



DEVA SYSTEM MANAGER

USER GUIDE



TABLE OF CONTENTS

Introduction	4
System architecture	5
Accessing the web interface	8
The System page.....	9
Hotkeys	9
The Grid.....	10
The Players window	12
Device Settings	13
Device Settings Grid	13
Device Settings Hot key Bar	15
Deva Settings.....	15
System Admin	17
Predefined messages	17
Predefined Fm Radio	17
Predefined web radio	18
Known Devas.....	19
Contacts.....	19
Users Management	20
Global Settings	21
Maintenance	22
The Library.....	23
The Playlists.....	24
The Zones	25
Schedules	26
Events	30
Details	32
Camera	32
Diagnostics	34
Logs	34
Sample configuration	35

Introduction

Deva is a multifunctional and compact device that implements two-way wireless communication, audio message playback and video capture.

Once configured, Deva operates as a self-sufficient device equipped with sensors such as microphone, presence detector, temperature and atmospheric pressure probe, and accessories such as LED spotlight, camera, etc., which make it capable of interacting with the environment through the integrated speaker and its audio playback and video capture functions.

Deva allows the exchange of messages and environmental control. Communication can take place either via Wi-Fi or via Ethernet LAN cable (also powered by POE) using PCs, tablets and smartphones. Remote control is also possible via GSM\GPRS\UMTS\LTE.

Deva has been designed to be independent of existing infrastructure, without the need for cabling and with very low installation costs. Deva uses “green” technologies: its highly efficient electronics limit current consumption, thus allowing the continuous use of energy supplied by a rechargeable battery. A normal trading solar panel can quickly charge the battery, even in low sunlight conditions.

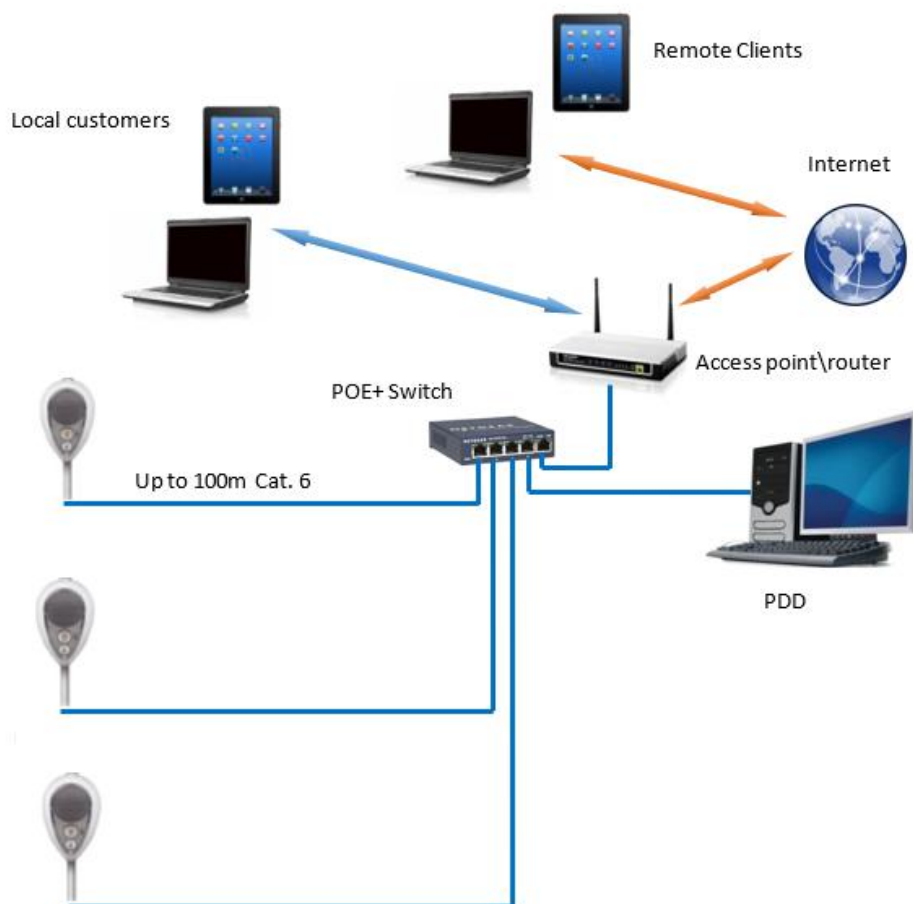
DEVA’s shell is resistant to water and dust (IP65), making it an ideal solution for outdoor installations, for applications ranging from scheduled diffusion of background music, to video surveillance.

Deva is a self-sufficient and fully configurable network drive that can be installed anywhere.

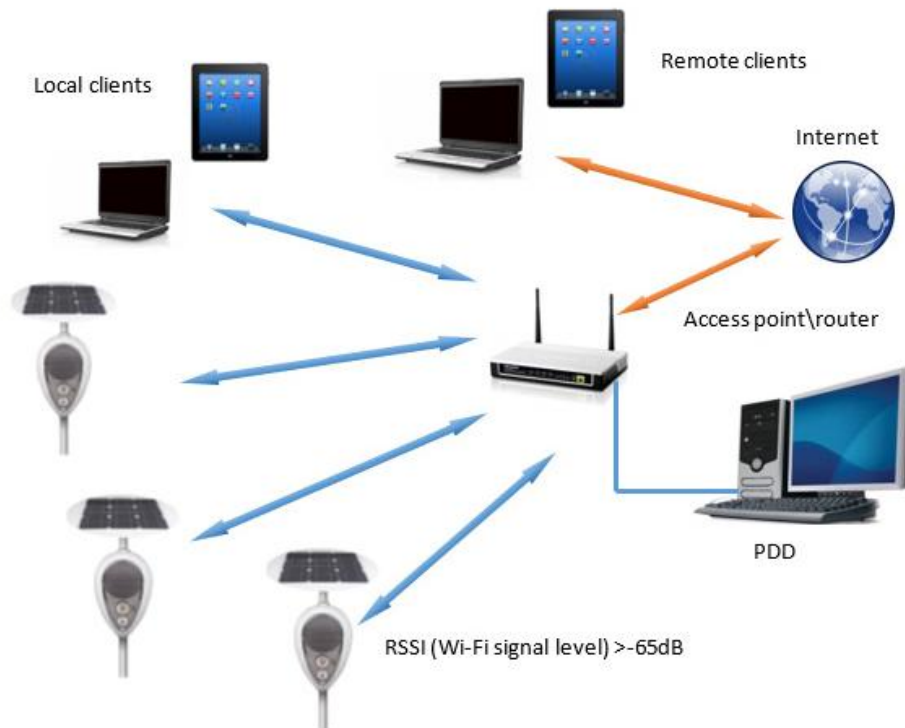
System architecture

A Deva system consists of the devices, the communication infrastructure, LAN, Wi-Fi, or mobile network, and a management server called PDD (Powersoft Deva Director). DSM (Deva System Manager) management software runs on this server. The DSM provides a web-type user interface that is accessible from any PC on the same subnet or that is able to connect to the PDD via the Internet if it has a static public address.

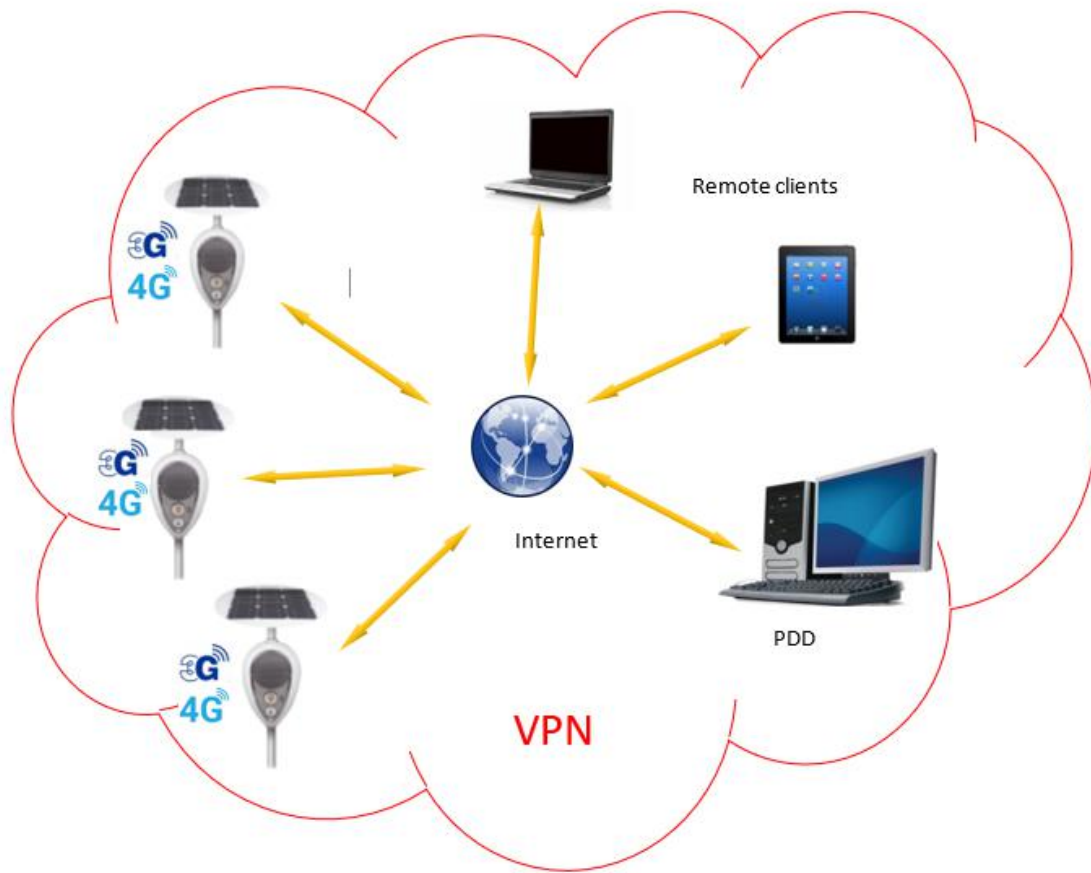
Below is a typical installation structure in the case of POE wiring:



Below is a typical installation structure in the case of a Wi-Fi network:



Below is a typical installation structure in the case of a Mobile network:



Accessing the web interface

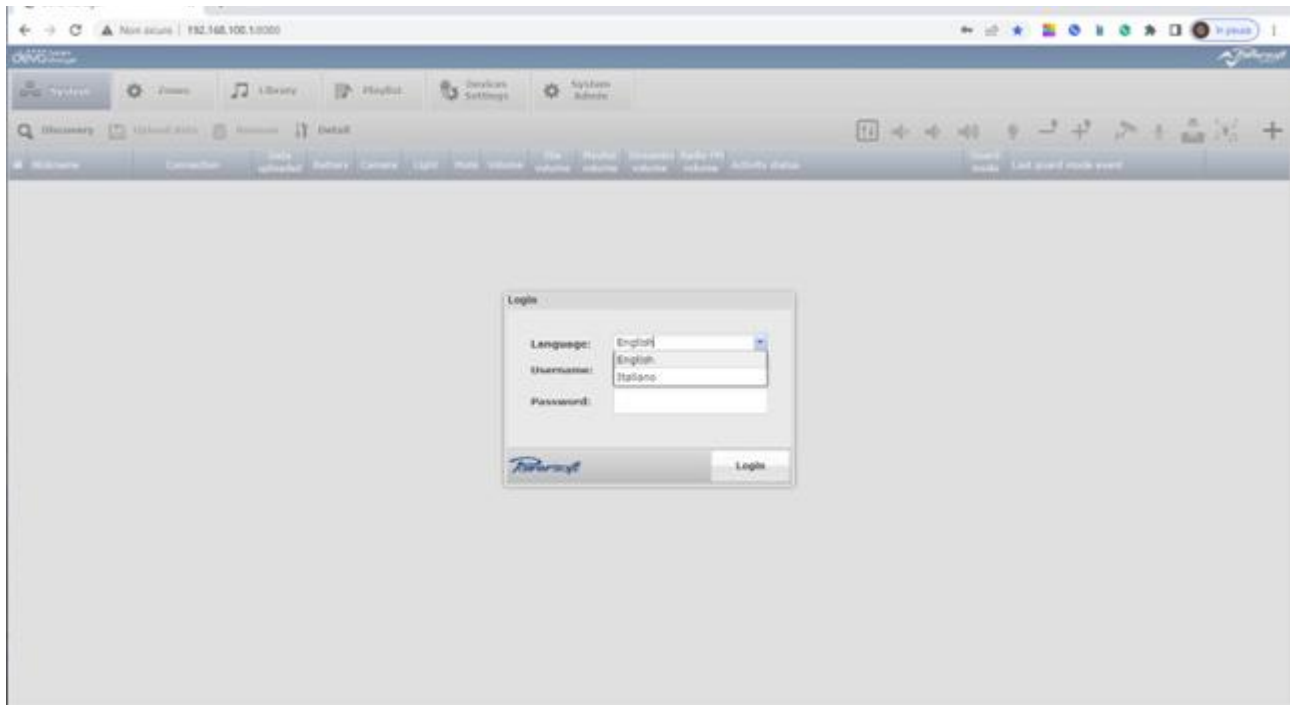
It is assumed that the Devas and the PDD have a static IP address set, of the 192.168.100.x type, therefore it is assumed that the PDD has 192.168.100.1. and the Devas, for example, have 192.168.100.10, 192.168.100.11 etc.

