction**: *ALL SP* (the attenuation is applied to the whole spectrum), *BAND 2 BAND* (only the bands that exceed the curve are attenuated) or *SMART* (the SPXOne calculates the limitation automatically; the curve is not used and is hidden).
- **Attack / Release**: response speed of the limiter when the level rises and when it falls (values 0 – 3; see *Limitation algorithm* in chapter 16).
- **Pre-att**: fixed attenuation applied before the limiter.
- **Direct mode**: see below. When it is on, the button flashes red and the Home screen shows *Direct mode on*.

Direct mode

Every change of the limitation is normally saved in the internal memory of the SPXOne, so that it is kept after a reboot. When many changes have to be made in real time — for example, adjusting the limitation level or the limitation curve during a live performance — switch on **DIRECT MODE**: the changes are **applied immediately but not saved**. This protects the flash memory of the SPXOne from wear caused by continuous writing.

- Switching direct mode **off** saves the current settings.
- If the SPXOne is rebooted or powered off while direct mode is on, the changes made in direct mode are **lost** and the last saved settings are used.

> **CAUTION**
> Switch direct mode off when the adjustments are finished, before leaving the installation, to keep the settings.

10 Audio outputs

Output type and level.

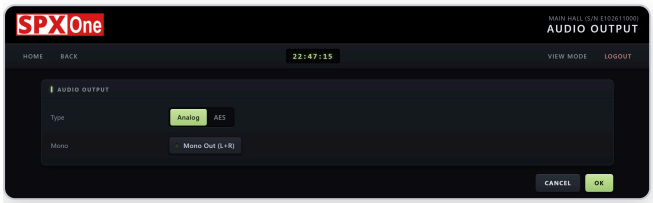


Figure 14 — AUDIO OUTPUT.

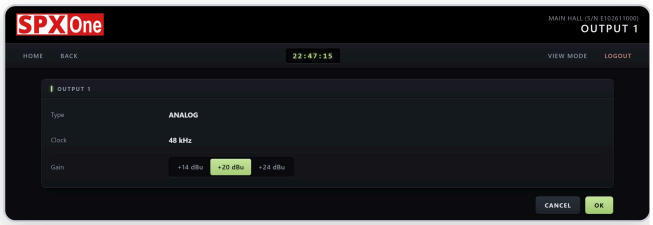


Figure 15 — OUTPUT 1.

PARAMETER	DESCRIPTION
Type	*Analog* or *AES* (digital output).
Mono	*Mono Out (L+R)* sends the sum of both channels to the outputs.
Clock	Sample rate of the outputs (**OUT 1** / **OUT 2** screens and **AUDIO OUTPUT** button). It is always the same as the input: 48 kHz with analog input, the sample rate of the source with AES input (see chapter 9).
Gain (OUT 1 / OUT 2)	Maximum analog output level: +14, +20 or +24 dBu. Select the value that matches the input sensitivity of the amplifiers.
Output 3	Available with AES output: *Enable / Disable* and attenuation (0 – 14 dB).

CAUTION

When the output gain is modified, the SPXOne must be calibrated again. The web interface reminds you with a message.

11 Microphones

Measurement microphones: enabling, data, adjustment and spectrum.

Mic input

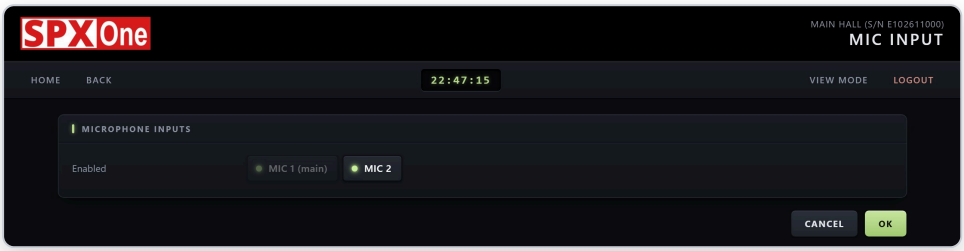


Figure 16 — MIC INPUT.

MIC 1 is the main microphone and is always enabled. Enable MIC 2 to measure a second room or a second point of the same room. The microphones and their installation are described in chapter 4 (*Measurement microphone*).

Mic 1 / Mic 2

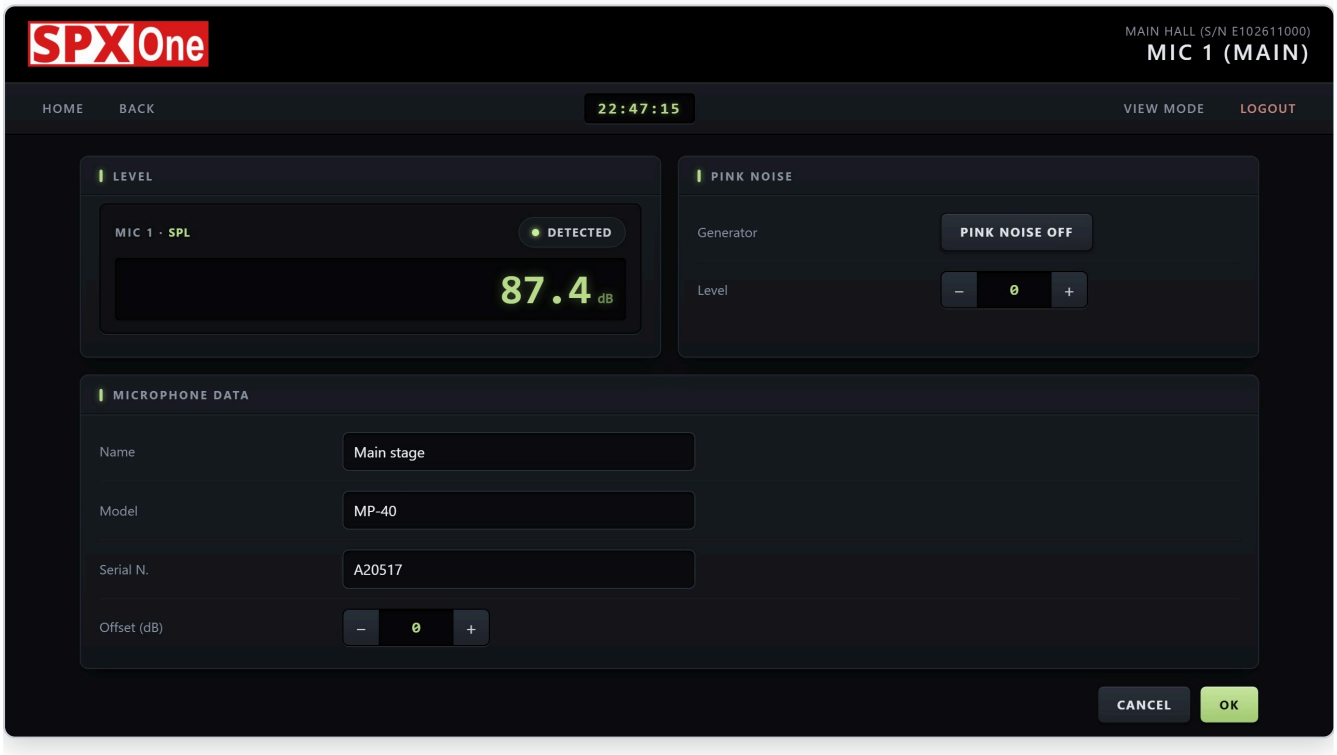


Figure 17 — MIC 1 (MAIN).

- **Level**: level measured by the microphone and detection status (*DETECTED / NOT DETECTED*).
- **Pink noise**: test generator. `PINK NOISE OFF / ON` switches it on and off and **Level** sets its level. The generator stops automatically when you leave the screen.
- **Microphone data**: name (location), model and serial number of the microphone, for the reports.

- **Offset (dB)**: correction of the reading (−10 to +10 dB). It is applied immediately so that you can compare it with a reference sound level meter. **CANCEL** restores the previous value.

Mic calibration (MIC 1 CAL / MIC 2 CAL)

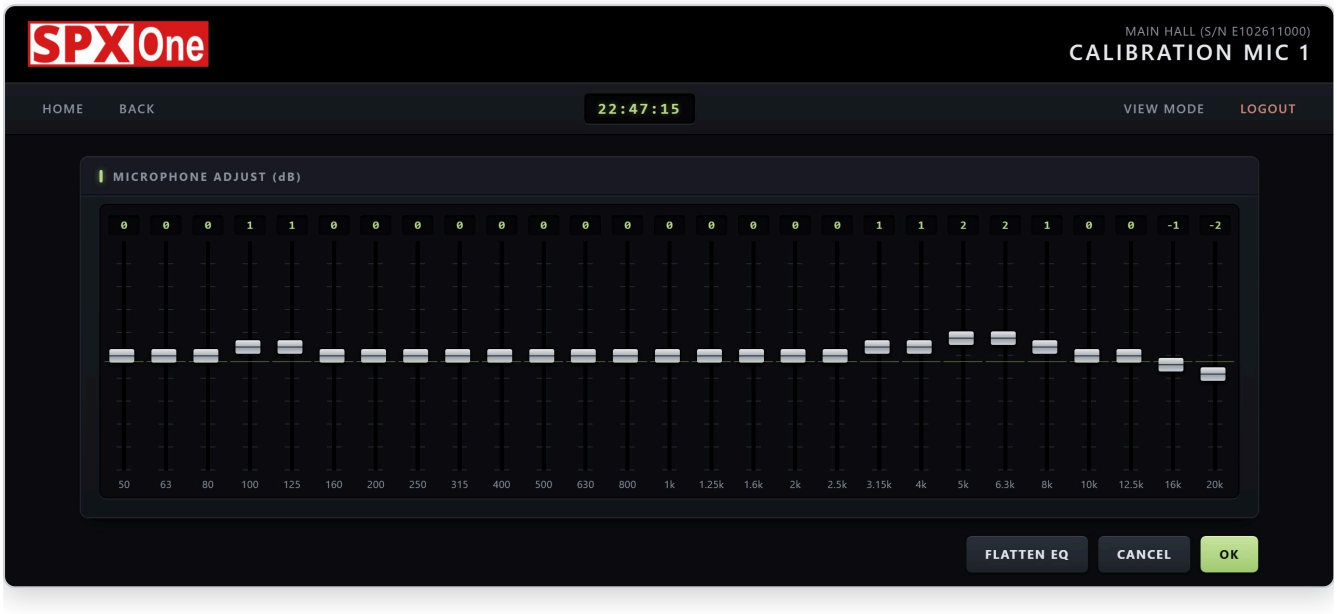


Figure 18 — Microphone frequency adjustment.

Frequency response correction of the microphone in 27 bands (50 Hz – 20 kHz, ±12 dB). Use it only with the correction data of the microphone or with a reference measurement. **FLATTEN EQ** removes all the corrections.

Mic RTA (MIC 1 RTA / MIC 2 RTA)



Figure 19 — Real time analyzer of microphone 1.

Spectrum measured by the microphone in 1/3 octave bands from 50 Hz to 20 kHz. **AVERAGE** shows the average spectrum, useful to analyse the acoustics of the room.

12 Calibration

Automatic adjustment of the SPXOne to the sound system and the room.

The calibration measures the relation between the audio signal and the sound level in the room. It is essential for the limiter to work correctly and must be carried out after the installation and whenever the sound system, the gains, the position of the microphones or the preset are changed.

