TERRACOM™

IP Speakers

Full Range IP Speakers
for Paging & Hands-Free Intercom

User Manual

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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.

1.1   Safety instructions

- 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 the type stated in this manual or as marked on the unit. Otherwise fire and electrical shock hazard results.

- When disconnecting the power cord, always grab the plug. Never pull the cord. A damaged power cord is a potential risk of fire and electrical shock hazard.

- Avoid touching power plugs with wet hands. Doing so is a potential electrical shock hazard.

- Avoid placing heavy objects on power cords. A damaged power cord is a fire and electrical shock hazard.

- 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 -5°C and +55°C (-40°F and +131°F).

- 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.

- **TERRACOM group reserves the right to update, amend, change or withdraw these functions and to introduce new functions at any time without notice.**

1.2   Firmware version

Version
v1.14

1.3   Copyright

2   System overview

2.1   Quick start

1. 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 DC-JACK 24V-1.5A power supply.

2. 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.
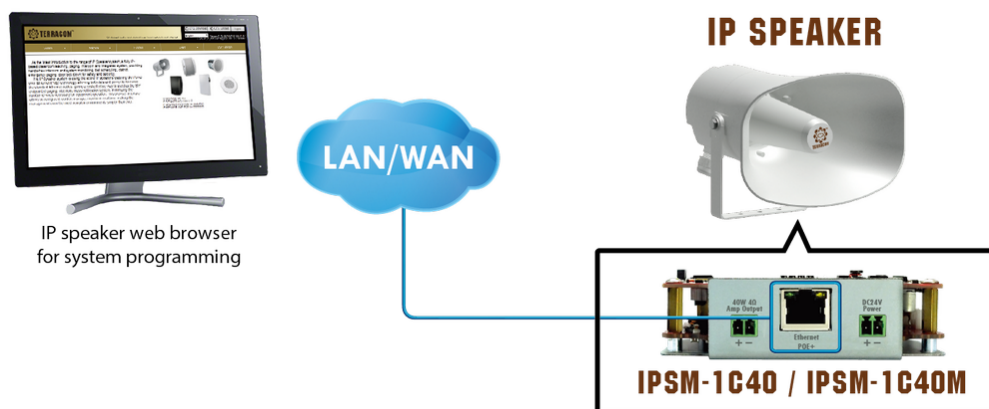
You will be asked for a login (By default: admin). After login, you can start to program the settings of IP speaker.

3. 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.

Net Setting

DHCP	○ Enable ● Disable
IP Address	192.168.101.49
Subnet Mask	255.255.252.0
Gateway	192.168.100.249
DNS	0.0.0.0 ☑
Mac Address	0.22.12.BF.C1.1D

Save

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.

4. 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.

SIP Settings

Firewall Traversal Mode	○ TERRA Net ● SIP Server
+ Username	IP_SPEAKER
+ Password	
SIP Server Call Only	☐
SIP Server IP	118.163.216.15
SIP Port	5060
RTP Port	6912
Global Priority	1
Audio Codec	G.722 ▼
Audio Delay Buffer	RT ▼
Ring Tone Level	1 ▼
Monitor Tone Interval(Second)	5 ▼

Save

- Without SIP server

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

  o Firewall Traversal Mode: TERRA Net

  o SIP Port: 5060

  o RTP Port: 6912

SIP Settings

Firewall Traversal Mode	● TERRA Net ○ SIP Server
+ Username	IP_SPEAKER
SIP Port	5060
RTP Port	6912
Global Priority	1
Audio Codec	G.722 ▼
Audio Delay Buffer	RT ▼
Ring Tone Level	1 ▼
Monitor Tone Interval(Second)	5 ▼

Save

2.2 IPSM-1C40/IPSM-1C40M - IP speaker module

IPSM-1C40   **IPSM-1C40M**

The IPSM-1C40/IPSM-1C40M module is equipped with 1 channel 40W Class-D amp board into the 4 ohm loudspeaker with PoE+ power (and/or 24VDC power supply if POE+ is not available). With

Power over Ethernet (PoE+), both audio control and power can be flowed over the standard 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-1C40/IPSM-1C40M is applicable for TERRACOM's full range IP speakers. To fulfill hands-free intercom and monitoring, the IPSM-1C40M is equipped with a microphone input built-in. The YMC0101-004 mic capsule could be connected to this microphone input.