In the case of VPN, the address set is typically 10.11.12.x.

Open a browser (Chrome is recommended) on any PC that can reach the PDD, then enter the address:

<http://192.168.1.1:8080>

The following page will appear:



Select the language and enter Username and Password. The default values are:

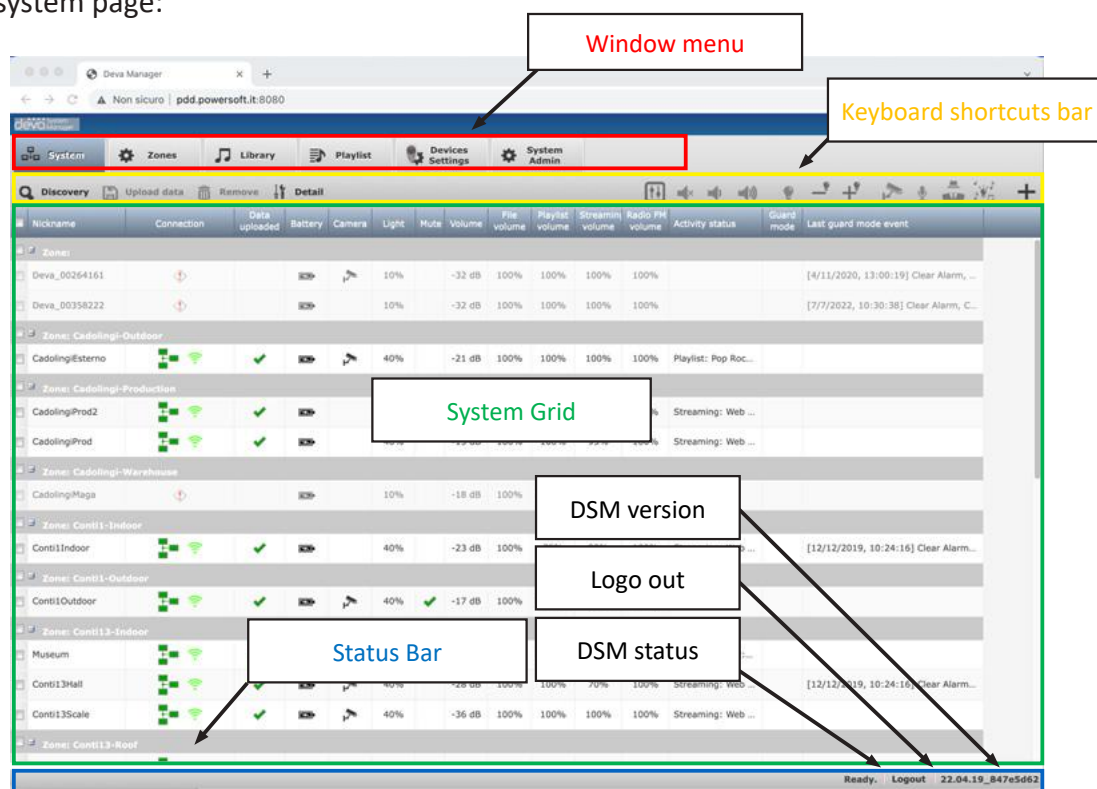
Username: admin

Password: admin

The system page is then accessed.

The System page









Below is the system page:












The page consists of: a window menu (indicated by the red rectangle), a hot key bar (indicated by the yellow rectangle), a system grid (indicated by the green rectangle) and a status bar (indicated by the blue rectangle) that shows the status of the “Ready” system, a “Logout” button to log out and the DSM version. Focusing on the “System” page. Below is an explanation of the purpose of the hotkeys.



Hotkeys

Here is the description of the hotkeys:

-  **Discovery** It is used to run a search in the network and detect all the Devas present
-  **Upload data** It is used to load the configurations performed on the PDD, then locally, on the Devas involved. During the upload in the “Updated data” column of the grid, an animated wheel will appear in correspondence of the selected Devas. The green horizontal line indicates that the data is up to date, the red horizontal line indicates that it is not. The exclamation point indicates a problem in communication, as will be explained in the paragraph on the grid
-  **Remove** Used to remove a Deva from the system. It is activated only by selecting Deva offline (see below). It is not possible to remove a communicating Deva. It must first be disconnected so that it goes offline.
-  **Detail** Allows you to access the sub-windows related to operations that concern the video part, the schedules, the events, and the diagnostics on the individual Deva. We will examine this in more detail later.
-  Opens the Player management window. See the relevant paragraph below.
-  Enables\disables the mute for the selected Devas
-  Lowers the volume for the selected Devas
-  Turns up the volume for the selected Devas

-  Turns the LED of the selected Devas on and off
-  Lowers the led intensity of the selected Devas
-  Raises the led intensity of the selected Devas
-  Turns the video camera on and off (for Deva HD)
-  Enables AUX Input Amplification
-  Activates the Guard mode, that is, all events set to the selected Devas that have the relative check-box marked in the relative window.
-  Activates a mode in which the LED spotlight goes in time with the music, creating a psychedelic effect.
-  Adds four columns to the grid containing information about the memory used, battery voltage, PoE voltage, and current delivered by the solar panel.
-  Hides the four columns added with the button above






The Grid

The grid is a table that shows on the rows all the checked Devas and on the columns the various statuses and levels of the quantities set on the various Devas. The Devas are displayed according to the zone grouping set. With keys   the Devas of an area can be shown or hidden to simplify the table. The check-box in the first column allows to select one or more Devas to send the commands. The check-box next to the name of an area acts on all the Devas of the same area.

The columns are described below:





Nickname: nickname assigned to the Deva

Connection: the type of active connection indicated by the icons





-  LAN
-  Wi-Fi (the green arcs indicate signal level)
-  Mobile (green bars indicate signal level)
-  VPN
-  absent

Data uploaded: indicates the alignment status between the files on the PDD and those on the Deva.

The statuses are:

-  aligned
-  non-aligned
-  alignment in progress
-  alignment failed

Battery: status and charge level of the battery. The statuses are:

-  in charge
-  charged
-  low charge,
-  fully discharged

Camera: the presence of the icon  indicates that the camera is on

LED: percentage of the LED light intensity. The icon  indicates that the LED is on

Mute: the presence of the icon  indicates the mute status of the Deva

Volume: amplifier output level value in dB. The maximum level is 0dB


File volume: percentage of the channel volume level that plays audio files on board Deva

Playlist volume: percentage value of the volume level of the channel that plays the playlists


Streaming volume: percentage value of the channel volume level that plays streaming audio files

Radio FM volume: percentage value of the volume level of the channel playing FM radio

Activity Status: column showing the work in progress on the Deva

Guard mode: the presence of the icon  indicates that the Deva is in guard mode (see the paragraph on event management)

Last Guard Mode Event: displays the last recorded event

If the user clicks on button  the following columns appear:


Memory Used: percentage of mass memories used

VBATT: battery voltage in Volts



VPoe: voltage generated by the solar panel in Volts



IPanel: current supplied by the solar panel in Ampere

The Players window

To access the Players window, it is necessary to select one or more Devas from the grid and click on button  of the hotkey bar. The window is shown here below:



The window is divided into four panes, one for each playback channel (also called pipeline). The four pipelines could be mixed together, this is why it is possible to define the percentage of individual volumes with buttons  and .

The first pane is called **Playlist** and it is used to play a file that is stored in the selected Devas. The user can choose one of the 10 messages, that can be both native or previously updated in the management part explained later or select a file from the DSM library. Clicking on the play button  causes the file to be played by all the selected Devas, in sync. If a DSM library file has been chosen that has not yet been transferred on board one or more Devas, obviously from among those selected, playing will begin after the file is uploaded. Obviously, if the same song is relaunched, it will start right away. Button  stops playing at any time.

The second pane is called **Playlist** and allows the user to play a previously compiled Playlist, as explained later. If the **Replay** option is selected, the Playlist plays in loop. As for the volume, the above applies.

The third pane is called **Streaming** and allows the user to play an audio file without transferring it on board the selected Devas, but by streaming it in real time. This means that if the connection between PDD and a Deva is lost, it will stop playing. Once again, playing takes place in sync in this pane. A second possibility is to select a Web Radio from a previously set list, which will be explained later, which can be listened to by all the selected Devas. A third possibility is displayed only on the web interface of the PDD itself, as it allows to stream to the selected Devas a message told using a microphone connected to the audio input of the PDD in Live mode.



Actually, it is necessary to take into account that in the streaming process a latency of about 300-500ms is introduced; therefore, this mode cannot be used to amplify a conference or live music.

The fourth and last pane is called **FM Radio** and allows to play a radio station whose frequency can be set with the arrows or by typing the frequency into the textbox and pressing the set button. There is also the possibility to select a station previously included in a list of favourite radios. How to create this list will be shown later.

At the bottom of the window the buttons to set the **volume** and **mute** of the amplifier can be found, exactly what can be done from the same buttons on the hotkey bar.

Device Settings

This window allows the configuration of all operating parameters and the performance of some important functions such as software update. Below is the window:

Device Settings Grid

The form allows the user to select only one Deva and to display the pane at the bottom where the general parameters, network, Voice over IP service, and its license can be set.

Below the meaning of the columns is explained.

Description: nickname assigned to the Deva

Software Update: status of the Deva software update procedure. The following statuses may appear:


Upload: the .deva file is being transferred from the PDD to the Deva

Running: the .deva file is on board the Deva and the file update operation is taking place

Reboot: the software has been updated and the Deva is rebooting with the new version

Phone: status of the Mobile connection. The following indications may appear:

“No SIM”: the operator’s SIM is absent or not recognised

: icon representing the signal level of the modem. Hovering over the icon with the mouse will show the signal level [1÷32].

Data Connection: this column shows the status of the mobile data connection. It is typically used in conjunction with VPN for security reasons. The following indications may appear:

Unavailable: Deva is currently unavailable, for example, it is off.

Disconnected: Deva is connected but does not use the data network.

10.11.12.xxx: is the IP address assigned to the Deva by the VPN server, which, typically, is the same PDD whose address will be 10.11.12.1.

LAN: this column shows the status of the LAN connection. The following indications may appear:

Disconnected: the Deva is disconnected from the LAN connection.

www.xxx.yyy.zzz: it is the IP address assigned to the Deva, either dynamically from a DHCP server, or statically, as explained later.


WIFI: this column shows the status of the WIFI network connection. The following indications may appear:

Disconnected: the Deva is disconnected from the WI-FI connection.

www.xxx.yyy.zzz: it is the IP address assigned to the Deva, either dynamically from a DHCP server, or statically, as explained later.

Please note:


In the event that the Deva is set as an Access Point, its default IP address is 192.168.0.1 and it will assign to its clients, for up to 5 devices, an address of the type 192.168.0.x with x>1. However, if the Deva is also connected to a LAN with 192.168.xxx.yyy address, then an address will be set on the WI-FI network controller that does not interfere with the subnet to which the LAN network controller belongs. For example, if on the LAN one had 192.168.1.123 with NET MASK 255.255.255.0, then on WIFI the Deva would set 192.168.2.0. If the NET MASK was 255.255.248.0, which creates a subnet with all addresses from 192.168.0.x to 192.168.7.x, then the Deva would set 192.168.8.0, which is the first useful address outside the subnet on the LAN.

VPN: This column remains empty until a VPN network is established. In that case, it will report the VPN symbol  and the address assigned to the Deva, typically of the type 10.11.12.x.


