TERRACOM™

IP Speaker Module/ Box

Fulfill IP Speaker Paging, Hand-Free Intercom
And BGM Functions

User Manual

Revision History

v1.04

Table of Contents

1 About This Manual

This user manual will explicitly describe the hardware installation and the software configuration, provides installers and users the necessary information to setup and configure the system.

- Firmware version:

Model	Version
IPSM-2C20, IPBX-2C20	v0.0.0.1

1.1 Safety Instructions & Declaration

- Do not expose the device to extreme temperatures, direct sunlight, humidity, or dust, which could cause fire or electrical shock hazard.
- Keep away water or other liquids from the device. Otherwise fire or electrical shock may result.
- Connect the power cord only to an AC outlet of the type stated in this owner's manual or as marked on the unit. Otherwise fire and electrical shock hazard results.
- Avoid touching power plugs with wet hands. Doing so is a potential electrical shock hazard.
- Take care for correct polarity when operating the device from a DC power source. Reversed polarity may cause damage to the unit or the batteries.
- Avoid placing heavy objects on power cords. A damaged power cord is a fire and electrical shock hazard.
- Do not cut, scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard. Ask your TERRACOM dealer for replacement.
- Turn off immediately the unit, remove the power cord from the AC outlet and consult your TERRACOM dealer in any of the following circumstances:
  - Smoke, odor, or noise getting out of the unit.
  - Foreign objects or liquids get inside the device.
  - The unit has been dropped or the shell is damaged.
  - The power cord is damaged.
  - If you continue using the device, fire and electrical shock may result.
- Do not drop or insert metallic objects or flammable materials into the unit as this may result in fire and electrical shock.
- Do not remove the device's cover, as there are exposed parts inside carrying high voltages that may cause an electrical shock. Contact your TERRACOM dealer if internal inspection, maintenance, or repair is necessary.
- Do not try to make any modifications to the device. This is a potential fire and electrical shock hazard.
- Avoid the device's ventilation slots to be blocked. Blocking the ventilation slots is a potential fire hazard.
- To prevent the unit from falling down and causing personal injury and/or property damage, avoid installing or mounting the unit in unstable locations.
- Leave enough space above and below the unit to provide good ventilation of the device. If the airflow is

not adequate, the device will heat up inside and may cause a fire.

- Operate the device in an environment with a free-air temperature of between -5ºC ~ 55ºC (23ºF ~ 131ºF).
- Turn off all audio equipment when making any connections to the device, and make sure to use adequate cables.
- Do not use benzene, thinner, or chemicals to clean the device. Use only a soft, dry cloth.
- If the device is moved from a cold place (e.g., overnight in a car) to a warmer environment, condensation may form inside the unit, which may affect performance. Allow the device to acclimatize for about one hour before use.

1.2 Notice Sign

There are two types of signs can be used in this manual. The type is closely related to the effect that may be caused if it is not observed.

Note: Containing additional information.

Caution: The equipment or the property can be damaged, or persons can be lightly injured if the alert is not observed.

1.3 Copyright

2 System Overview

❖ IPSM-2C20/ IPBX-2C20 application in system

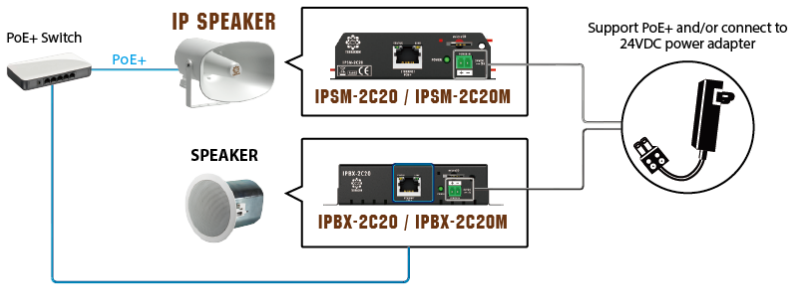
The TERRACOM IP speaker can be utilized within a variety of applications for real time broadcasting, intercommunication, music playback etc. In addition, IPSM-2C20/ IPBX-2C20 supports user to control power switch of light, door, curtain and air condition.

- System diagram

2.1 Quick Start

❖ Power connection

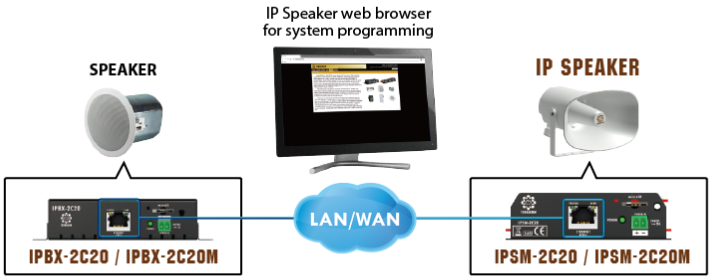
The IP speaker can be powered by PoE+ switch via CAT5/6 cable, or/and the IP speaker can also be powered by an external power supply adapter like PSU65-27 or PSU36-24.



❖ Network connection

Use a straight CAT5/6 cable to link your PC network card to the IP speaker. Open your favorite web

browser (we recommend Google Chrome or Mozilla Firefox). Each IP speaker is shipped from the factory with a default IP address of 192.168.100.49, type the default IP address into the address bar.

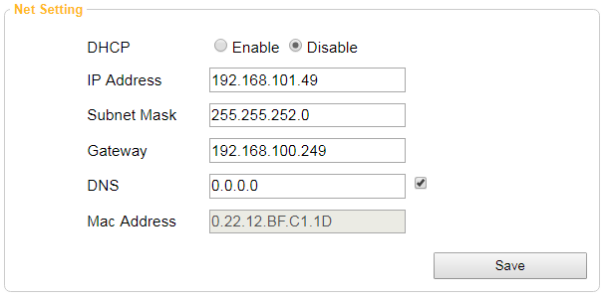


❖ Login

You will be asked for a login (By default: admin). After login, you can start to program the settings of IP speaker.

❖ Assign IP address to IP speaker

- Change the IP address of your device at "Machine > Setting > IP". After the settings have been saved, please plug out & plug in the Ethernet cable of IP speaker to reboot the IP setting.

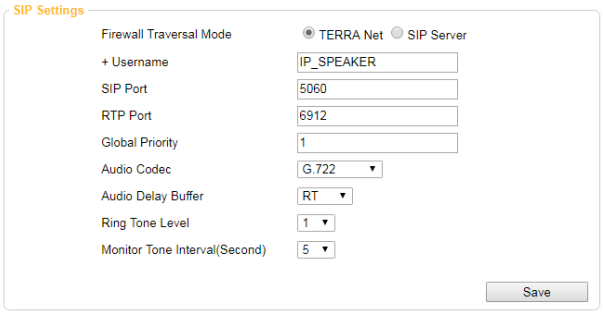


You might need to change the IP settings of your PC network card to be in the same network mask as the new IP address of your IP speaker. To avoid the conflict issues when connecting multiple IP speakers with the same IP address, be sure to only connect one IP speaker at a time to the Ethernet switch when assigning IP addresses.

❖ SIP Setting

- With SIP server

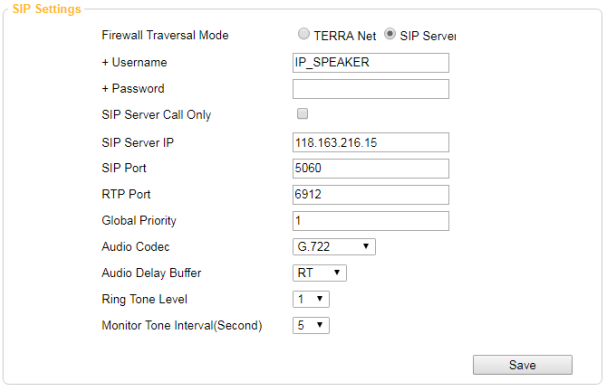
  The audio streaming can be done using a SIP Server. Go to "Machine > Setting > SIP" and enter the settings of your SIP server.



- Without SIP server

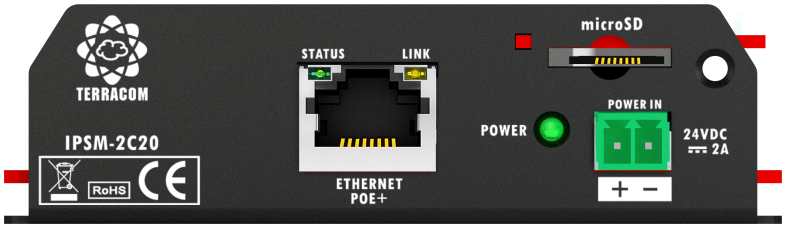
  If you don't have a SIP server, please follow the settings as below,

  - Firewall Traversal Mode: TERRA Net
  - SIP Port: 5060
  - RTP Port: 6912

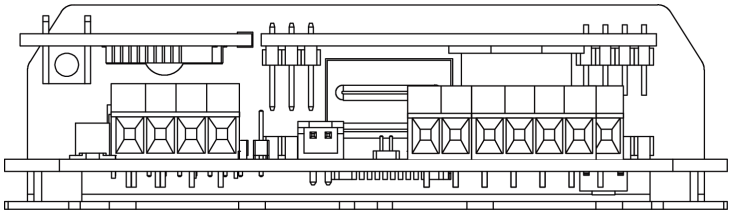


3 Hardware Installation

3.1 IPSM-2C20/IPSM-2C20M



Front panel



Rear panel

Modules of IPSM-2C20 are equipped with 1 channel in 2 channels in 20W with 8 ohm loudspeaker, and PoE+ power (If PoE+ is not available, 24VDC power adapter will supply higher power). With Power over Ethernet (PoE+), both audio control and power can be flowed over the standard female RJ45 Ethernet

connector, giving a cost effective way to used as the SIP endpoint of paging, intercom, mass notification system and minimizing the number of cables. The IPSM-2C20 is designed to embed in TERRACOM's IP speaker. To fulfill hands-free intercom and monitoring, the IPSM-2C20M is equipped with a built-in microphone interface. The YMC0101-005 mic capsule could be connected to this microphone interface. The IPSM have 3 control inputs for level control and source selection using the RAC 5/8 controller, 1 relay contact output can be programmed to control an external device via TerraManager. To configure, control, monitor the IP speakers in real-time, this can be easily done through your favorite web browser interface, making the management even the most complex environments simpler than ever. The remarkable features include event management, volume control, paging, intercom, music streaming, routing, logic control, 3rd party control, DSP control, monitoring, etc.

The 20W x 2CH amp output is applied for 8 ohm speaker. However, it can be bridged to 1 channel 40W for 4 ohm speaker by hand making.

- See the following table listed the supported audio codec by IPSM-2C20

Function	Supported Audio Encoders/ Decoders
SIP	G.711 ulaw, G.711 alaw, G.722, G.726-32, G.727-32, PCM16K, WAVE(decode only), MP3(decode only)
SHOUTcast/ Icecast (decode only)	AAC, AAC+, MP3
Stream	G.711 ulaw, G.711 alaw, G.722, PCM16K, WAVE, MP3
Record (encode only)	WAVE, MP3

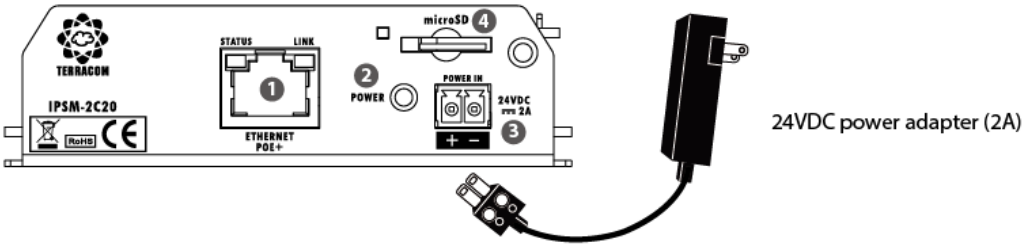
- Ordering information

Models	Model Description
IPSM-2C20	IP Speaker Module/2 ch/20W w/PoE+
IPSM-2C20M	IP Speaker Module/2 ch/20W w/mic in w/PoE+
IPSM-2C20P36	IP Speaker Module/2 ch/20W w/PSU36-24
IPSM-2C20P65	IP Speaker Module/2 ch/20W w/PSU65-27
IPSM-2C20MP36	IP Speaker Module/2 ch/20W w/mic in w/PSU36-24
IPSM-2C20MP65	IP Speaker Module/2 ch/20W w/mic-in w/PSU65-27
YMC0101-005	Mic Capsule w/40cm lead & connector

All IPSM-2C20 models are not shipped with the mic capsule, please order **YMC0101-005** mic capsule if necessary.

3.1.1 Front Panel

THE FRONT SIDE OF IPSM-2C20



1. Ethernet POE+ port
   - Connect the IP speaker to Ethernet network via RJ45 plug, CAT5/6 cable, allowing the system to be configured, controlled and monitored via web browser.
   - In addition, the IP speaker can use the power(20W) from PoE+ (PoE+ switch is required).
2. LED power light

   Display the power of IPSM-2C20 is on or off.
3. Power Input

   If the IP speaker require higher power or PoE+ power isn't available, external PSU power adapter (24VDC/ 2A) can supply power.

External power adapter ordering information: "PSU65-27" supplies 65W and "PSU36-24" supplies 36W for IP speaker.

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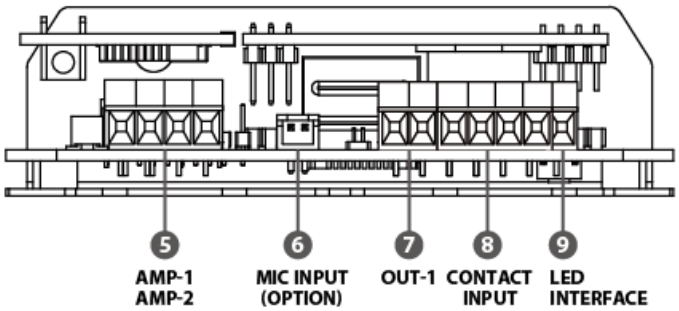
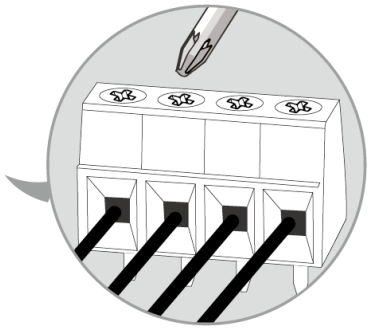
4. Micro SD card interface:

   Micro SD Card interface and internal 200MB storage of IPSM-2C20 are for music message/recording storage.

The micro SD card must be formatted to FAT32 to read (max. 512GB)

3.1.2 Rear Panel





Euro-style Terminal Block

5. Amp output

   20W x 2 channel for 8 ohm speaker or can be bridged to 1 channel with 40W for 4 ohm speaker.

6. Microphone input

   - To fulfill hands-free intercom and monitoring, the IPSM-2C20M module is equipped with a microphone input. The YMC0101-005 mic capsule could be connected to this microphone input.
   - This mic input provides DC 2.5V phantom power for microphone.

7. Contact output

   1 relay contact output can be programmed to control an external device.

8. Logic contact inputs

   3 supervised control inputs are designed to work with a simple contact such as RAC 5/RAC 8 programmable source selector and volume control remote or a push button for two-state logic control.

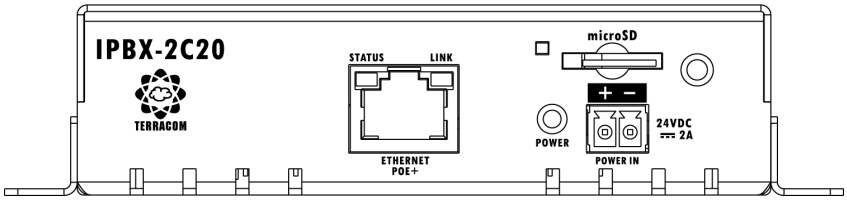
9. LED status controller interface (3.3V@10 mA)

   For safety and emergency alerting.

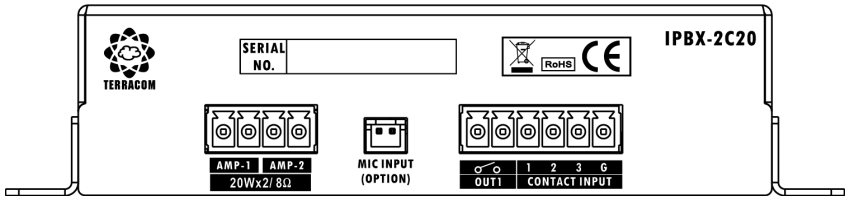
- Euro-style terminal block

  It is embed on the board and can be wired directly by screwdriver for easy operation and saving place.

3.2 IPBX-2C20/IPBX-2C20M



Front panel



Rear panel

Modules of IPBX-2C20 are equipped with 1 channel in 2 channels in 20W with 8 ohm loudspeaker, and PoE+ power (If PoE+ is not available, 24VDC power adapter will supply higher power). With Power over Ethernet (PoE+), both audio control and power can be flowed over the standard female RJ45 Ethernet connector, giving a cost effective way to used as the SIP endpoint of paging, intercom, mass notification system and minimizing the number of cables. The IPBX-2C20 is with a outside box as an external connection for general speakers. To fulfill hands-free intercom and monitoring, the IPBX-2C20M is equipped with a built-in microphone interface. The YMC0101-005 mic capsule could be connected to this microphone interface.

The IPBX have 3 control inputs for level control and source selection using the RAC 5/8 controller, 1 relay contact output can be programmed to control an external device via TerraManager. To configure, control, monitor the IP speakers in real-time, this can be easily done through your favorite web browser interface, making the management even the most complex environments simpler than ever. The remarkable features include event management, volume control, paging, intercom, music streaming, routing, logic control, 3rd party control, DSP control, monitoring, etc.

The 20W x 2CH amp output is applied for 8 ohm speaker. However, it can be bridged to 1 channel 40W for 4 ohm speaker by hand making.

- See the following table listed the supported audio codec by IPBX-2C20

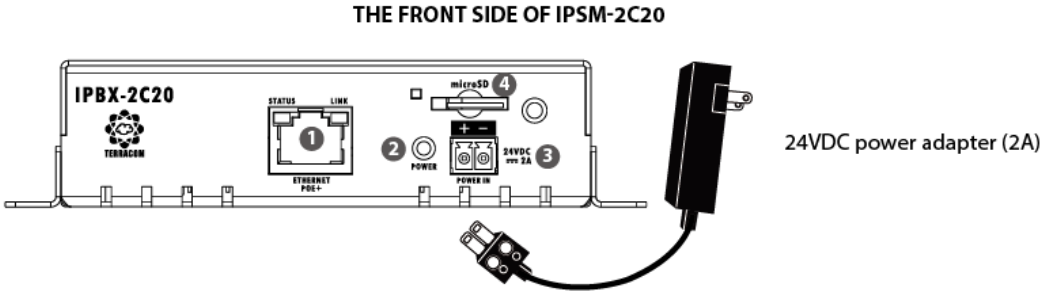
Function	Supported Audio Encoders/ Decoders
SIP	G.711 ulaw, G.711 alaw, G.722, G.726-32, G.727-32, PCM16K, WAVE(decode only), MP3(decode only)
SHOUTcast/ Icecast (decode only)	AAC, AAC+, MP3
Stream	G.711 ulaw, G.711 alaw, G.722, PCM16K, WAVE, MP3
Record (encode only)	WAVE, MP3

- Ordering information

Models	Model Description
IPBX-2C20	IP Speaker Box/2 ch/20W w/PoE+
IPBX-2C20M	IP Speaker Box/2 ch/20W w/mic in w/PoE+
IPBX-2C20P36	IP Speaker Box/2 ch/20W w/PSU36-24
IPBX-2C20P65	IP Speaker Box/2 ch/20W w/PSU65-27
IPBX-2C20MP36	IP Speaker Box/2 ch/20W w/mic in w/PSU36-24
IPBX-2C20MP65	IP Speaker Box/2 ch/20W w/mic-in w/PSU65-27
YMC0101-005	Mic Capsule w/40cm lead & connector

All IPBX-2C20 models are not shipped with the mic capsule, please order **YMC0101-005** mic capsule if necessary.

3.2.1 Front Panel



1. Ethernet POE+ port
   - Connect the IP speaker to Ethernet network via RJ45 plug, CAT5/6 cable, allowing the system to be configured, controlled and monitored via web browser.
   - In addition, the IP speaker can use the power(20W) from PoE+ (PoE+ switch is required).
2. LED power light

   Display the power of IPSM-2C20 is on or off.
3. Power Input

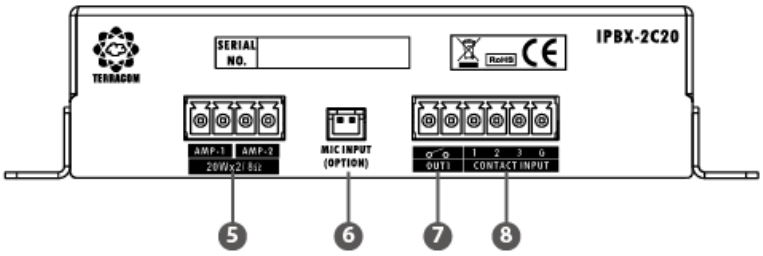
   If the IP speaker require higher power or PoE+ power isn't available, external PSU power adapter (24VDC/ 2A) can supply power.

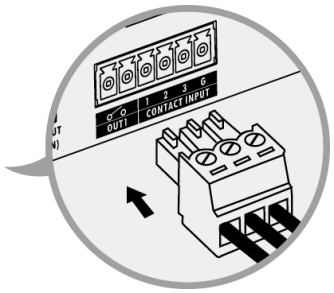
   External power adapter ordering information: "PSU65-27" supplies 65W and "PSU36-24" supplies 36W for IP speaker.
4. Micro SD card interface

   Micro SD Card interface and internal 200MB storage of IPSM-2C20 are for music message/recording storage.

The micro SD card must be formatted to FAT32 to read (max. 512GB)

3.2.2 Rear Panel





Euro-style terminal block

5. Amp output:

   20W x 2 channel for 8 ohm speaker or can be bridged to 1 channel with 40W for 4 ohm speaker.

6. Microphone input:

   - To fulfill hands-free intercom and monitoring, the IPSM-2C20M module is equipped with a microphone input. The YMC0101-005 mic capsule could be connected to this microphone input.
   - This mic input provides DC 2.5V phantom power for microphone.

7. Contact output:

   1 relay contact output can be programmed to control an external device.

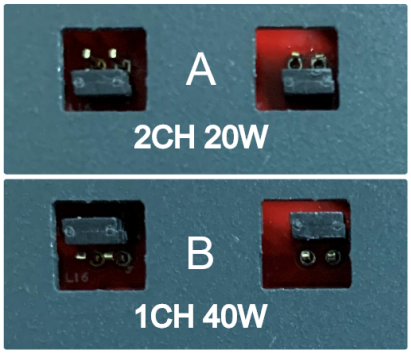
8. Logic contact inputs:

   3 supervised control inputs are designed to work with a simple contact such as RAC 5/RAC 8 programmable source selector and volume control remote or a push button for two-state logic control.

- Euro-style terminal block
  Euro-style terminal block of IPBX-2C20 is pluggable for assembling easily.

3.3 Bridge Amp Output

[真實板子]
2 CH 20W amp broad can be bridged to 1 CH 40W by hand making. The jumper position is at the bottom, please do the bridge operation from there.
Relocate jumpers from A to B and set amplifier output on product web browser.



Two jumpers must relocate simultaneously.

The user must go setting the option of amplifier power on the webpage because the incorrect power setting may damage the speaker. Check out the web browser topic

4 Configuration-Web Browser

4.1 Getting Started

- Connect the IPSM/IPBX-2C20 to network switch.
- Open the web browser on your PC/laptop. The IPSM/IPBX-2C20 device is compatible with and optimized for the latest version of these web browsers:
  - Chrome (we recommend to use it)
  - Safari
  - Firefox
  - Opera
  - Edge

Internet Explorer is not supported.

- Enter the default IP address into the address bar, then you can open the webpages of IPSM/IPBX device.