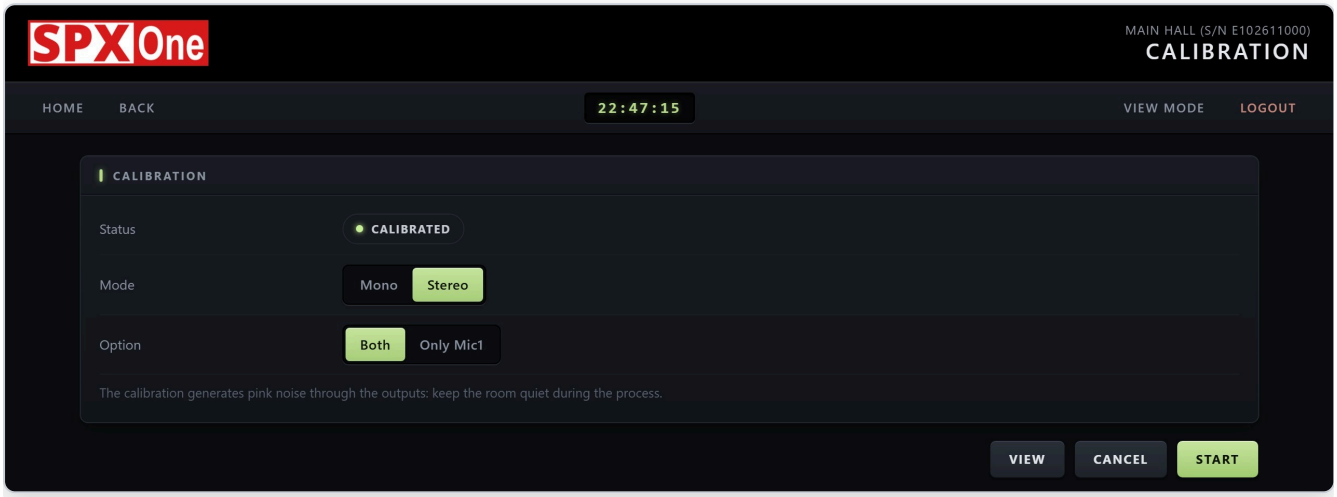


Figure 20 — CALIBRATION.

PARAMETER	DESCRIPTION
Status	*CALIBRATED* or *NOT CALIBRATED*.
Mode	*Mono* or *Stereo* (stereo requires input 2 enabled).
Option	*Both* (both microphones are calibrated) or *Only Mic1*. *Both* is available only when MIC 2 is enabled.

Calibration process

> **WARNING**
> The calibration generates pink noise through the outputs at high level. Warn the people present and do not stay close to the loudspeakers.

1. Check that the sound system is on, with its usual gains, and that the room is quiet.
2. Select **Mode** and **Option** and press **START**. A dialog window opens.
3. Press **START** in the dialog. The SPXOne adjusts the level of the pink noise (*Adjusting pink noise...*) and then calibrates (*Calibrating...*). The level measured by the microphones is shown in dB and a mark moves along the bar while the process is running.
4. When the process finishes, the bar is shown full and the result appears. Press **CLOSE**.



Figure 21 — Calibration dialog.

If the message *There is too much noise in the room* appears, reduce the background noise and repeat the calibration. **STOP** cancels the process.

Calibration view



Figure 22 — CALIBRATION VIEW.

VIEW shows the spectrum obtained in the last calibration for each microphone and the calibration gain (GCAL).

13 Limiter

Maximum levels of the rooms and sound insulation data.

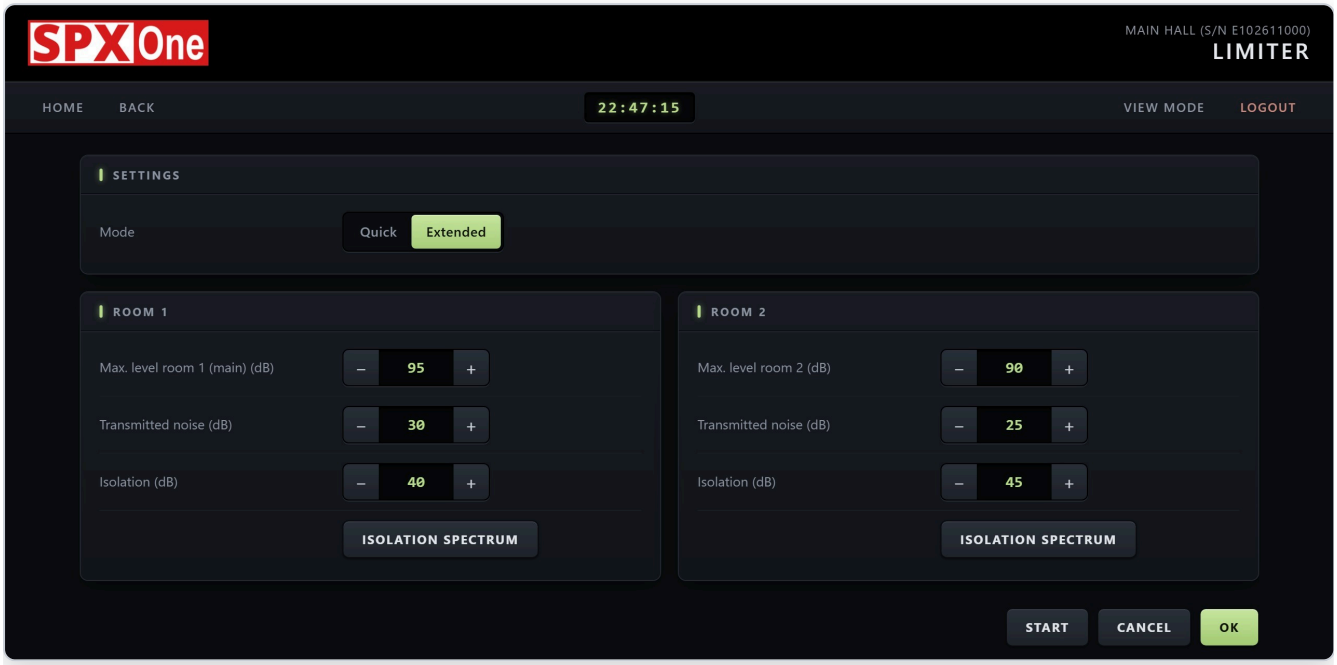


Figure 23 — LIMITER, extended mode with two rooms.

PARAMETER	DESCRIPTION
Mode	*Quick*: only the maximum level of each room is configured. *Extended*: the transmitted noise and the sound insulation of each room are also taken into account.
Max. level room 1 / 2	Maximum sound pressure level allowed in the room measured by MIC 1 (main) and by MIC 2, in dB. Room 2 is shown only when MIC 2 is enabled.
Transmitted noise	Extended mode: maximum noise level allowed in the receiving room (neighbour), in dB.
Isolation	Extended mode: sound insulation between the emitting room and the receiving room, in dB. **ISOLATION SPECTRUM** opens the insulation per frequency band.

Isolation spectrum



Figure 24 — Isolation spectrum of room 1.

Sound insulation in each band from 50 Hz to 5 kHz (20 – 110 dB), normally taken from the acoustic insulation test of the premises. **DEFAULT** loads the default spectrum.

Automatic limitation (START)

START sends the values of the screen and starts the automatic calculation of the limitation. After a 3-second countdown the SPXOne calculates the limitation while the level of MIC 1 is shown. When the process finishes, the message *Done!* appears and the LIMITER key of the Home screen shows *LIMITATION OK*. **STOP** cancels the process.

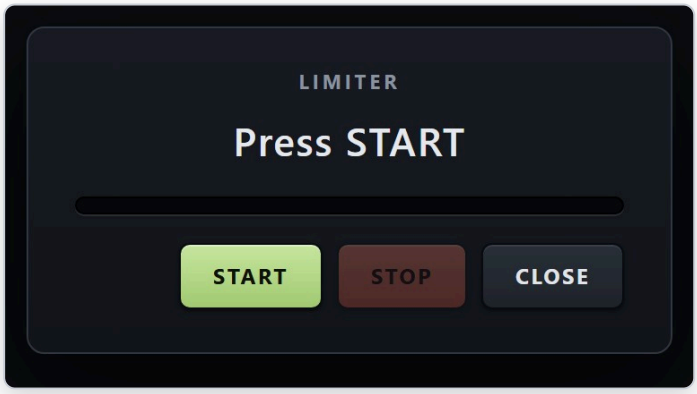


Figure 25 — Automatic limitation dialog.

OK saves the values without starting the process.

14 Presets

Configuration of channels and microphones of the installation.

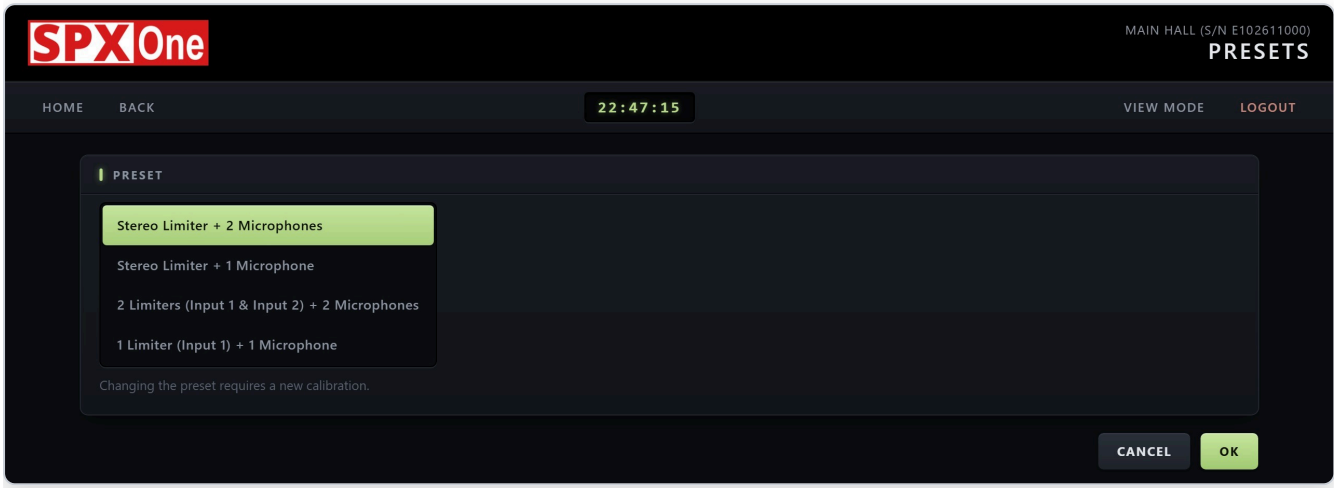


Figure 26 — PRESETS.

PRESET	TYPICAL APPLICATION
Stereo Limiter + 2 Microphones	Stereo sound system in one room, measured at two points, or one room and a neighbouring room.
Stereo Limiter + 1 Microphone	Stereo sound system in one room with one measurement microphone.
2 Limiters (Input 1 & Input 2) + 2 Microphones	Two independent zones, each with its own input, output and microphone.
1 Limiter (Input 1) + 1 Microphone	Mono installation with one microphone.

CAUTION

Changing the preset requires a new calibration.

15 Link and Wi-Fi

Connection with the remote control server and with the Wi-Fi network of the installation.