Phone no.: this field shows the phone number of the SIM entered in the Deva. It serves only as a reminder, it does not have any operational use

Sip: This Column reports the status of the SIP service. In particular, these are the possible statuses:


Empty: not supported


: missing licence


: active service

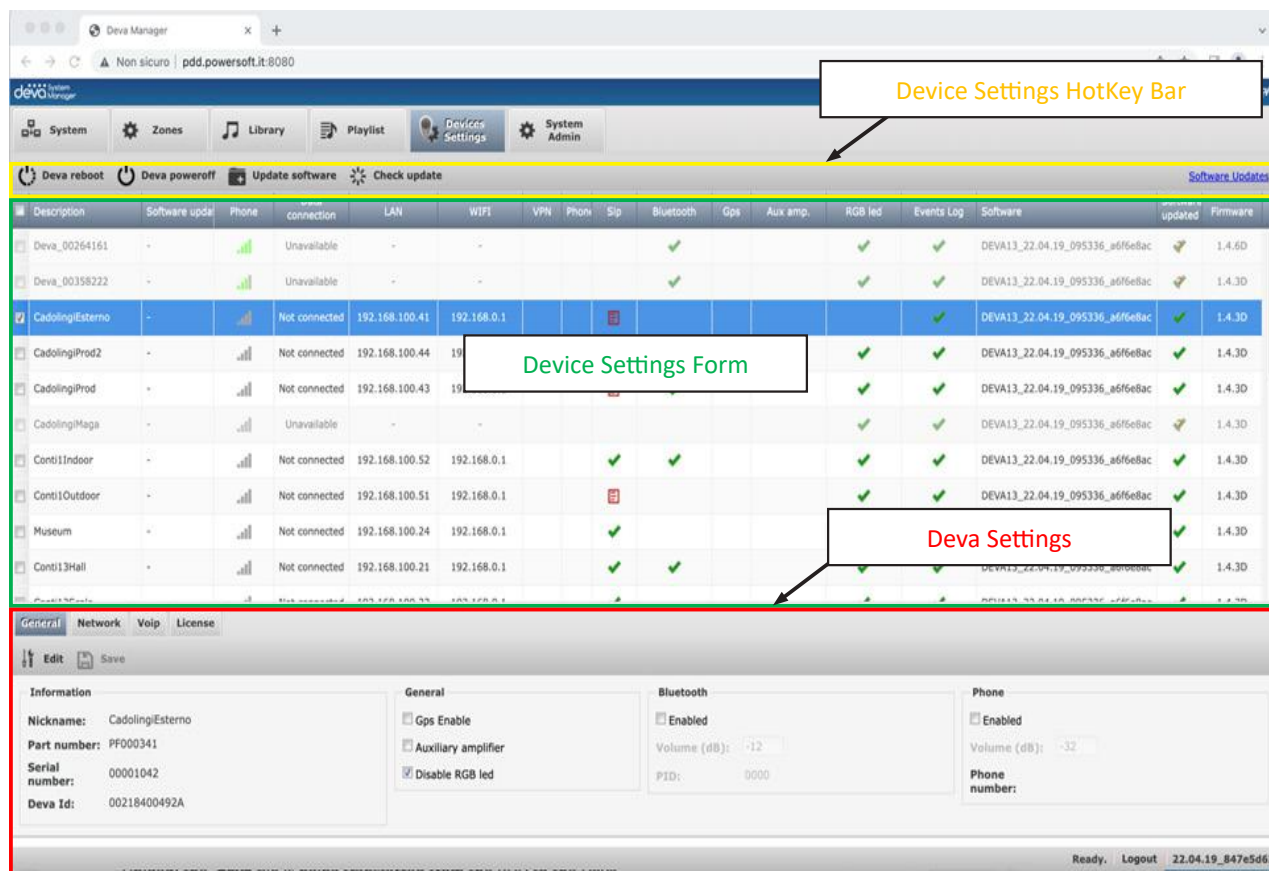
: SIP server unreachable

Bluetooth: if the icon  is present in the column, then the Bluetooth interface is active.

Gps: if the icon  is present in the column, then the GPS receiver is active.

Aux Amp: if the icon  is present in the column, then the second amplifier for the AUX output is active.

RGB Led: if the icon , is present in the column, then the RGB LED that shows the power and WI-FI connection statuses is active. As explained on the installation guide of the Deva, this RGB LED located in the centre of the LED spotlight indicates the following statuses according to its colour and flashing:



The screenshot shows the Deva Manager web interface. At the top, there's a navigation bar with tabs: System, Zones, Library, Playlist, **Device Settings**, and System Admin. Below this is a yellow bar with buttons: Deva reboot, Deva poweroff, Update software, and Check update. The main area is a table of devices. The table has columns: Description, Software update, Phone, connection, LAN, WIFI, VPN, Phone, Sip, Bluetooth, Gps, Aux amp., RGB led, Events Log, Software, updated, and Firmware. The row for 'CadolingEsterno' is highlighted in blue. Below the table, there's a 'Deva Settings' form for 'CadolingEsterno'. The form has tabs: General, Network, Voip, License. The 'General' tab is active, showing fields for Nickname, Part number, Serial number, Deva Id, and checkboxes for Gps Enable, Auxiliary amplifier, and Disable RGB led. There are also sliders for Bluetooth Volume and Phone Volume, and a 'Check update' button.

Green: battery charging thanks to external power supply.

Blue: no external power supply. The Deva is using the battery.

Red: low battery. After a while, the Deva will turn off.

Purple: software update in progress.

Yellow: internal communication problem.


In some cases, this LED may be kept off, in order to make unclear whether the Deva is active or not. How to set this will be explained later.


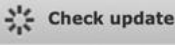
Events Log: if the icon , is present, then saving event logs is active.

Software: reports the version of the software present in the Deva

Software updated: this column shows the status of the Deva software compared to the latest version available on the PDD. The following indications are possible:

 : the Deva's software is updated to the latest version on the PDD.



 : the Deva's software is not the latest available.

 : the situation is not updated. A check must be launched using the button .



Firmware: it shows the firmware version of the microcontroller that manages the Deva power supply.

Device Settings Hot key Bar

The following buttons are located on the shortcut bar of the Device Manager window:

-  **Reboot Deva** : used to launch a reboot of the selected Deva(s)
-  **Deva poweroff** : used to trigger a shutdown of the selected Deva(s).

WARNING: it only works on Devas that have FW version 1.4.6 or higher.

-  **Update software** : : used to update the software of the selected Deva(s). A request to select a **.deva** file from the PDD disk appears and then the update starts with the three phases of upload, running, and reboot.
-  **Check update** : launches a check of the versions of the connected Devas with respect to the last one available on the PDD by updating the “Software updated” column.

On the right the “Software Updates” link is present. The “software-installation” page of the deva.powersoft.it website opens after clicking on it.

Deva Settings

As already mentioned, once only one Deva has been selected, the Deva settings panel will appear at the bottom of the window, consisting of 4 Tabs. Let us see them in detail.

General



In this part, the general parameters of the Deva are set. The user can change the nickname of the Deva, which by default is “Deva_xxxxxxx”, where xxxxxxxx is the serial number, by pressing the Edit key. In the General pane, the GPS can be activated, which will be used as a clock for audio synchronisation in the absence of a network connection with the PDD, as well as the second amplifier to connect a Deva Slave to the AUX output, and the RGB LED can be disabled in case the user does not want to show the operating status of the Deva. In the Bluetooth part, the Bluetooth interface can be enabled by defining the PID for pairing with a smartdevice, as well as the maximum volume with which the music can be played. The last pane concerns the enabling of the telephone modem to make and receive voice calls and to exchange SMS. Here, too, the volume of the Deva, when the call is put on speaker, can be defined. The “Telephone Number” field is purely for reminder purposes. This is also required in order to use the data connection.

Network



This is the most delicate part, as it defines how the Deva will need to connect to the PDD. The first part concerns the WIFI part. Here it is possible to set whether the Deva should turn on its WLAN card and whether it should act as an Access Point by configuring the display name as SSID and password. Please note that it is not possible to use 5GHz channels in this mode. The EU and US region, as well as the preferred radio channel can

be selected. If the “Infrastructure” mode is selected, the name of the Access Point to which the Deva must connect and the password must be entered. There are two types of authentication: Personal and Enterprise. The region can be selected here as well, but above all, the user can choose the type of IP address between Static and DHCP.

Immediately to the right, the use of the VPN can be enabled, which requires a system-wide configuration, as explained later.

Setting up the LAN entails the usual two IP addressing mechanisms: static and dynamic with DHCP. The last part concerns connecting data from a mobile network. Once the checkbox is enabled, the APN provided by the telephone provider must be entered. For example, TIM uses IBOX.TIM .IT and Vodafone uses MOBILE.VODAFONE.IT. Usually, the Username and Password fields must be left blank. Once the Save button is pressed, after a few seconds, if all goes well, the address assigned by the provider to the modem will appear in the “IP Address” field.

Voip

The screenshot shows the 'Voip' configuration window. It has tabs for 'General', 'Network', 'Voip', and 'License'. The 'Voip' tab is active. Below the tabs are 'Edit' and 'Save' buttons. The main area is titled 'Voip: new configuration'. It contains several fields: 'Enable' (checked), 'Registrar' (192.168.7.1), 'User' (110), 'Password' (110), 'Stun' (empty), 'Bind Interfaces' (lan), and an 'Audio' section with 'Volume (dB)' (-18), 'Speaker output' (checked), and 'Aux output' (unchecked).

Deva can function as a VoIP telephone terminal. In this part, the user must enable the functionality, enter the IP address of the Registrar, which is none other than the SIP server, such as Asterisk that runs under Linux and is open source, enter the User number, that is, the extension to be called to speak through the Deva and the password to authenticate. It also necessary to set the type of binding, that is, the interface with which the server is reached. It can be “lan”, “wlan”, but also both using “*”. As always, the volume of the Deva and where to direct the audio can be defined, whether on the speaker of the Deva or on the AUX audio output, but also on both.

License

The screenshot shows the 'License' configuration window. It has tabs for 'General', 'Network', 'Voip', and 'License'. The 'License' tab is active. Below the tabs are 'Edit' and 'Save' buttons. The main area is titled 'License: current status'. It contains a text box with license details: 'ISSUER: Powersoft S.p.A. <info@powersoft.com>', 'DEVA ID: 0021840048BC', 'DEVA SERIAL: 001058', 'ISSUED: Mon May 2 2022', and 'FEATURES: * SIP: VALID BEFORE Mon Dec 31 2040'. To the right is an 'Upload license file' button.

To activate the SIP function, it is necessary to purchase a license thanks to which a .lic file is provided to be uploaded from the latter panel using the “Upload license file” button, browsing the folders of the PDD disk on which the file was copied. If the file is valid, the license details will be shown in the left pane. In particular, the expiration date.



To request the .lic file, it is necessary to provide Powersoft with the Serial number and “Deva ID” of the Deva on which the SIP function must be activated. This data is visible in the General pane:

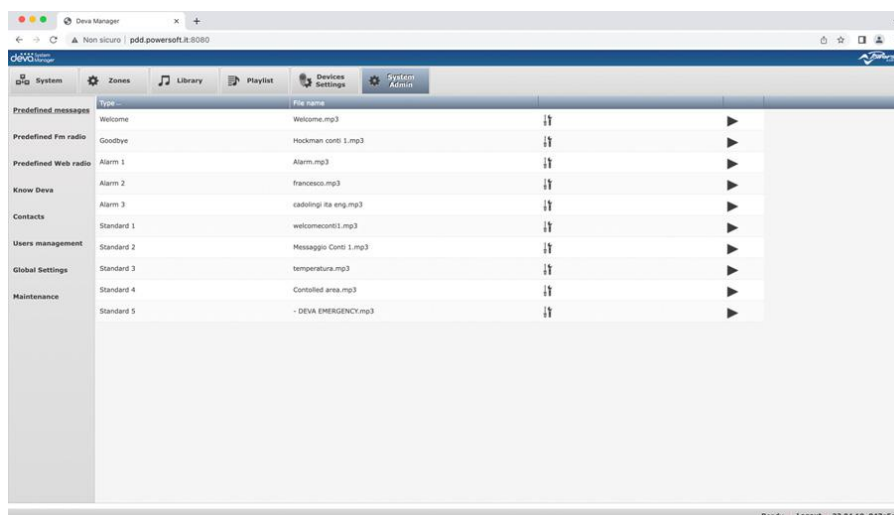
The screenshot shows the 'General' configuration window. It has tabs for 'General', 'Network', 'Voip', and 'License'. The 'General' tab is active. Below the tabs are 'Edit' and 'Save' buttons. The main area is titled 'Information'. It contains a text box with device information: 'Nickname: Deva_00279360', 'Part number: PF000341', 'Serial number: 00279360', and 'Deva Id: 00218400540D'.