The IPSM-1C40/IPSM-1C40M has 3 control inputs for level control using RAC 5/8 remote device, 1 contact output for triggering events via TerraManager and a clock module interface for connecting to time clock display. To configure, control, monitor the IP speakers in real-time, this can be easily done through web browser interface.

The remarkable features include priority management, event management, volume control, AEC (Acoustic echo cancellation), NR (Noise Reduction), paging, intercom, music streaming, routing, logic control, monitoring etc..

The 40W x 1CH amp output of IPSM-1C40/IPSM-1C40M module is fed by 4 ohm load loudspeaker. However, if users wish to connect the 8 ohm speaker to the amp output of IPSM-1C40/IPSM-1C40M, please note the maximum amp output will change to 20W x 1CH.

❖ Ordering information

Models	Model Description
IPSM-1C40	IP Speaker Module/1 channel/40W
IPSM-1C40M	IP Speaker Module/1 channel/40W w/ mic input
YMC0101-004	Mic Capsule w/40cm lead & connector for IPSM-1C40M

IPSM-1C40M is not shipped with the mic capsule, please order **YMC0101-004** mic capsule if necessary.

2.2.1   Front, rear, side panel

❖ Front panel
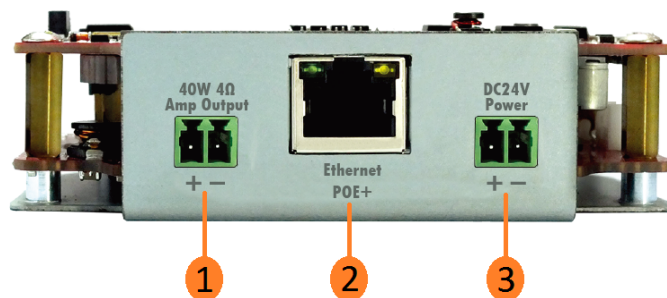
1. Amp output: 40W x 1CH (class-D amp) amplifier output on 4 ohm load loudspeaker.

The 40W x 1CH amp output of IPSM-1C40/IPSM-1C40M module is fed by 4 ohm load loudspeaker. However, if users wish to connect the 8 ohm speaker to the amp output of IPSM-1C40/IPSM-1C40M, please note the maximum amp output will change to 20W x 1CH.

2. Ethernet POE+ port:

   1) 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.

   2) In addition, the IP speaker can use the power from PoE+ (PoE+ switch is required).

3. 24VDC power input: If POE+ power is not enough or not available, connect the 24VDC power adapter (1.5A) to IP speaker.

❖ Rear panel
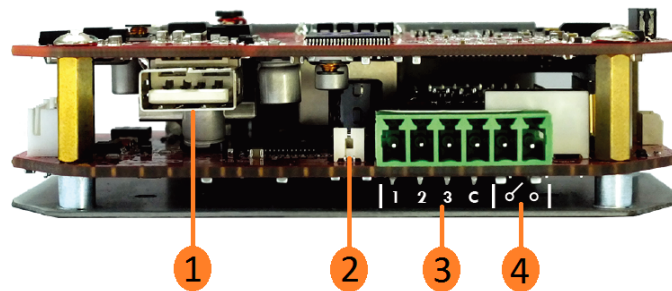
1. USB interface (function reserved).

2. Microphone input: To fulfill hands-free intercom and monitoring, the IPSM-1C40M module is equipped with a microphone input. The **YMC0101-004** mic capsule could be connected to this microphone input. This mic input provides DC 2.5V phantom power for microphone.

3. Logic control 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.

Return to the default factory setting: Short-circuit (close) the control input 2-pin and G-pin will reset to the default factory setting (192.168.100.49 by default).
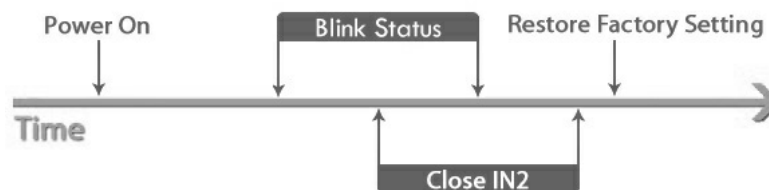
Read out the IP address: First, open-circuit (open) the control input 1-pin, then short-circuit (close) the control input 1-pin and G-pin during the time that the connected status LED is flashing, then the IP speaker will read out its IP address.
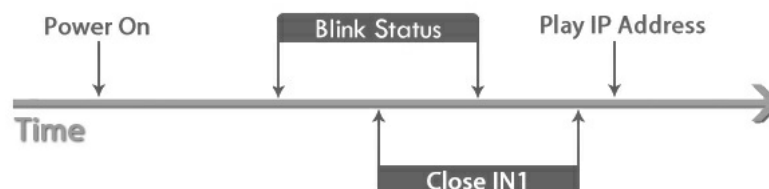
4. Contact output: 1 relay contact output can be programmed to control an external device.