Link

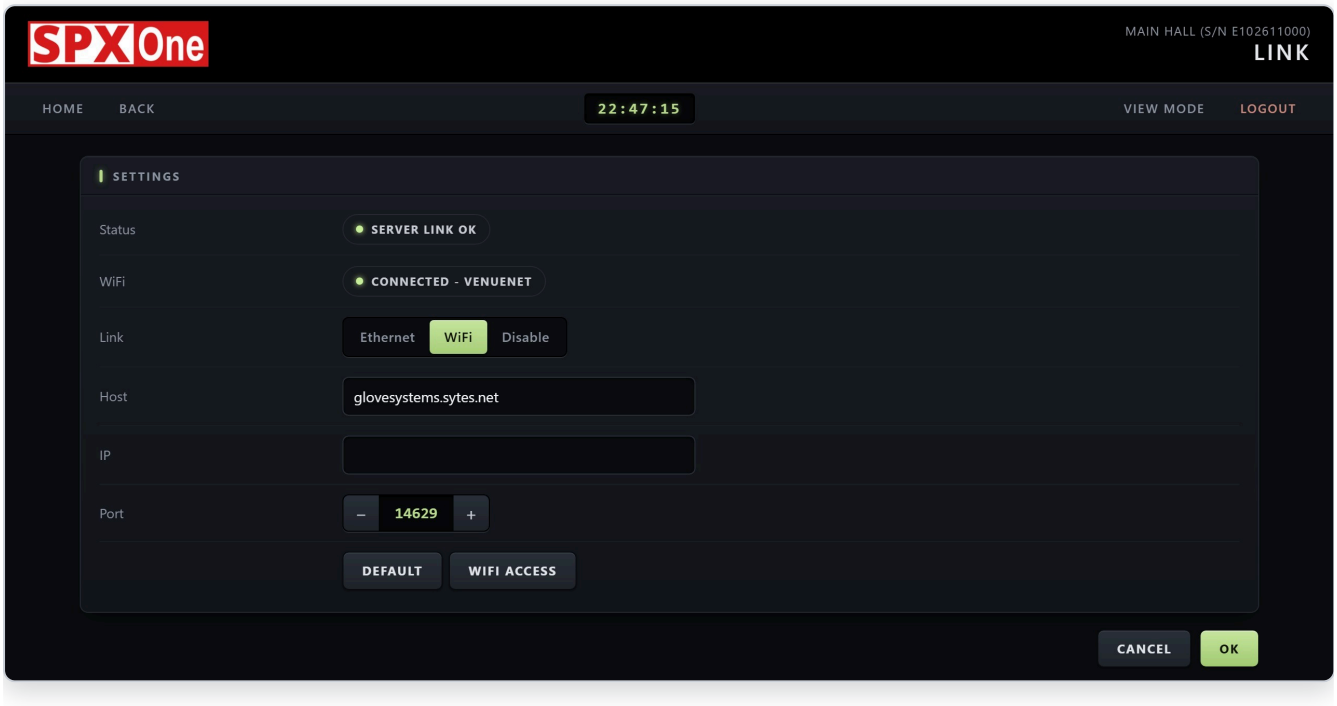


Figure 27 — LINK.

The SPXOne can send its measurements, sessions and events to the remote control server, where they can be consulted online, and receives from it the time and the firmware updates.

PARAMETER	DESCRIPTION
Status	State of the link with the server: *SERVER LINK OK* (data delivered), *SERVER LINK CONNECTING*, *SERVER LINK FAIL* (no connection) or *LINK DISABLED*.
WiFi	With the *WiFi* link, state of the Wi-Fi connection (for example *CONNECTED - VenueNet*; see Wi-Fi access).
Link	*Ethernet*, *WiFi* or *Disable*.
Host / IP	Name or IP address of the server (only one of them).
Port	TCP port of the server.
DEFAULT	Loads the server data of the manufacturer.
WIFI ACCESS	Shown with the *WiFi* link. If the link type has been changed, it is saved before the WIFI ACCESS screen opens.

If the SPXOne cannot reach the server, the data are stored in the device and are sent automatically when the connection is restored.

Wi-Fi access

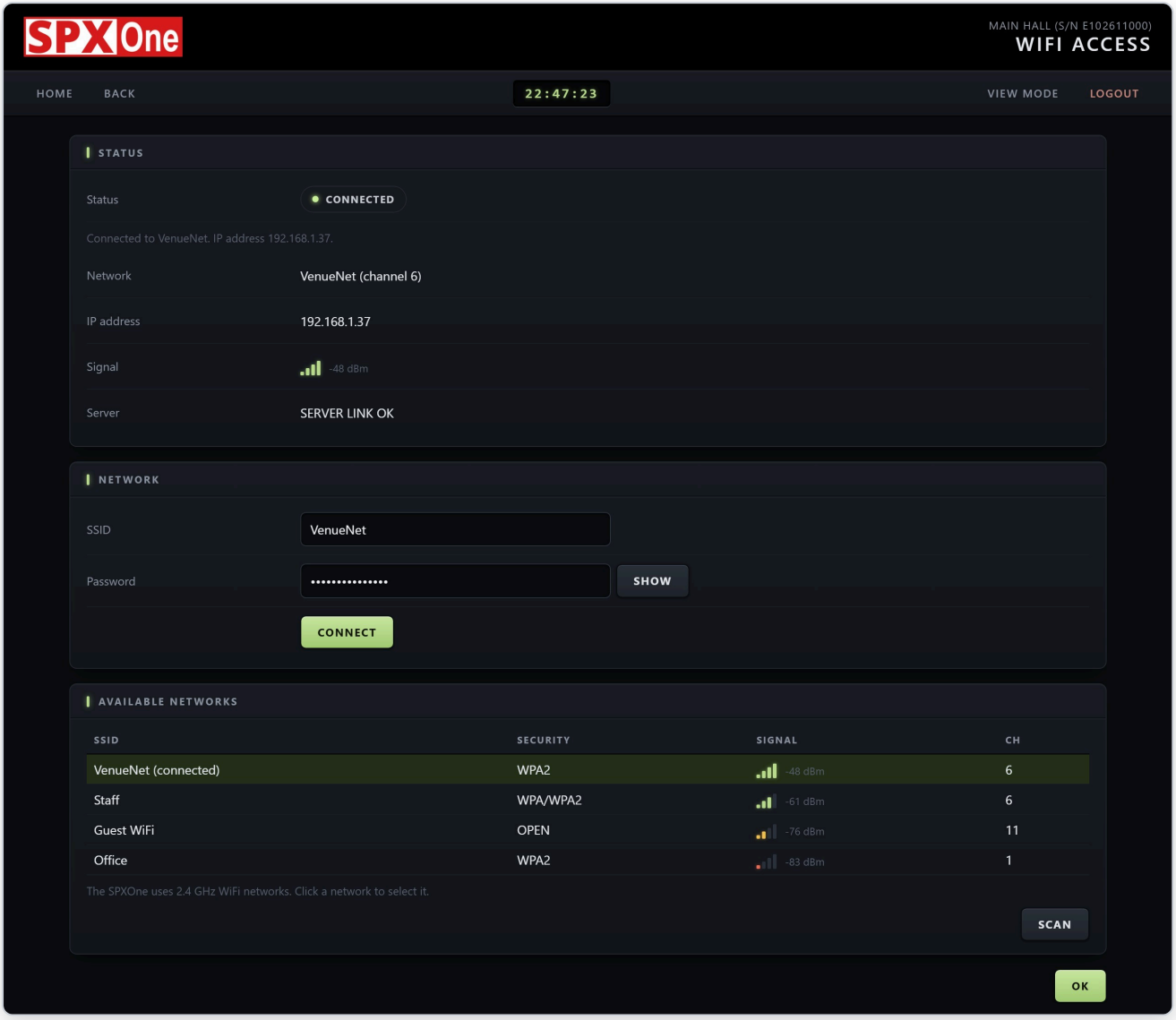


Figure 28 — WIFI ACCESS.

Connects the SPXOne to the Wi-Fi network of the installation. The SPXOne only joins the Wi-Fi network when the link is *WiFi*.

1. In **LINK**, select *WiFi* and press **WIFI ACCESS**.
2. The networks are scanned when the screen opens. **Available networks** shows the networks detected, sorted by signal, with their security, signal strength (bars) and channel. Press **SCAN** to scan again.
3. Click a network to copy its name to **SSID**, or type it if the network is hidden. Type the **Password** of the network (**SHOW** displays it). Open networks (*OPEN*) have no password.
4. Press **CONNECT** and confirm. The SPXOne tries to connect immediately and **Status** shows the result.

STATUS	MEANING
CONNECTED	Connected. The network and its channel, the IP address assigned, the signal strength and the state of the link with the server are shown.

CONNECTING	Connection in progress (up to about 20 seconds).
WAITING	The SPXOne will connect when no device is connected to its access point `SPXOne-XXXXXXX`. Press **CONNECT** to try now.
NOT CONNECTED	The last attempt failed. The message gives the reason: wrong password, network not found (off, out of range or 5 GHz) or no answer from the network. The SPXOne retries automatically.
NO NETWORK	No network is configured.
WIFI LINK OFF	The link selected in LINK is not *WiFi*.

If you are configuring through the SPXOne access point, once connected the screen shows the address to use from the installation network: `http://<IP address>` or `http://spxone-XXXXXXX.local`.

NOTE

The SPXOne uses 2.4 GHz Wi-Fi networks. The network name can have up to 31 characters and the WPA/WPA2 password 8 to 63 characters (letters, digits, spaces and keyboard symbols).

CAUTION

The SPXOne has a single Wi-Fi radio: when it joins the network, its access point `SPXOne-XXXXXXX` moves to the channel of that network and the devices connected to it may be disconnected for a few seconds. If you change the network while configuring the device through the installation network, the page stops responding: open it again from the new network or from the SPXOne access point.

TIP

For a reliable connection the signal should have at least 3 green bars (−70 dBm or more). With 2 yellow bars (−71 to −80 dBm) the connection works, but with little margin; with 1 red bar (below −80 dBm) it is unstable. If the signal is low, orient the antenna or use an extension cable to place it outside the rack. The display of the device uses the same bar scale.

16 Settings

Limitation, schedule control, measurement, device, network and security settings.

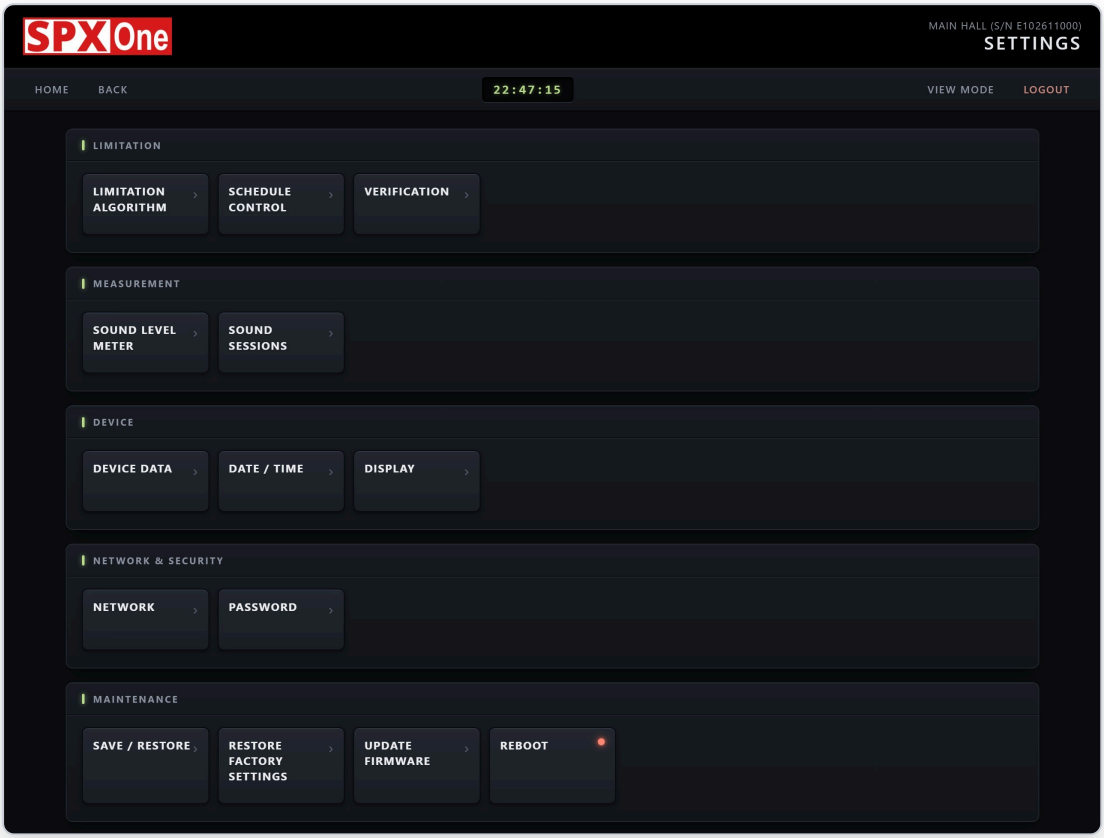


Figure 29 — SETTINGS.