System Admin

In this window a whole series of general system parameters can be configured and some maintenance operations can be performed. Below is the menu in detail:

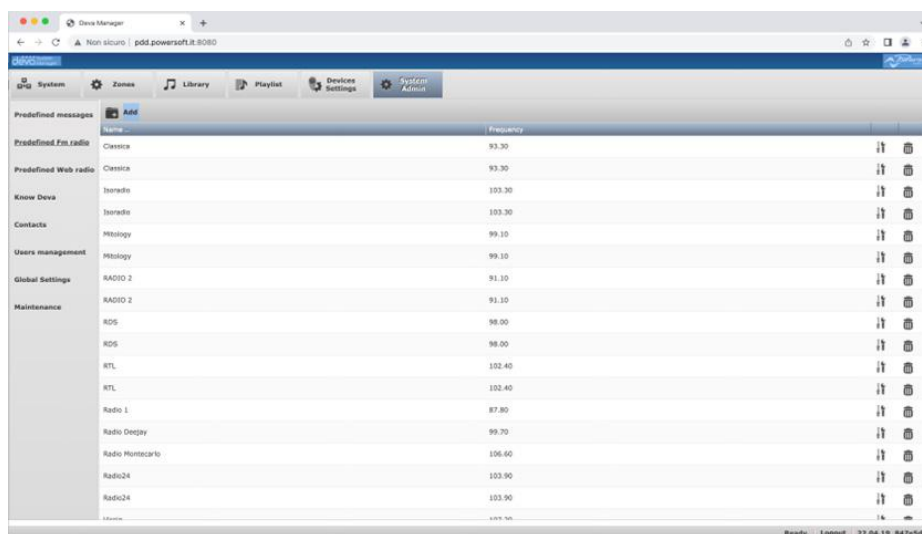
Predefined messages

In this screen, the 10 default messages that will always be present on the system Devas can be configured. To edit standard messages, simply click on the icon , select a library file from the list that will be displayed and press the Save button. Clicking on the icon  enables to listen to the file on the user's PC.





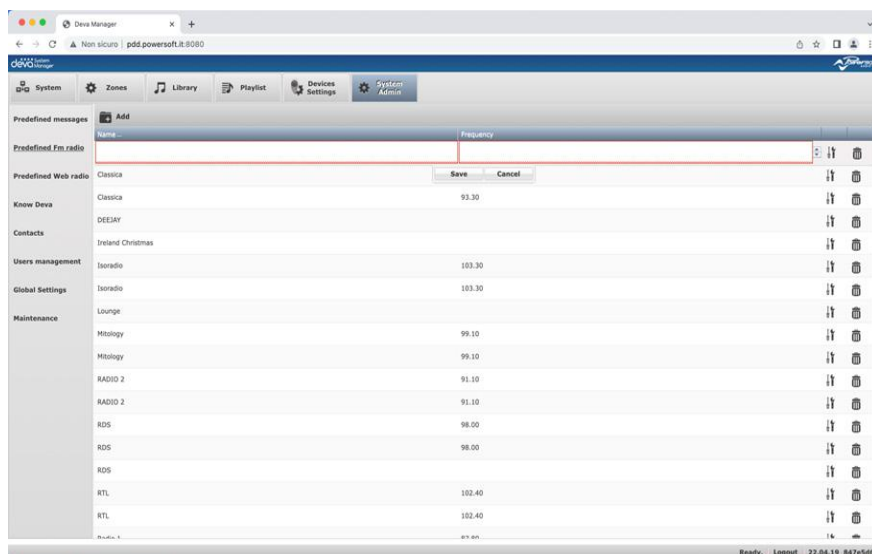
Predefined Fm Radio

In this screen the user can store the data of the favourite FM radio stations.



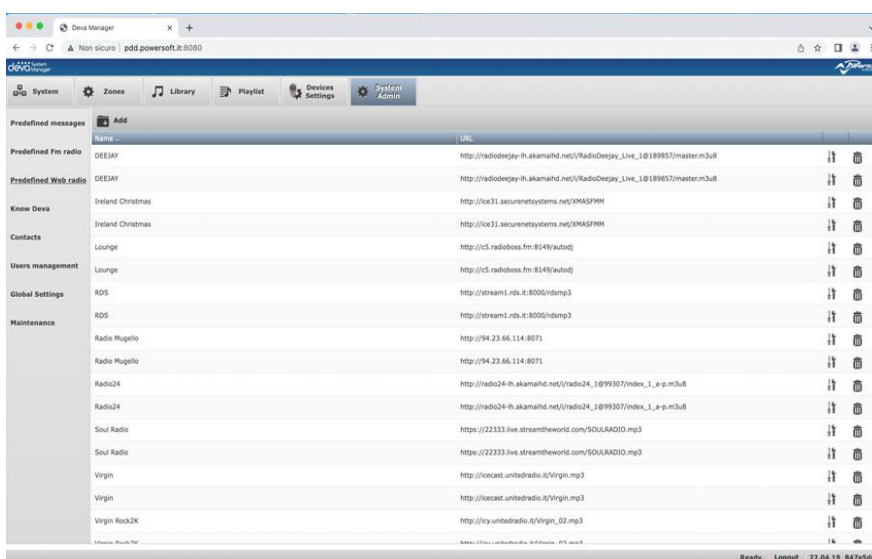
After clicking on the icon  Add , the panel where the name of the radio and its frequency can be set will

open. To change a radio already entered, simply click on the icon  or double click on the line. To delete a radio, click on the icon . See next image.



Predefined web radio

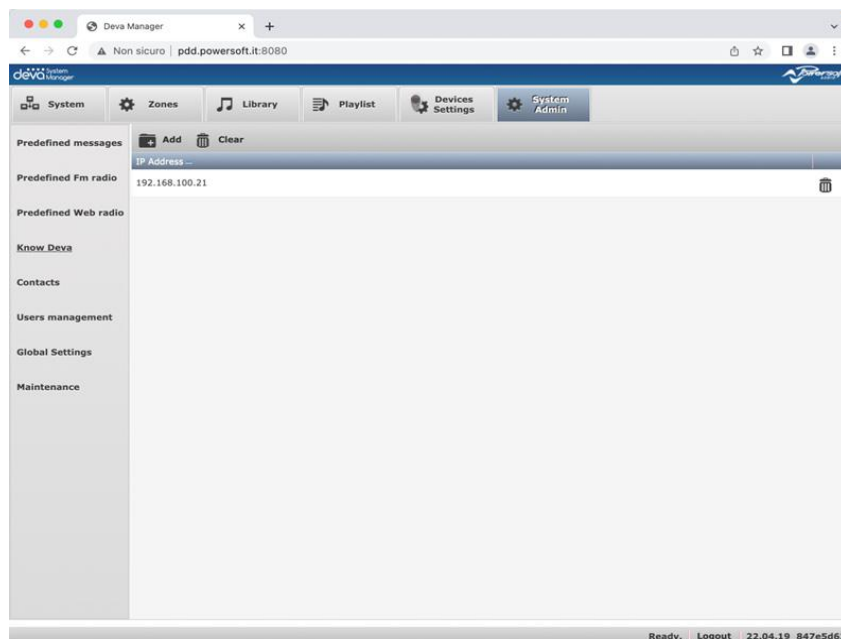
In this screen, it is possible to store the internet addresses of the preferred web radios. To be sure that the addresses are valid, it is necessary to verify that entering them a browser on the PC, allows direct listening of the radio station, without other interactions.





The management is exactly the same as that of FM radios, as explained in the paragraph above.

Known Devas

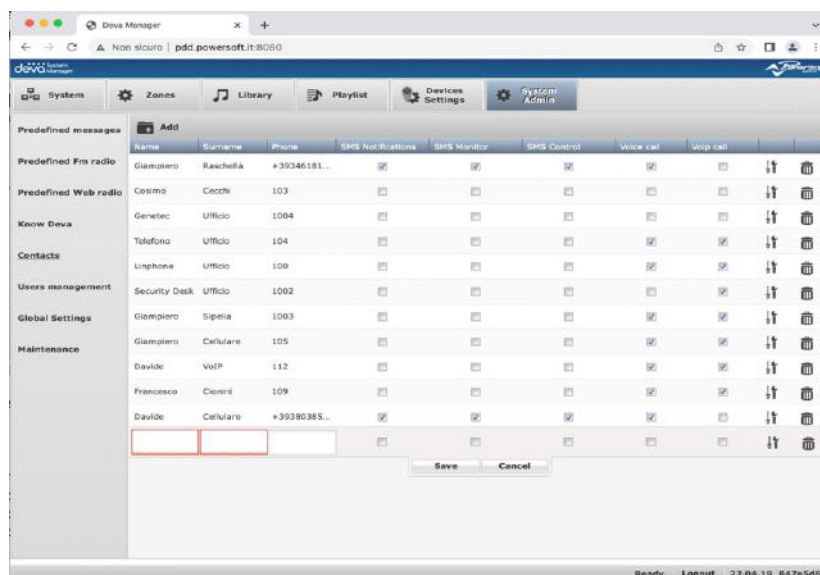
This screen allows to store the static IP addresses of the Devas connected to the system. Normally, the DSM automatically detects the connected Devas by sending broadcast packages. In some installations, these packages may be blocked for security reasons. In this case, the Devas must have a static IP address so that the DSP can contact them thanks to the data entered in this window:




After Clicking on the icon , the pane will open and it is possible to set the IP address of a Deva. To delete an address, the user can click on the icon .

Contacts

In this window, the references of the people who must be able to communicate with the system via SMS, voice GSM calls and SIP VoIP calls can be managed



After clicking on the icon , the pane where you can enter the name and surname of the contact, the telephone number, or the SIP extension, will open, and the various communication channels can be set. In particular:

SMS Notifications: it enables the sending of SMS notifications (events)

SMS Monitor: it enables the sending of monitor SMS (reboot, etc.)


SMS Control: it enables the reception of SMS containing commands for the Deva

Voice Call: it enables voice calls in and out on mobile network

VoIP Call: it enables voice-in and voice-out calls over VoIP-SIP protocol

To change or delete a contact, use the usual procedure.

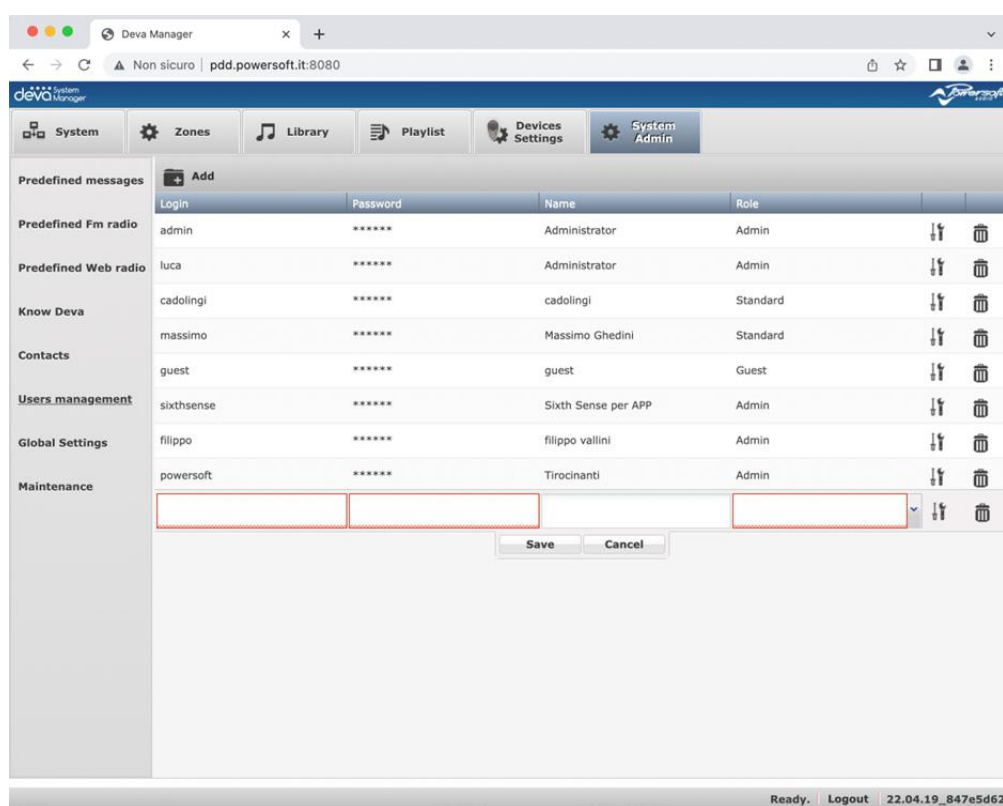
Users Management

This window allows to manage system users. By default, there is the Admin user who has administrator rights. Clicking on the icon  **Add**, will open the pane where a new user can be added, to whom a name and password for the login can be assigned. From the drop-down menu one of the following three roles can be assigned:

Admin: it can do anything

Standard: it can do everything except modify Device Management, System Management and remove Devas.

Guest: it can only manage the volumes, the mute, the LED spotlight, view the map, turn on and off the video camera, with which it can take photos and view the diagnostics and logs.



Modification and deletion methods are the same.

Global Settings

In this window it is possible to set some parameters related to the clock, VPN and the Twilio SMS service via cloud.