Default setting	Web browser
IP address	192.168.100.1
Subnet Mask	255.255.255.0
Gateway	192.168.100.254

4.2 IP & Network

4.2.1 IP Information

- The TERRACOM products are using the following Multicast address (IGMP)
  - 239.211.34.48: for ATEIS-NET status display
  - 239.211.34.45~49: for IDA8 or BOUTIQUE IGMP address
  - 239.240.38.25, Port 9000/9002: for Machines status
  - 239.240.38.25, Port 8998: for Paging control
  - 239.240.38.25, Port 8995: for Machines display status
  - 239.241.100.0 ~ 239.241.100.255, Ports 2000 ~ 3000: for Audio steam
  - 239.240.38.25, Port 9002: for BOUTIQUE protocol

- The Local Host Ports of TERRACOM products
  - 20: File Sync
  - 21: File Sync
  - 20: Web Server
  - 80: website
  - 123, 14500, 4096: NTP Server
  - 161: SNMP protocol
  - 5060: SIP call
  - 6912: RTP address
  - 8010: Third Party commands
  - 26570: Remote Control
  - 19760: for IDA8
  - 19761: 3rd party control
  - 19762: for IDA8
  - 19770: for IDA8
  - 19780: for IDA8
  - 19781: for IDA8
  - 19782: for IDA8
  - 9002: BOUTIQUE
  - 9999: TerraServer File Access

4.2.2 IP Address

If user lose the IP address of IPSM/IPBX-2C20, please check the following instruction.

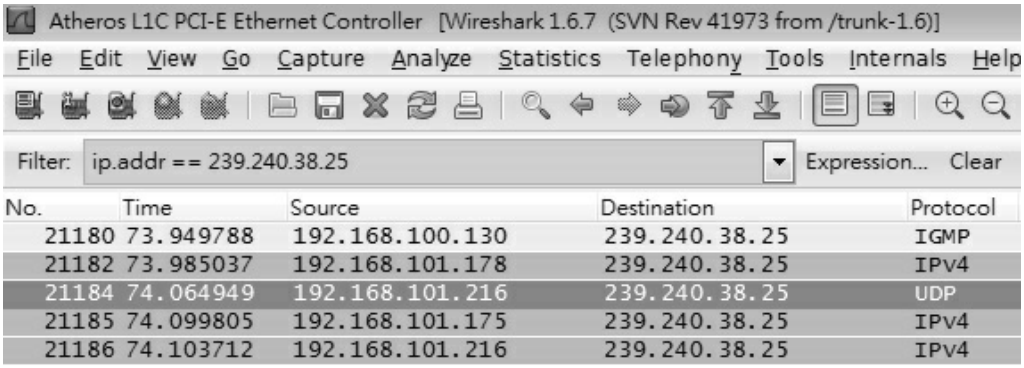
❖With only one device

- Read Out the IP Address

  Use the tool to push reset button of device bottom (long push over 10 sec will reboot the device), and it will read out the IP address via the connected loudspeakers. Please make sure the loudspeakers is connected to the amplifier outputs of IPSM/IPBX-2C20.

- Using Packet Analyzer software

  Download the free Packet Analyzer software such as Wireshark and set the filter as "ip.addr == 239.240.38.25", a list of all TERRACOM units connecting to your LAN will be displayed.



4.2.3 Network Bandwidth And Bitrate

- The data rate over the network is calculated as below
  - Audio Streams: It is based on the number of audio stream channels and the audio format.
  - Control Streams: Each TERRACOM device is estimated at 28kbps.

- The total bit rate is calculated using the formula (in kbps) as below

  ((number of products)* 28kbps) + ((number of streams) * stream bitrate)

- The example below is using 8 Terra-FDX units + 2 TerraManager, and altogether use 10 channels audio streams (MP3 format) at same time.

  ((8+2) * 28) + (10 * 150) = 1780Kbps.

❖Audio Stream Format

- Mono:

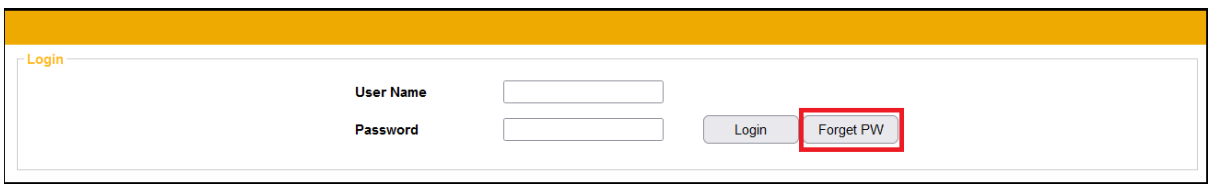
- MP3: 150kbps
- G.722: 90kbps
- G.711ulaw: 90kbps
- G.722alaw: 90kbps
- PCM16k: 280kbps
- WAVE: 780kbps

- Stereo:
  - MP3: 150kbps
  - WAVE: 1560kbps

4.3 Login/Logout

- Login/logout from IPSM/IPBX-2C20 web browser
  1. Enter a valid user name and password.
  2. To logout, click the [Logout] button located on the upper tab

- Forget Password
  1. Click [Forget PW] button if users forget the password, but you need to enter the user name first.
  2. Then a [pwd.] file will be downloaded into your PC/laptop, please send this [pwd.] file to our technical team to retrieve the password.

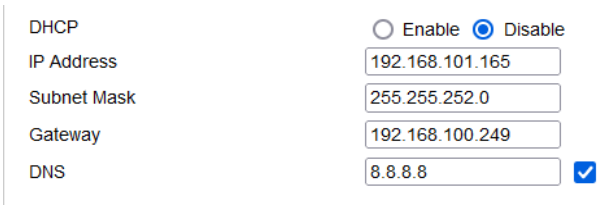


4.4 Setup

4.4.1 Basic Setting

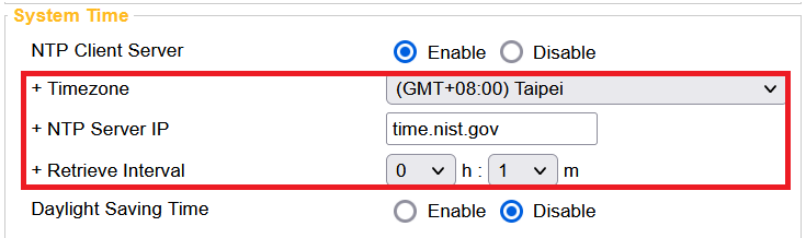
❖ Network

- DHCP: Enable/disable the DHCP (Dynamic Host Configuration Protocol).
  - IP Address: Click to change the IP address to fit your network.
  - Subnet Mask: Depend on the LAN where the IPSM/IPBX-2C20 is located.
  - Gateway Server: The IP address of the gateway server.
  - DNS: Tick the checkbox to enable the DNS server and set the IP address.



❖ System Time

- NTP Client Server: Enable the NTP setting. If the NTP is activated, the system date/time of IPSM/IPBX-2C20 will be synchronized by NTP server.
  - + Timezone: The timezone of user's country.
  - + NTP Server IP: Set the IP address of NTP Server.
  - + Retrieve Internal: Set the internal to update the system time.



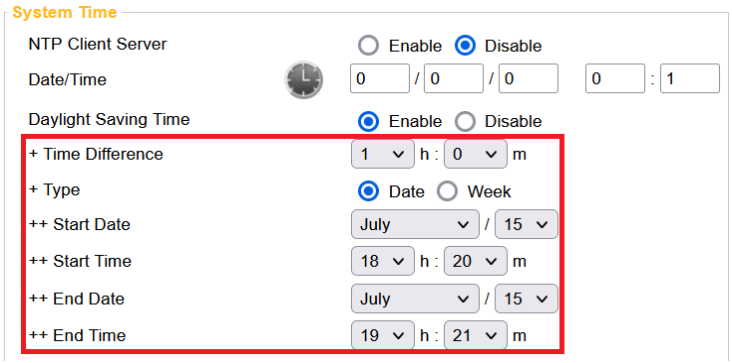
- Date/Time : If the NTP Client Server is disabled, user shall manually set the time and the timezone of your IPSM/IPBX-2C20.

If the IPSM/IPBX-2C20 is not powered for a period of time (approx. 23 days), the internal battery will be under low voltage, and result in incorrect system time of IPSM/IPBX-2C20. Should the system time is incorrect, please connect the power supply of IPSM/IPBX-2C20, and set the system setting or enable the NTP setting on its web browser again.

The changes in [System Time] will also affect the Scheduler function on web browser.

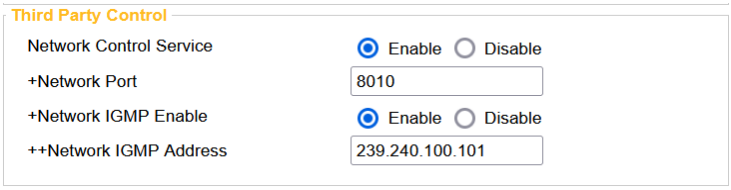
- Daylight Saving Time: Enable/disable the Daylight Saving Time function on IPSM/IPBX-2C20.
  - + Time difference: Define the time to be an hour/a minute earlier or more.
  - + Type: Choose [Date] or [Week] option to define the period of Daylight Saving Time.
  - ++ Start Date / ++ End Date: Set the start/end date of Daylight Saving Time.

- ++ Start Time / ++ End Time: Set the start/end time of Daylight Saving Time.



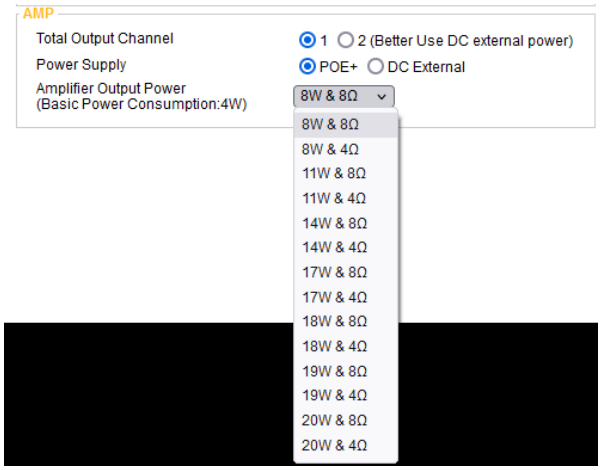
❖Third Party Control

- Network Control Service: Enable/disable the Network Controls Service.
  - Network Port: Set the local network port.
  - Network IGMP Enable: Enable/disable to use IGMP address, the default network port is 8010.
  - Network IGMP Address: Set the IGMP address.

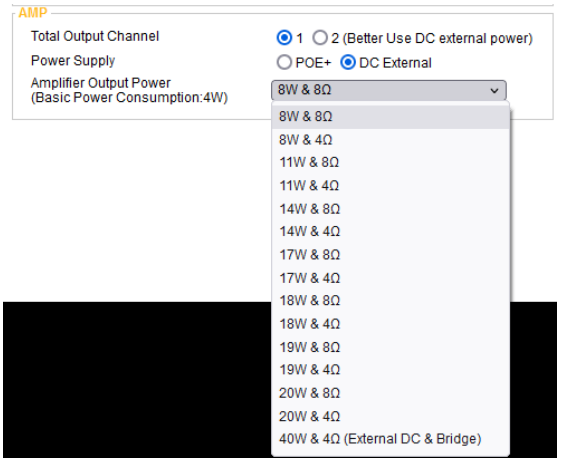


❖AMP

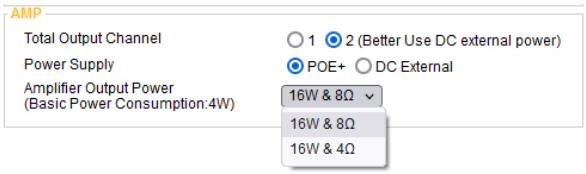
- Total Output Channel: Number of available output channel. Two channels of amp output can be bridged to one which with 40W output, and it must be supplied by DC power.
- Power Supply: Options of power supply.
- Amplifier Output Power: Options of output power
  - There is four application of amp output power:
    Please make the accurate setting before connecting to the loudspeakers to avoid the situation of "overload power failure".
  - Amplifier Output Power: xW & xΩ indicates power supplying(Watts) and connecting how much ohm loudspeaker.



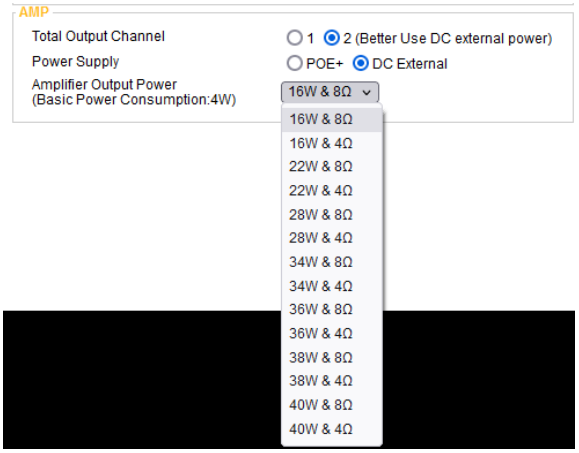
1 output channel & PoE+ power



1 output channel & DC power

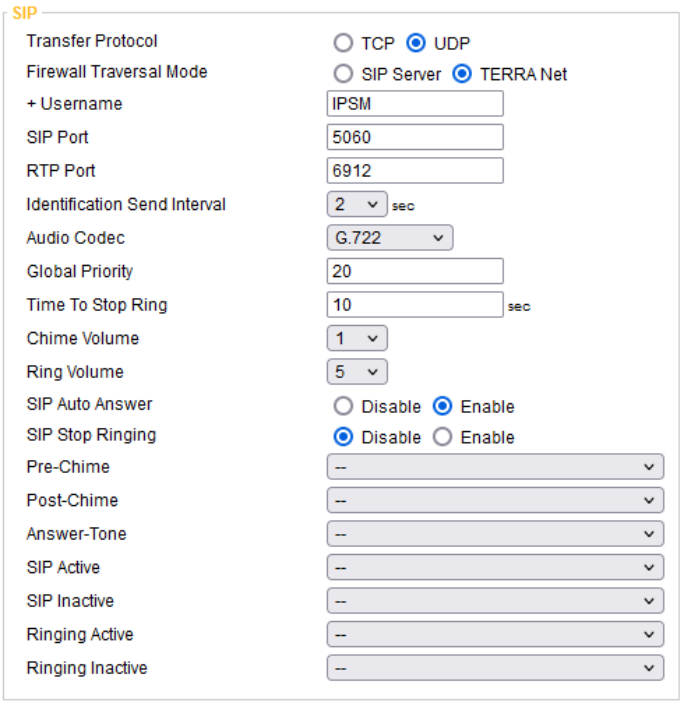


2 output channels & PoE+ power



2 output channels & DC power

❖ SIP



- Transfer Protocol: Select either TCP or UDP for the communication protocol between the IPSM/IPBX-2C20 and SIP Server. You can only choose one protocol at a time.

- The transfer protocol of the IPSM/IPBX-2C20 and SIP Server should be the same.

- Firewall Traversal Mode: Use [TERRA Net] to relay the audio packet through TCP/UDP or use [SIP Server].
- + Username
  - TERRA Net: Set the calling name for SIP call, normally this username is defined in the telephone number.
  - SIP Server: Set the username (account) for using to connect to the SIP server, this username is the account you've registered on SIP server.
- + Password (SIP Server only): Enter the password for using to connect to the SIP server, this password is the one you've registered on SIP server.
- Enable the checkbox to reveal the hidden password.
- SIP Server IP (SIP Server only): Set the IP address of SIP server which you've registered on SIP server.
- SIP Port: The network port for SIP protocol, set 5060 by default.
- RTP Port: The network port for RTP protocol for receiving and transmitting audio, set 6912 by default.
- Identification Send Interval (sec): The IPSM/IPBX-2C20 supports to paging to other TERRACOM devices via Internet Paging Server (IPS). Here you can set the time interval of sending IPS signal.

  If the time interval is set higher, it can decrease the occupied bandwidth on network; but it will also cause the response time which IPS detects the IPSM/IPBX-2C20 become slower.

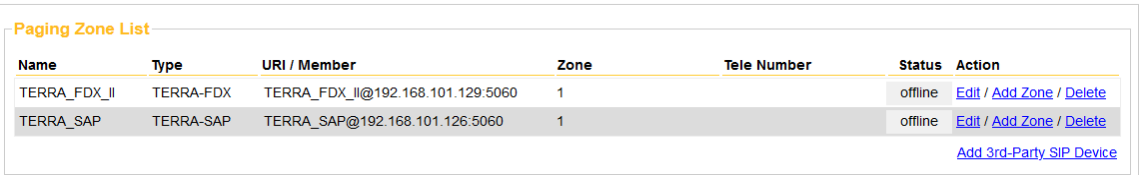
- Audio Codec: The supported audio codec for SIP (G.711, G.722 and PCM16K decoder).

- Global Priority: When TERRACOM devices are calling (SIP intercom) TerraManager, the order of which device can intercom with TerraManager shall be based on Global Priority setting. 1 is the highest priority, and 99 is the lowest priority.
- Time to Stop Ring: The SIP call will be hung up after the set time. If sets up as 0 second, it won't stop ringing.
- Chime Volume: The volume of pre-chime/post-chime.
- Ring Volume: The volume of ring tone.
- SIP Auto Answer: Enable/disable to pick up the SIP call automatically.
- SIP Stop Ringing: Enable/disable to ring when receiving SIP call.
- Pre-Chime/Post-Chime: Support to program the pre-chime/post-chime setting when making SIP call and paging to chosen zones.
- Answer-Tone: Choose an audio tone which this tone will be played to your caller after the caller picks up the call.
- SIP Active/Inactive: Trigger an action after the SIP call has picked up or trigger an action after the SIP call ends. The triggered action can be the Contact Out, Command (string) and Multi Function.
- Ringing Active/Inactive: Trigger an action when the SIP ringtone starts ringing or trigger an action after the SIP ringtone ends. The triggered action can be the Contact Out, Command (string) and Multi Function.

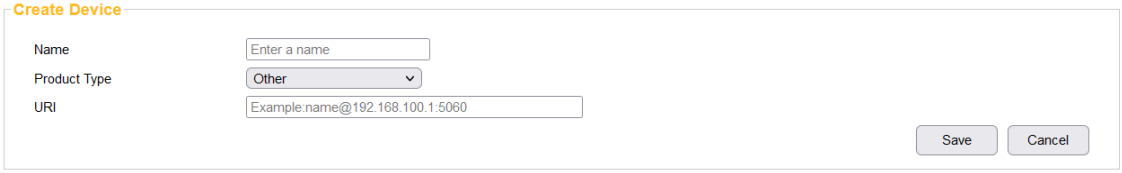
4.4.2 Device

❖ Paging Zone List

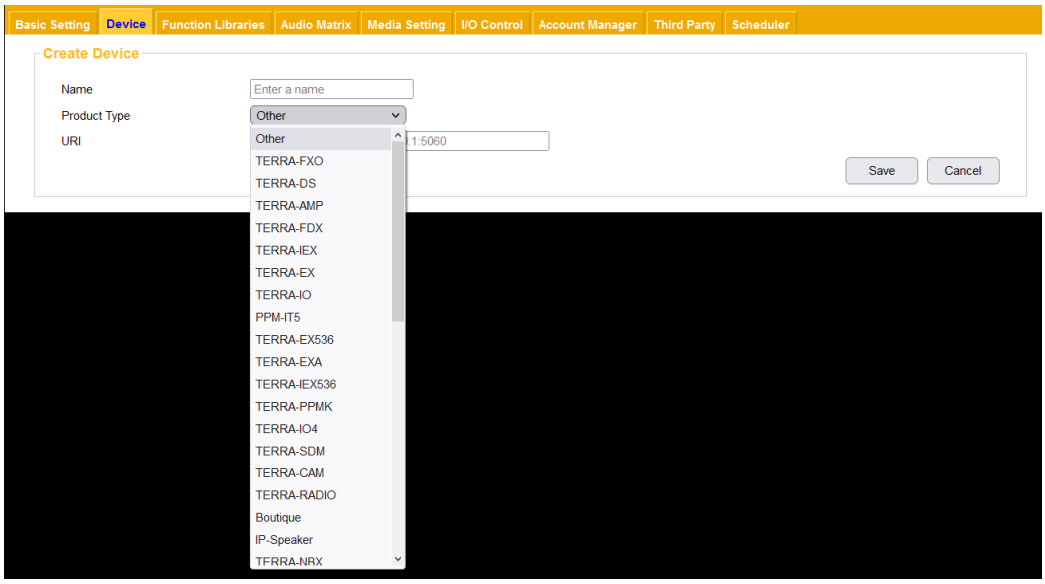
Select devices that will execute commands and will appear on the setting drop-down options.



- Add 3rd-Party SIP Device
  Type in the name of 3rd-party device, choose [other] product type and set the URI of the device.



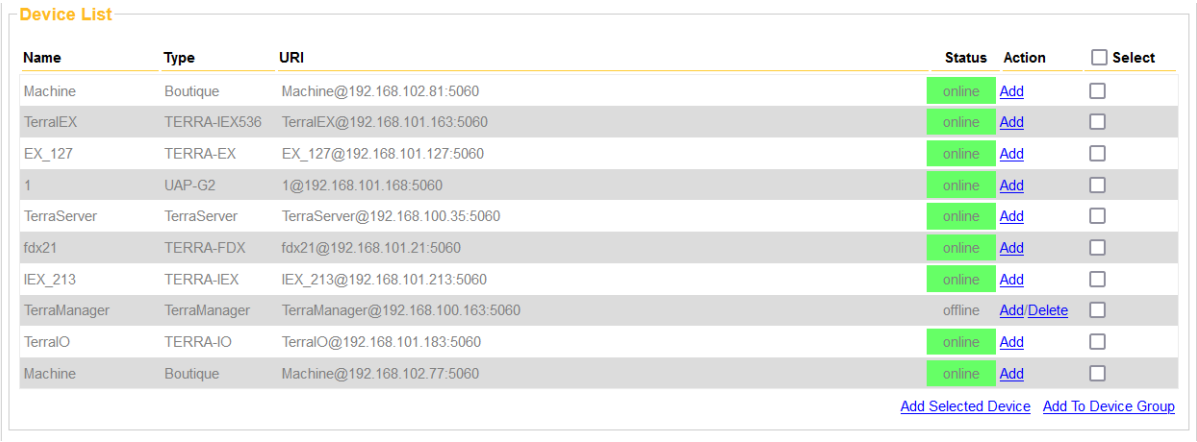
- Create Device
  Choose TERRACOM's device of [Product Type] options for adding it in the device list.



❖ Device List

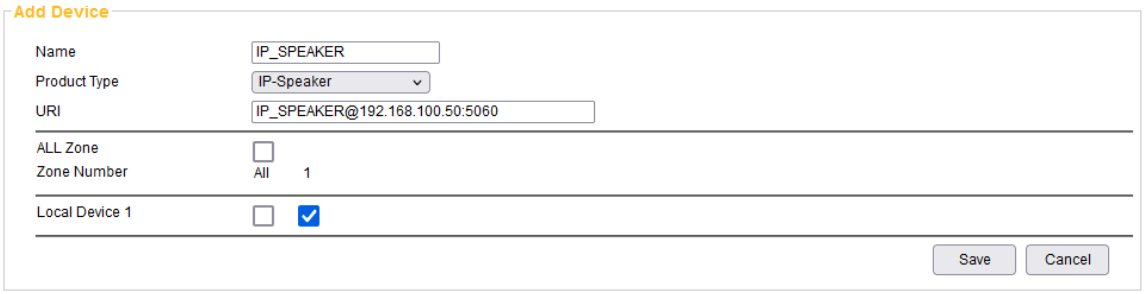
List the TERRACOM devices located in the same LAN or the devices which users add in manually. The different color on status of device will be indicated as below.

- Black color: The devices that users manually add in.
- Grey color: The devices are located in the same LAN, but they haven't been added into the Device List.



- Name: The name of device.
- Type: The type of device.
- URI: The URI of device.
- Status: The green button will indicate the device is in online status, and grey button indicates the device is in offline status.
  - Online (green): Device is online (connected).
  - Offline (grey): Device is offline (disconnected).
  - Paging: Device is currently paging.
  - Phone: Device is currently in intercom.

- Action:
  - Add: Create a new device in the device list which the zone settings require to be different from the same device. For example, the zone setting of IP-SPEAKER on first device is Zone 1, and on the second device is Zone 2.