❖ Side panel
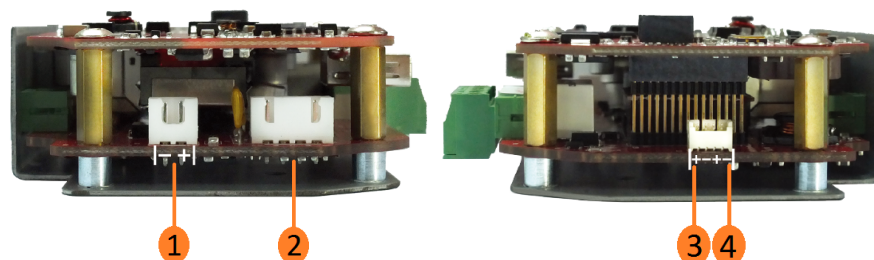
1. LED strobe light interface (DC 19V output): Connect a strobe light for safety & emergency alerting (function reserved).

2. RS232 interface (function reserved).

3. Power LED interface: If users wish to know the power status of IP speaker, please make sure the pins of wire cable are connected to the correct pins (3V pin, Power LED control pin), see the picture as below.

3V   Power   3V   Status
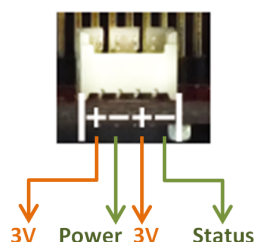
4. Status LED interface (function reserved).

2.3   Ceiling IP speakers

2.3.1   RCS5/RCS5CX/RCS6/RCS6CX/RCS8/RCS8CX

❖ Ordering information

Models	Model Description
RCS5-IP	Metal Ceiling IP Speaker/10W
RCS5-IPM	Metal Ceiling IP Speaker/10W w/ mic
RCS5CX-IP	Metal Ceiling Coaxial IP Speaker/20W
RCS5CX-IPM	Metal Ceiling Coaxial IP Speaker/20W w/ mic
RCS6-IP	Metal Ceiling IP Speaker/10W
RCS6-IPM	Metal Ceiling IP Speaker/10W w/ mic
RCS6CX-IP	Metal Ceiling Coaxial IP Speaker/20W
RCS6CX-IPM	Metal Ceiling Coaxial IP Speaker/20W w/ mic
RCS8-IP	Metal Ceiling IP Speaker/10W
RCS8-IPM	Metal Ceiling IP Speaker/10W w/ mic
RCS8CX-IP	Metal Ceiling Coaxial IP Speaker/20W
RCS8CX-IPM	Metal Ceiling Coaxial IP Speaker/20W w/ mic

2.3.2   CCS4/CCS6
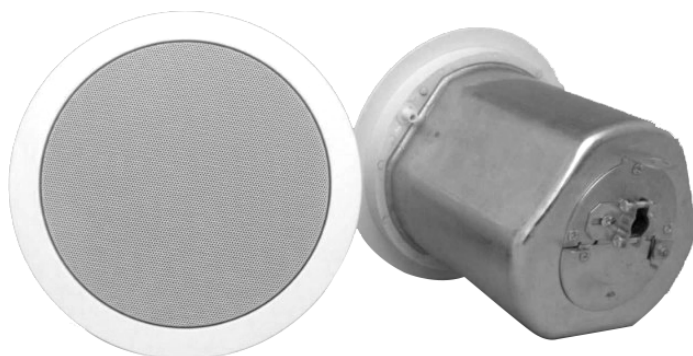
❖ Ordering information

Models	Model Description
CCS4-IP	4" Pro-Ceiling IP Speaker 2 Way/20W
CCS4-IPM	4" Pro-Ceiling IP Speaker 2 Way/20W w/ mic
CCS6-IP	6" Pro-Ceiling IP Speaker 2 Way/20W
CCS6-IPM	6" Pro-Ceiling IP Speaker 2 Way/20W w/ mic