The screenshot shows the 'System Admin' interface of the Deva Manager. The left sidebar contains a navigation menu with the following items: Predefined messages, Predefined Fm radio, Predefined Web radio, Know Deva, Contacts, Users management, Global Settings (highlighted), and Maintenance. The main content area is titled 'System Admin' and contains three sections: 1. 'Date and time settings' with fields for Date (07/07/2022), Time (4:13 PM), and Timezone (Europe/Rome), plus Edit and Save buttons. 2. 'VPN' with an IP Address field (93.146.228.93) and Edit/Save buttons. 3. 'Twilio SMS account settings' with fields for Account SID (841e7280), Account Token (5e599), Sender Number (+19...), and Do not resend same message for (s) (60). There is also a checkbox for 'Send test SMS' and a 'Test number' field. Edit and Save buttons are present at the bottom of this section. The bottom status bar shows 'Ready', 'Logout', and the session ID '22.04.19_847e5d62'.

In the first pane the user can set the time, date, and time zone of the PDD. This is useful if one is working on the PDD on board Deva, because it allows to set the exact time in the absence of connectivity with an external PDD or GPS coverage.

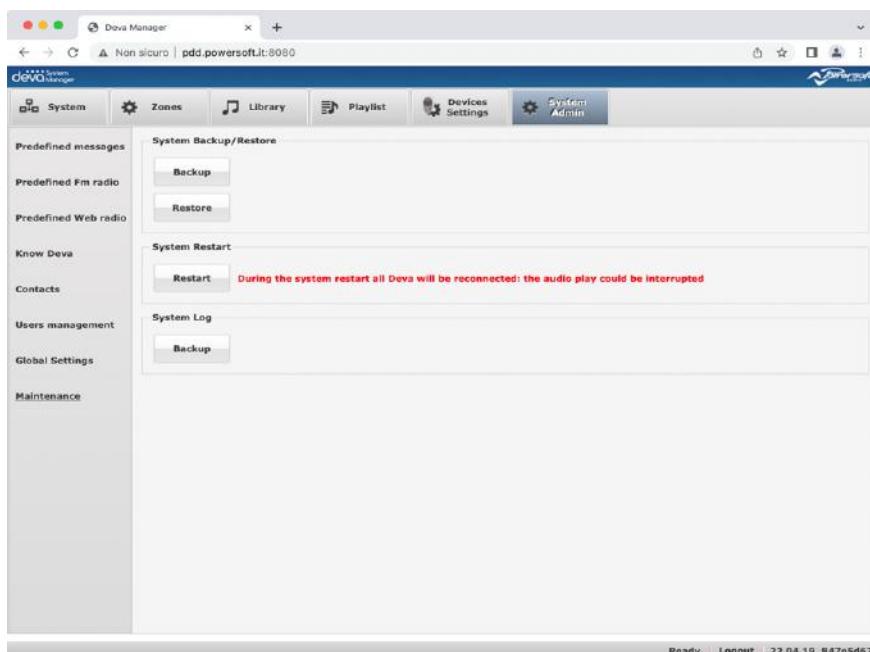
In the VPN pane the public IP address of the VPN server that could run on the PDD itself can be set. In this case, the address of the PDD must be published on the Internet. Typically, the public address is that of the router\gateway that gives connectivity to the local network whose Firewall is programmed to forward connections on ports 8080 (for DSM9 and 1194 (for VPN) to the internal address of the PDD.

The last panel allows to configure the Twilio cloud SMS service, useful to receive notification and/or monitoring SMS messages without inserting a SIM in each Deva. The "Account SID", "Account Token", and "Sender Number" fields must be collected from the site <https://www.twilio.com/messaging> after activating an account. The "Do not send the same message for (s)" field is used to not receive the same SMS continuously for "s" seconds if two or more Devas detect the same event.

To edit the fields described above, press the Edit button and then save the settings by pressing Save.

Maintenance

This window allows to access some important maintenance functions.



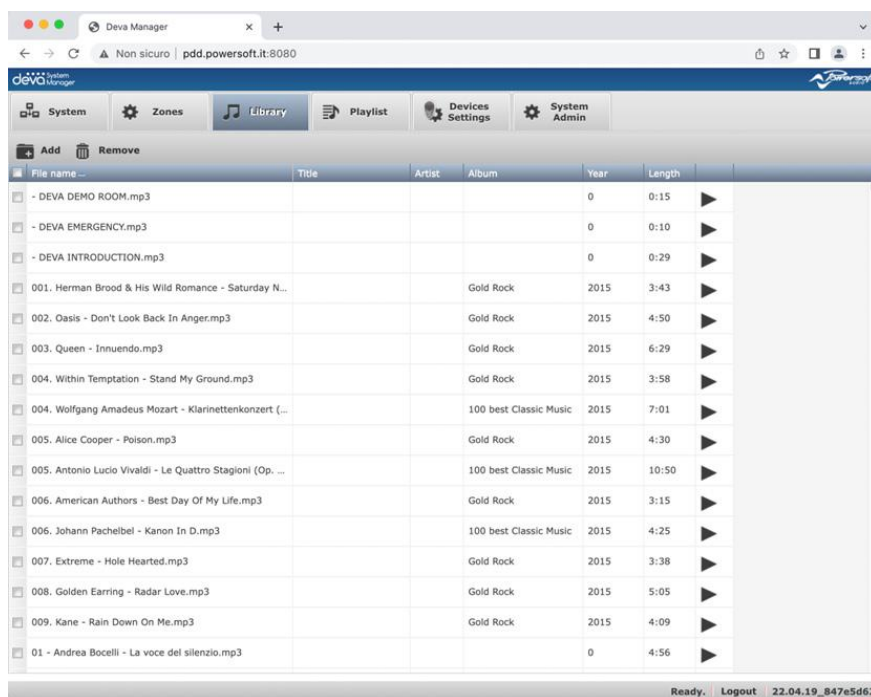
In particular, the **Backup** key allows to make a complete copy of the system and save it in a compressed file that can be saved on an external media and then restored in a new PDD using the **Restore** key and selecting the previously stored file.


The **Restart** key sends a command to the DSM to restart the Back End. It can be useful if the DSM has an incorrect behaviour that could be fixed without the need to restart the Linux machine.

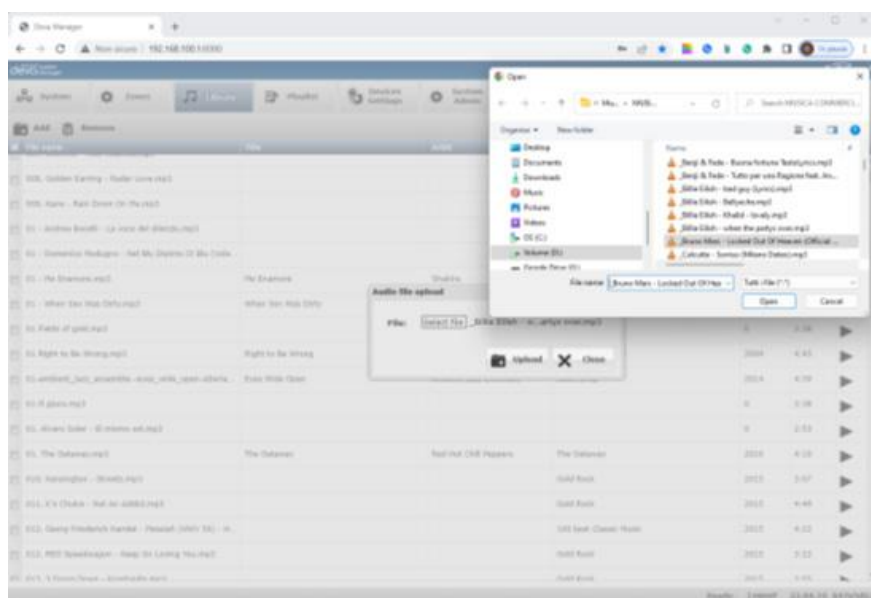
Finally, the Backup key of the system log allows to save the logs of the entire system in a compressed file to be analysed with appropriate tools.

The Library



After performing the basic configurations of the system, the audio files that will compose the library can be uploaded. This is done from the following Library window:



After pressing the button  **Add** a window will open that will allow to browse the PDD memory and select one or more mp3 files to load into the library by pressing the **Load** button.

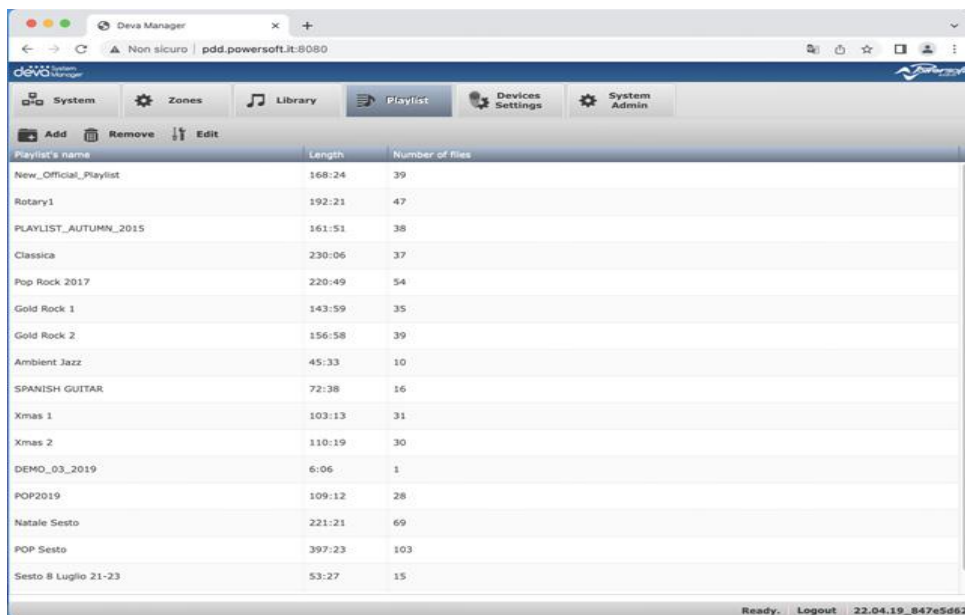


Once this is done, a procedure will start that transfers the files within the system by entering the data in the database: file name, title, artist, album, year and duration.

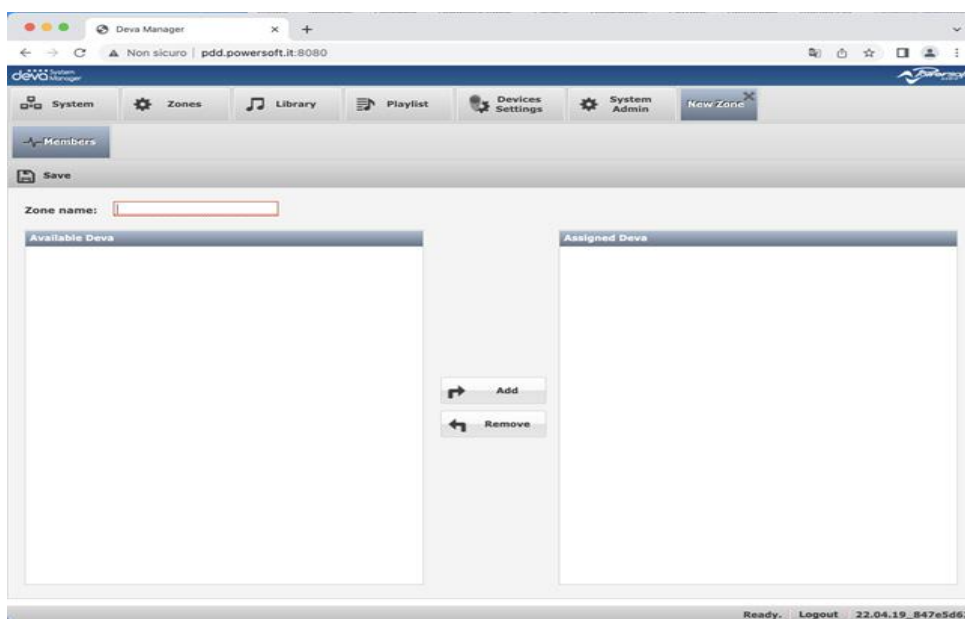
To remove a file, simply select it and press the button  **Remove**. With the button  the song can be listened to on the PC.