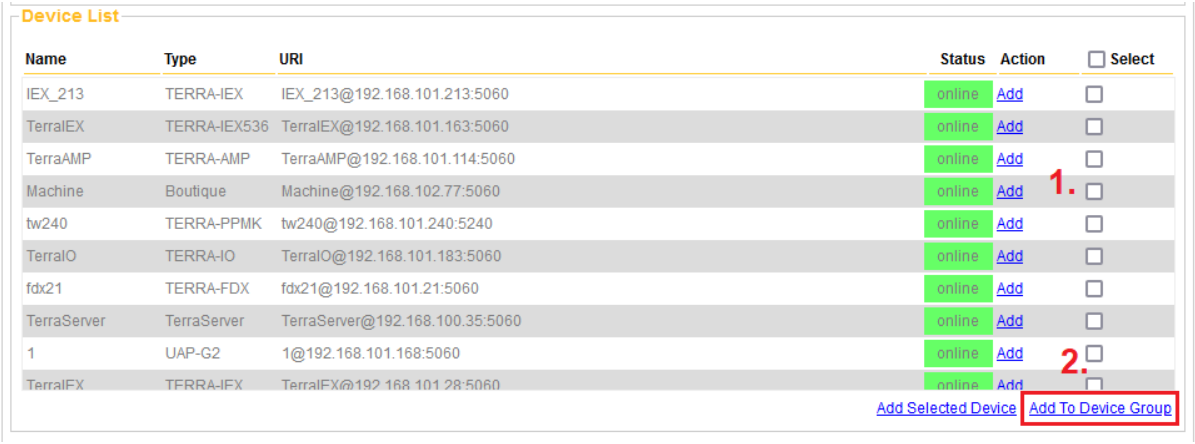


  - Delete: Delete the device.

❖ Add To Device Group

Add the device to the group to perform the same operation synchronously.

1. Select which devices that be in the group
2. Click [Add To Device Group] button for further setting



3. Name: Name the group.
4. Zone: The paging zone of the group.

The max. number of supported zones is 1024.

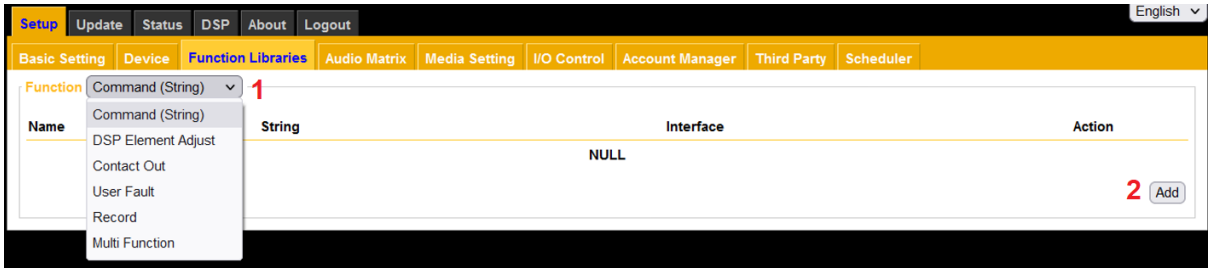
5. Action: Delete the device.
6. Add Member: Add device in the group.

4.4.3 Function Libraries

The [Function Libraries] allows to set the functions and action for controlling the IPSM/IPBX-2C20. Follow the steps to create an action.

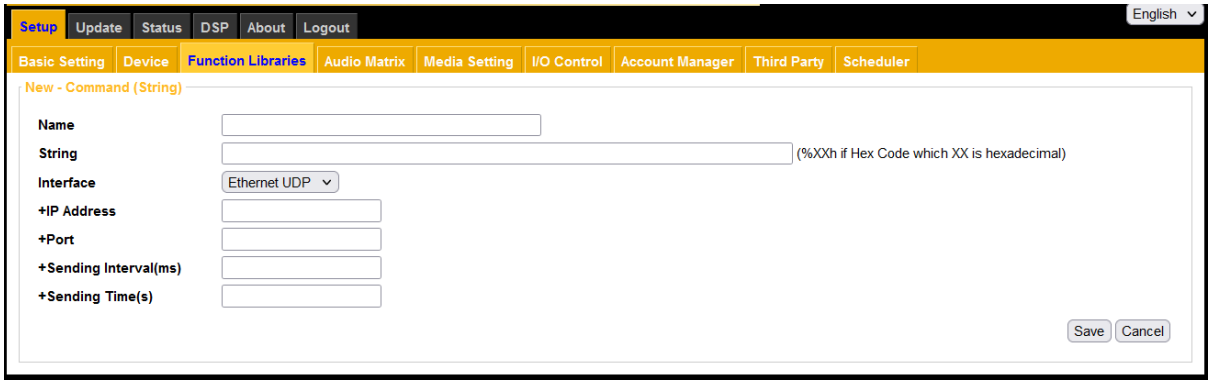
1. Select the function from drop-down box.

2. Click [Add] button for next operation.



4.4.3.1 Commend (String)

Third party devices send command string to IPSM/IPBX-2C20 such as TERRACOM device, IDA8 processor, BOUTIQUE controller, etc.



- Name: The name of this [Command String] action.
- String: The code of the string will depend on the 3rd party devices.

The picture above is an example of sending the command string in ASCII code to Ateis processors (IDA8, BOUTIQUE, UAP G2, ECS, LAP G2T), the Ateis processors use Hex code, then users need to change the string in Hex code to ASCII code. The Hex code is %XXh, the XX indicates the character of Hex code.

For TERRACOM device: accept in ASCII code.
For BOUTIQUE processor: accept ASCII code.
For ATEIS processor (IDA8, UAP G2 etc.): accept Hex code.

- Interface: Choose the protocol of sending the command string, Ethernet UDP by default.
- +IP Address: Set the IP address of TERRACOM device.
- +Port: The network port setting requires to be the same as the TERRACOM device, IDA8 device, BOUTIQUE device, see the table as below.

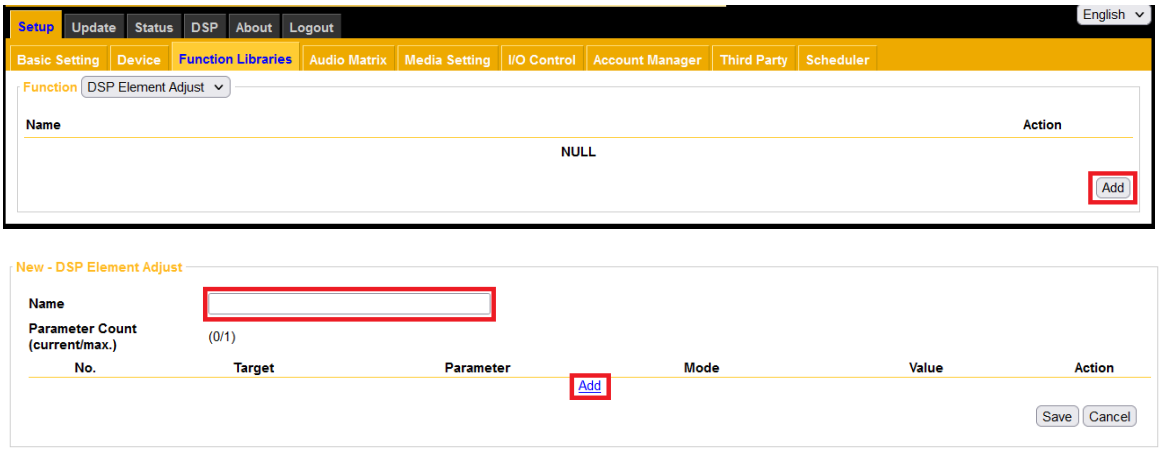
Default Port	
Terracom device	8010
IDA8, ECS, LAP	19761
BOUTIQUE	8010

- +Sending Interval (ms): The interval of sending the command string to TERRACOM device, IDA8 device, BOUTIQUE device.
- +Sending Time(s): The device will stop sending the command string after receiving the answer string from the 3rd party device.

4.4.3.2 DSP Element Adjust

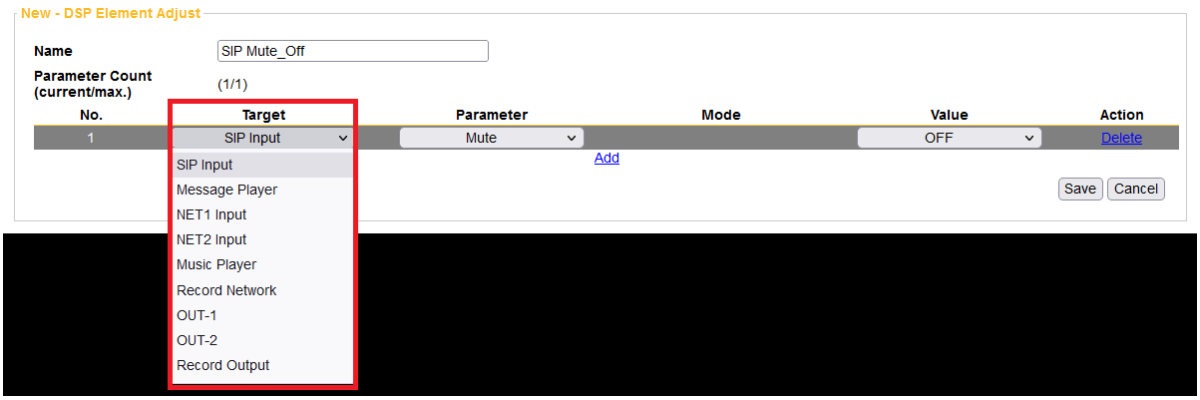
The [DSP Element Adjust] event is used for adjusting the DSP parameter such as the audio level of input source.

- First, choose [DSP Element Adjust] function and click [Add] to open setting window for next operation. Second, Type in the name of the setting and click [Add] button to create a new parameter setting.

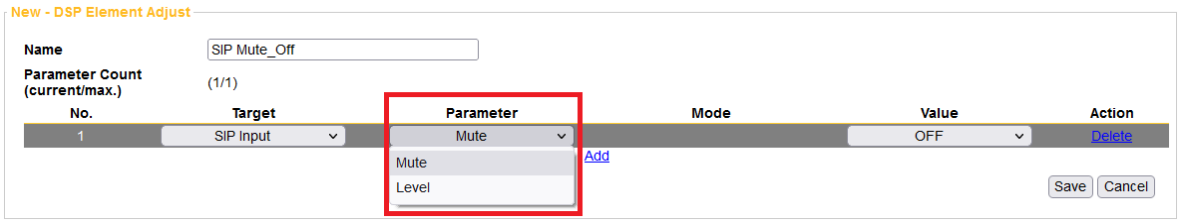


- Choose the [Target] which will be sent a string of the action

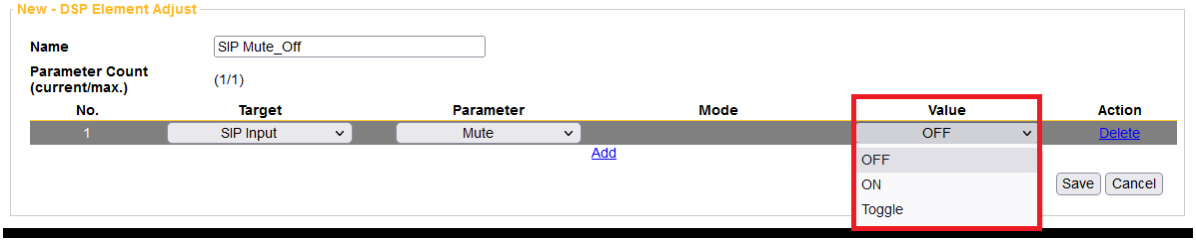
  The [Target] combo box lists all the inputs/outputs of IPSM/IPBX-2C20 on [DSP Function] window.



- Choose [Mute] or [Level] of setting parameter



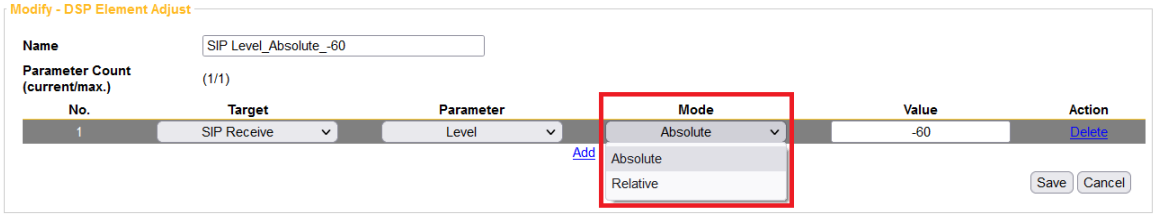
- Set [Value] of [Mute]
  - OFF: The function of mute will turn off.
  - ON: The function of mute will turn on.
  - Toggle: No matter the current situation of mute is on or off, the mute function will switch to opposite situation.



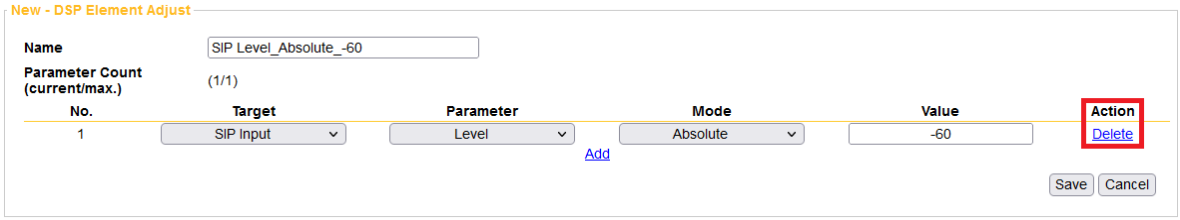
- Set [Mode] and [Value]of [Level]
  - Absolute: The level adjustment will follow the [Value] that set by user, and change the current value to the same value as [Value] gird. For example, if the [Value] gird is set as -60dB, and the current level value is -50dB, and once this event is triggered, the level of input/output will be change to -60dB.

  - Relative: The level adjustment will follow the [Value] that set by user, and increase/decrease the level value when each time the event is triggered. For example, if the [Value] grid is set as -10dB,

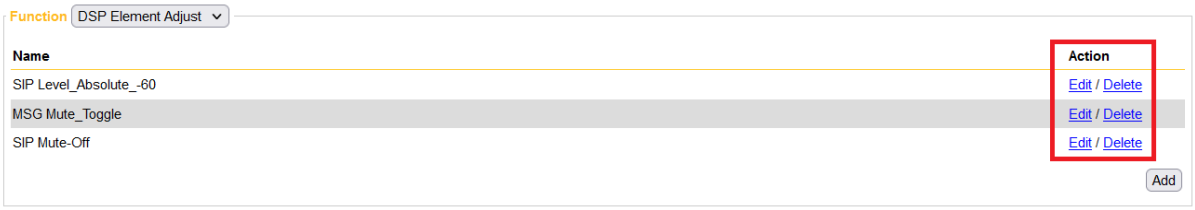
and the current level value is -35dB, and once this event is triggered, the current level value will be change to -25dB (-35dB minus -10dB equals -45dB)



- [Action]: Delete the setting



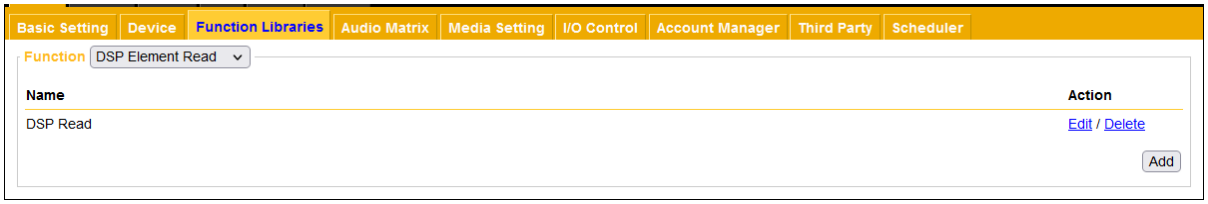
- After saving the individual settings use [Action] to edit or delete the existing settings.



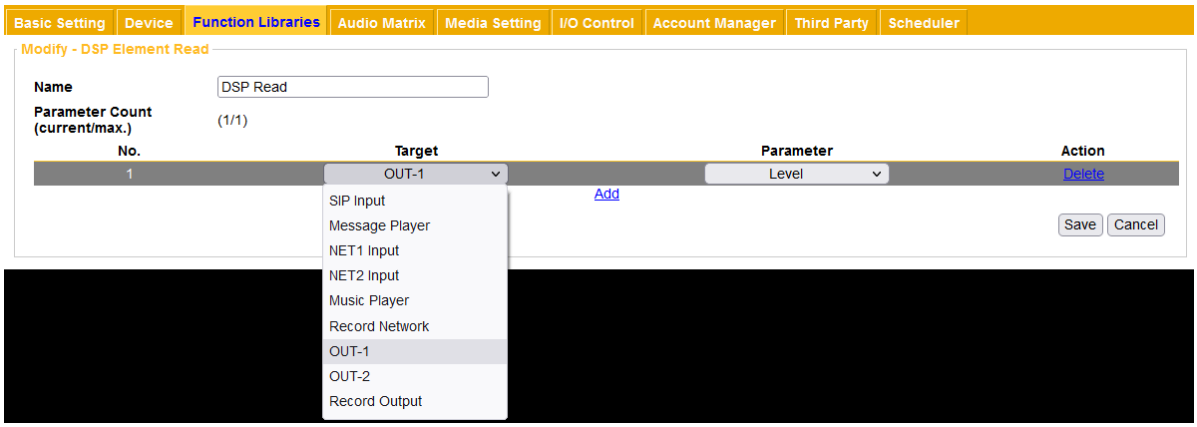
The PM001 module can expand more DSP adjustment parameters and options of [Target], please order it if the scale of application is bigger and more complex.

4.4.3.3 DSP Element Read

The [DSP Element Read] event is used for remote monitoring the DSP parameter of device.



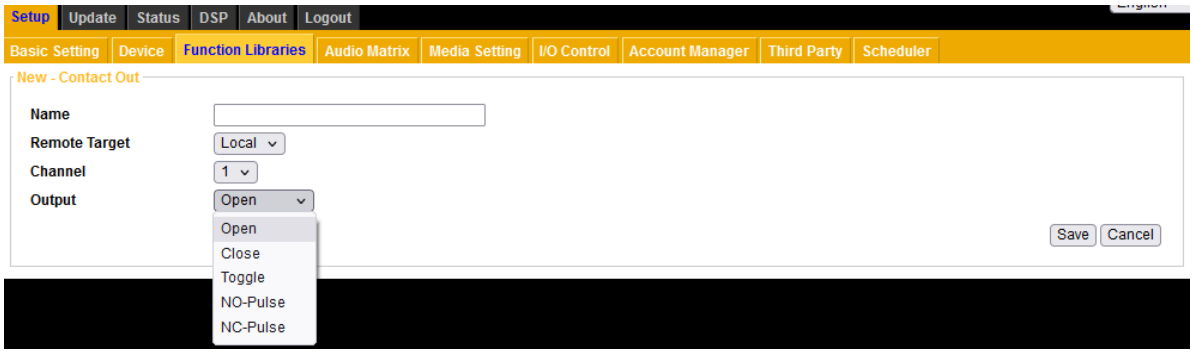
- Choose the [Target] which will be sent a string(Name) of the monitoring action
  The drop-down options of [Target] lists all the inputs/outputs of IPSM/IPBX-2C20 on [DSP Function] window.



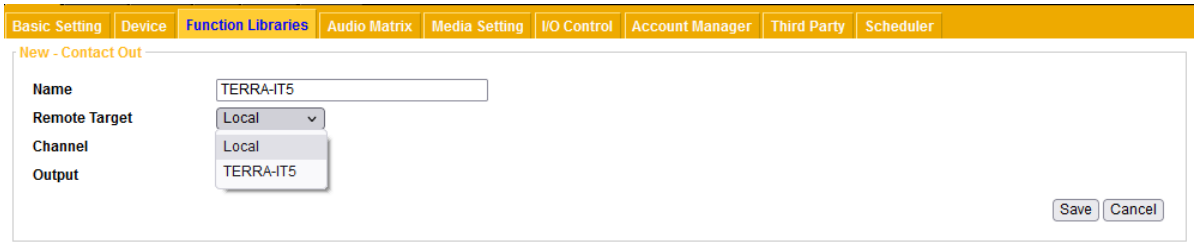
- Choose [Mute] or [Level] of monitoring parameter
  Please use the auxiliary software to send the string and get the status prompt. There are many free downloadable software for user.

4.4.3.4 Contact Out

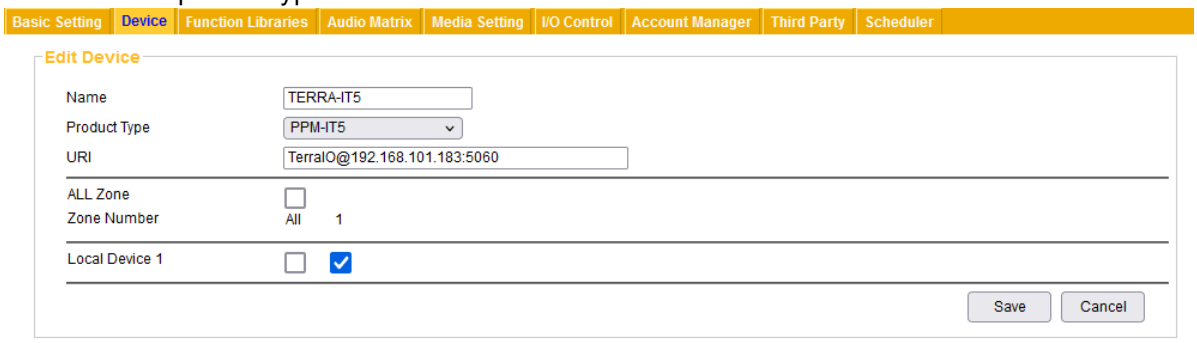
The contact output of IPSM/IPBX-2C20 can be programmed and send a pulse or a static closing/opening to an external device



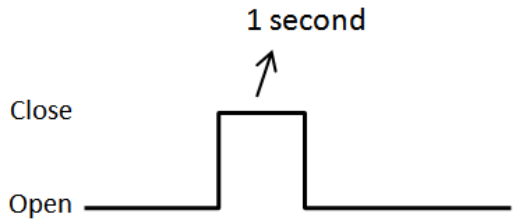
- Name: The name of this [Contact Out] action.
- Remote Target: The remote consoles and paging consoles that add in [Device] setting.



How to add device in the option of [Remote Target] drop-down list:
Click the connecting device and the setting window will pop up. And, tap in the target name and choose product type.

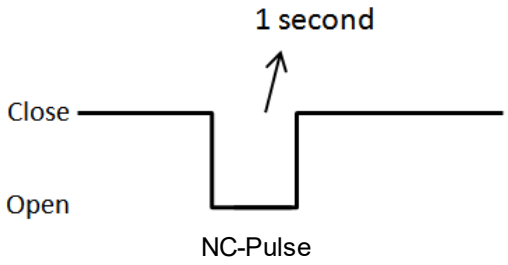


- Channel: The contact output channel on the rear panel of IPSM/IPBX-2C20.
- Output:
  - Open: The contact output's channel is opened when the action is triggered.
  - Close: The contact output's channel is closed when the action is triggered.
  - Toggle: Trigger the relay switch of contact output's channel between open and close.
  - NO-Pulse: The NO (normally open) contact is opened, and when the action is triggered, the contact is closed for 1 second.



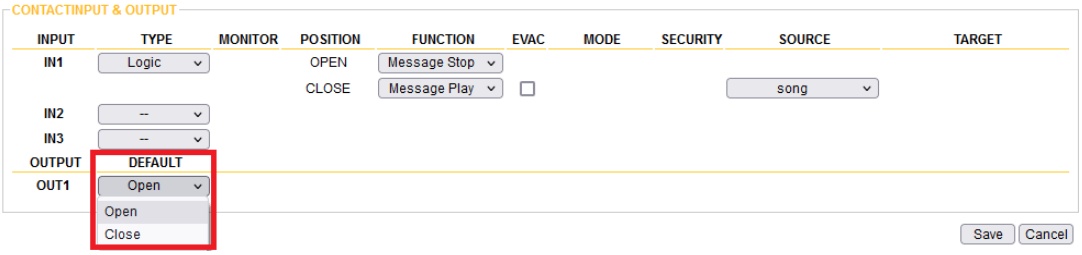
NO-Pulse

- NC-Pulse: The NC (normally close) contact is closed, and when the action is triggered, the contact is opened for 1 second.