Limitation algorithm

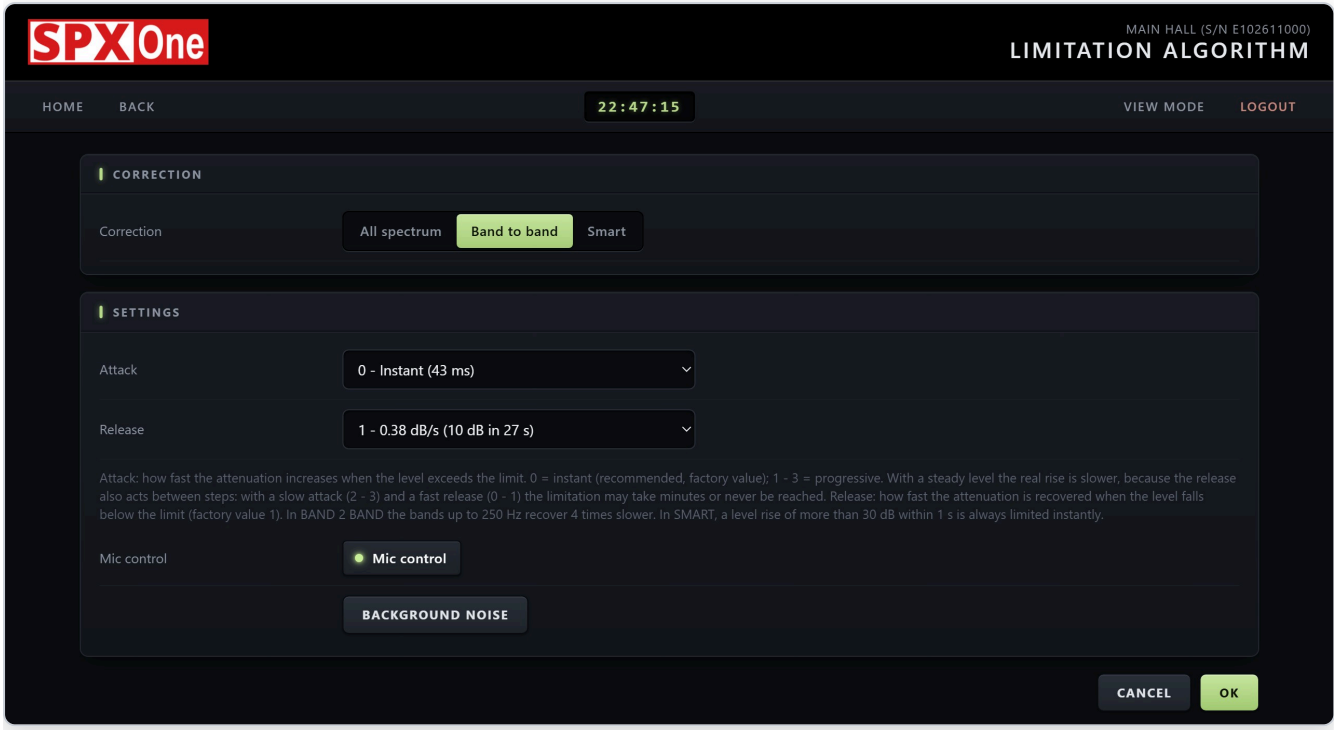


Figure 30 — LIMITATION ALGORITHM.

PARAMETER	DESCRIPTION
Correction	*All spectrum*, *Band to band* or *Smart* (see Real time analyzer, chapter 9).
Smart offset	Shown with the Smart correction (0 – 10). It corrects the excess of level caused by the dynamics of the music; it does not compress the signal and it does not modify the limitation algorithm. Recommended value: 2 – 3 (chapter 6).
Attack	How fast the attenuation increases when the level exceeds the limit (0 – 3, see the table below). Factory and recommended value: 0.
Release	How fast the attenuation is recovered when the level falls below the limit (0 – 3). Factory value: 1.
Mic control	Uses the microphone measurement to control the limitation.

Attack and release

The limiter recalculates the attenuation with each spectrum analysis: 23.4 times per second (every 42.7 ms), at any sample rate. Attack and release set how much the attenuation can change at each step:

VALUE	ATTACK (ATTENUATION RISE)	RELEASE (RECOVERY)
0	Instant: the required attenuation is applied at the next step (43 ms)	0.75 dB/s (10 dB in 13 s)
1	0.94 dB/s (0.04 dB per step)	0.38 dB/s (10 dB in 27 s)
2	0.47 dB/s (0.02 dB per step)	0.19 dB/s (10 dB in 53 s)
3	0.23 dB/s (0.01 dB per step)	0.09 dB/s (10 dB in 107 s)

- With attack 1 – 3 and a steady level, the real rise is slower than shown, because a release step acts between two attack steps. For example, with a steady excess of 10 dB, attack 1 and release 1 take about 32 s to reach 90 % of the attenuation; with a slow attack (2 – 3) and a fast release (0 – 1) the limitation may take minutes or never be reached. This is why attack 0 is recommended.
- With the *Band to band* correction, the bands up to 250 Hz recover 4 times slower.
- With the *Smart* correction, a level rise of more than 30 dB within 1 s is always limited instantly, whatever the attack.
- A value higher than 3 (possible in old configurations) works as 0 and the interface shows it as *not valid*.

Background noise

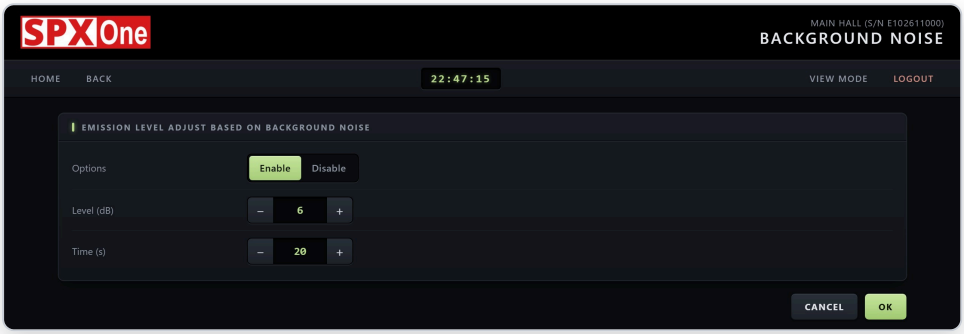


Figure 31 — Emission level adjust based on background noise.

When enabled, the emission level is adjusted according to the background noise of the room: **Level** (0 – 60 dB) and **Time** (10 – 60 s) define the adjustment.

Schedule control

The schedule control changes the allowed level automatically according to the day and the time. **Schedule control** *On / Off* enables or disables it immediately.

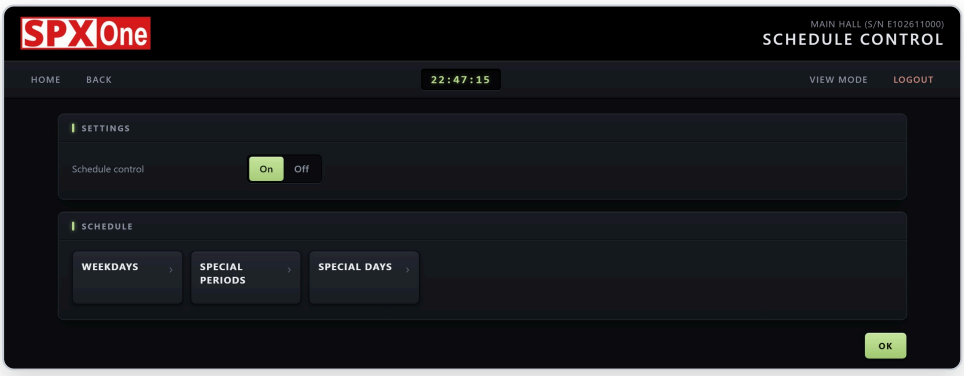


Figure 32 — SCHEDULE CONTROL.

Weekdays

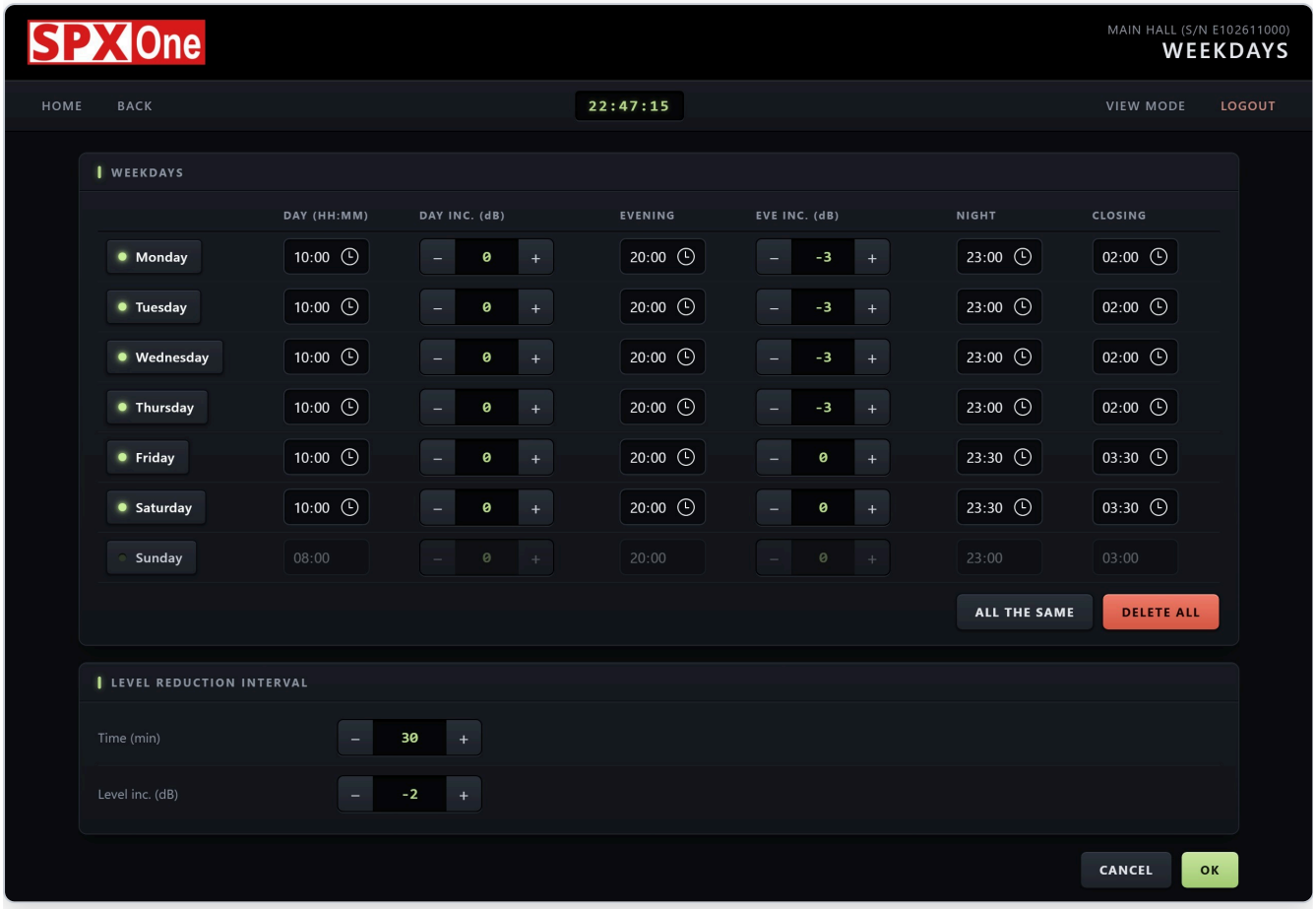


Figure 33 — WEEKDAYS.