The Playlists

The DSM allows to create playlists composed by the music tracks and audio messages previously entered in the library. This is what the window looks like:



To create a new playlist, click on the button  **Add** and the following window will open:

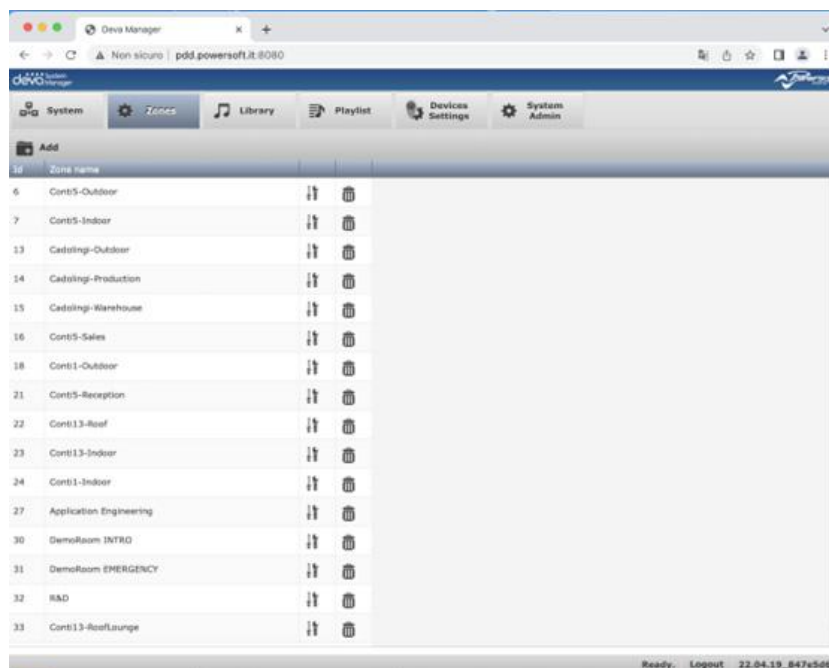


Simply enter the name of the playlist and move the songs from left to right by selecting one or more titles from the left pane and moving it to the right with the button  **Add**. When the list is complete, click Save. To remove a song from the playlist, select the title in the right pane and click on the button  **Remove**. Multiple selections are allowed in both panes. In the right pane, the order of the songs can be changed by simply dragging a title from the list up or down. Once the playlist is saved, it will appear in the list with the total duration and number of tracks. To edit a playlist, double click on the grid row or click once to select the row and click on the button  **Edit**. To delete a playlist, simply select it and click on the button .

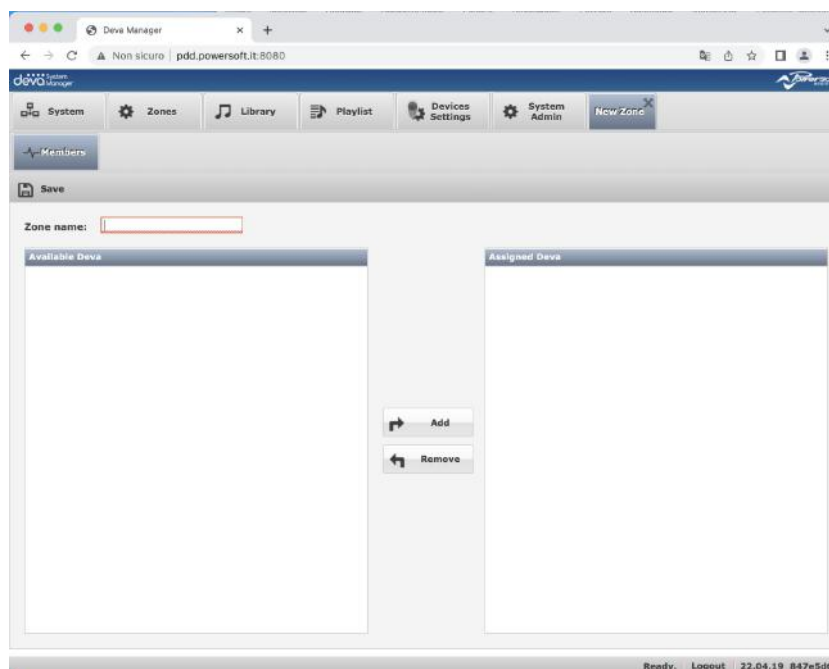
The Zones

The DSM makes it possible to organise the Deva system in areas where programming is homogeneous. For example, in a theme park system there will be Devas installed in the car parks, those installed in the restaurant area, etc.

Creating zones allows to simplify the programming of the Devas by setting the operating parameters of the zone that will automatically propagate to all the Devas belonging to the zone itself. Here is the Zones window:



To create a new zone, click on the button  **Add** and the following window will open:




As for the playlists, after entering the name of the new zone, Devas installed in that area, chosen among those not yet associated with any zone, must be added from the left pane to the right one with the usual **Add** button. To remove a Deva from the zone, just select it from the right pane by clicking on the **Remove** button. At the end, click Save and the new zone will appear in the grid.

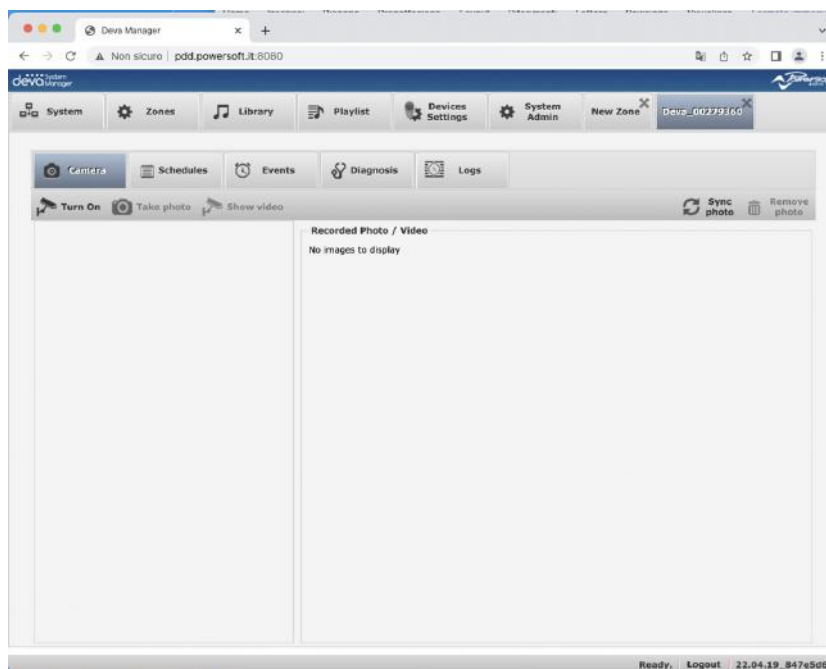
Schedules



Let us now see how to configure schedules. A distinction must be made in the case of working on a Deva that does not belong to any area or on an area that includes several Devas.

It is not possible to individually configure a Deva that belongs to a zone.

In the case of a single Deva, to access the configuration windows of Events and Scheduling, the user must select the Deva from the grid of the **System** window and press the button  **Detail**. Alternatively, double-click on the Deva line to be configured.

The following window will open:

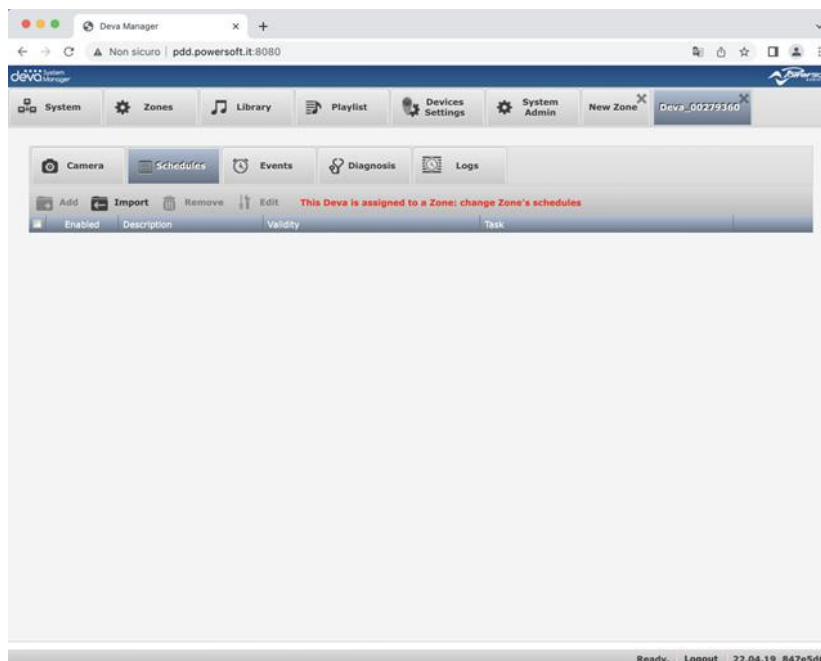



In the case of a zone, the user must open the Zones window by pressing the relevant tab  **Zone** and click on  the icon of the zone to be configured or double-click on the grid line.

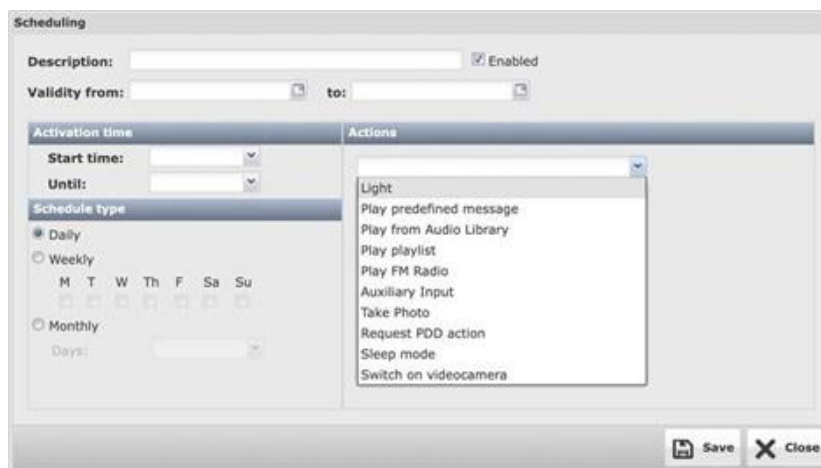
As it is shown, the **Scheduling** and **Events** are present in both windows.

The related windows are identical, therefore we will explain them only once knowing that in the first case the settings will be sent only to the selected Deva, while in the second case they will be sent to all the Devas belonging to the Zone. Let us start with Scheduling.

Clicking on the tab  **Scheduling** will open the following window:



In the case of Zone, the **Diagnostics** and **Logs** tabs are not present. To create a new schedule, click on the button  **Add**. The following window will open:



After entering the description, the type must be defined by entering the validity period of the schedule (for example for Christmas 2022 from 8/12/2022 to 6/01/2023), the start and end time, the daily, weekly, monthly, or spot mode, that is valid only for a certain day. Once this is completed, you will go to the action setting from the drop-down menu. As shown in the previous image, the following valid actions are available in the set time interval:



1. LED: it turns on the LED spotlight. The intensity can be set and the flashing can be activated with a certain duty cycle.
2. Play single file: it plays one of the 10 default messages. The file can be selected from the library, in a repetition interval in seconds, as well as the desired volume if different from the one already set on its pipeline
3. Play from Audio Library: it plays a file from the Audio Library. The file can be select from the library, in a repetition interval in seconds, as well as the desired volume if different from the one already set on its pipeline

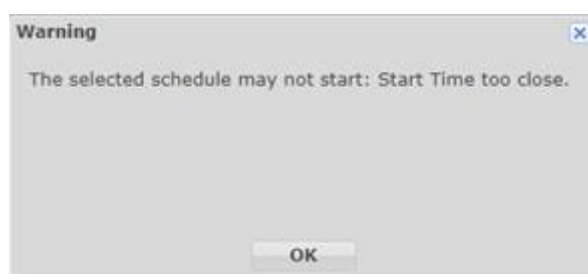
4. Play playlist: plays a playlist. The playlist can be selected from the playlist list and the desired volume if different from the one already set on its pipeline. The playlist is played in loop until the schedule ends.
5. Play FM Radio: it plays an FM radio station. A frequency, or a station from the list of favourites, and the desired volume, if different from the one already set on its pipeline, can be set.
6. Auxiliary input: it amplifies the signal connected to the mini-jack auxiliary input on the rear panel of the Deva.
7. Take a photo: it takes a photo with the camera. It is possible to a single or multiple shot every x seconds.
8. Request PDD action: it is possible to choose “Live Mic”, to stream the audio input of the PDD (microphone or line-in), or “Web Radio” by entering the name of the web radio among those included in the list of favourites.
9. Sleep mode: it activates the low power state during which the Deva’s activities are suspended.
10. Turn on video camera: it turns on the video camera.


The “Enabled” check-box allows to enable or disable the schedule, without having to delete or reinsert it every time it is needed.