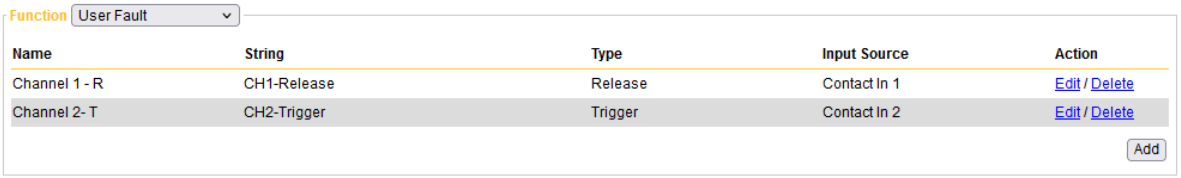
NC-Pulse

When choosing [NO-Pulse] or [NO-Pulse] option, please set the default state (open or close) of relay output on I/O Control window > Contact Output, see the picture below.



4.4.3.5 User Fault

Create the user-defined fault, and once this user-defined fault is being triggered/released, the fault can be displayed on the [Monitor] window of TerraManager software.



- Name: The name of this [User Fault] action.
- String: The display message of TerraManager software > Monitor window.
- Action: The action (Trigger/Release) of this User Fault.
- Input Source: Select the source (Contact Input of IPSM/IPBX) to trigger/release the [User Fault] action.

After completed the User Fault setting, please go to I/O Control to continue configuring its control setting.

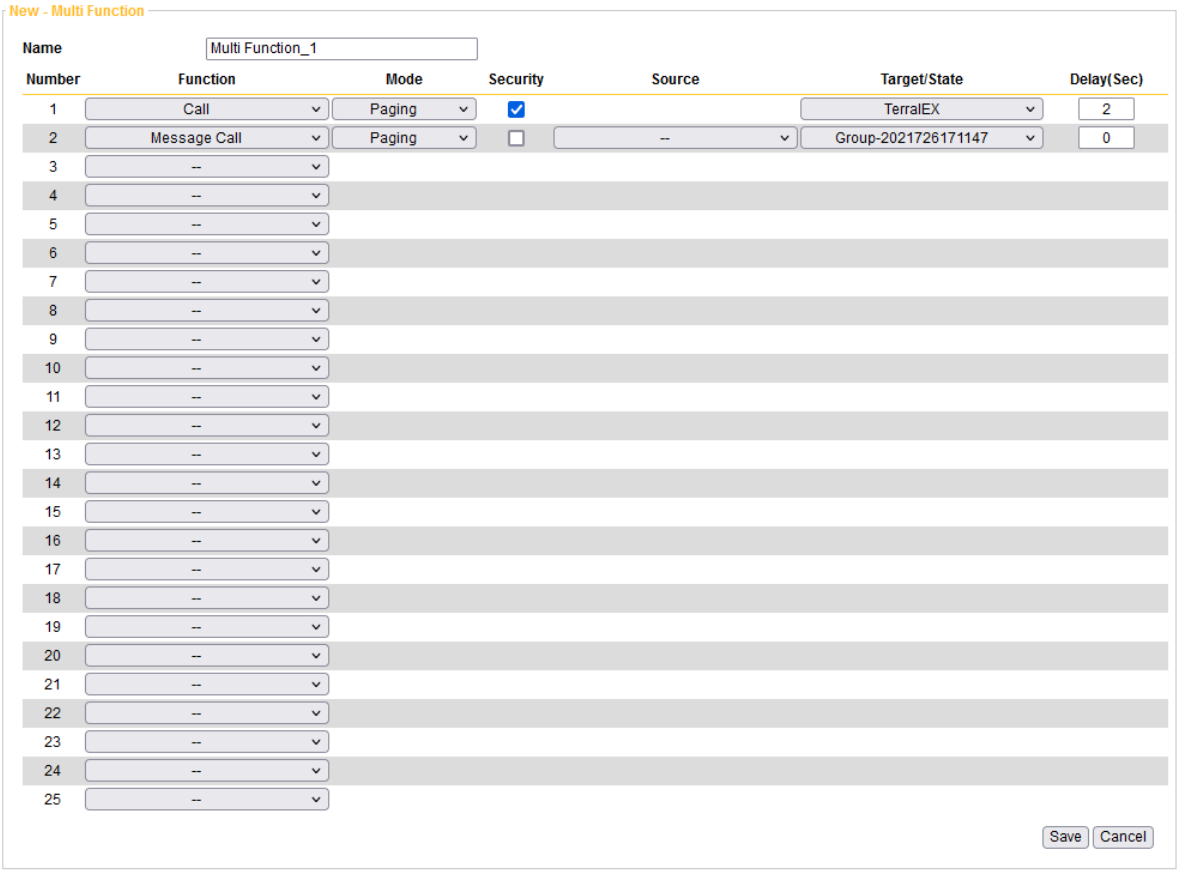
Edit Window

4.4.3.6 Rocord

Display the built-in Record function (Record Start/Record End) of TERRA-SAP, and allows users to assign the [Record Start]/[Record End]] action on I/O Control > Record window.

4.4.3.7 Multi Function

Create a group of action with multiple functions. There are three default functions - [Call Function], [Message Function] and [Hang up Function]. If users wish to use other functions such as [Contact Out], please create it on [Function Libraries] first, then the function you create will be listed on [Function] drop-down box.



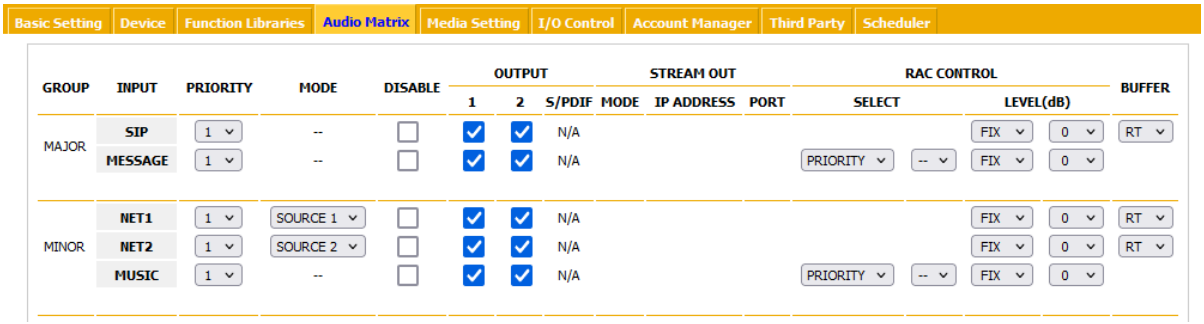
- Name: The name of this [Multi Function] action.
- Function: Select a function from the drop-down list, these functions will be triggered by the order of the list.
- Mode: Choose the calling mode (intercom/paging).
- Security: If the [Security] option is enable, the caller cannot hang up the call during paging unless the caller cancels the call itself.
- Source (message call only): Choose a playlist which you've created on Setup 1 > Media Setting.
- Target/State: Choose a TERRACOM device to paging/SIP intercom, play message, etc.
- Delay (Sec): The delay time between the previous action and the next upcoming action in [Multi Function] list.

4.4.4 Audio Matrix

The Audio Matrix allows to manage all audio input/output with the following functions:

1. Audio routing with priority.
2. Audio routing with RAC 5/8.
3. Volume control depends on audio source.
4. Announcement has different volume with music.
5. Send network stream.

6. Play network stream.



- Group
  The priority of group [MAJOR] will always bigger than group [MINOR].

- Input
  The audio input sources.
  - SIP: SIP calls.
  - MESSAGE: Play message audio input.
  - NET1: The first channel of playing network stream.
  - NET2: The second channel of playing network stream.
  - Music: Play background music.

- Priority
  Set the priority of the audio input sources.

Always set the the priority of SIP input as "1" (the highest priority), otherwise the SIP call will be left aside. The SIP includes Call, Paging Group and Pre-define Message.

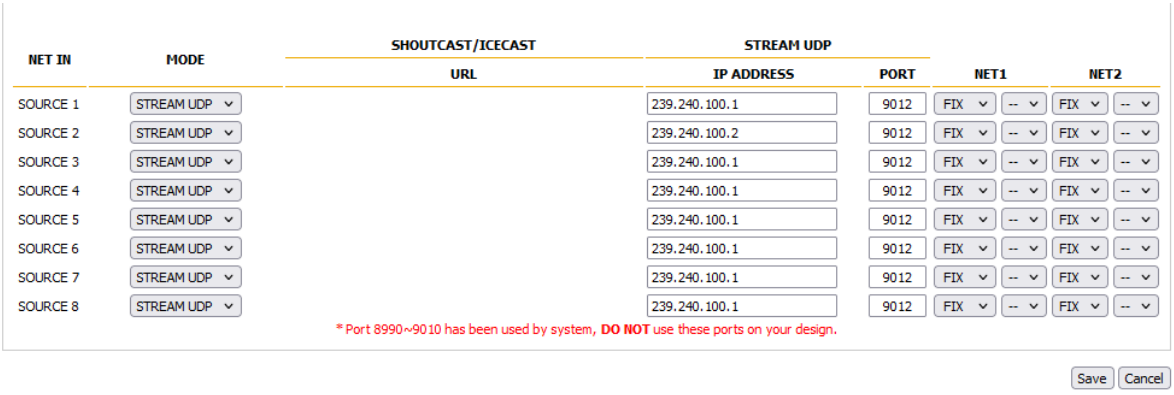
The priority of source of will be based on the priority setting here. If the priority of input source is the same, the priority order will be followed by "first in first serve" basis.

- .Mode
  Receive the network stream: Source 1~8 and proceed audio routing via TerraManager (TM).
- Disable
  When enables the [Disable] option, the corresponded audio input source will no longer output even its priority is higher than other input sources.
- Output 1 and 2
  Tick the checkbox to enable the audio output channels.
- RAC Control
  - Select: Assign which contact input channel (IN1/IN2) of IPSM/IPBX-2C20 will be used for channel selection of RAC 5/8 (including the sources from NET1).
  - Level (dB): Either set a fixed level for an assigned source channel or control the level with the rotary knob of RAC 5/8, see How-to: Use RAC for music/source selection and level control for

details.

- Buffer

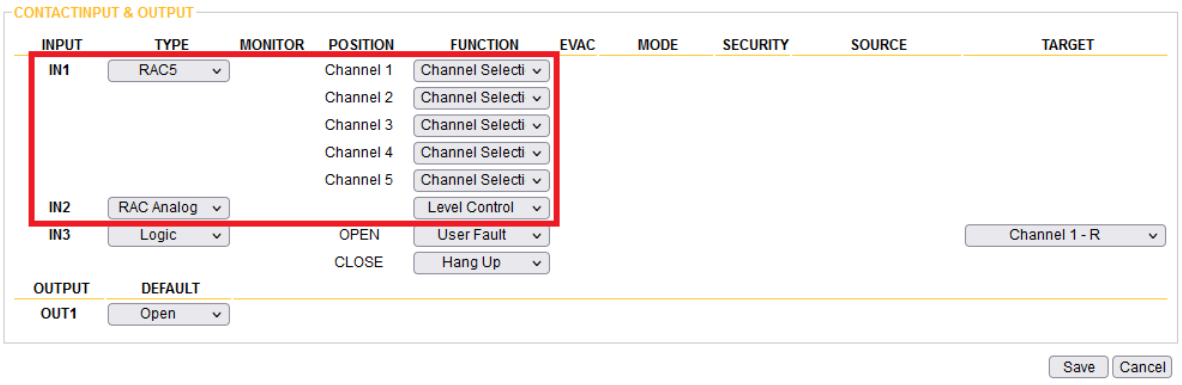
  Set the buffer time (by second) before the receiving input sources. This function will be particularly helpful for a Terracom system which multiple Terracom devices are located in different area and lots of network switches are connected, this will cause a delay time for audio transmission for the devices located at remote area, then please set the Buffer in longer delay time. If user wants to play the message audio in real-time for example, please set [RT] Buffer.



- NET IN
  The setting of source 1~8.
- Mode
  Choose a received type of network stream (Stream UDP or SHOUTcast/Icecast) on Source 1~Source 8.
- Stream UDP
  The IGMP setting of [IP ADDRESS] and [PORT].
- NET1 and 2
  Assign a RAC 5/8 and its channel, and use this RAC 5/8 to switch the network stream source (Source 1~Source 8).

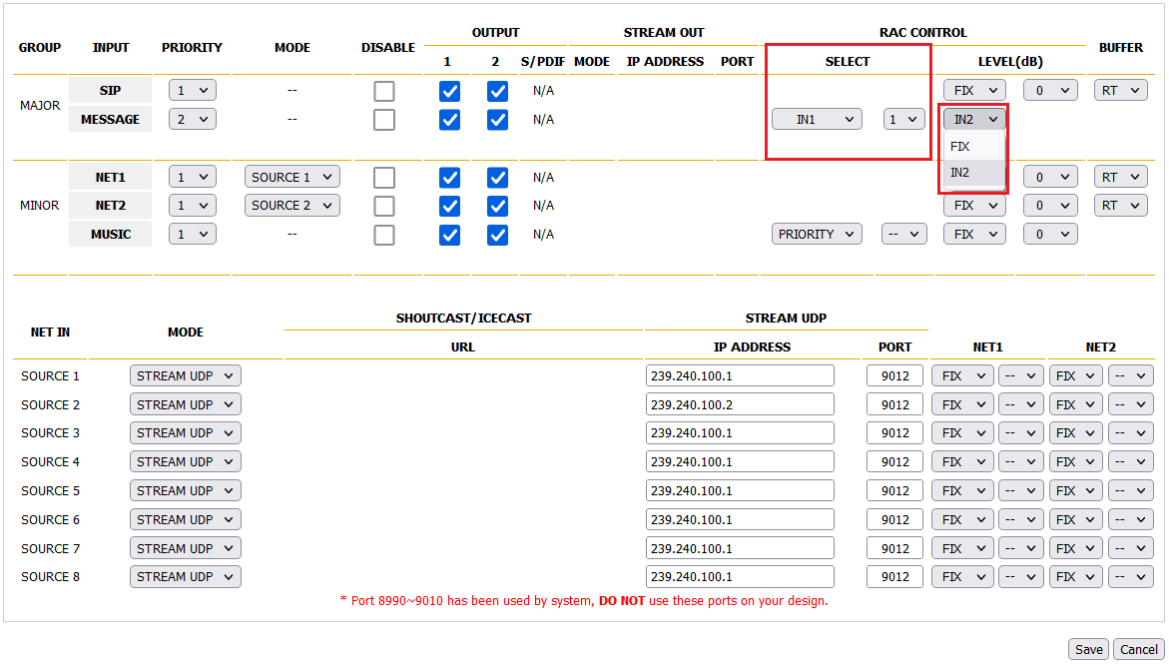
4.4.4.1 How-to: Use RAC for music/source selection and level control

Go to [I/O Control] window and select a [RAC 5/8] for channel selection, and select [RAC Analog] for controlling the source level which is currently playing. Here we assign the [Channel Select] to IN1 and [Level Control] to IN2.



IN1~3 indicates as the contact input channel 1~3 on the rear panel of IPSM/IPBX-2C20.

Go to [Audio Matrix] window:

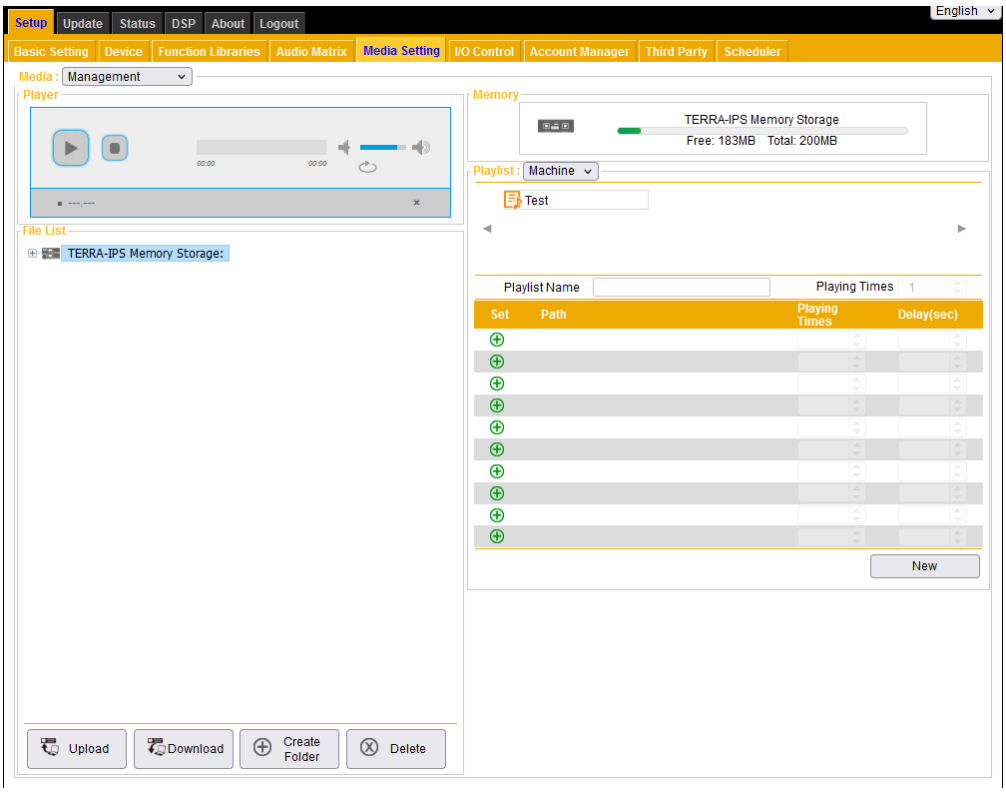


- Select: Assign [IN1] as RAC 5 source selector, and set the five steps of RAC 5 from [SELECT] drop-down box (incl. the sources from NET1).
- Level (dB): Assign [IN2] as RAC's level control knob, and set either a fixed level or control the level by the knob of RAC 5 from [LEVEL] drop-down box.

4.4.5 Media Setting

4.4.5.1 Management

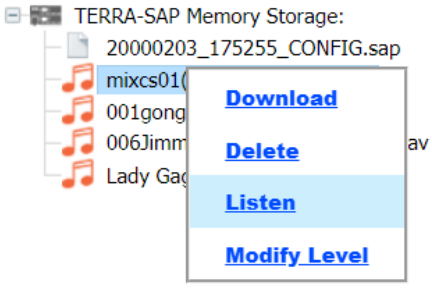
Display all the message files stored in the IPSM/IPBX-2C20 or Micro SD card.



❖ Player

Preview the audio file on your PC

- Select an audio file on File List, and right click the audio file, then click [Listen], see the picture on the right.
- And the audio file will be played automatically on [Player] window.



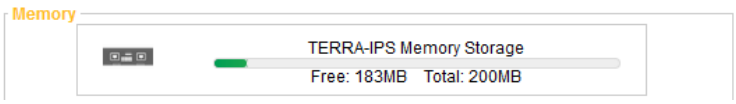
○

Symbol	Function
	Play
	Stop
	Repeat
	Volume adjustment

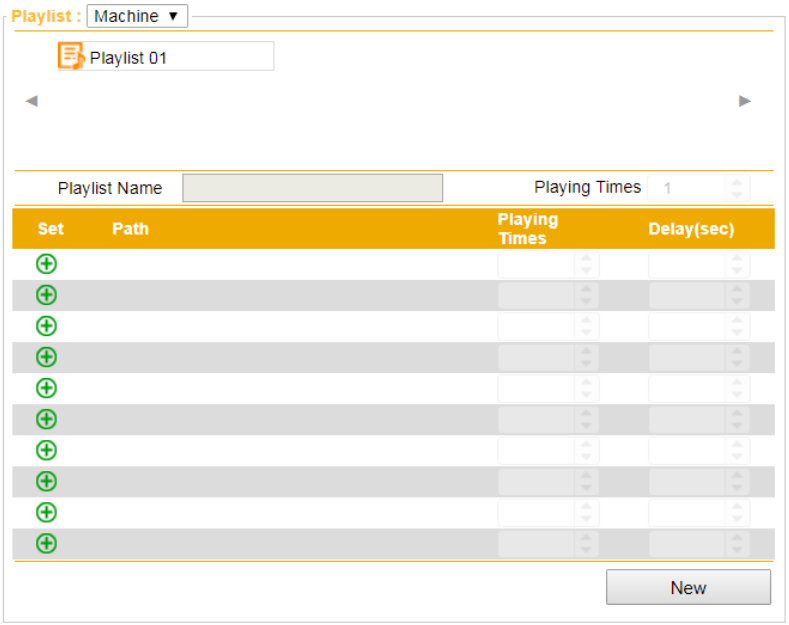
	Click to mute, click to unmute
...	Display the current audio file which is selected from the File List.
✖	Remove the audio file from Player

❖ Memory

Check current memory storage of IPSM/IPBX-2C20 on Media Setting > Management



❖ Playlist



- Playlist name: Rename the selected playlist.
- Playing times: Set the playing times of the selected playlist. The range of playing times is from 1~65535, 65535 indicates to repeat the the playlist endlessly.
- Delay (sec): Set the delay time (sec) for each audio song. If the audio file is set as 5 seconds for delay time, it will delay 5 seconds before playing a next audio file.
- ⊕ Add file into the playlist
- ⊖ Remove file from the playlist
- Select the playlist
- New: Create a new playlist, and set the name and the storage location (Machine/USB) of this playlist.

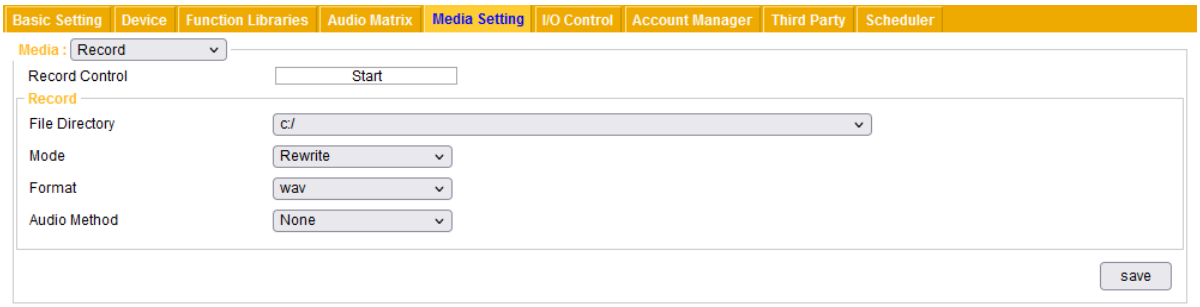
❖ Example of creating a playlist

1. First, click [New] to create a new playlist.

2. Select the audio file you want to have it on your list, the list is located on the left side of the window.
3. Then click ⊕ button to add the audio file in, click ⊖ button to remove it. And click [Save to Machine] button to complete the setting.

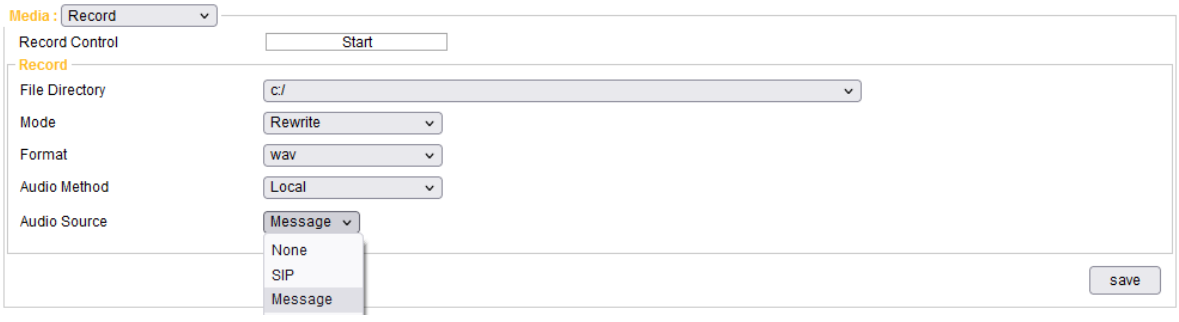
4.4.5.2 Record

Before operating the [Record] function of IPSM/IPBX-2C20, please configure the basic recording settings in this webpage.