For each day of the week: enable the day and set the start time of the **day**, **evening** and **night** periods and the **closing** time. **DAY INC.** and **EVE INC.** raise or lower the limit during the day and evening periods (dB). **ALL THE SAME** copies Monday to all the days and **DELETE ALL** disables all of them.

Level reduction interval: before closing, the level is reduced by *Level inc.* (dB) every *Time* (minutes).

Special periods and special days

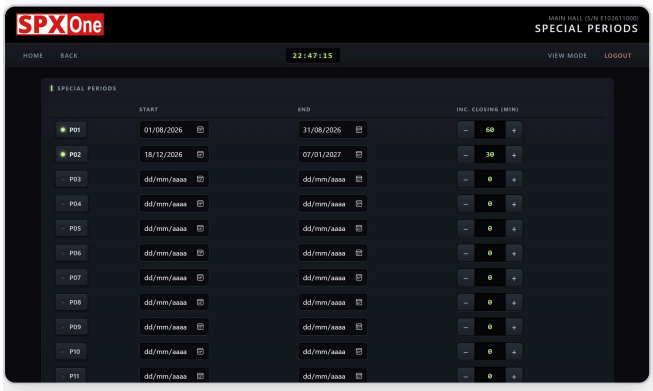


Figure 34 — SPECIAL PERIODS (detail).

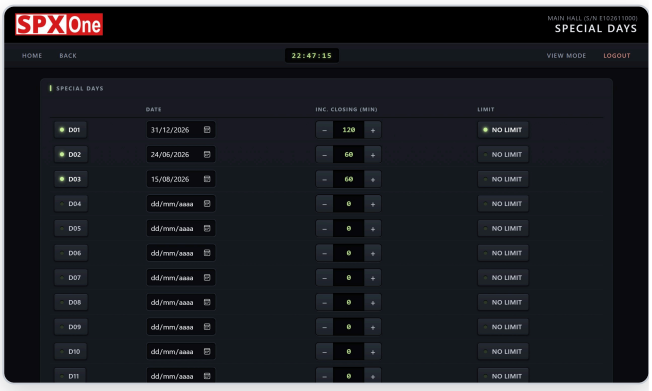


Figure 35 — SPECIAL DAYS (detail).

- **Special periods** (up to 20): from a start date to an end date the closing time is extended by *INC. CLOSING* minutes (for example, summer season or festivities).

- **Special days** (up to 30): on a date the closing time is extended by *INC. CLOSING* minutes; *NO LIMIT* disables the limitation on that day.

Verification

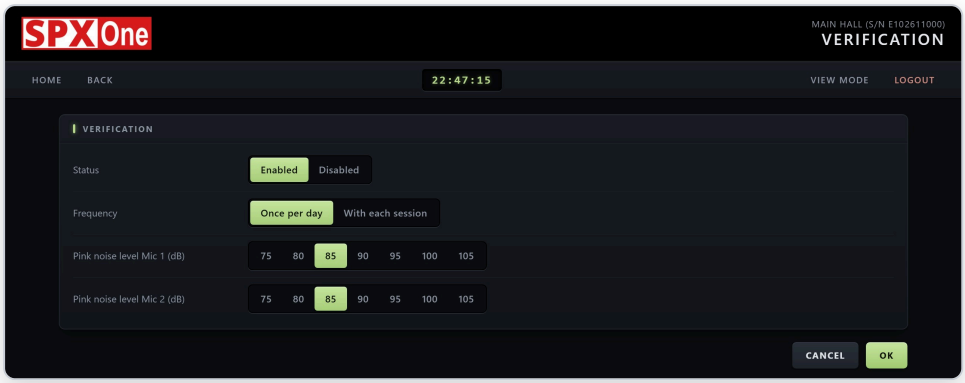


Figure 36 — VERIFICATION.

Automatic check that the microphones and the sound system are working: the SPXOne emits pink noise at the selected level (75 – 105 dB) *once per day* or *with each session* and checks the measurement.

Sound level meter

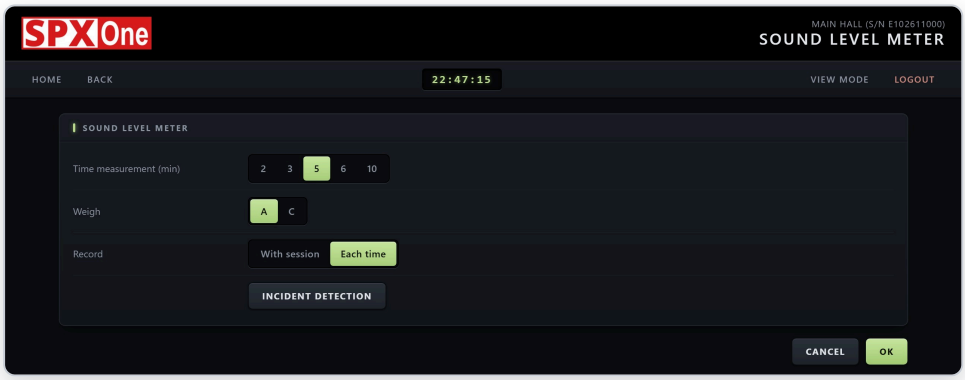


Figure 37 — SOUND LEVEL METER.

PARAMETER	DESCRIPTION
Time measurement	Integration time of the LEQ x' value and of the records of the data logger: 2, 3, 5, 6 or 10 minutes.
Weigh	Frequency weighting: *A* or *C*.
Record	*With session* (only while there is a sound session) or *Each time* (always).

Incident detection

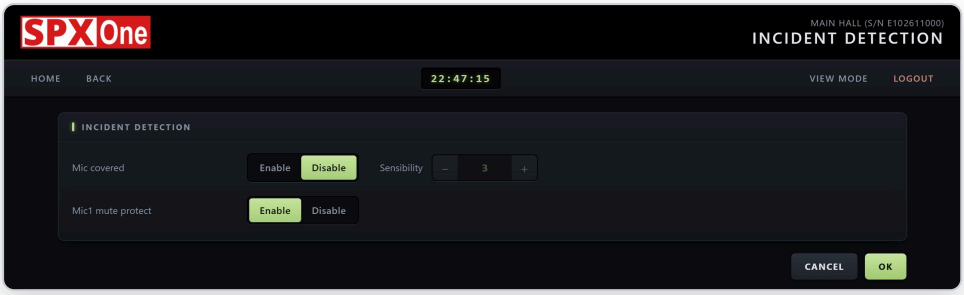


Figure 38 — INCIDENT DETECTION.

Mic covered detects attempts to cover or manipulate the microphone. Its **Sensibility** (1 – 10) is part of the same control: it is shown on the same line and is available only when *Mic covered* is *Enable*. **Mic1 mute protect** (on compatible hardware) protects against the muting of microphone 1. Default values: *Mic covered* = *Disable*, *Mic1 mute protect* = *Enable*. The incidents are recorded in the data logger.

Sound sessions

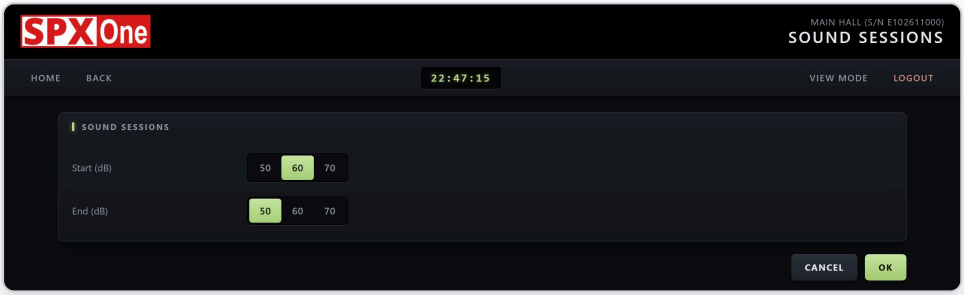


Figure 39 — SOUND SESSIONS.

A sound session starts when the level exceeds the **Start** level and ends when it falls below the **End** level (50, 60 or 70 dB). The sessions are recorded with their start and end time.

Device data

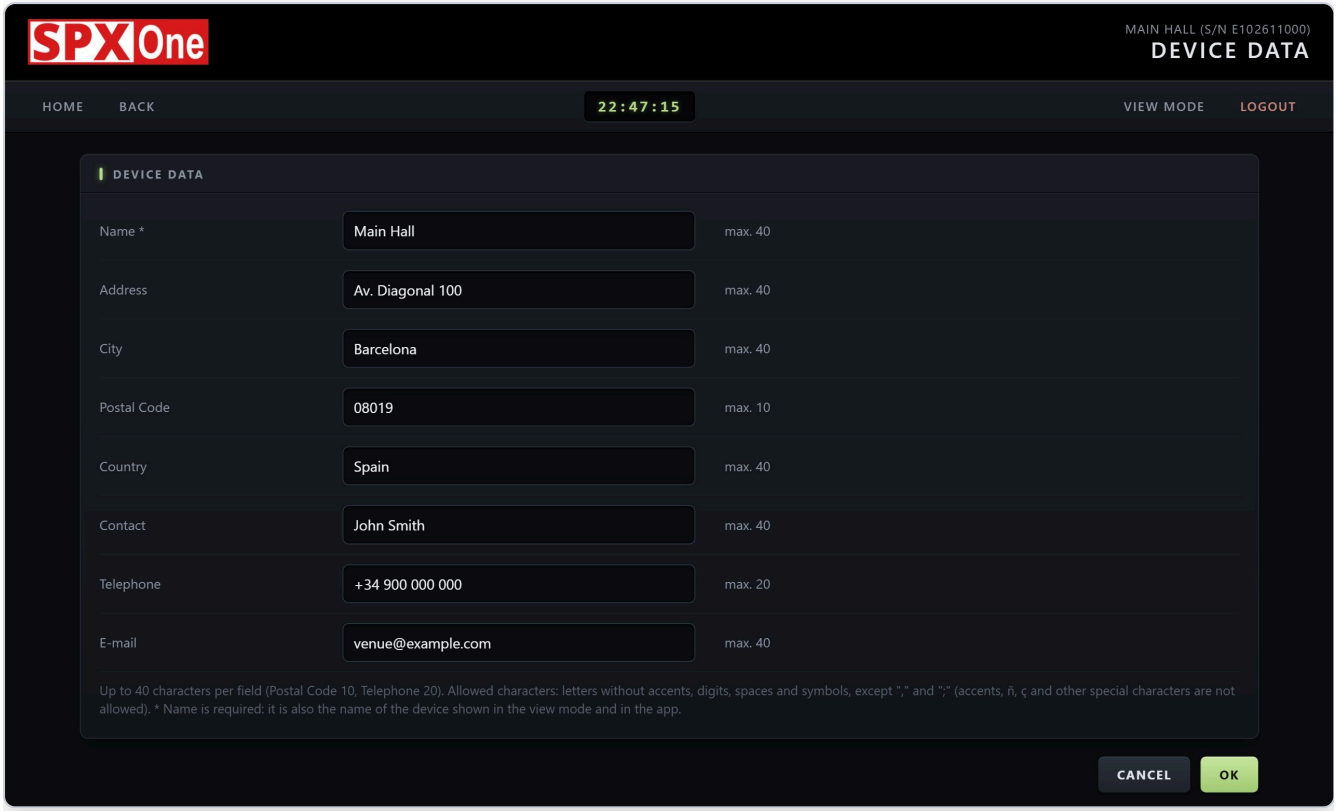


Figure 40 — DEVICE DATA.