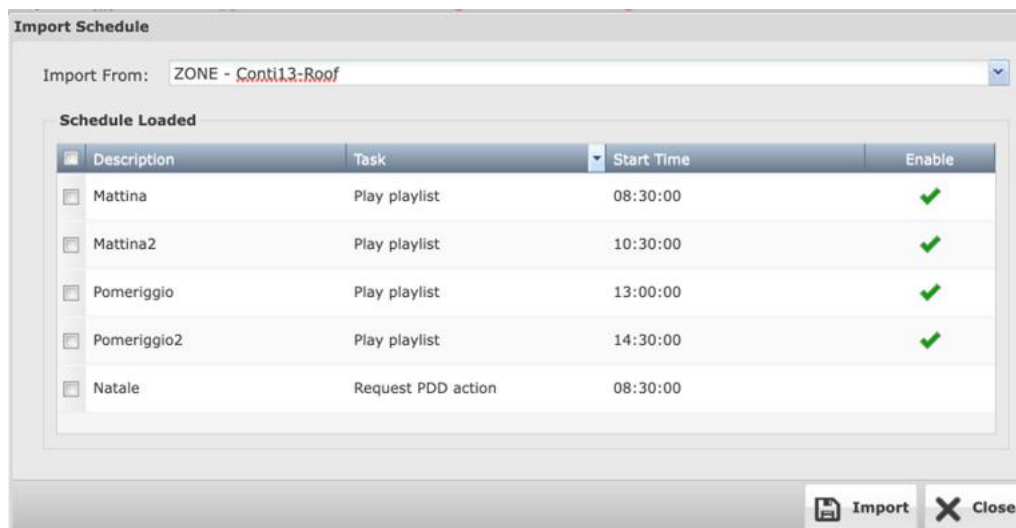
If the Save button is pressed, the configuration will be saved on the PDD, but not yet on the Devas concerned, as will be indicated by the message that appears on the screen that also reminds the user to avoid overlapping of the scheduled playlists:



The System window shows that in the column “Updated data” of the Devas affected by the schedule just set, an icon  indicating that the configuration of the Deva is no longer aligned with that set on the PDD is present. To align the Devas click on the button  Upload data. When scheduling a playlist whose files are not yet present on the Devas, it should be borne in mind that it will take some time for the data to be transferred on board. The schedule must therefore be set up well in advance of the start time. This is signalled by the following message:




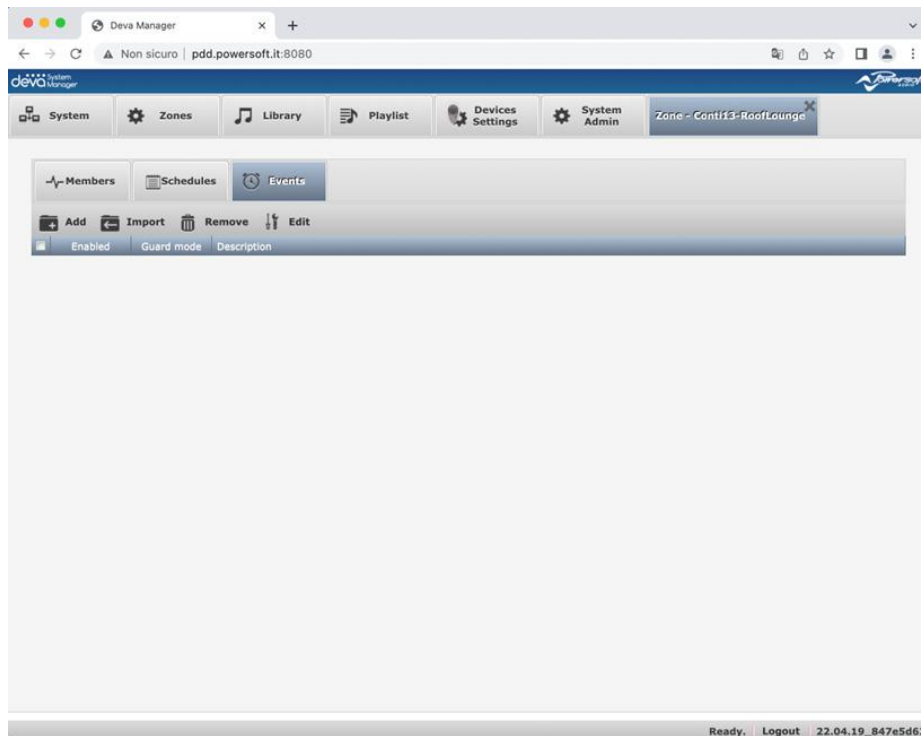
A very convenient function is the one that allows the user to import a schedule already set for another Deva, or zone. To access this function, simply click on the button  Import and select the desired schedule from the list that is displayed by selecting the Deva or the Zone that contains the schedule to be cloned from the drop-down menu:



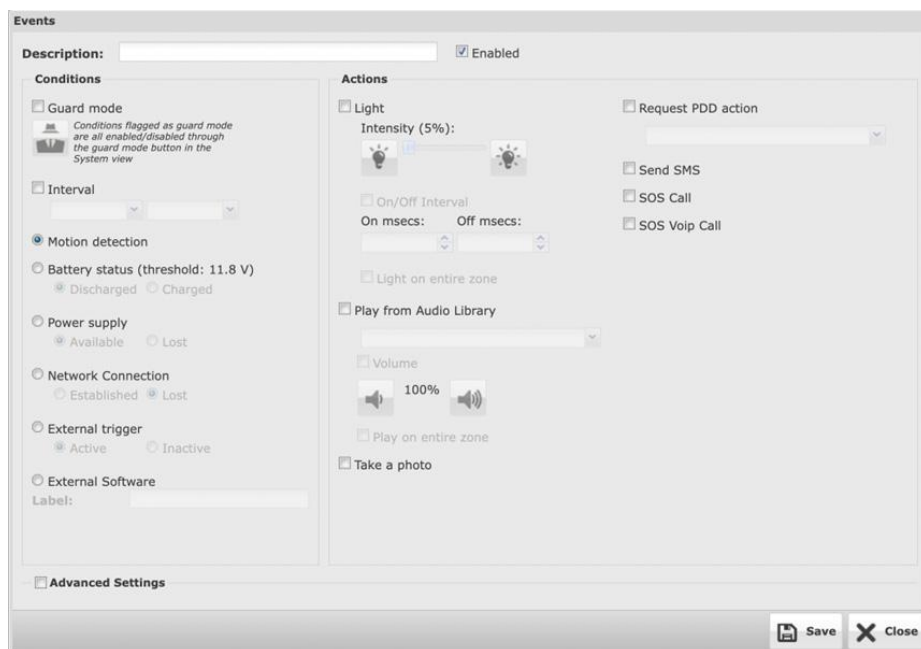
Multiple selection is allowed to import multiple schedules at the same time.


Events

To set the events, select a Deva or a zone and then click on the tab , as seen in the previous paragraph for the schedules. The following window will open:



Clicking on the button  will open the following window:



After entering a description in the relevant field, the user can decide whether the event will be active or inactive based on the status of the “Enabled” check-box. If the “Guard mode” check-box is enabled, the event can be activated and deactivated using the button  in the shortcut bar of the Systems window.

There are two sections: Conditions and Actions.


In the Conditions section, the time interval in which the event is active and the input to be used as a trigger to start the action can be set. The following are available:

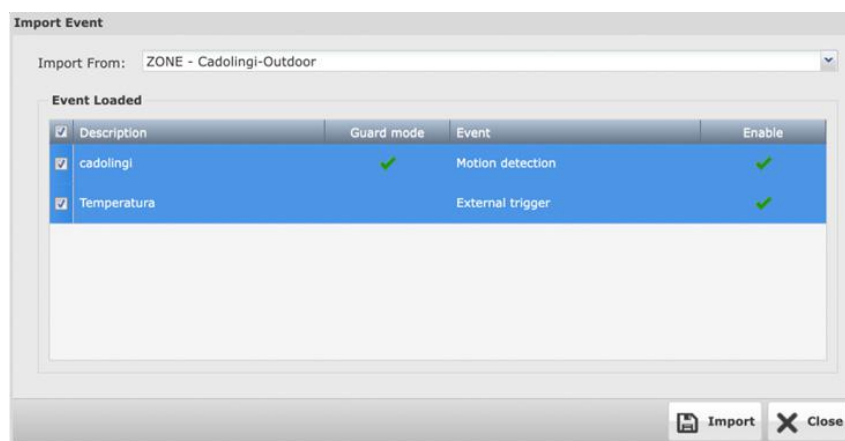
1. Motion detection: this is the status of the PIR sensor
2. Battery status (threshold: 11.8V): battery low voltage status. The user can choose whether to have the trigger when the voltage drops below the threshold (discharged) or when it rises above (charged).

3. Power supply: presence of external power supply. The user can decide whether to detect the availability or loss of power.
4. Network connection: availability of the network connection, at least one between LAN, Wi-Fi. The user can decide whether to detect the availability or loss of the network connection.
5. External trigger: status of an external button connected to the digital input available on the rear panel of the Deva. The user can decide whether to detect the closure or the opening.
6. External software: the DSM can receive triggers from external software via protocol strings that contain a keyword. This keyword must be entered in the Label field to be interpreted as a trigger.

In the right section all the actions that can be launched when the event occurs can be found. In particular, the following actions can be performed:

1. Light: turn on the led spotlight at a certain percentage of intensity. A flashing time can also be set by choosing the On and Off time. In the case of an Event set on an area, the user can choose whether, upon its occurrence, if the LED spotlight only of the Deva that detected the event, or of all the Devas belonging to the area must be turned on.
2. Playing files from the Audio Library: plays the selected file from the Audio Library. The user can set the volume of the pipeline and whether the file should be played only by the Deva that detected the event, or synchronously by all the Devas belonging to the zone.
3. Take a photo: it takes a photo using the video camera
4. Request PDD Action: it allows to send an SMS using the cloud service.
5. Send SMS: it sends an SMS to all contacts who have the “SMS Notifications” option activated.
6. SOS Call: it makes a GSM Voice call to contacts that have the “Voice Call” option active until one responds.
7. VoIP SOS Call: makes a VoIP Voice call to contacts who have the “VoIP Call” option active until one answers.

As for Scheduling, also for Events, it is possible to import a configuration already set for another Deva, or zone. To access this function, simply click on the button  **Import** and select the desired event from the list that is displayed by selecting the Deva or the Zone that contains the event to be cloned from the drop-down menu:




Multi-selection is allowed to import multiple Events at once.

If the “Advanced settings” check-box is enabled, the following two parameters can be set that allow the management of the trigger times of the event:

Raising Edge: is the time in seconds during which the trigger must remain active before the event is triggered
 Falling Edge: is the time in seconds during which the event remains active after the trigger on is more active.



For example, if I set a Raising Edge of 5 seconds and a Falling Edge of 30 seconds, for an event on the presence sensor that must turn on the LED spotlight, it is necessary that a person moves in front of the Deva for at least 5 seconds before the LED spotlight is turned on and when the person has left, the LED spotlight remains on for another 30 seconds.

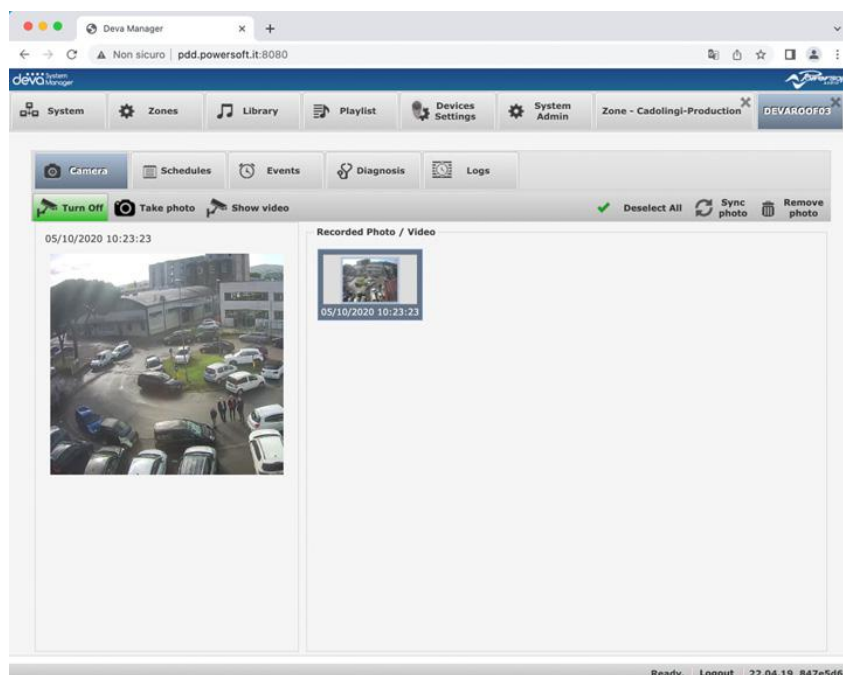
Details




Selecting a Deva from the System window and clicking on the button  **Detail**, or double-clicking on the line of the Deva concerned, allows to access the detail window, which was already seen to access the Scheduling and Events setting windows.


There are other tabs in this window. In particular, those to access the window relating to the Camera, Diagnostics, and Logs. Let us see them in detail.