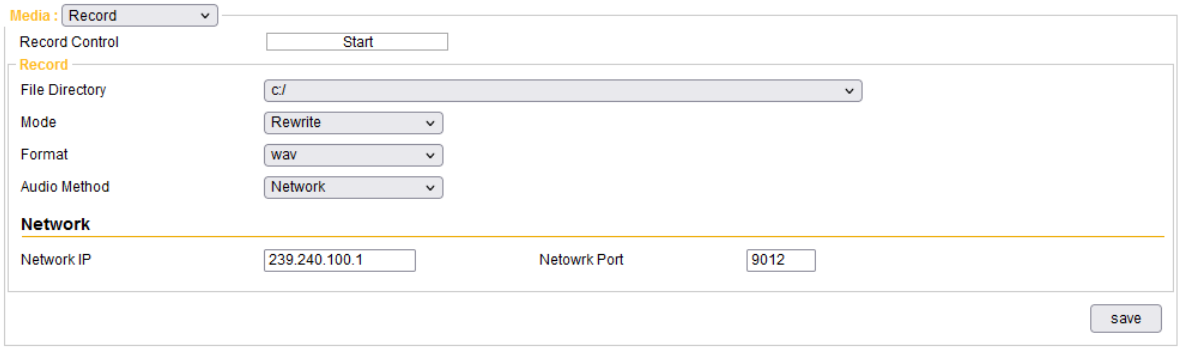


❖ Record Setting

- File directory: The file path where the recorded files will be stored.
- Mode: When the memory storage is not enough, choose either [Rewrite] or [Stop] mode.
  - Rewrite: Rewrite the file from the first recorded file when the memory storage is full. If there are no other recorded files which can be deleted, the recording will be stopped.
  - Stop: Stop recording if the memory storage is full.
- Format: Choose which audio codec (Wav or MP3) the recorded file will be saved as.
- Audio method: Choose the audio source of recorded file either from [Local] IPSM/IPBX-2C20 or [Network].

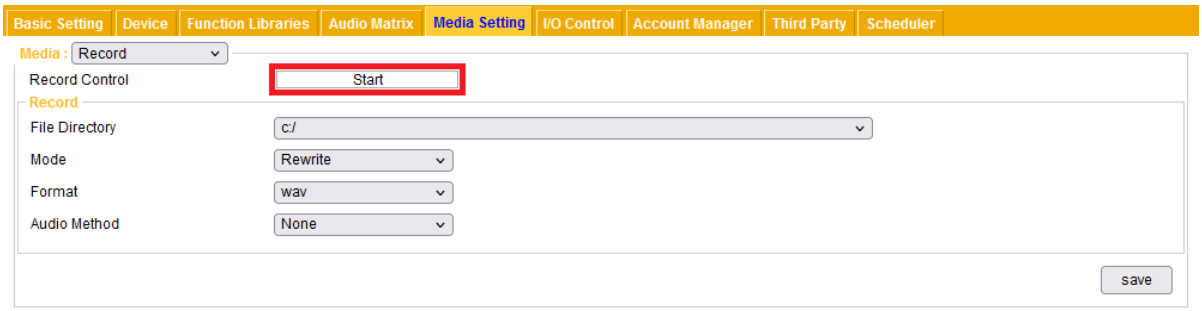


- Network: Record the audio source from the network. Please set the [Network IP address] and [Network Port].

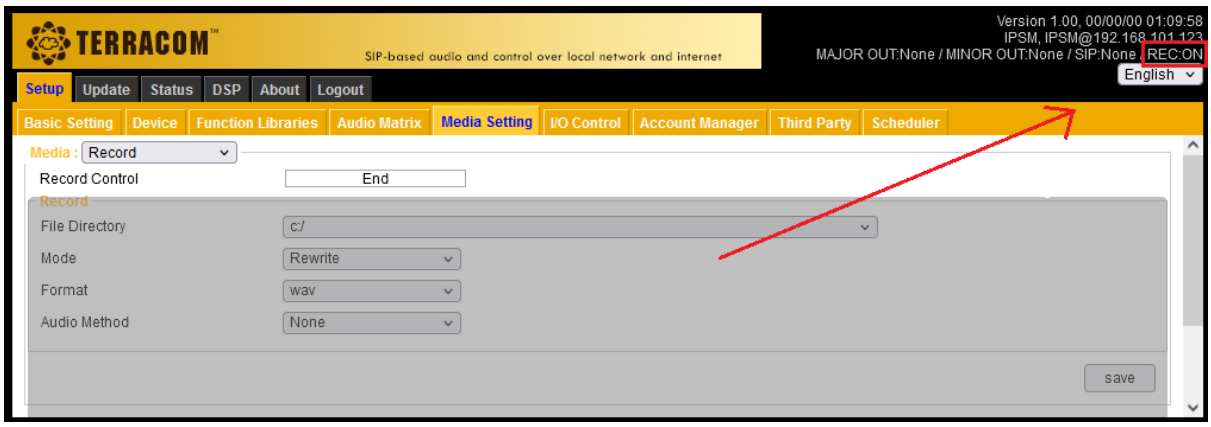


❖Record action

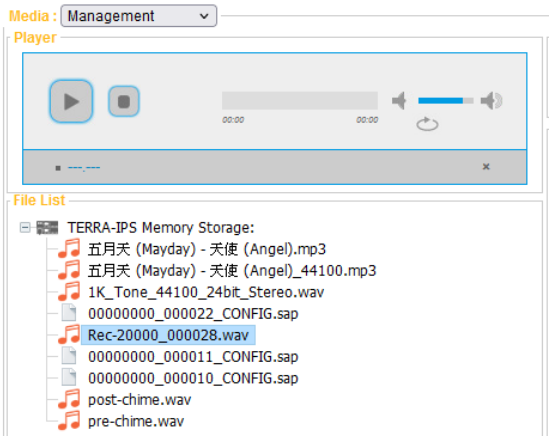
- Start: Click this button to start recording.



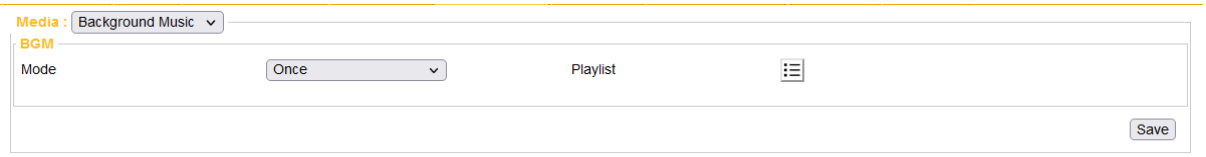
- The [REC ON] status will be shown on the top-right corner during recording.



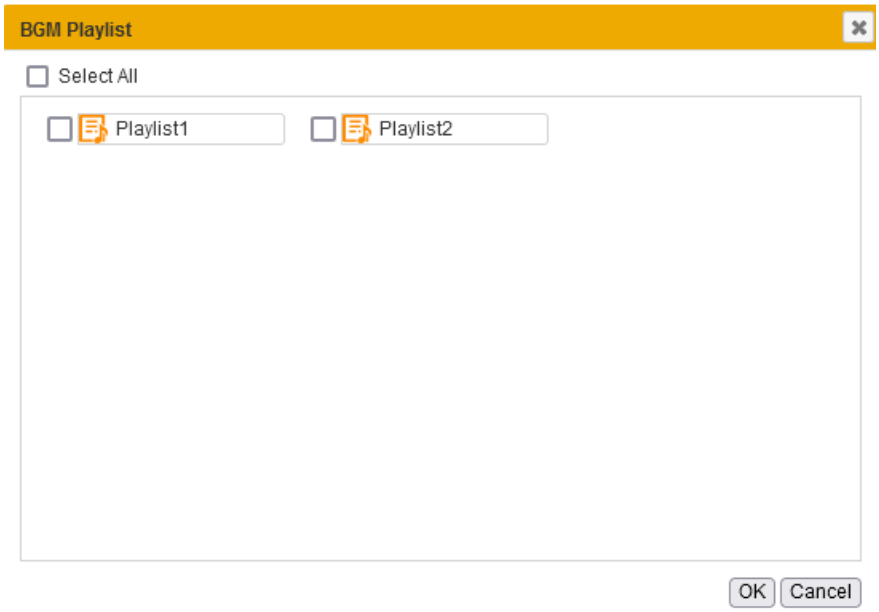
- End: Click this button to stop recording. Then the recorded file will be listed on Media Setting > Management. See the picture as below.



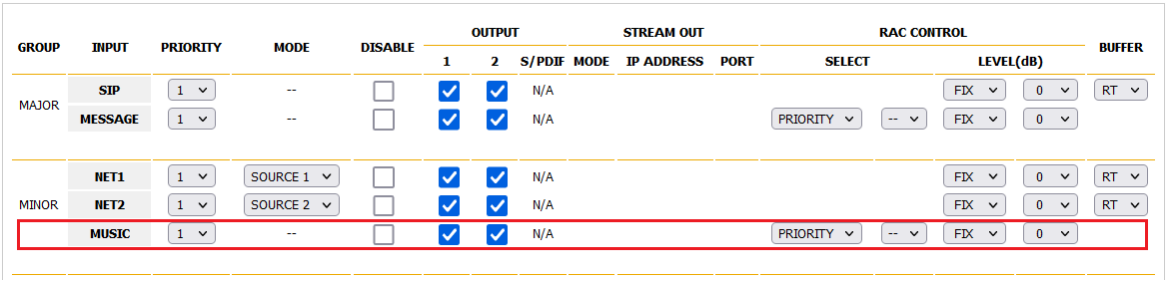
4.4.5.3 Background Music



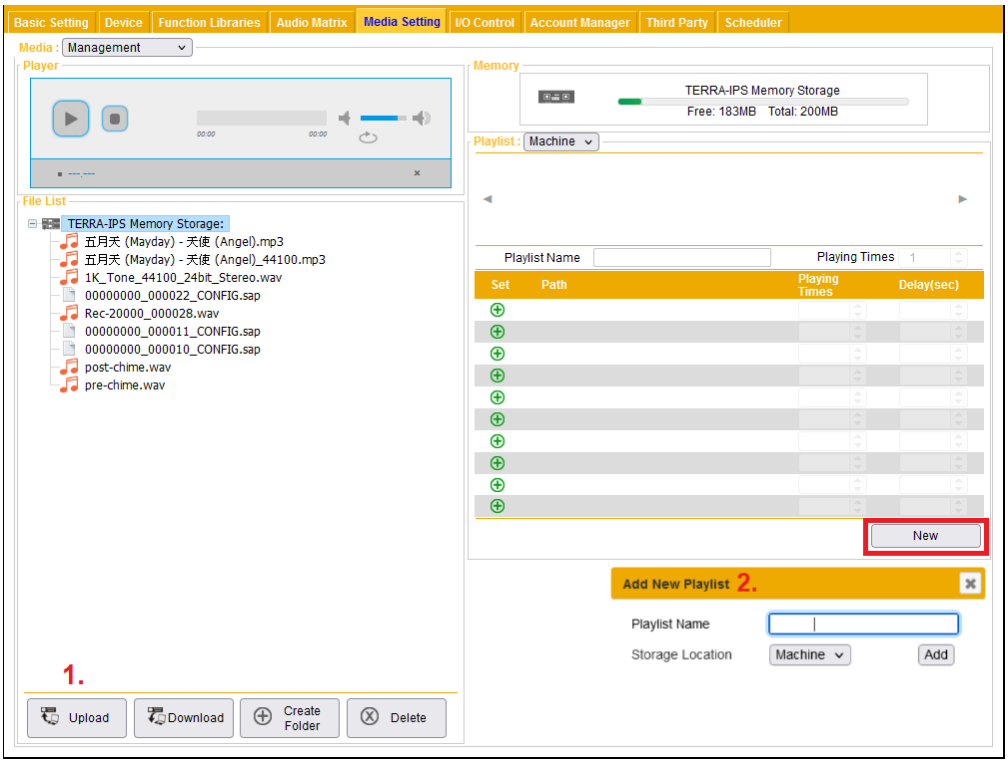
- Mode: The play mode of playlist.
  - Once: Play all the audio files which are added in [Playlist] setting once.
  - Repeat All: Play the audio files which are added in [Playlist] setting repeatedly in order.
  - Shuffle: Play the audio files which are added in [Playlist] setting randomly.
- Playlist: Click to choose the playlist(s) you wish to be played.
- Tick the checkbox of the playlist(s) that user would play.



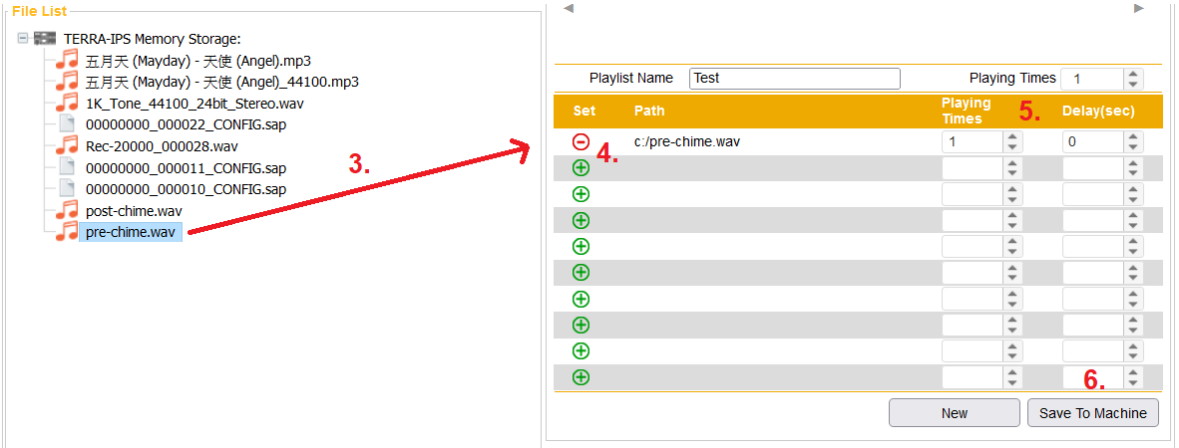
- Please go to [Audio Matrix] window, and set the priority.



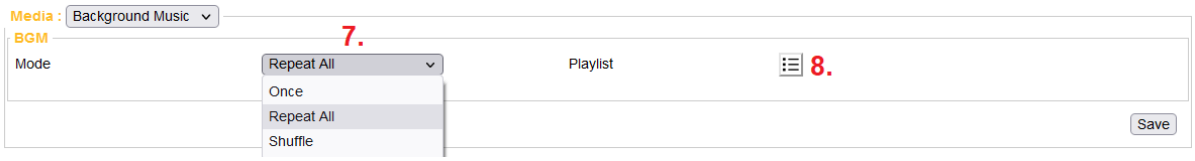
4.4.5.4 Add Audio Files/Creat playlist for BGM



1. Click [Upload] to browse an audio file, and upload it into IPSM/IPBX-2C20.
2. To create a new playlist, click [New] to add a new playlist first.

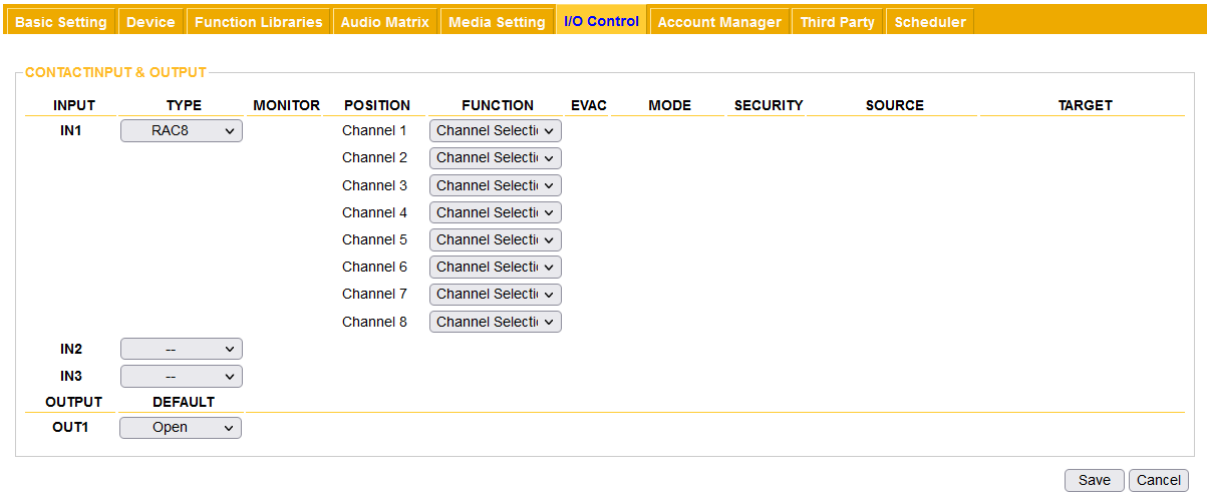


3. Select the audio file you want to have it on your list, the list is located on the left side of the window.
4. Then click ⊕ button to add the audio file in, click ⊖ button to remove it.
5. Set the [Plying Time] and [Delay(sec)] of the list.
6. Click [Save to Machine] button to complete the setting.



7. Choose the play mode (play once/repeat/random) and play target setting (internal/external/detect by external). For example, set [Repeat All] mode for BGM playing.
8. Click ☰ to choose one or multiple playlists as the BGM source.

4.4.6 I/O Control



❖ Contact Input

- Input: The contact input which will be used for triggering an action, IN1 means contact input channel 1. IN1 have the function of monitoring.
- Type: Choose the type of interface which will be used for controlling the action, including logic and remote device (RAC 5/8, RAC Analog and Logic switch).
  - Logic: Switching between "open" and "close" situations.
  - Logic-Click: Single click button that without "on" and "off" function.
- Position:
- Function: Select a function from the drop-down list, see the table as below.

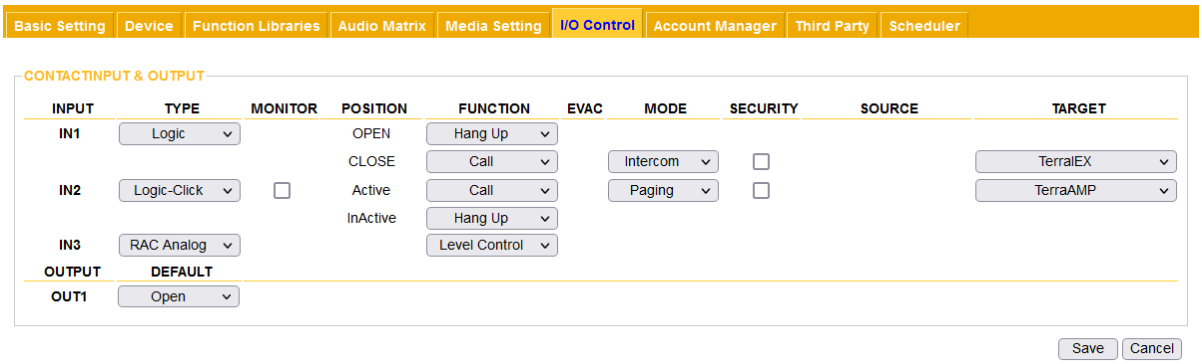
Function
Call
Message Call
Hang Up

Function
Message Play
Message Stop
Contact Out
Command (String)
Multi Function
Record
User Fault
DSP Element Adjust
Music Play
Music Stop

❖ Contact Output

- Output: The relay contact output of IPSM/IPBX-2C20, it can be programmed to open or close the contact to an external device.
- Default: Set the default state (open or close) of logic relay outputs after the TERRA-SAP is powered.

4.4.6.1 Call/Hang Up



- Call (Intercom/Paging)

  Proceed intercom or paging call by using the connected contact inputs of IPSM/ IPBX-2C20 to a chosen TERRACOM device target when closing or activating the logic switch .

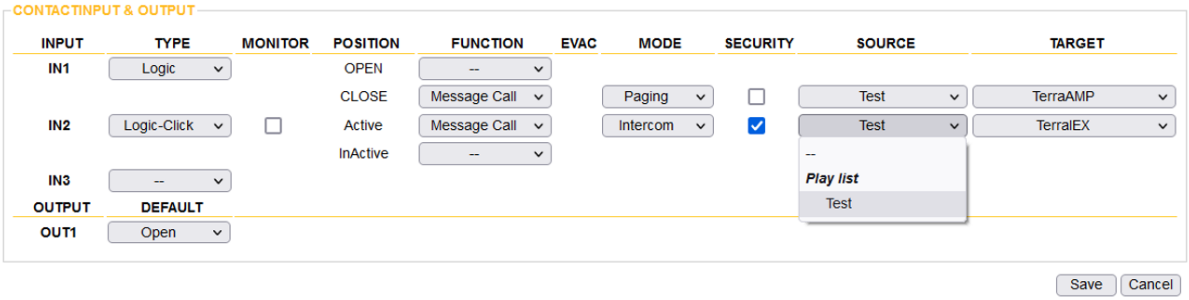
- Hang Up

  Hang up the intercom and paging call by opening or inactivating the logic switch .

- Security

  If the [Security] option is enable, the caller cannot hang up the call during paging unless the call receiver cancels the call itself.

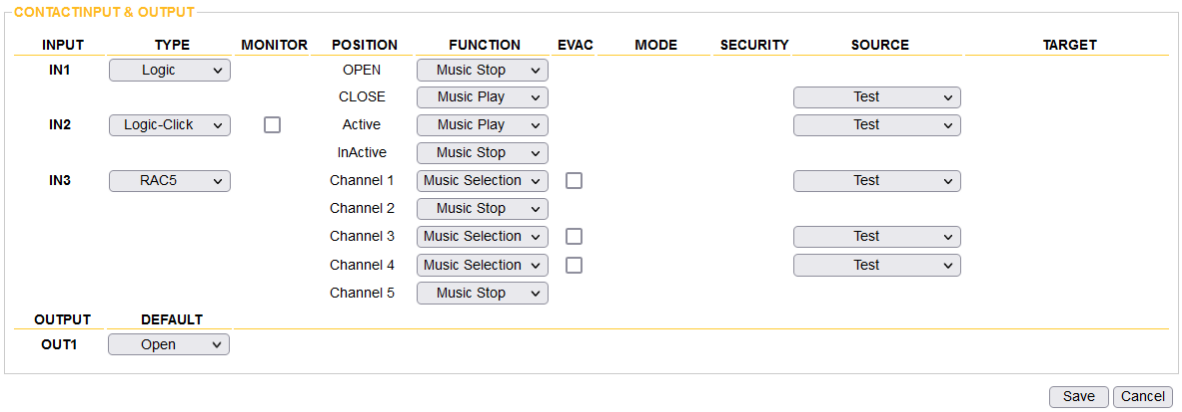
4.4.6.2 Message Call



The Message Call action allows to play the messages directly to a chosen TERRACOM device target when closing or activating the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20.

- Stop the message call
  Open or inactive the logic switch.
- Source
  Select the playlist source which user have created on Setup 1 > Media Setting > Management.

4.4.6.3 Message Play/Stop

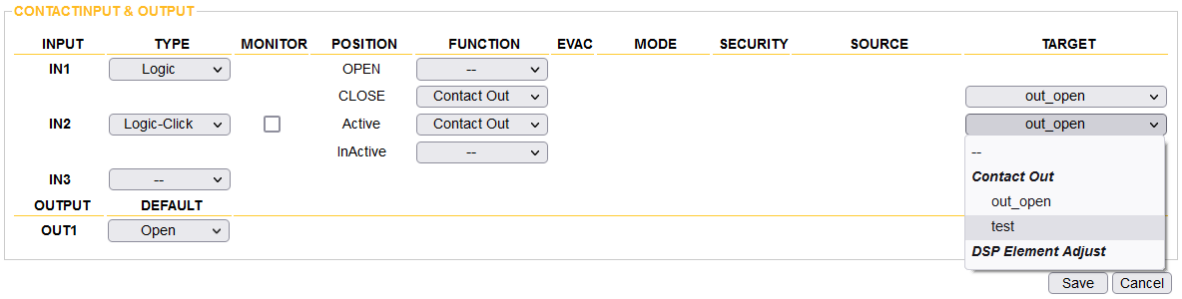


Play the message (important broadcast content, such as fire emergency evacuation message) when closing or activating the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20.

The priority of message always higher than music.