Name and data of the installation. They identify the device in the reports and in the remote server. The name is shown in the view mode and in the SPXOne Control application. The web interface checks each field before sending it to the SPXOne: the fields with errors are marked in red and the reason is shown below them.

FIELD	MAXIMUM LENGTH	ALLOWED CHARACTERS
Name	40 (required)	Letters without accents, digits, spaces and symbols, except `,` and `;`
Address, City, Country, Contact	40	Same as Name
Postal Code	10	Letters, digits, spaces and `-`
Telephone	20	Digits, spaces and `+ ( ) - .`
E-mail	40	A valid address (`name@domain.com`), or empty

Accented and special characters (á, ñ, ç, €...) are not allowed in any field: they are not supported by the device.

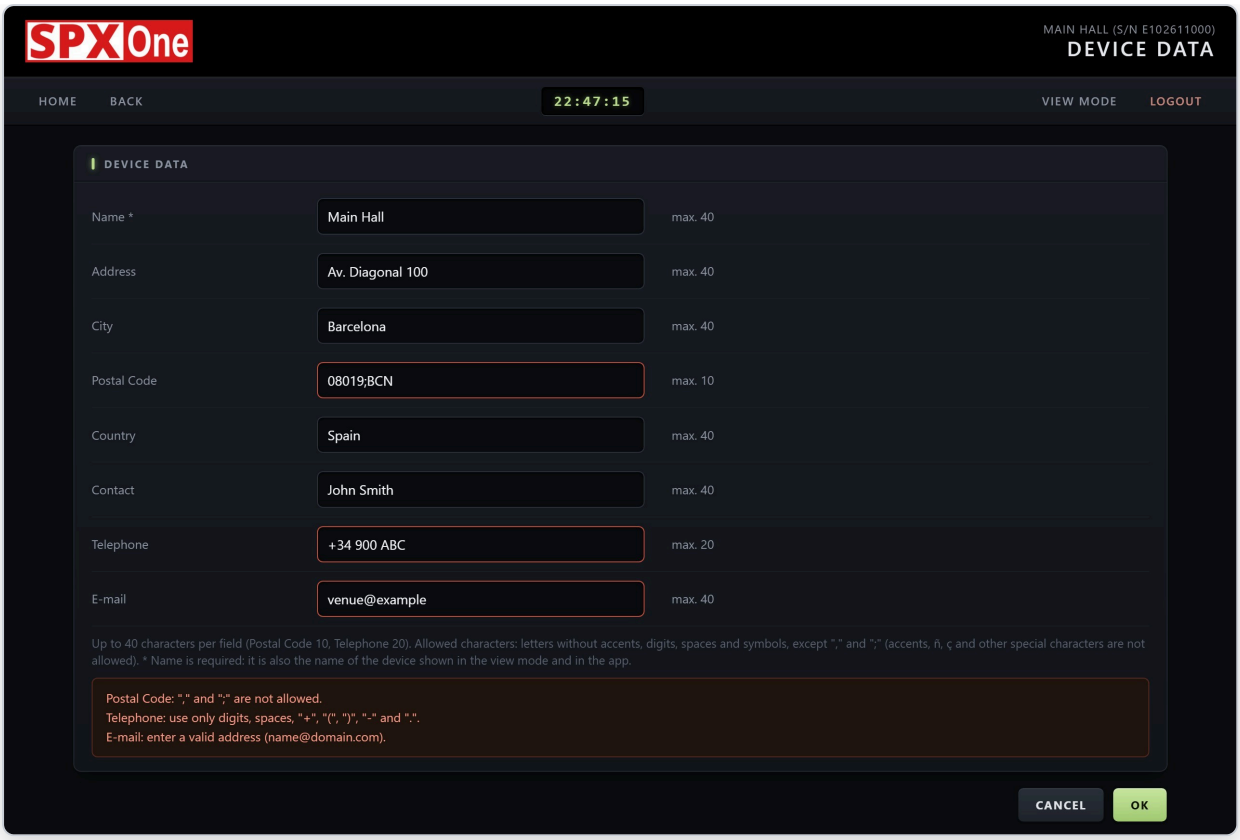


Figure 41 — DEVICE DATA: fields with errors.

Date / time

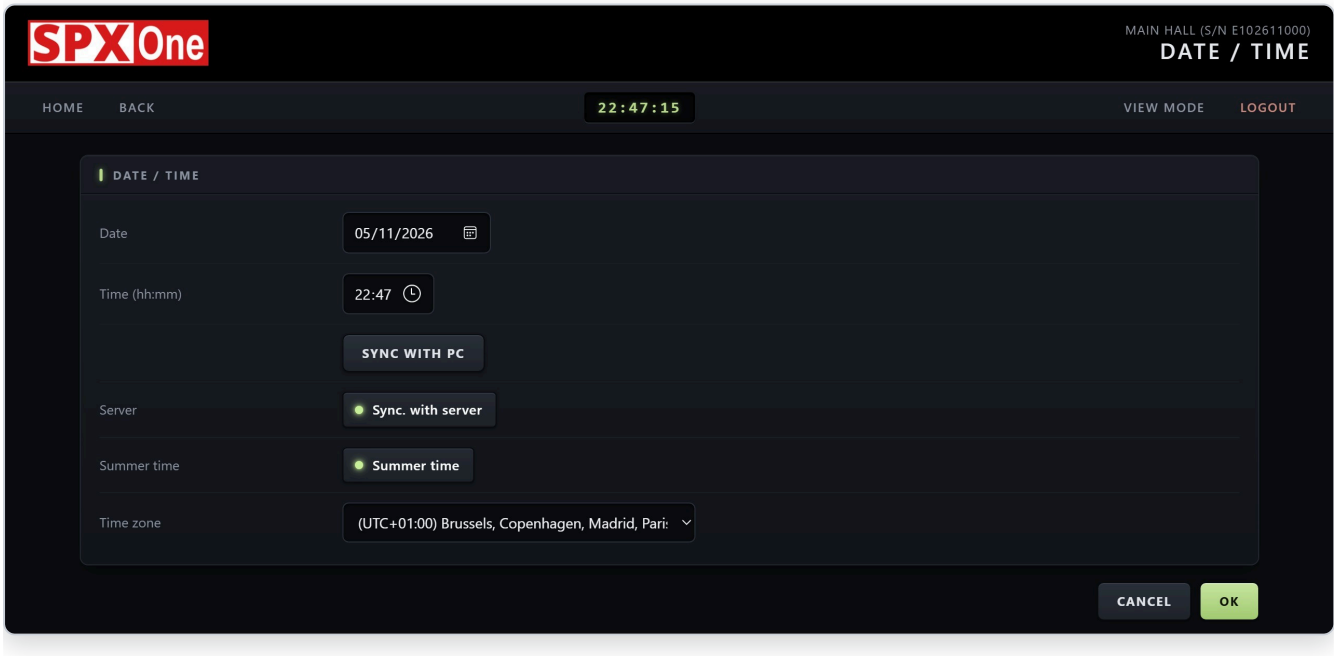


Figure 42 — DATE / TIME.

Set the date and time manually or press **SYNC WITH PC** to copy the time of your computer. With **Server** enabled the time is synchronized automatically through the link. Select the **Time zone** and enable **Summer time** if applicable.

Display

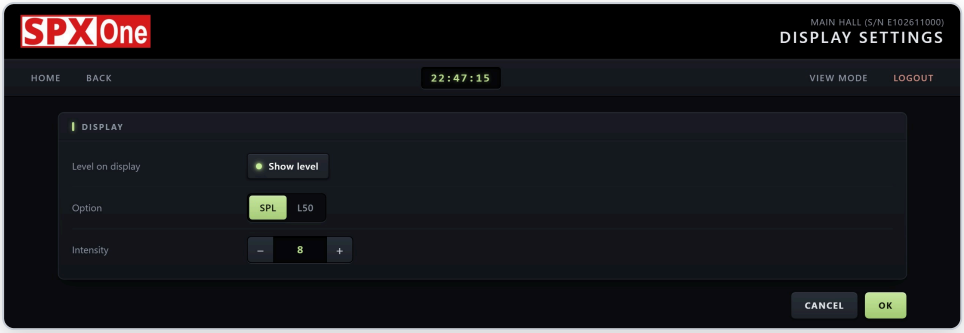


Figure 43 — DISPLAY SETTINGS.

Front display of the SPXOne: show the level (*SPL* or *L50*) and the intensity (1 – 15).

Network

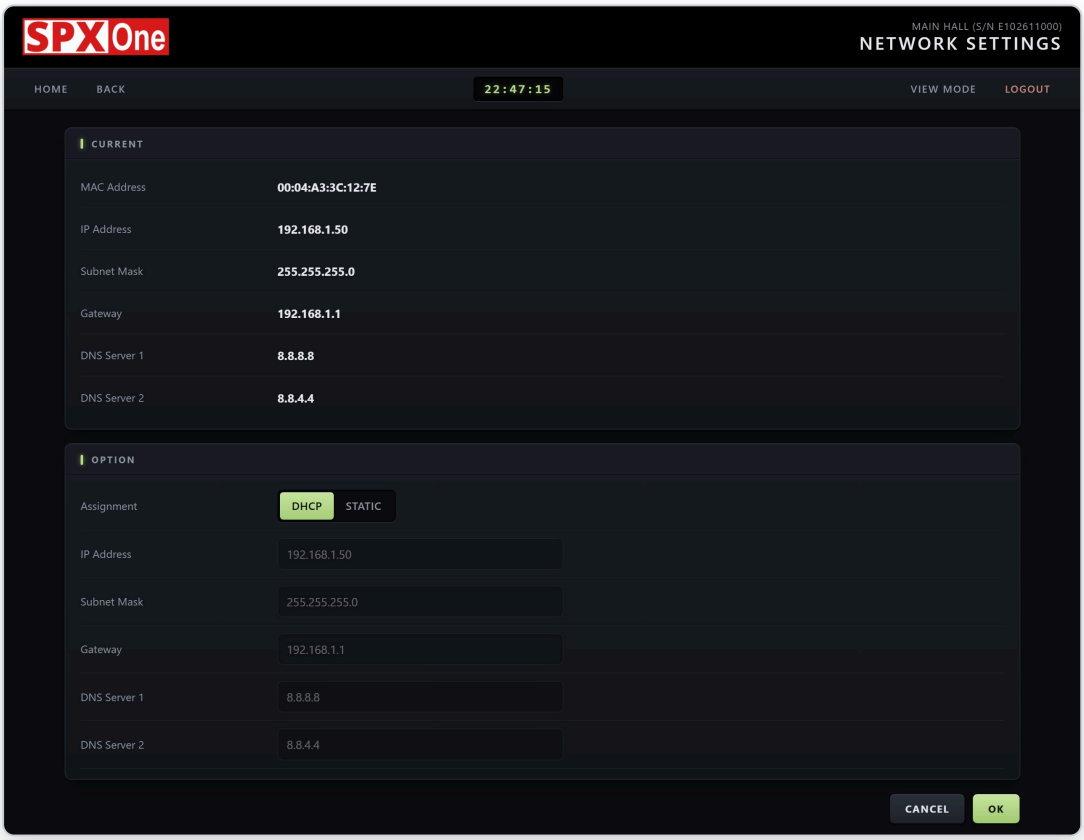


Figure 44 — NETWORK SETTINGS.