Camera

In this window the user can access and turn off the camera by clicking on the button  **Turn On** and take a photo by clicking on the button  **Take photo**, of course after turning it on. The camera takes about thirty seconds to make the video stream available. Here is how the window looks after taking a photo:

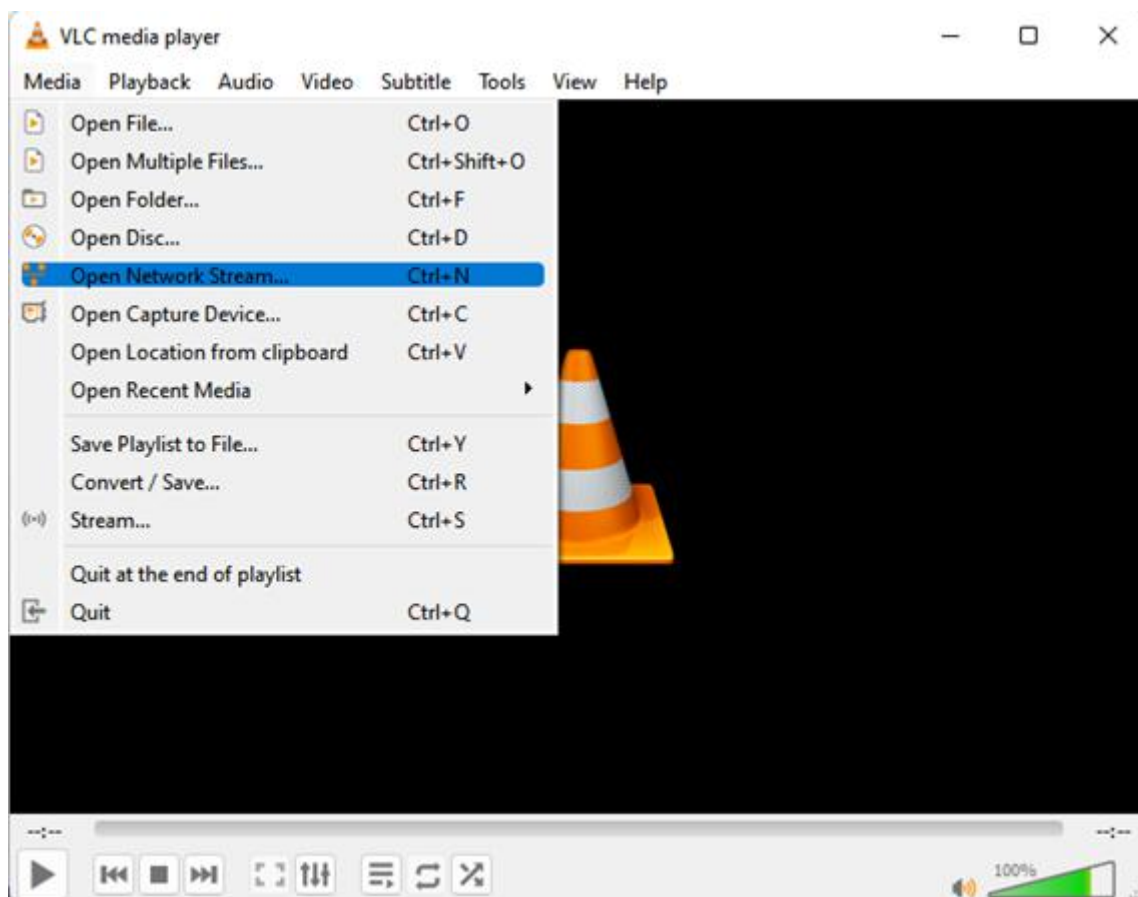


The process of taking the photo is quite long, because it includes both acquisition of the image on board Deva and the subsequent transfer to the PDD. If for some reason the photo does not reach the PDD, the button  **Sync photo** can be used to force the download on PDD. The preview of the last photo taken is displayed, on which the user can double click to open it in another full-size window. The thumbnails of all the photos taken are shown in the left pane. To view them in the preview, simply select them by clicking on them. The user can delete the selected picture by clicking on the button  **Remove photo**. Multiple selection and selection/deselection of all thumbnails can be done with the button  **Select All**.

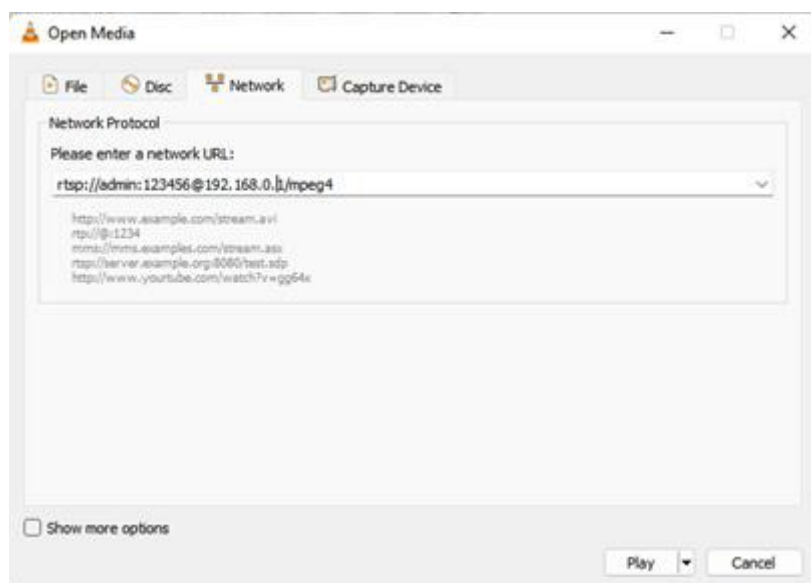
After Clicking on the button  **Show video** a window opens indicating the standard RTSP connection string to be copied and pasted on any video player or VSM (Video System Manager):



For example, if using the VLC media player the user must click on the menu item “Media->Open Network Stream”, as shown in the following figure:




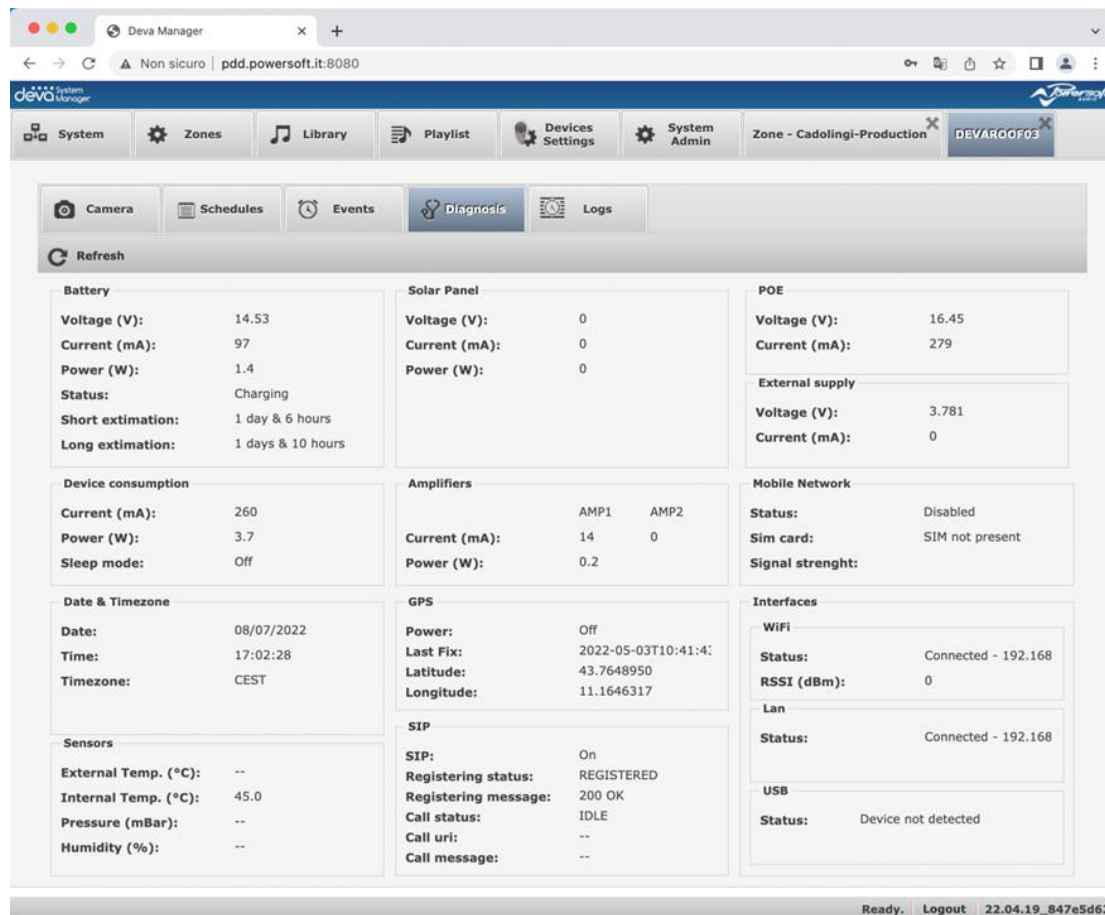
The video coming from the Deva can be viewed by entering the address copied from the DSM window.



Of course, the video camera must have been On for at least thirty seconds.


Diagnostics

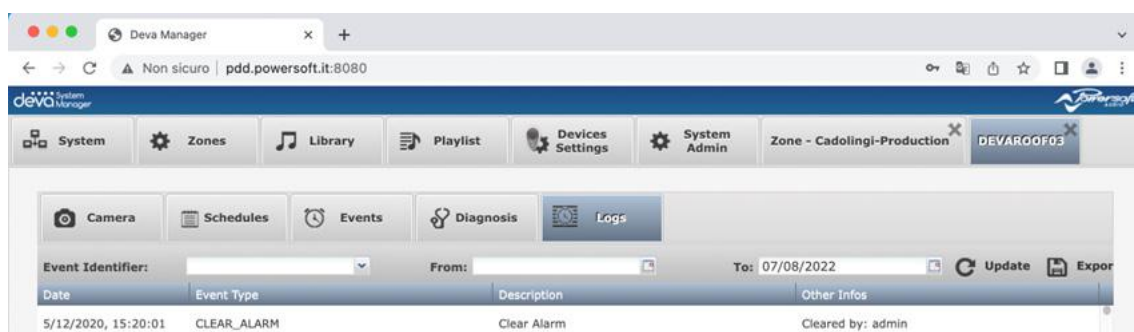
Clicking on the tab  allows to access the window that shows all the quantities acquired by the Deva as well as various operating statuses. Below is the window:





To refresh the data shown in the window, click on the button  Refresh.

Logs

Clicking on the Tab  opens the window where it is possible to view the records of the detected events.




The grid shows the events with the date and time when they occurred, the type, the description and any other data. The types are "EVENT", which indicates when the event started, and "EVENT_DONE", which indicates when the event ended.

Filters can be entered on the description and on the time interval from date to date. To refresh the grid, click on the button  Update. The data can be exported to an Excel spreadsheet in CSV format by clicking on the button  Export in CSV. The file will be downloaded to the browser's default download folder.


Sample configuration

Let us suppose that we want to configure from scratch a small system consisting of 3 Deva HD, an Access Point (hereinafter called AP), and the PDD. The PDD is connected via LAN to the AP that integrates the DHCP server. Using the AP manual, configure the SSID with the name “POWERSOFT” and the authentication password “powersoft”.

It is assumed that the DSM has already been installed on the native Linux 18.04 on the PDD, or that it runs on a virtual machine such as Oracle VirtualBox, with the network adapter configured in DHCP.

After unpacking the Devas, the battery, and an external power supply must be connected. At this point, the Devas can be turned on. After the three double beeps that indicate that the system loading procedure has been completed, the Devas, by default, will connect to the prepared AP that will provide a dynamic IP address, as it did with the PDD. The status of the AP search is indicated by the flashing of the RGB LED which, since we the power is supplied from an external source, will be green. When the LED remains steady, it means that the Devas have connected to the AP. On a browser running on a PC connected to the same PDD network, enter the web address <http://localhost:8080> and the DSM login page will be loaded. After entering the default User: admin and Password: admin credentials, the System page is accessed, which should immediately display the 3 Devas. The user can force the Deva search procedure on the subnet by clicking on the button  Discovery.

The system is now ready to be configured. Typically, the sequence is as follows:

1. Uploading audio files to the Library
2. Creating playlists
3. Creating Zones
4. Setting Up Schedules
5. Setting Up Events
6. Refreshing data using the button  Upload data

This type of setting is very convenient for the laboratory configuration of a new system to be sent to the field to be installed. In fact, once the Devas are on the Wi-Fi network with the PDD, the user can modify the network settings depending on the requests of the system: wired, Wi-Fi, Mobile, and test everything in a controlled environment. It must be considered that the Devas, once installed at a certain height, are difficult to reach to make changes to the local configuration.



DRIVING HUMAN AUDIO EXPERIENCE

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