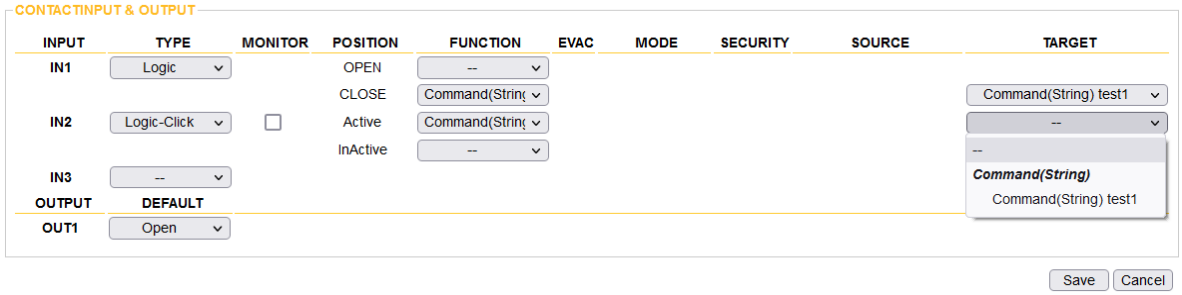
- Source
  Select the playlist source which user has created on Setup 1 > Media Setting > Management.
- EVAC
  When the [EVAC] option of Contact IN1~3 is enabled, the TerraManager software will show the source name on Monitor window > EVAC tab > Status grid. In addition, when the IPSM/IPBX-2C20 is proceeding multiple EVAC paging, **ONLY** the latest EVAC call will be displayed on the EVAC tab of TerraManager software.

4.4.6.4 Contact Out



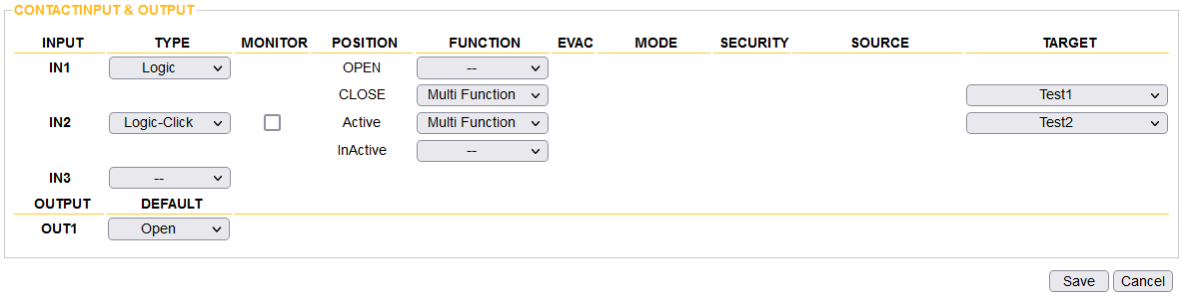
- Program the only one contact output of IPSM/IPBX-2C20 to control the external device with the target that user set on Setup 1 > Function Libraries > Contact Out.
- Close or active the logic switch to trigger the setting.

4.4.6.5 Command(String)



- Send the 3rd party command (string) to the external device with the target that user set on Setup 1 > Function Libraries > Command (String).
- Close or active the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20 to trigger the target.

4.4.6.6 Multi Function

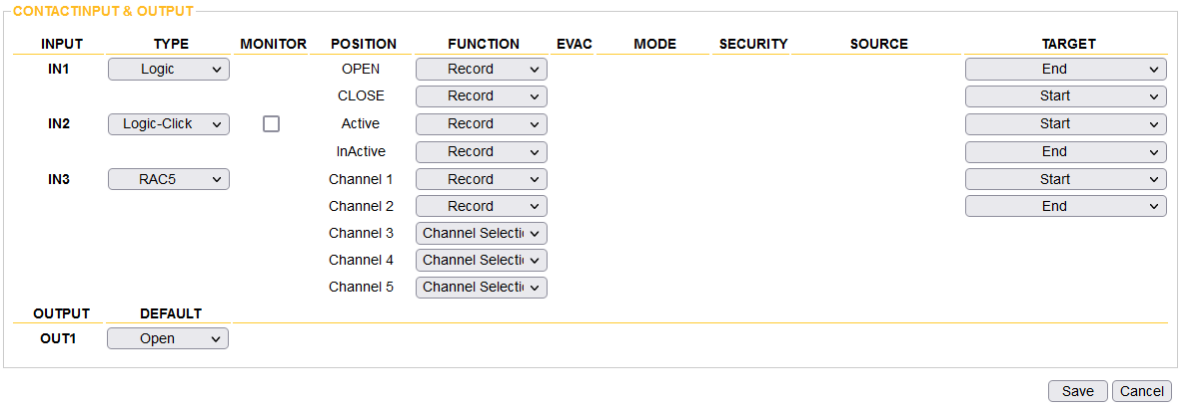


- Trigger a group of action with multiple functions to different devices by closing or activating the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20.
- Close the logic switch to trigger the "Test1" setting of [Multi Function], and active the logic switch to

trigger the "Test2" setting of [Multi Function].

- Target
  Set on Setup 1 > Function Libraries > Multi Function.

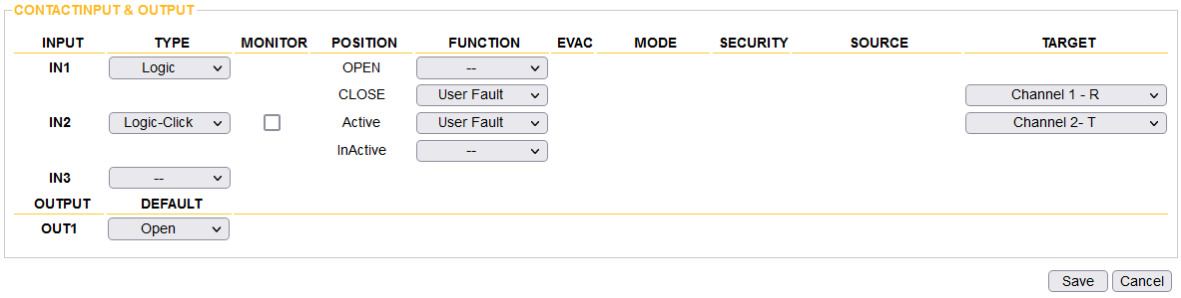
4.4.6.7 Record



- Record the chosen audio source when closing or activating the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20, and switching RAC5 to channel 1 can also do this record action.
- To stop the recording, open or inactivate the logic switch, or switching RAC5 to channel 2.

The chosen audio source (SIP, MESSAGE, LINE IN, USB PC, NETWORK etc.) needs to be programmed on Media Setting > Record webpage first.

4.4.6.8 User Fault

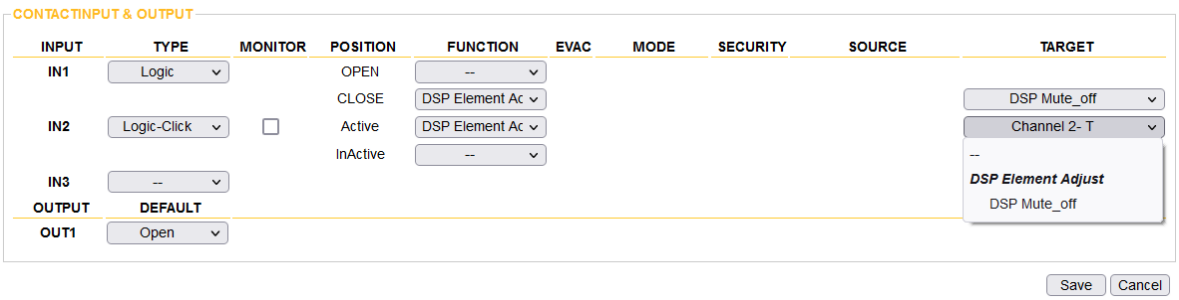


- Assign the [User Fault] to an input source, then select the trigger/release action from [Target] drop-down list.
- The trigger/release action of [User Fault] needs to be configured on Setup 1 > Function Libraries > User Fault first.

Make sure the input source you set on [Function Libraries] window is matched with the settings on

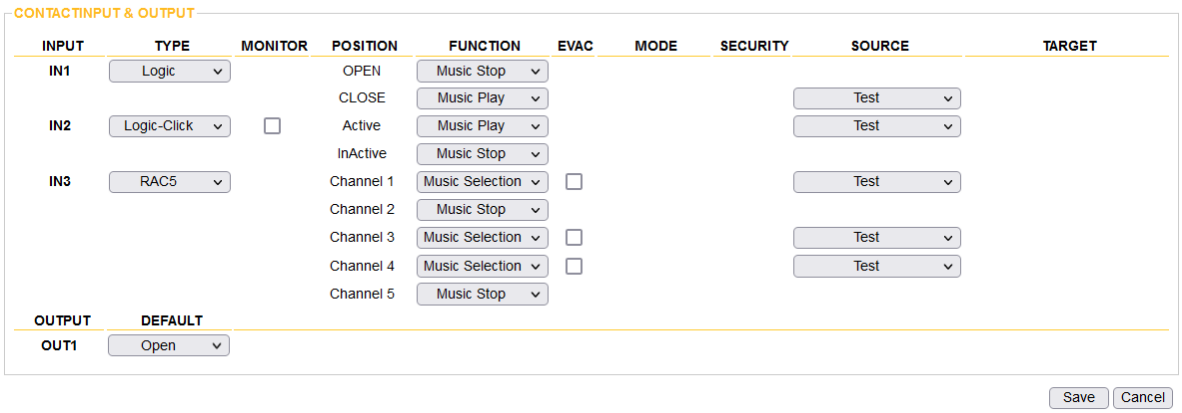
[I/O Control] window.

4.4.6.9 DSP Element Adjust



- To trigger the action of [DSP Element adjust] setting when closing or activating the logic switch.
- Target
  Select the DSP element adjust action from the target that user have created on Setup 1 > Function Libraries > DSP Element Adjust.

4.4.6.10 Music Play/Stop

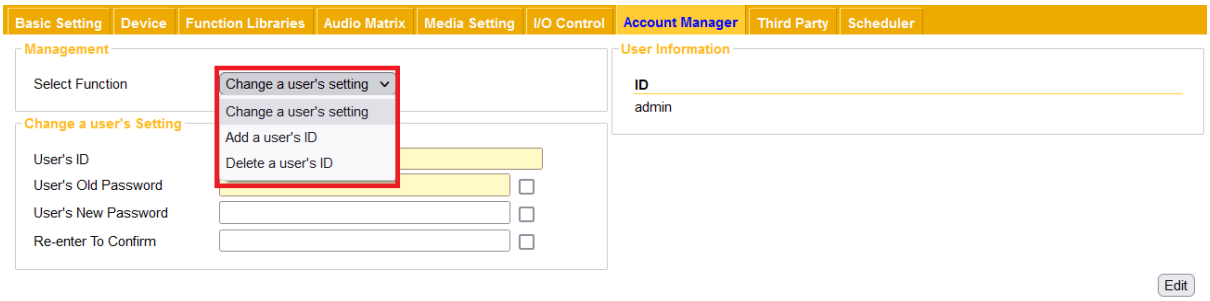


Play the music playlist (ON-state action) when closing or activating the logic switch which have connected to the contact inputs of IPSM/IPBX-2C20.

- RAC5/RAC8
  Set channel 1, 3 and 4 to play next music in the "Test" playlist, and set channel 2 and 5 to stop the music.
- Source
  Select the playlist source which user have created on Setup 1 > Media Setting > Management.

4.4.7 Account Manager

Except the [ADMIN] user ID, multiple sets of user ID can be created in [Account Manager] function, and have access to the IPSM/IPBX-2C20 web browser.



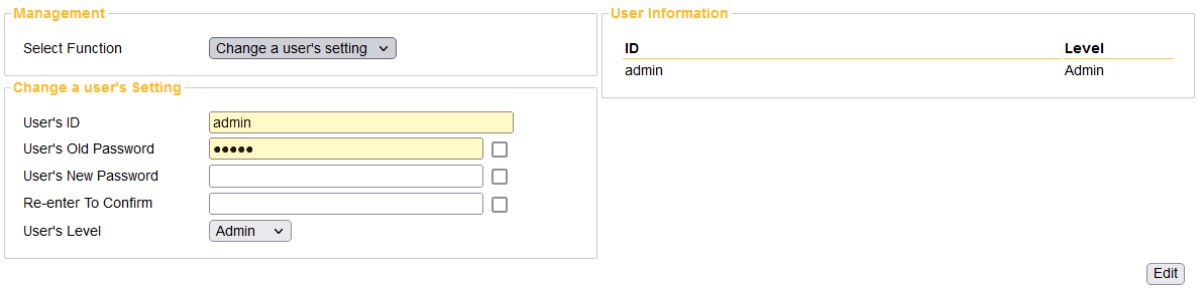
❖ Three functions of account management

1. Change a user's setting
2. Add a user's ID
3. Delete a user's ID

The default [User Name] is admin and its [Password] is admin. The admin user ID cannot be deleted, but its password can be user-defined.

❖ Change a user's setting-password

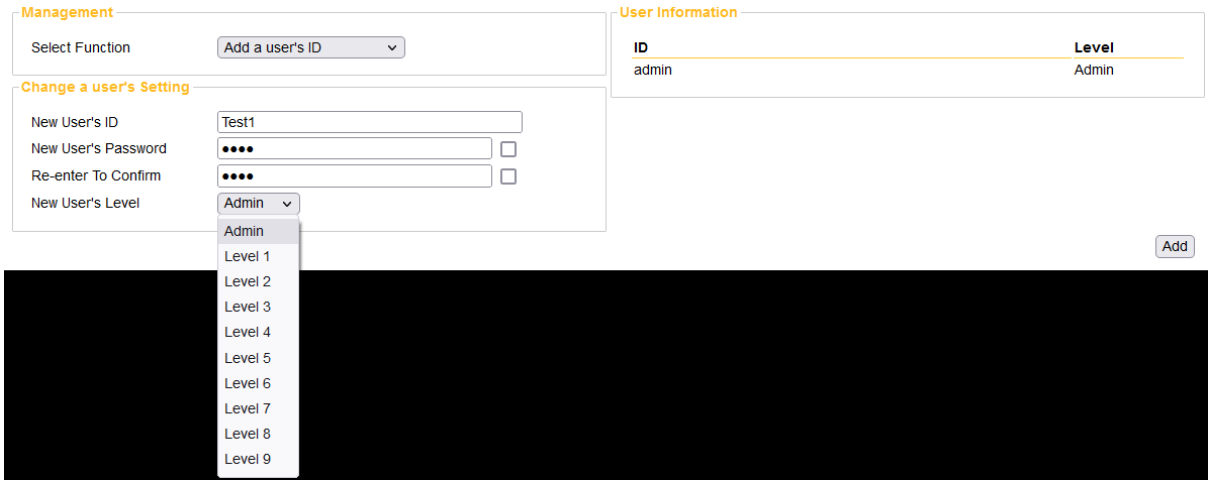
Select the user ID which user gonna change, type in new password and click [Edit] button.



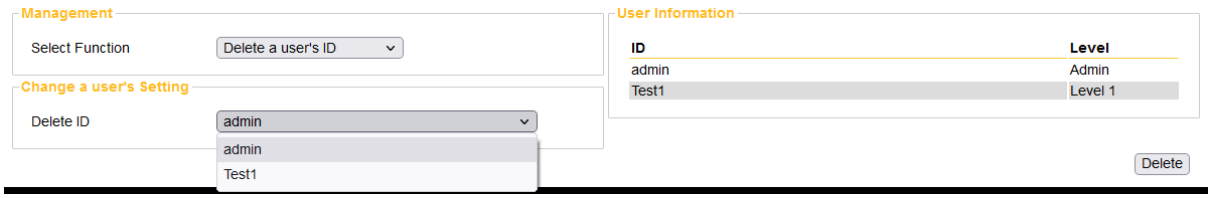
❖ Add a user's ID

Enter the User ID and the password, and choose the access level of new account, then finish the steps by clicking [Add] button.

- The password must contain at least one number or letter, and cannot leave blank on password field.
- Letters are case sensitive.



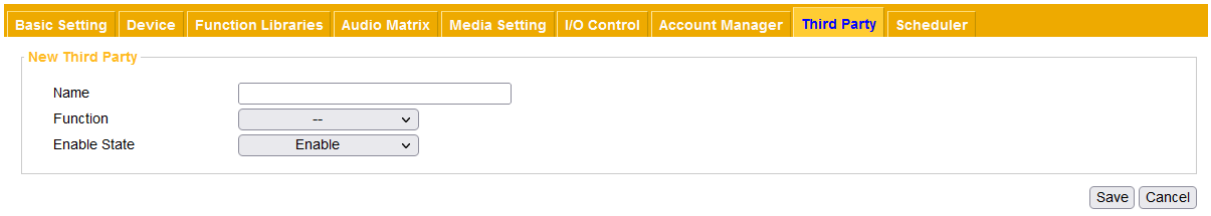
❖ Delete a user's ID
Select the ID that to be deleted from the drop-down options.



4.4.8 Third Party

Set the 3rd party commend to allow other devices to control the IPSM/IPBX-2C20.

Please enable [Network Controls Service] and set [+Network Port] on Steup1 > Basic Setting > Third Party Controls first.



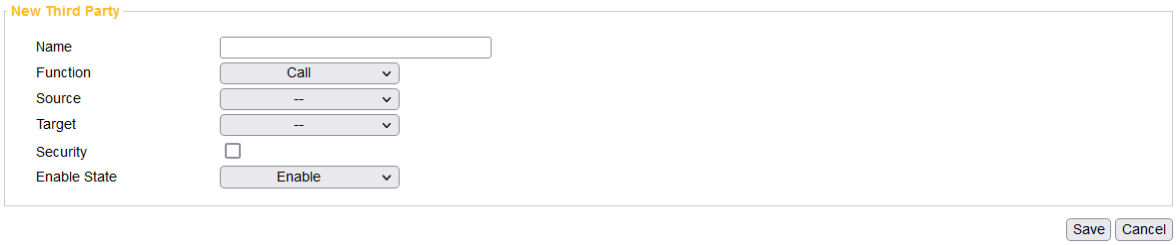
- Name: The [Name] field is the command string for triggering an action via 3rd party control.
- Function

Function
Call
Hang Up
DSP Element Adjust

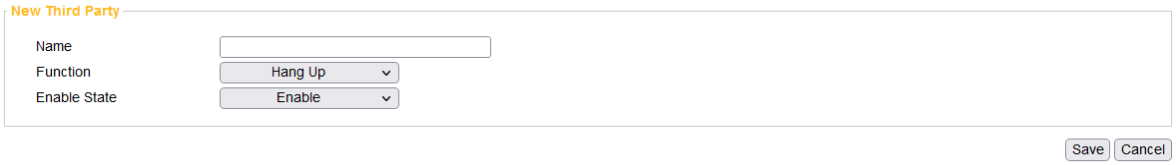
Function
DSP Element Read
Net Stream 1 Select
Net Stream 2 Select
Record

- Enable State: To enable or disable this 3rd party command. If this field is set disable, the Terracom device will not execute the function even receives the command.

4.4.8.1 Call/Hang Up

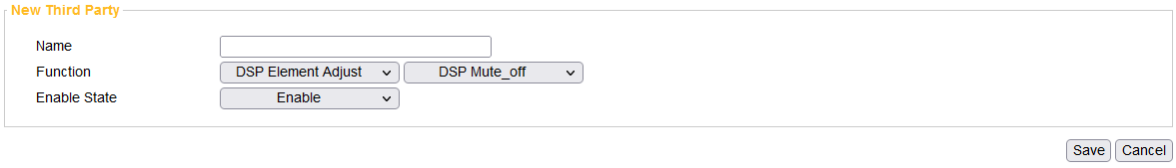


- Call
  - Source: The analog input source of MIC sound.
  - Target: The device that controlled by 3rd party device.
  - Security: Mechanism that cannot be rejected and hang up.



- Hang up
  Set the 3rd party commend to let target hang up the call.

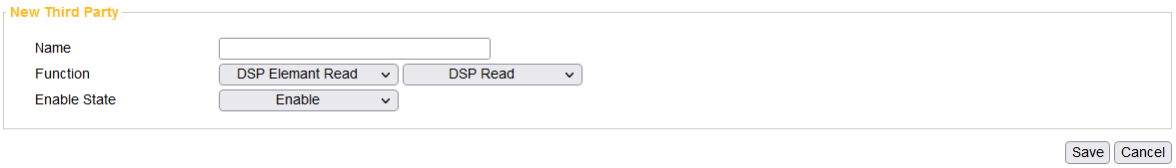
4.4.8.2 DSP Element Adjust



Make the 3rd party device to send the action command of [DSP Element Adjust] to the IPSM/IPBX-2C20.

The action was set by the user from Setup > Function Libraries > DSP Element Adjust.

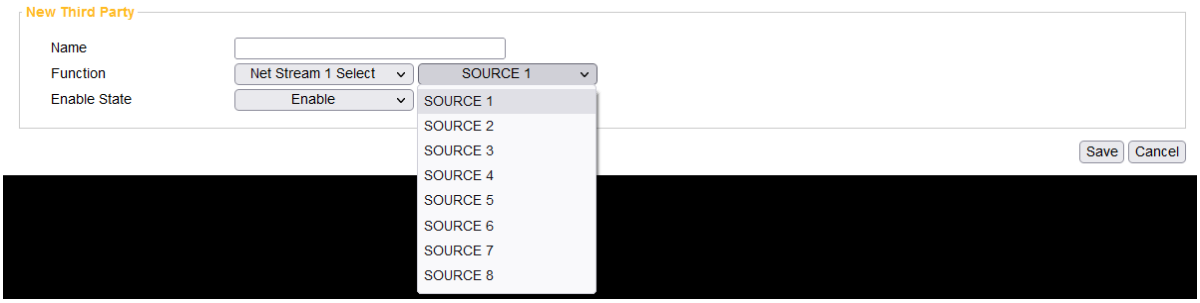
4.4.8.3 DSP Element Read



Make the 3rd party device to send the action command of [DSP Element Reas] to the IPSM/IPBX-2C20.

The action was set by the user from Setup > Function Libraries > DSP Element Read.

4.4.8.4 Net Stream Select



Set the 3rd party commend, and choose to receive the network audio stream. Every Terracom device provides 8 sets of [SOURCE], the setting of every [SOURCE] can be configured on Setup1 > Audio Matrix.

- Command

  Choose the Network that receiving from [Net Stream 1] or [Net Stream 2], and to recognize which audio stream source (channel 1~8) in a quicker way, please send string:n-c commend string behind the [Name] string.

Command	Meaning	Range
:n-c	n indicates the number of network (NET)	1~2
	c indicates the source channel	1~8

- Command - Net Stream Select

  If user would record the chosen audio source, please send the commend string (Name). The IPSM/IPBX-2C20 device will send back in ASCII code as below.

  - 200 (ASCII Code) indicates OK (received).
  - 400 (ASCII Code) indicates NG (the 3rd party command sent from 3rd party device is not the same as [Name] field).

- Example

  If users do not wish to send the 3rd party commend from [NET 1 SOURCE 1~8] and [NET 2 SOURCE 1~8] one by one, send string:n-c command string.

- Assume the value of Name is "TARGET".
- To choose to receive the [NET 2 SOURCE 7], the command string is TARGET:2-7.