Current shows the MAC address and the current IP configuration. In **Option** select *DHCP* (automatic address from the router) or *STATIC* and type the IP address, subnet mask, gateway and DNS servers. Press **OK** and confirm with **APPLY**: the SPXOne reboots to apply the new settings.

With *STATIC*, the web interface checks the configuration **before** sending it to the SPXOne. If it is not valid, nothing is sent: the wrong fields are marked in red and the reason is shown so that you can correct it.

FIELD	CHECKS

All	Four numbers from 0 to 255 separated by dots (for example `192.168.1.50`).
IP Address	Usable host address: not 0.x.x.x, loopback (127.x.x.x), multicast (224 – 239), reserved (240 – 255) or link-local (169.254.x.x), and not the network or broadcast address of its subnet.
Subnet Mask	Valid mask (contiguous bits) between 255.0.0.0 (/8) and 255.255.255.252 (/30).
Gateway	In the same subnet as the IP address, different from it and not the network or broadcast address.
DNS Server 1 / 2	Valid host address. DNS Server 2 is optional (leave it empty) and must be different from DNS Server 1.

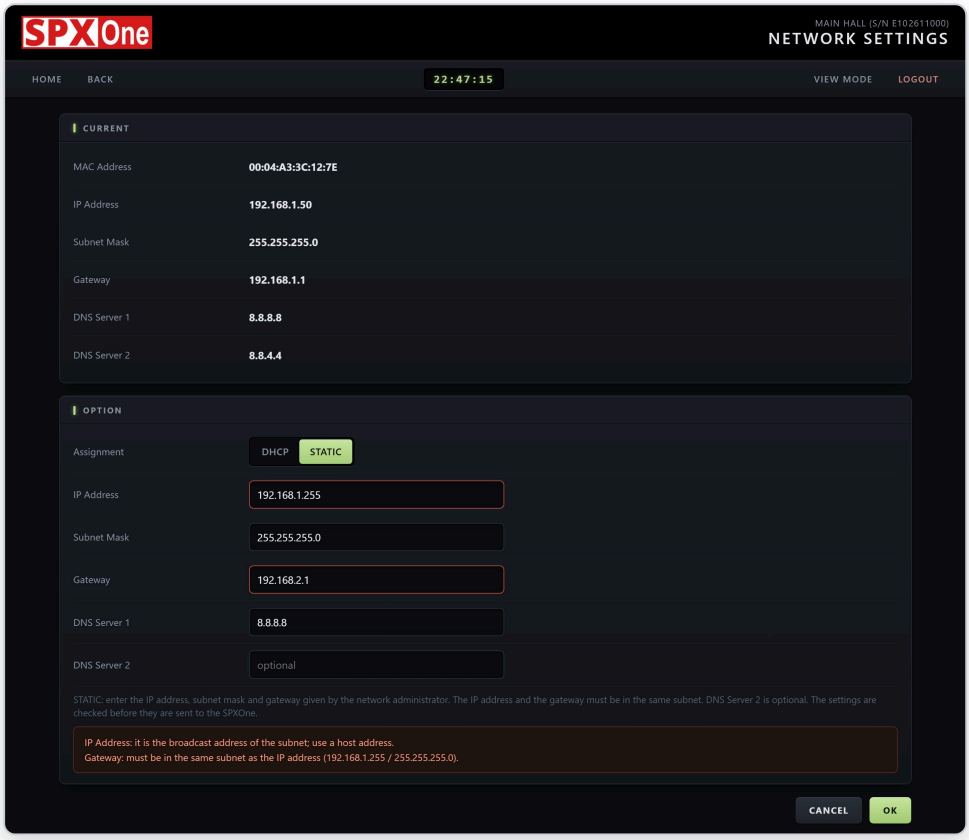


Figure 45 — NETWORK SETTINGS: static configuration with errors.

> **CAUTION**
>
> If the IP address changes, open the web interface at the new address. Write down the static address before applying it. An incorrect configuration can leave the SPXOne unreachable through Ethernet; in that case connect through its Wi-Fi access point to correct it.

Password



Figure 46 — PASSWORD.

Type the current password and the new one twice, and press **OK**. The rules are shown on the screen:

PASSWORD	RULE
Length	4 to 7 characters.
Allowed	Letters `A-Z` and `a-z` (case sensitive), digits `0-9` and the symbols `! " # $ % & ' ( ) * + - . / : < = > ? @ [ \ ] ^ _ ` { | } ~`
Not allowed	Comma `,` and semicolon `;` (they are reserved by the communication protocol), spaces, and accented or non-English characters (ñ, á, ç, €...).

> **NOTE**
> Keep the password in a safe place: if it is lost, contact your installer or the technical support.

17 Maintenance

Backup, factory settings, firmware update and reboot.

Save / restore

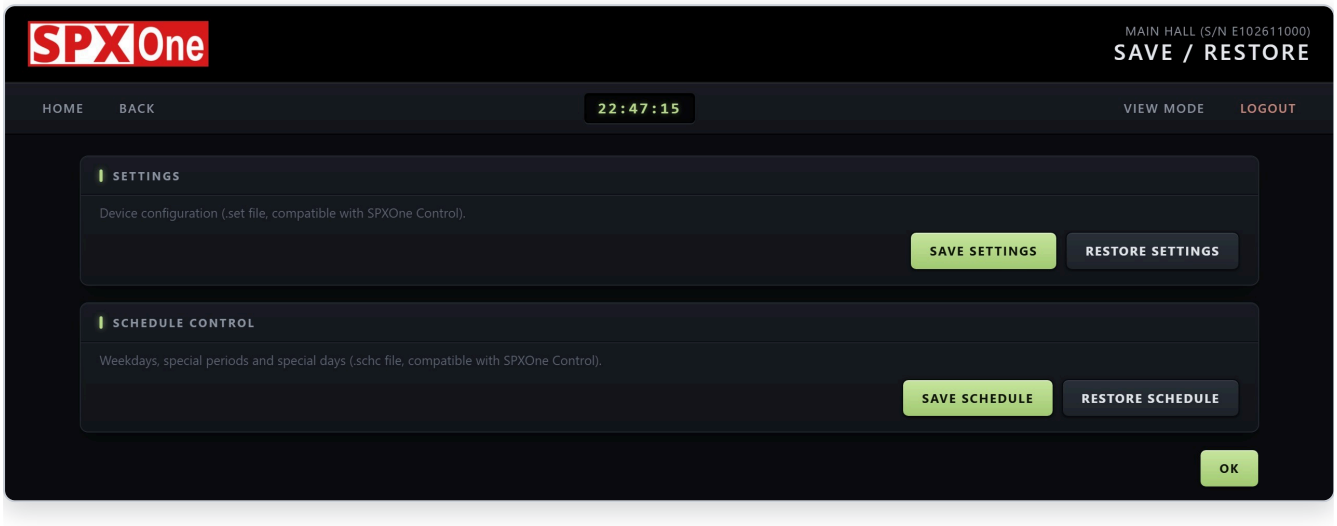


Figure 47 — SAVE / RESTORE.

- **SAVE SETTINGS** saves the configuration of the device in a `.set` file; **RESTORE SETTINGS** loads it. After restoring the settings, a new calibration is required.
- **SAVE SCHEDULE** / **RESTORE SCHEDULE** save and load the schedule control (weekdays, special periods and special days) in a `.schc` file.

The files are compatible with the SPXOne Control application. Depending on the browser, the file is saved in the downloads folder or the browser asks where to save it.

Restore factory settings

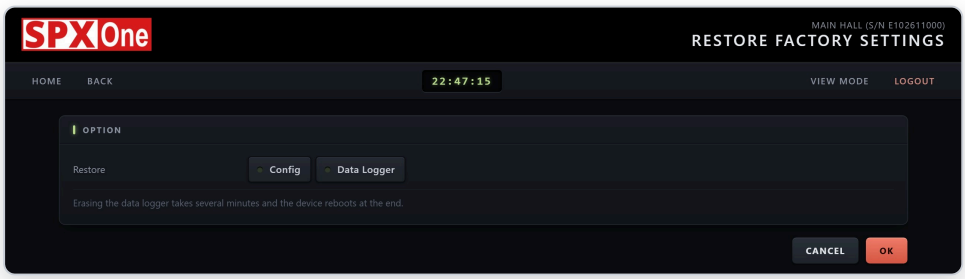


Figure 48 — RESTORE FACTORY SETTINGS.

Select *Config* (configuration) and/or *Data Logger* (stored records) and press **OK**. Erasing the data logger takes several minutes; a progress bar is shown and the device reboots at the end.

> **WARNING**
> This operation cannot be undone. Download the report and save the settings first if you need them.

Firmware update

The SPXOne keeps its firmware up to date through the internet. Each time it connects to the server (link through Ethernet or Wi-Fi), it checks whether a new version is available and, if so, downloads it in the background; the update is applied automatically at the next reboot. You can also check and download the update manually:

1. Go to **SETTINGS > UPDATE FIRMWARE**. The window shows the **current firmware version**.
2. Press **CHECK FOR UPDATES**. The SPXOne asks the update server for the latest version (a mark moves along the bar while it checks).
3. If a new version is available, its number is shown with the **DOWNLOAD** button. Nothing is downloaded until you press it. If the device is up to date, the message *Your SPXOne is up to date* appears.
4. Press **DOWNLOAD**. The progress bar shows the percentage downloaded. The SPXOne keeps working normally during the download; you can press **HIDE** and continue with other tasks.
5. When the download finishes, the update will be applied automatically the next time the SPXOne reboots. Press **REBOOT NOW** to apply it immediately or **LATER**.



Figure 49 — Current version.



Figure 50 — New version available.



Figure 51 — Downloading.