4.4.8.5 Record

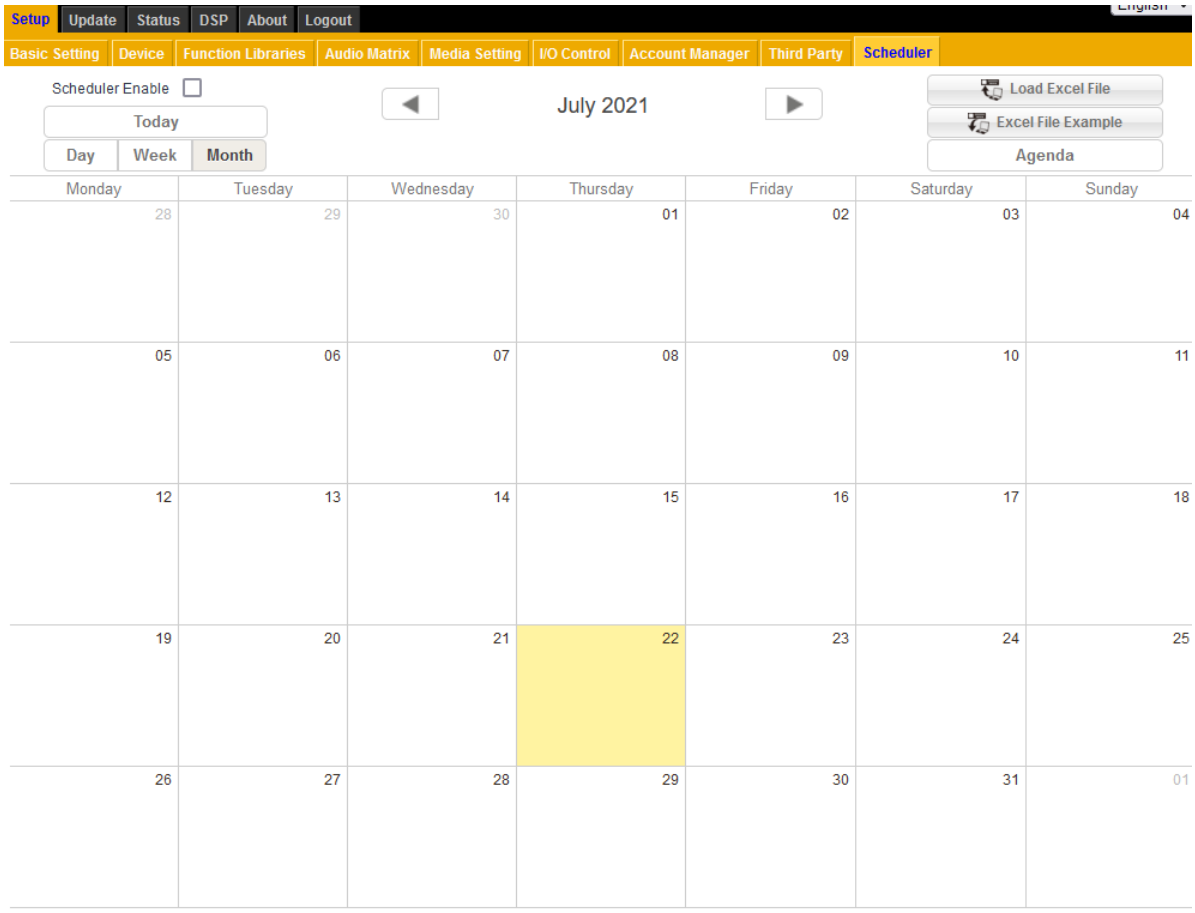
Set the 3rd party commend to record the chosen audio source (SIP, MESSAGE, NETWORK, etc.).

The chosen audio source needs to be programmed on Media Setting > Record webpage first.

- Command - Record Start/Stop
  If user would record the chosen audio source, please send the commend string (Name). The IPSM/ IPBX-2C20 device will send back in ASCII code as below.
  - 200 (ASCII Code) indicates OK (received).
  - 400 (ASCII Code) indicates NG (the 3rd party command sent from 3rd party device is not the same as [Name] field).

4.4.9 Scheduler

The Scheduler allows to schedule the events such as messages playing, commands triggering, etc.

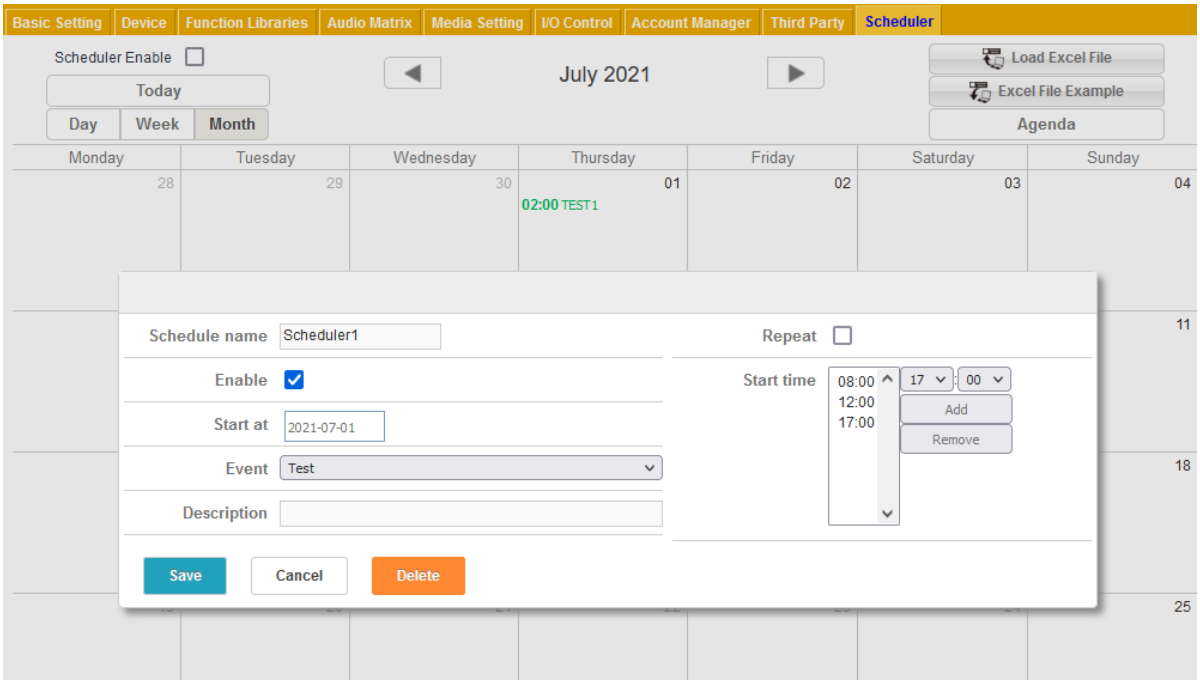


- Scheduler Enable: Tick this checkbox to enable the scheduler function.
- Today: Click to go back to the area which displays today's schedule.
- Day/Week/Month: Choose from the three types of display window template on scheduler. The default window is Month.
- Load Excel File: Click to load an excel sheet with the listed events you want to create on Scheduler.
- Excel File Example: Click to download the excel file of event examples. The listed events must be followed by the order on the excel sheet.
- Agenda: Switch to [Agenda] template for editing schedules

4.4.9.1 Add/Edit/Delete

❖ **Add an event**

Double click the date user would add an event, then the Event window will be opened.

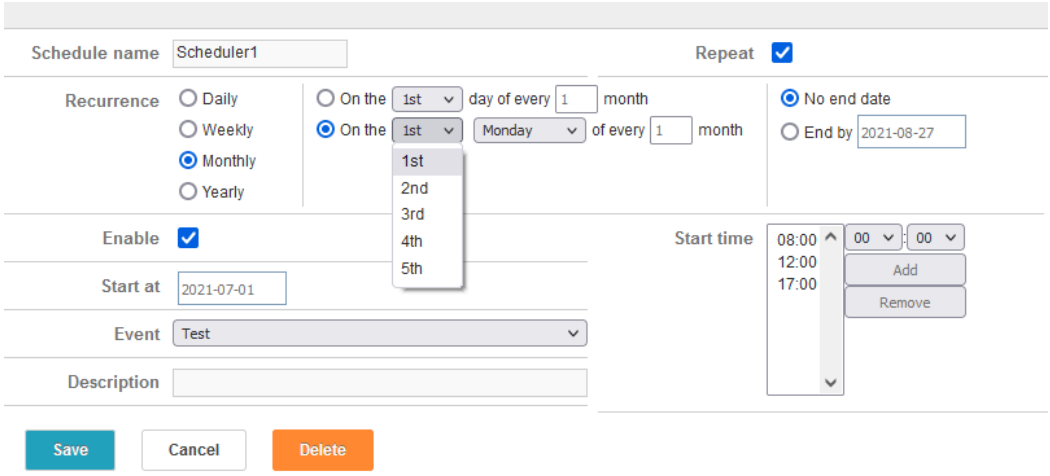


- Enable: Tick this checkbox to enable this event.
- Start at: Click the date to open a calendar window, double check and select a date to start this schedule.
- Event: Display which event is affiliated to the schedule action, see Event for details.

The criteria of the event name and description:

- Event name: Contain a max. number or letter of 40.
- Description: Contain a max. number or letter of 100.

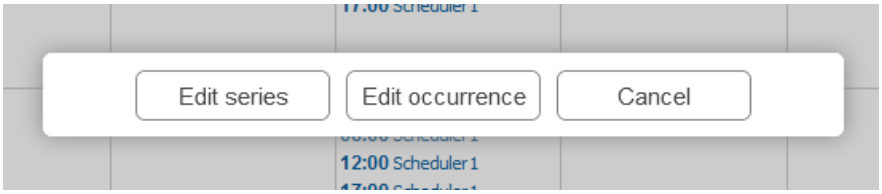
- Description: Memo area.
- Start Time: Set the time and click [Add] button to make an activation time. Select the time and click [Remove] button to delete time. Several time can be scheduled and the format is HH:MM.
- Repeat: Tick this checkbox to enable the [Recurrence] function (repeat event).



- Recurrence event: The event can be repeatable by daily, monthly, weekly and yearly. And, user can set an end date or let the "recurrence" not end.

❖ **Edit the existed event**

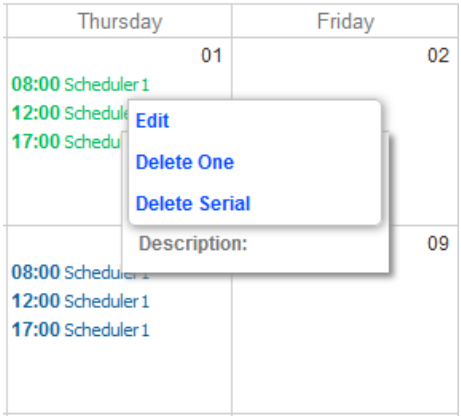
Double click the event that user would modify its parameters.



- Edit series: Edit the date of a series repeated event
- Edit occurrence: Edit the date with the selected event Individually.

❖ **Delete the event**

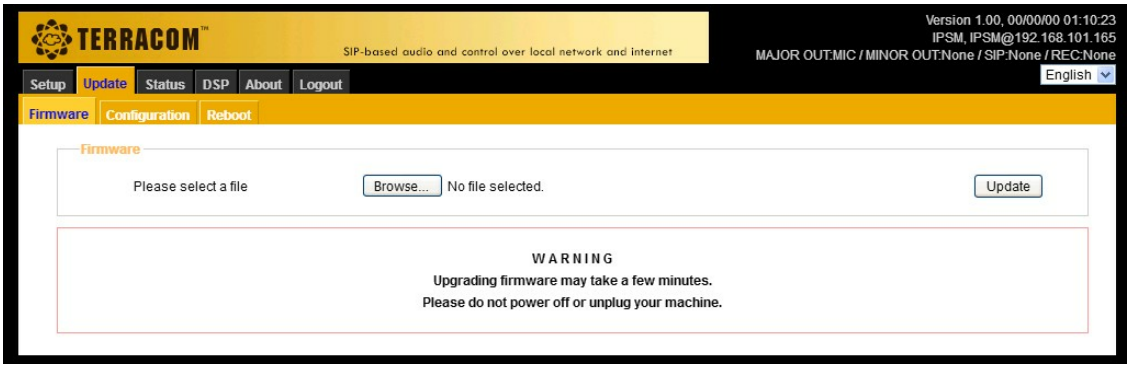
Left click the event for deleting or editing.



- Delete One: Delete one event of one time in the day.
- Delete Serial: Delete whole event in the recurrence situation.

4.5 Update

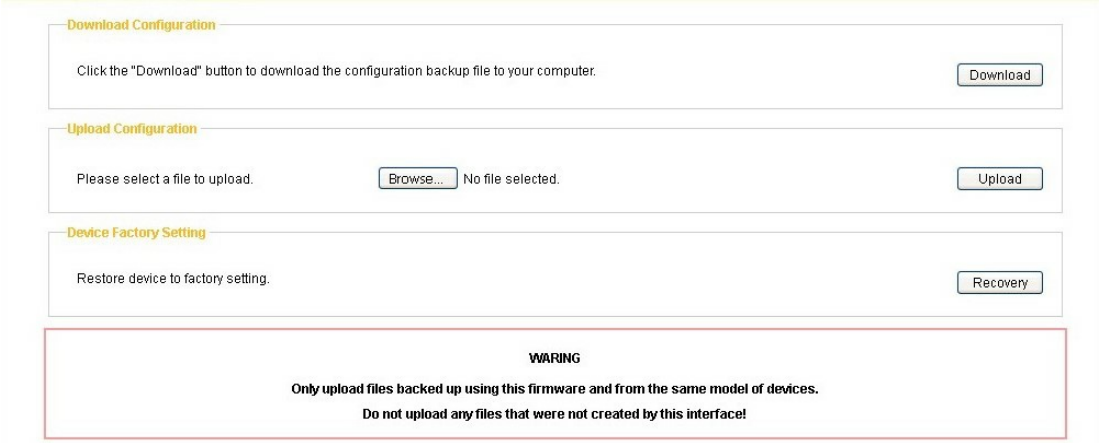
4.5.1 Firmware



Update the IPSM/IPBX-2C20 firmware to the latest version. Follow the steps as below:

1. Click [Browse File...] button to choose the firmware path specified to the one corresponding to the IPSM/IPBX-2C20 device.
2. Click [Update] to proceed this action.
3. At last, click [Reboot] button to apply to the IPSM/IPBX-2C20 device.

4.5.2 Configuration



- Download Configuration: Click [Download] button to download the current configuration file to the selected path of PC/laptop.
- Upload Configuration: Click [Browse File...] button to choose a configuration file from the selected path of PC/laptop, then click [Upload] button to load this configuration file to device.
- Device Factory Setting: Click [Recovery] button to restore the IPSM/IPBX-2C20 to factory setting.

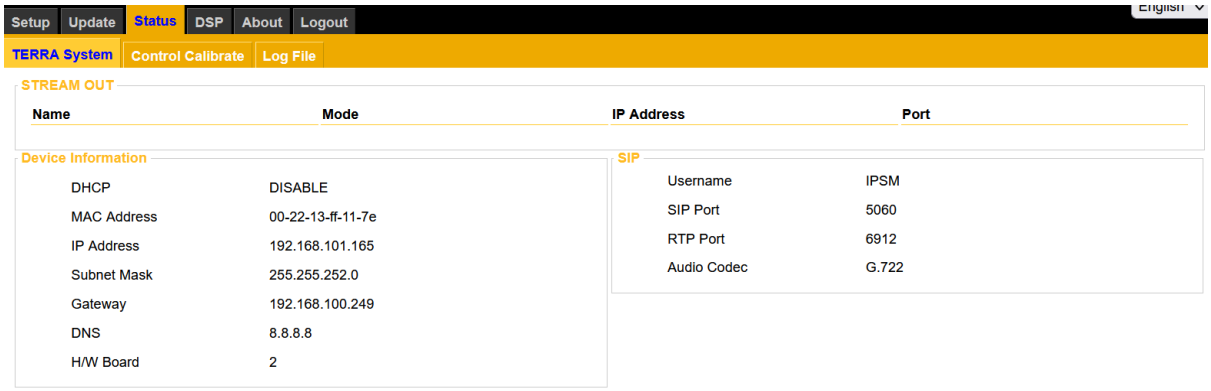
4.5.3 Reboot

Click [Reboot] to reboot the IPSM/IPBX-2C20 device.

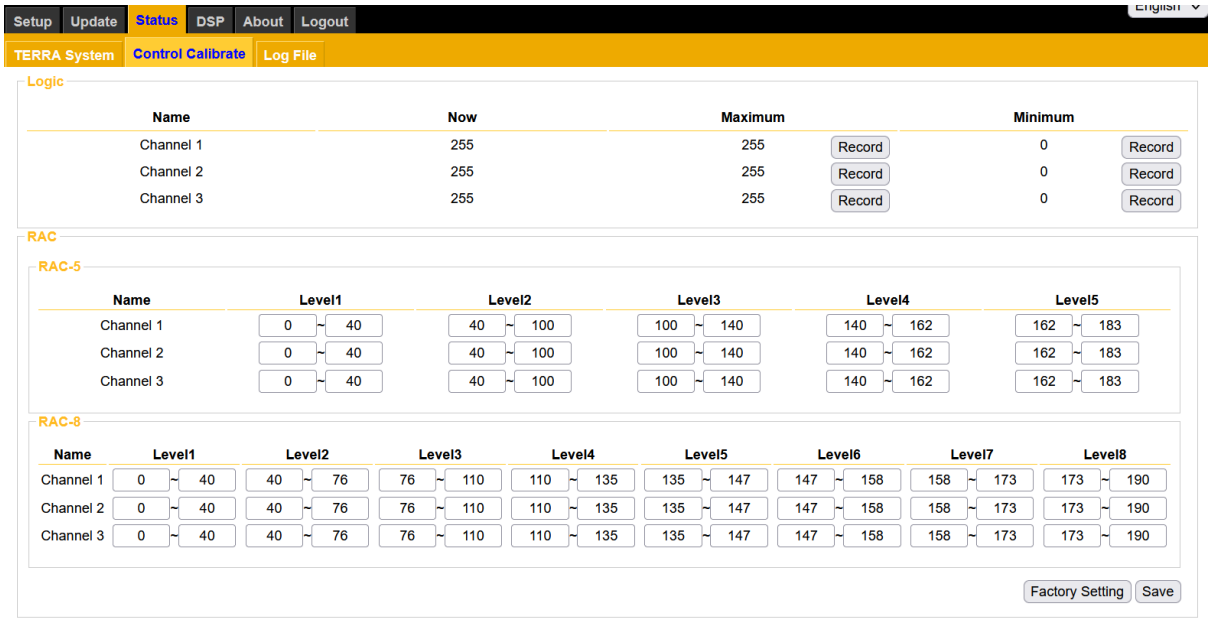
4.6 Status

4.6.1 TERRA System

Display the general information of IPSM/IPBX-2C20.



4.6.2 Control Calibrate



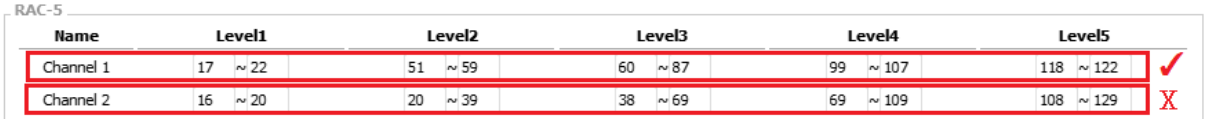
- Logic: Display the calibration result (value between 0~255) of contact input channel on IPSM/IPBX-2C20, it is commonly used for a two-state push button or an analog knob on RAC 5/RAC 8.
  Record: Calibration button of maximum and minimum value.

- RAC: The RAC 5/RAC 8 are the remotes which features the wall-mount volume display and source selection for Terracom system. When the channel selection on RAC 5/8 does not work correctly, the [RAC] calibration function allows users to manually set the range of each level value on RAC 5/RAC 8.

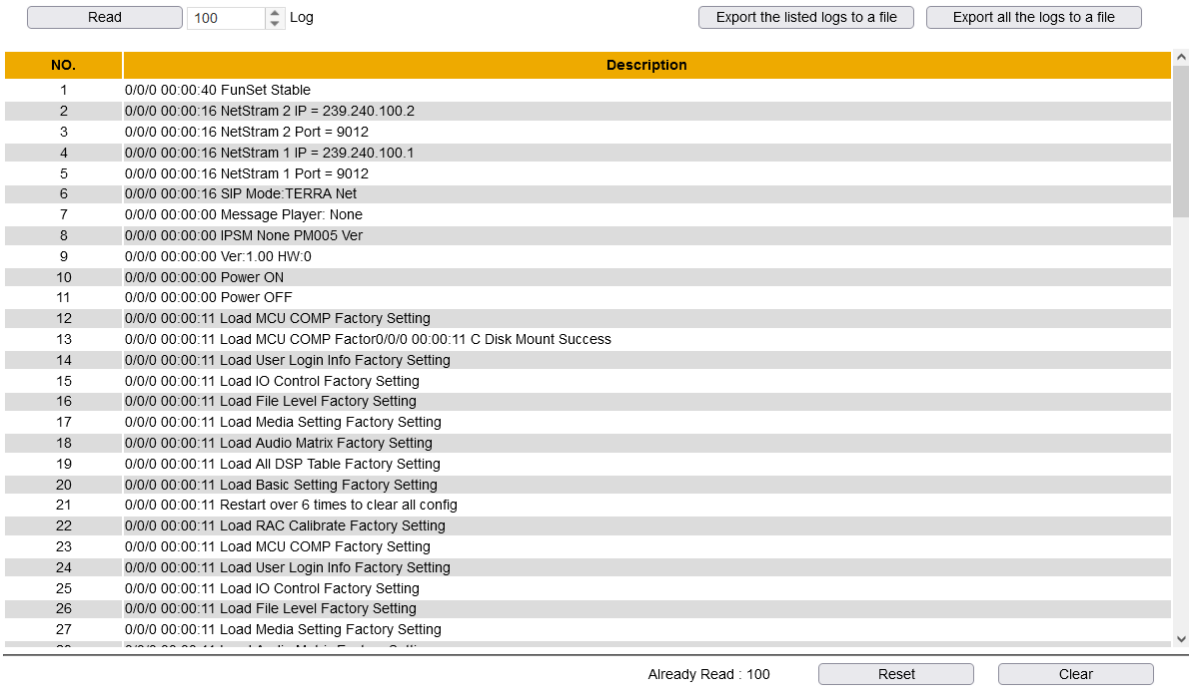
- Factory Setting: Restore to original factory settings.

If the level value are too close or overlap with other level value, please set the value manually. To set the correct values, please see the example picture as below.

- Channel 1: The Level1 (17~22) on Channel 1 does not overlap the Level2 (51~59), and so does other values on Channel 1.
- Channel 2: The Level1 (16~20) on Channel 2 is overlapped the Level2 (20~39), and so does other values on Channel 2, therefore, please adjust the level values again.

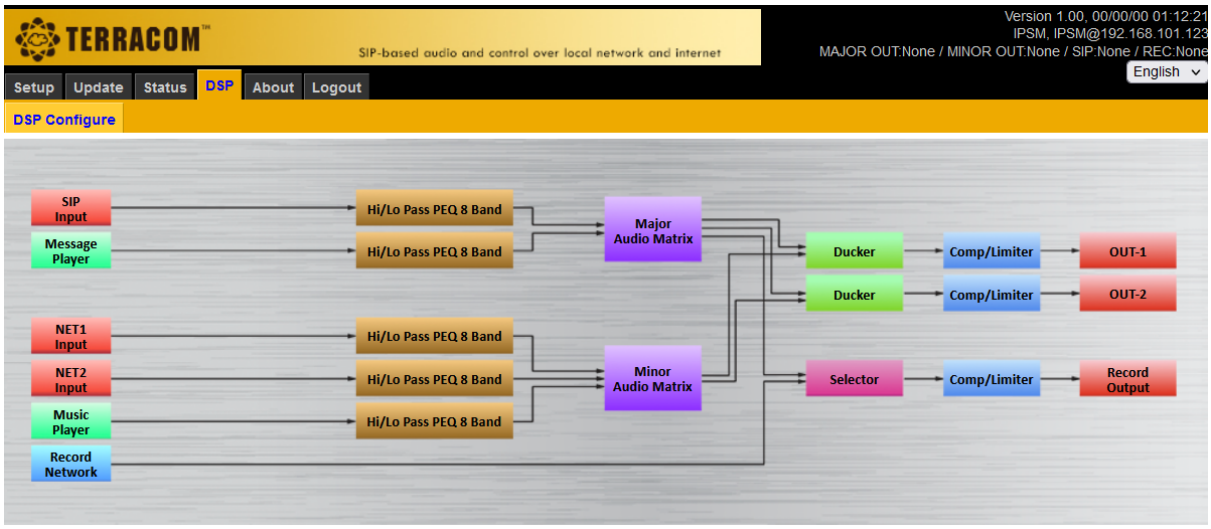


4.6.3 Log File

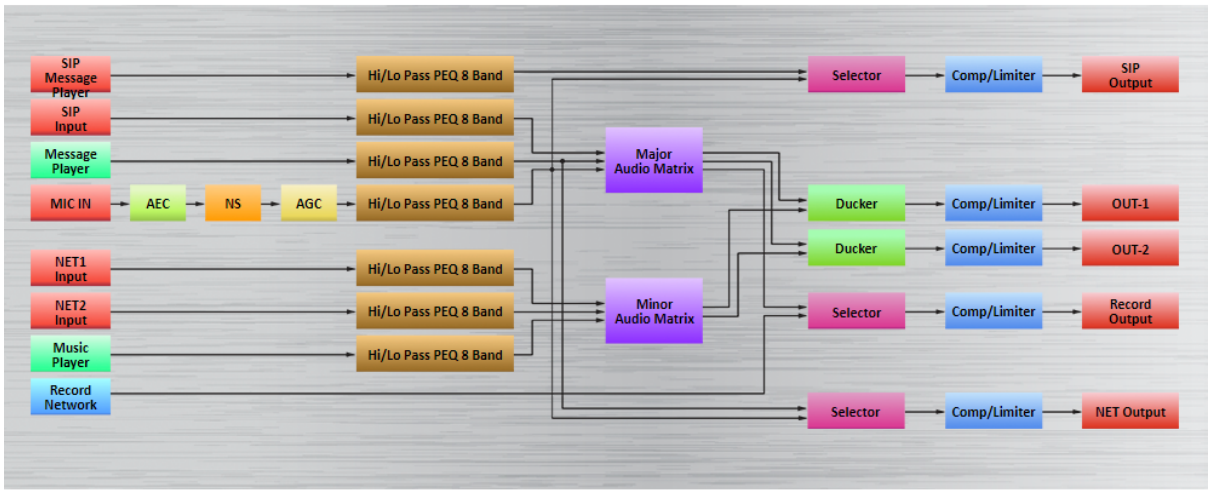


- Read: Click this button to read the logs of device. Click this button again to read the entries of log based on the setting on the right field. For example, if the setting of entries of log is 100, click [Read] button to read from 1 to 100 logs; click [Read] button again, then the list will show 1~200 logs on the list.
- Reset: Click this button to reset the log list. The [Already Read] log will also be reset.
- Clear: Click this button to clear the entries of log displayed on the window. The [Already Read] log will remain from the last [Read] count.
- Export the listed logs to a file: Export the device logs displayed on current log list to a text file.
- Export all the logs to a file: Export all the device logs to a text file.

4.7 DSP Function



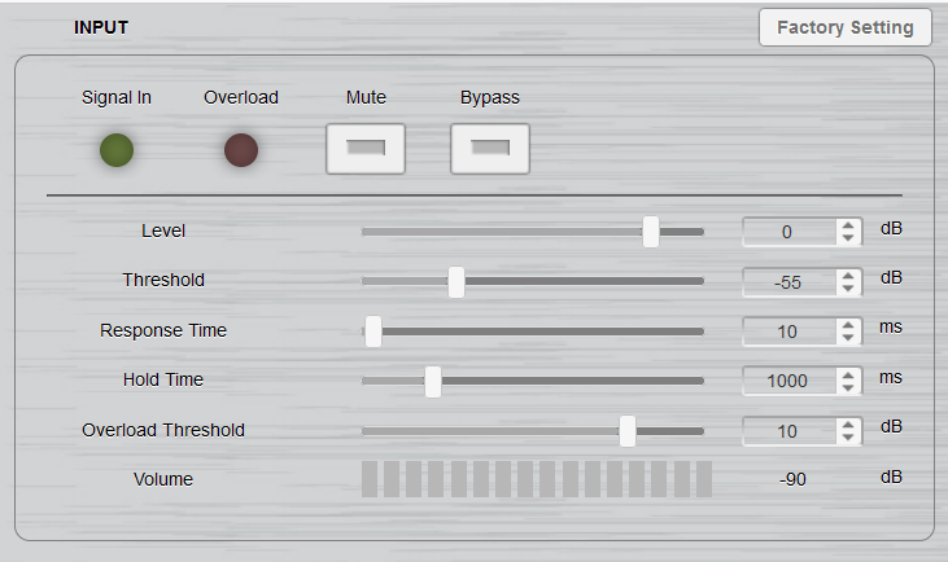
DSP function of IPSM/IPBX-2C20



DSP function of IPSM/IPBX-2C20 wuth PM005

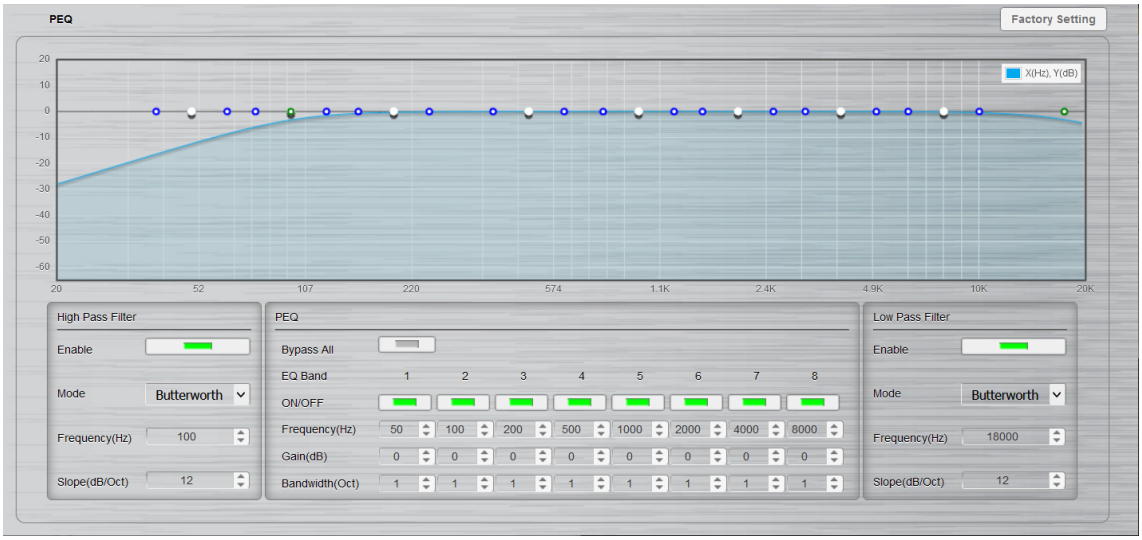
4.7.1 Input

The pop-up control window of the source settings are identical, see as below.



- Signal In: LED light up when the level of mic input is above -30 dB.
- Overload: LED light up when the level of input source is above the Overload Threshold (dB).
- Mute: Mute/unmute the source input, the LED will light in red while the input channel is muted.
- Bypass: Bypass the input signal to the output of Input component, the [Level] setting will be disabled.
- Level (dB): The input level of this source channel/mic channel.
- Threshold: The threshold that user can take it as a standard of pass on audio signal.
- Response Time: The processing time between level detection and sound passing.
- Hold Time: When the sound level is lower than the standard of threshold, the setting of the [Hold time] will define the time to stop transmitting the input audio.
- Overload threshold (dB): This threshold value is to determine the input signal is overloaded or not.
- Volume (dB): Display the real-time volume of input by meter.
- Factory setting: Click to restore all settings to factory default value.

4.7.2 Hi/Lo Pass PEQ 8 Band



This components combines Hi/Low pass filter and PEQ together. It offers a dynamical graphical control window to easily know the overall results.

- Graphical control window

  The parameters which are mentioned above can also be adjusted by a graphical control window. Once the parameters change, the graph will move together, and vice versa. It will show the result for the parameters.

  - Axis-X: Frequency of output signal (Hz).
  - Axis-Y: Level of EQ gain (dB).
  - Blue control point: Adjust bandwidth.
  - White control point: Adjust EQ gain (using vertical direction) and frequency (using horizontal direction).
  - Green control point: Adjust the frequency of High/Low Pass filter.

- High/low pass filter

  This DSP component passes the high/low frequency and attenuate the frequency lower/higher than its cutoff frequency.

  - Enable: Enable the filtering.
  - Mode: The type of filtering (Linkwitz-Rilet, Butterworth, Bessel).
  - Frequency (Hz): The frequency of cut.
  - Stope (dB/Oct): The slope of attenuation.

- 6 band PEQ

  PEQ (Parametric Equalizer) is a multi-band variable equalizers which controls the three primary parameters: gain, center frequency and bandwidth, making more precise adjustments to sound than

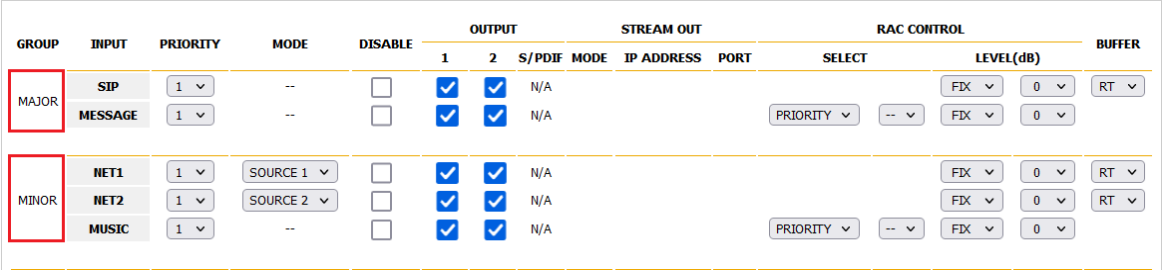
other equalizers. The gain of each band can be controlled, the center frequency can be shifted, and bandwidth ("Q") can be widened or narrowed.

- Bypass all: Disable the PEQ function.
- ON/OFF: Activate/disable the selected EQ band.
- Frequency (Hz): Set the central frequency of a band.
- Gain (dB): Set the PEQ gain (attenuate or increase the selected frequency band).
- Bandwidth (Oct): Set the width around the frequency (Q factor) of selected frequency band.

- Factory setting: Click to restore all settings to factory setting.

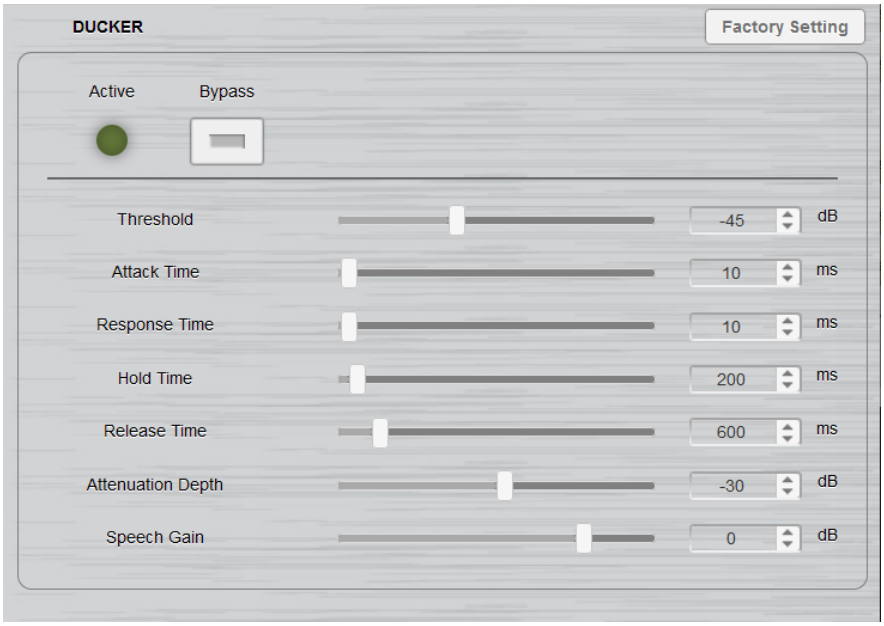
4.7.3 Major Audio Matrix

This setting is the same as [Audio Matrix], the button on the DSP page is the shortcut to jump to [Audio Matrix].



- Input settings are divided into Major and minor to distinguish priority.

4.7.4 Ducker



The Ducker lowers the level of one audio signal (NET1/ NET2/ Music Player) based upon the level of an

audio signal (SIP Input/ Message Player/ MIC IN). A typical application is the paging over background music: The device senses the presence of audio from MIC IN, and it triggers a reduction to the level of background music signal. And, make a level gain to the paging signal. The background music restores to the original level once the paging is over.

- Active: The function of [Ducker] is activated while the level of audio signal has been passed the value of [Threshold], and the LED lights up to remind user.
- Bypass: Unconditionally let the audio signal of [Minor] group play.
- Threshold (dB): The threshold of detection on audio signal. And, The level value of threshold decides that which audio signal will play: major group or minor group or both of them and with [Attenuation Depth] and [Speech Gain] functions.

To avoid the unexpected attenuation, don't set a threshold level too low.

- Attack Time (ms): The fade-in time for main audio when the Ducker is activated.
- Response Time (ms): The time between the level detection and the beginning of Ducker's activation.

The shorter the attack and response time, the faster the conversion efficiency.

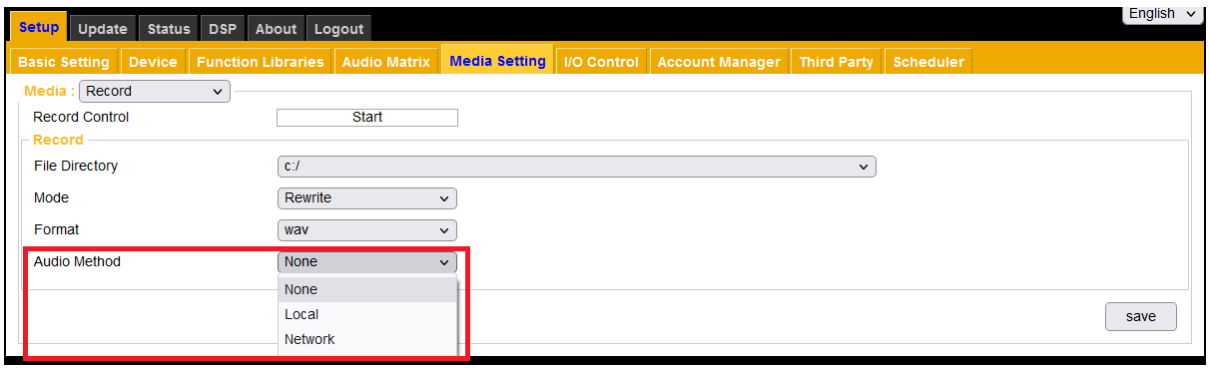
- Hold Time (ms): The length of audio pause that is regarded as the end of the Ducker action.

Set enough "Hold time" to avoid the unexpected background level during the speeches breaks.

- Release Time (ms): The fade-out time for main audio when the Ducker is not activated.
- Attenuation Depth (dB): When main audio is broadcasting and the level of second audio is to high, set the attenuation depth for level reduction.
- Speech Gain (dB): If the volume of main audio is too low, the function of [Speech Gain] is for enhancing the level automatically.
- Factory setting: Click to restore all settings to factory setting.

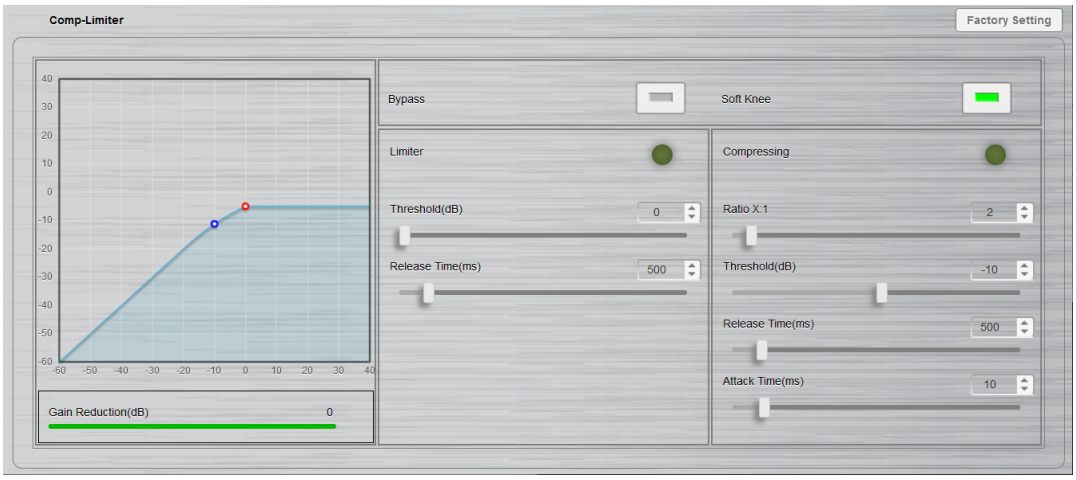
4.7.5 Selector

There is no setting page but to let user know the sequence and structure of sound processing. Set the function with [Audio Method] option on the [Record] page.

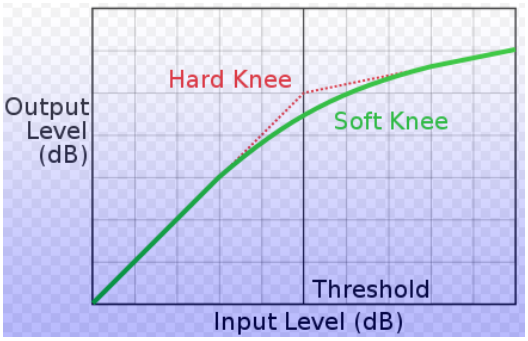


4.7.6 Comp/Limiter

Comp-limiter is a combination of the Compressor and the Limiter Component.



- Bypass: Disable the Comp-limiter function.
- Soft Knee: Enable/disable the “Soft Knee” mode. This element controls whether the bend in the response curve is a sharp angle or has a rounded edge. A soft knee slowly increases the compression ratio as the level increases and eventually reaches the compression ratio set by user. A soft knee reduces the audible change from uncompressed to compressed, especially for higher ratios where the changeover is more noticeable.



Enable to smoothly increase the audio level to reduce distortion.

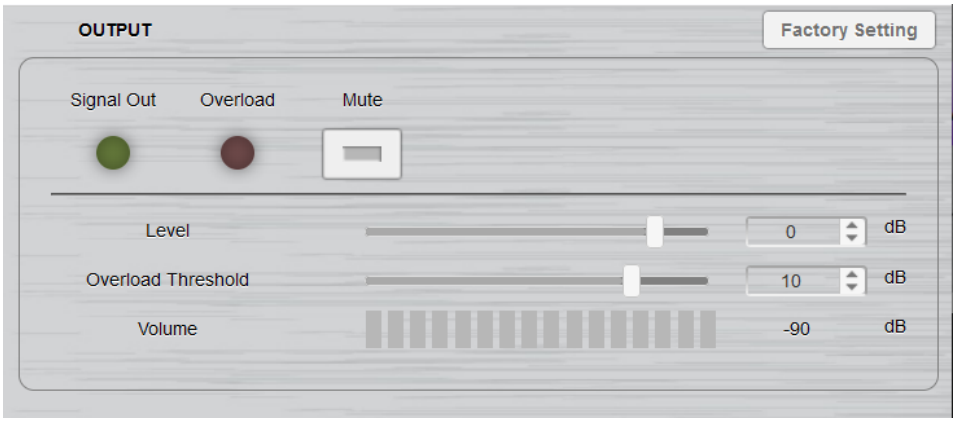
- Limiter:
  - Limiter LED: Light up when the limiting is activated.
  - Threshold (dB): Activate the Limiter function when input level above this value.
  - Release time (ms): The time it takes to release gain reduction.
- Compressing:
  - Compressing LED: Light up when the compression is activated.
  - Ratio X:1: Set the compression ratio, which the compressor will compress the input level by this compression ratio setting to be the output level.

- Threshold (dB): Activate the Compression function when input level above this value.
- Release time (ms): Set the time it takes to release the compressor gain. The Release Time is the period when the compressor is increasing gain to the level determined by the ratio or to 0 dB, once the level has fallen below the threshold.
- Attack time (ms): Set the time it takes to respond to the input signal. The Attack Time is the period when the compressor is decreasing gain to reach the level that is determined by the ratio.

The attack time can decide the sensitivity of compressor. The longer of Attack Time is, the slower of the compression it will take, and vice versa.

- Gain reduction (dB): Indicate the current amount of gain reduction.
- Graphical Window
  - Axis-X/Y: Input/output signal level (dB).
  - Blue control point: Threshold (Compressor).
  - Red control point: Threshold (Limiter).
- Factory setting: Click to restore all settings to factory setting.

4.7.7 Output



- Signal out: LED lights up when the signal level of output > -30 dB.
- Overload: LED lights up when the channel level is above the value of Overload Threshold (dB).
- Mute: Mute/unmute the output signal, the LED will be on/off the red light.
- Level (dB): The level of output channel.
- Overload threshold (dB): This threshold value is to determine the output signal is overloaded or not.
- Volume (dB): Display the real-time volume of output by meter.
- Factory setting: Click to restore all settings to factory default value.

4.8 About-Copy Right

5 Techinical Data

5.1 IPSM-2C20/IPSM-2C20M

❖ Electrical

Item	Voltage	Output power	Connect Type
PoE+	-	25W	RJ45
PSU power adapter	24 VDC	36W(PSU36-24) / 65W(PSU65-27)	Euro-style terminal block

- Audio Characteristics- Amplified Output
  - Rated output power: 20W x 2CH
  - Frequency response: 20Hz ~ 20kHz (±3 dB) @ 0 dBu
  - THD+N: 1% (50~20 kHz @ full power)
  - SNR: > 85dBu
- Audio Characteristics- Mic Input
  - Phantom power: 2.5VDC
  - Frequency response: 50Hz ~ 20kHz (±1 dB) @ 0 dBu
  - Input impedance (unbalanced): 1k ohm
  - Equivalent Input Noise (EIN): < -90 dBra @ 14 dB gain
  - THD+N: 0.1%
- Interconnection
  - Female RJ45 socket, CAT5/6 cables

- Max. cable length: 100m

- Contact output
  - Maximum voltage: 60V
  - Maximum current: 0.5A
- LED STATUS CONTROLLER
  - Output: 3.3V@10 mA
- Mechanical & Environmental

Dimensions (W x H x D):	95mm x 27mm x 58mm
Weight:	0.53kg
Operating temperature:	-5ºC ~ 55ºC (23ºF~131ºF)
Storage temperature:	-40ºC~ +70°C (-40°F ~158°F)
Relative humidity:	20% to 95%
Air pressure	600 to 1100 hPa
Heat dissipation	6.28 BTU/hr

5.2 IPBX-2C20/IPBX-2C20M

- Electrical

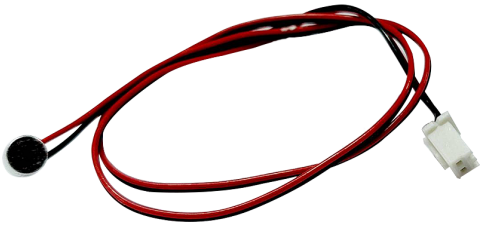
Item	Voltage	Output power	Connect Type
PoE+	-	25W	RJ45
PSU power adapter	24 VDC	36W(PSU36-24) / 65W(PSU65-27)	Euro-style terminal block

- Audio Characteristics- Amplified Output
  - Rated output power: 20W x 2CH
  - Frequency response: 20Hz ~ 20kHz (±3 dB) @ 0 dBu
  - THD+N: 1% (50~20 kHz @ full power)
  - SNR: > 85dBu
- Audio Characteristics- Mic Input
  - Phantom power: 2.5VDC
  - Frequency response: 50Hz ~ 20kHz (±1 dB) @ 0 dBu
  - Input impedance (unbalanced): 1k ohm
  - Equivalent Input Noise (EIN): < -90 dBra @ 14 dB gain
  - THD+N: 0.1%
- Interconnection
  - Female RJ45 socket, CAT5/6 cables
  - Max. cable length: 100m
- Contact output
  - Maximum voltage: 60V
  - Maximum current: 0.5A

- Mechanical & Environmental

Dimensions (W x H x D):	95mm x 27mm x 58mm
Weight:	0.53kg
Operating temperature:	-5ºC ~ 55ºC (23ºF~131ºF)
Storage temperature:	-40ºC~ +70°C (-40°F ~158°F)
Relative humidity:	20% to 95%
Air pressure	600 to 1100 hPa
Heat dissipation	6.28 BTU/hr

5.3 YMC0101-005 MIC capsule



- Audio Characteristics
  - Directional characteristic: Omni-directional
  - Sensitivity: -38 (±2) dBu @ 1 kHz (0 dBu=1VPa)
  - Impedance: 2.2k (max.)
  - S/N ratio (a weighted network): 62 dB
  - Maximum SPL: 110 dB
  - Frequency response: 50 Hz ~ 20 kHz (±3 dB) @ 0 dBu

Endnotes 2... (after index)

Back Cover