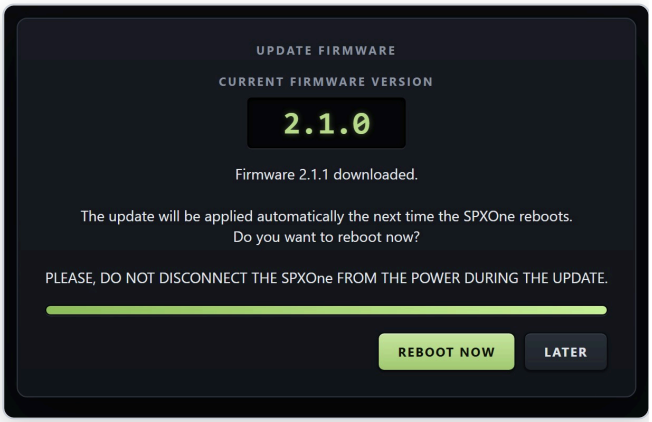


Figure 52 — Download completed.

> **WARNING**
> Do not disconnect the SPXOne from the power supply while the update is being applied after the reboot. The process takes some seconds; the configuration and the data logger are kept.

The online update requires the link with the server (chapter 15). If there is no connection, the window shows *No connection with the update server*.

Reboot

SETTINGS > REBOOT restarts the SPXOne after confirmation. The web page returns to the view mode after about 25 seconds.

18 Report

Download of the data logger and generation of reports.

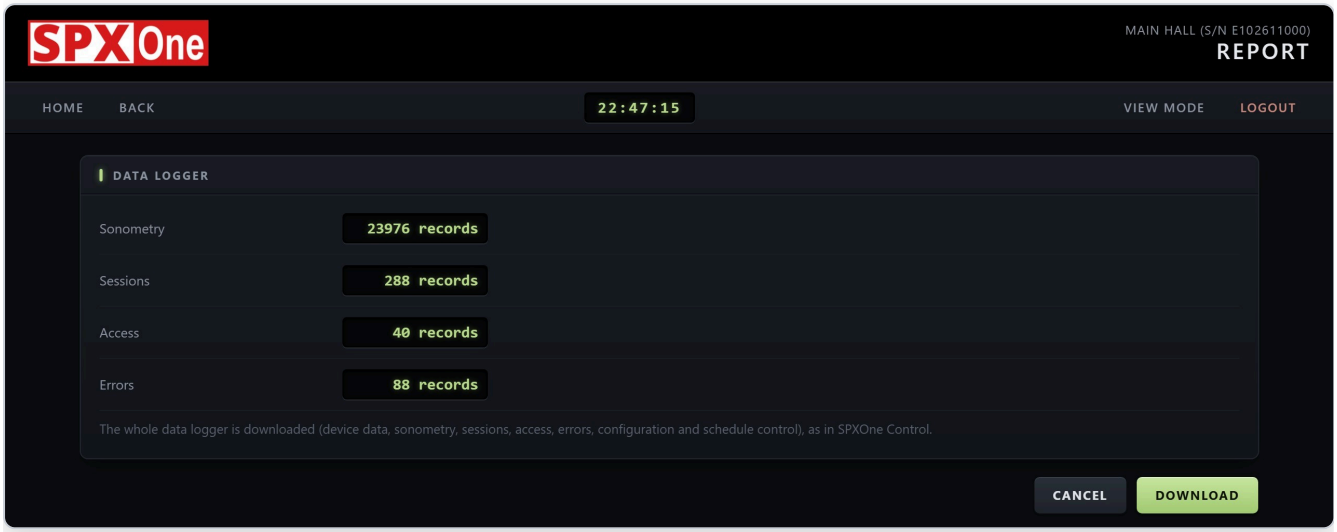


Figure 53 — REPORT.

The SPXOne stores the sonometry records (levels), sound sessions, accesses and errors. The REPORT screen shows the number of records of each type. Press **DOWNLOAD** to download the whole data logger together with the configuration and the schedule control; a progress bar is shown and the download can be stopped with **STOP**. When it finishes:

BUTTON	RESULT
SAVE DATA .CSV	Text file with all the data, for spreadsheets.
SAVE DATA .REG1 (ENCRYPTED)	Encrypted file, compatible with SPXOne Control, which guarantees that the records have not been modified (for inspections).
CONFIG REPORT (PDF)	PDF report of the configuration of the device. You can add a description of the sound equipment.

NOTE

Downloading a full data logger can take several minutes, especially through Wi-Fi. Keep the page open until it finishes.

19 Troubleshooting

Solutions to common situations and meaning of the error references.

SITUATION	SOLUTION
The web page does not open	Check that the computer is in the same network as the SPXOne. Use the IP address instead of the name. Through Wi-Fi, connect to the `SPXOne-XXXXXXX` network and use `http://192.168.4.1`.
Device busy	The configuration is open from SPXOne Control or from another browser. Close that session (LOGOUT) or wait one minute.
WRONG PASSWORD	The password is case sensitive. Check the Caps Lock key and type it again.
Session expired	The session was closed because of inactivity or loss of connection. Log in again.
NO DATA FROM DEVICE	The view mode does not receive data. Check the network connection; the screen recovers automatically.
Not calibrated	Carry out the calibration (chapter 12).
No mic signal	Check the microphone cable and connection, and that the microphone is enabled (MIC INPUT).
SERVER LINK FAIL	Check the internet access of the network, the link type and the server data (LINK > DEFAULT).
The SPXOne does not join the Wi-Fi network	Check that the link is *WiFi* and read the reason given in **WIFI ACCESS** (password, network not found or no answer). The network must be 2.4 GHz. Check the signal quality and press **CONNECT** to retry.
Too much noise in the room	Reduce the background noise and repeat the calibration.

Error references

When an operation fails, the message includes a reference such as `Ref. NET-1 / C010 / 14:32:05` (code / command / time). Give this reference to technical support.

CODE	MEANING
NET-1	No response from the device. Check the network connection.
HTTP-n	Communication error (n = HTTP code). Try again in a few seconds.
BSY-1	Configuration open from SPXOne Control or another browser.
BSY-2	The device is busy. Try again in a few seconds.
SES-1	Session expired. Log in again.
GW-n	The device could not process the request.
DEV-99	The device rejected the command (value not valid or not allowed).
DEV-0	The device could not apply the change.
RSP-1	Unexpected response from the device.
WEB-1	Internal error of the web page. Reload the page.

20 Technical specifications

Main characteristics of the SPXOne.

LIMITING FUNCTION	
Type	Spectral, 1/3 octave
Frequency range	21 bands between 50 Hz and 5 kHz, according to regulations
Setting	Maximum level allowed in the venue / acoustic insulation + maximum level in the adjacent dwelling
Control algorithm	Full bandwidth without pitch modification / discrete frequency
Control	Independent on both channels (double limiter function)
Graphic EQ	31 bands, 1/3 octave, 20 Hz – 20 kHz
Number of channels	2 independent channels (control of 2 different acoustic signals)

DATA LOGGER	
Number of sensors	2
Weighting	A / C
Frequency range	50 Hz – 20 kHz
Measurement range	40 – 120 dB
Parameters	LAeq, LCeq, L50, statistics and expected levels in adjacent rooms / outdoors
Measurement interval	2, 3, 5, 6 and 10 minutes
Capacity	> 2 years

SCHEDULE CONTROL	
Weekly control	4 time slots, including mute
Periods	20, with mute time variation
Special days	30, with mute time variation and operating exceptions
Capacity	> 2 years without assistance

AUDIO INPUTS	
Number	2 analog line inputs / 1 digital input (AES/EBU); 2 sensor inputs
Connectors	2 × XLR female (1 selectable analog / AES); 2 × XLR female for the sensors

Type	Electronically balanced, with RF filter
Impedance	> 20 kΩ, balanced, line to line
Input level	Electronically adjustable: +14, +22, +28 dBu
Maximum input level	> +28 dBu, balanced, < 1 % THD
CMRR	> 52 dB @ 1 kHz

AUDIO OUTPUTS	
Number	2 analog line outputs / 1 digital output (AES/EBU)
Connectors	2 × XLR male (1 selectable analog / AES)
Type	Electronically balanced, with RF filter
Impedance	120 Ω, balanced, line to line
Output level	Electronically adjustable: +14, +20, +24 dBu
Maximum output level	+24 dBu, balanced, < 1 % THD

A/D AND D/A CONVERSION	
A/D converters	24 bit, SPX conversion system
A/D dynamic range	112 dB A-weighted, 110 dB unweighted, 22 kHz BW
D/A converter	24 bit
D/A dynamic range	112 dB A-weighted, 110 dB unweighted, 22 kHz BW

SYSTEM PERFORMANCE	
Number of CPUs	2, with FPU
Internal processing	32-bit floating point
Sampling rate	48 kHz (analog) – 48 / 96 / 192 kHz (digital). Inputs and outputs always work at the same rate (chapter 9)
Dynamic range	112 dB A-weighted, 110 dB unweighted
THD + noise	0.0025 % typical @ +4 dBu, 1 kHz, 0 dB input gain
Frequency response	20 Hz – 20 kHz, +0 / −0.5 dB
Crosstalk between channels	< −95 dB, −105 dB typical @ 20 Hz – 20 kHz, +4 dBu
Latency (analog IN-OUT)	0.44 ms @ 48 kHz
Latency (digital IN-OUT)	0.04 ms @ 96 kHz

Temperature range	0 – 65 °C

CONFIGURATION AND COMMUNICATION	
Configuration	Multi-device: SPXOne Control application (Windows 8 / 10 / 11) and built-in web server (this manual)
Ports	RJ-45 Ethernet; Wi-Fi 2.4 GHz IEEE 802.11 b/g/n with external antenna (chapter 2)
Security	Digital key on the device + licence of the application; configuration password
System clock	Automatic time update (SNTP)
Data transmission	Real time, via Ethernet and Wi-Fi, TCP/IP protocol

POWER SUPPLY	
Voltage	100 – 240 V AC, 50 / 60 Hz
Consumption	10 W
Inlet	IEC 60320 C14 with power switch and fuse holder

PHYSICAL CHARACTERISTICS	
Dimensions	484 × 45 × 170 mm (19" rack, 1U)
Unit weight	2.2 kg
Packed weight	4.0 kg

AUDIO CONFIGURATIONS	
P1	Stereo analog IN – stereo analog OUT
P3	Stereo digital IN – stereo digital OUT
P4	Stereo digital IN – stereo digital OUT + mono analog monitor (L+R)

Specifications subject to change without notice. Radio characteristics of the Wi-Fi module: see chapter 2.

21 Glossary & support

Terms used in this manual and technical support.

TERM	DEFINITION
SPL	Sound pressure level, in dB. In the SPXOne, the level integrated over 1 second (LEQ 1 s).
LEQ	Equivalent continuous sound level over a time interval (1 minute: LEQ 1'; x minutes: LEQ x').
dBA / dBC	Sound level with A or C frequency weighting. The web interface shows the levels in dB: the weighting (A or C) is the one selected in **SETTINGS > SOUND LEVEL METER**.
dBFS	Level of a digital signal relative to full scale (0 dBFS = maximum level before saturation).
dBu	Analog audio voltage level (0 dBu = 0.775 V).
L50	Level exceeded during 50 % of the measurement time.
Pink noise	Test signal with the same energy in each octave band, used to calibrate and verify.
RTA	Real time analyzer: display of the spectrum in 1/3 octave bands.
GEQ	Graphic equalizer.
Limitation curve	Maximum level allowed in each frequency band.
Attenuation	Reduction of the signal level applied by the limiter, in dB.
AES	AES/EBU professional digital audio interface.
DHCP	Automatic assignment of the IP address by the router.

Technical support

For technical assistance contact your installer or distributor, or Glove Systems S.L. at **www.glovesystems.es**. Have the serial number of the device (shown in the header of the web interface) and the firmware version at hand.

SPXOne

Glove Systems S.L.

www.glovesystems.es

SPXOne — Web Configuration User Manual

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