2.3.3   PCL5/PCL6

❖ Ordering information

Models	Model Description
PCL5-IP	5.25" Plastic Ceiling IP Speaker/10W
PCL5-IPM	5.25" Plastic Ceiling IP Speaker/10W w/ mic
PCL6-IP	6" Plastic Ceiling IP Speaker/10W
PCL6-IPM	6" Plastic Ceiling IP Speaker/10W w/ mic

2.3.4   LCS8

❖ Ordering information

Models	Model Description
LCS8-IP	Twin-Cone IP Speaker/10W
LCS8-IPM	Twin-Cone IP Speaker/10W w/ mic

2.4   Horn IP speakers

2.4.1   APH30

❖ Ordering information

Models	Model Description
APH30-IP	IP Horn Speaker/20W
APH30-IPM	IP Horn Speaker/20W w/ mic

2.4.2 MSH30

❖ Ordering information

Models	Model Description
MSH30-IP	2 Way Music IP Horn Speaker/20W
MSH30-IPM	2 Way Music IP Horn Speaker/20W w/ mic

2.5 Projector IP speakers

2.5.1 CAD10/CAD20

❖ Ordering information

Models	Model Description
CAD10-IP	Plastic IP Sound Projector Speaker/10W
CAD10-IPM	Plastic IP Sound Projector Speaker/10W w/ mic
CAD20-IP	Plastic IP Sound Projector Speaker/20W
CAD20-IPM	Plastic IP Sound Projector Speaker/20W w/ mic

2.6 Cabinet IP speakers

2.6.1 JD20W/JD20B

❖ Ordering information

Models	Model Description
JD20W-IP	Music Cabinet Loudspeaker/20W, white
JD20W-IPM	Music Cabinet Loudspeaker/20W w/ mic, white
JD20B-IP	Music Cabinet Loudspeaker/20W, black
JD20B-IPM	Music Cabinet Loudspeaker/20W w/ mic, black

2.6.2 WWC6

❖ Ordering information

Models	Model Description
WWC6-IP	6" Wooden Cabinet IP Speaker/10W
WWC6-IPM	6" Wooden Cabinet IP Speaker/10W w/ mic

2.6.3   PWC6
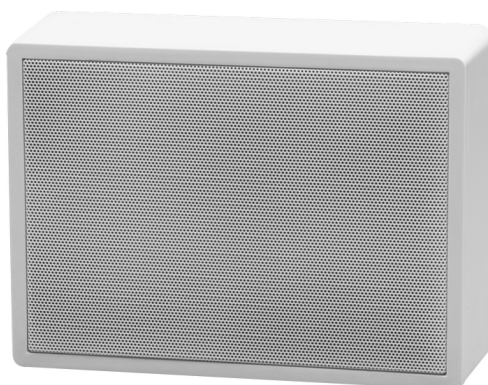
❖ Ordering information

Models	Model Description
PWC6-IP	Wall-Mount Square Plastic IP Speaker/10W
PWC6-IPM	Wall-Mount Square Plastic IP Speaker/10W w/ mic

2.6.4   SENTRY6R/SENTRY6S
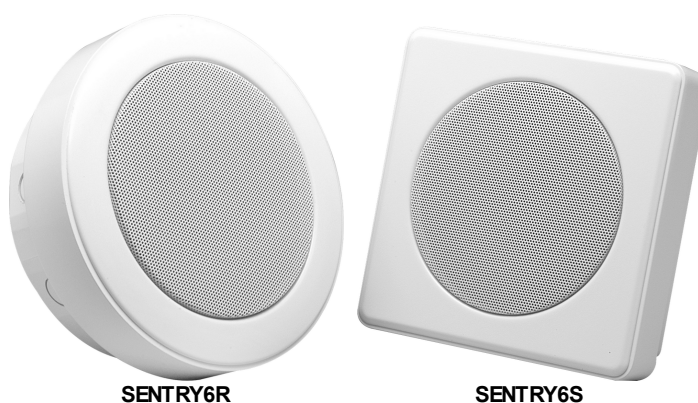
SENTRY6R   **SENTRY6S**

❖ Ordering information

Models	Model Description
SENTRY6R-IP	Metal Round Ceiling IP Speaker/10W
SENTRY6R-IPM	Metal Round Ceiling IP Speaker/10W w/ mic
SENTRY6S-IP	Metal Square Ceiling IP Speaker/10W
SENTRY6S-IPM	Metal Square Ceiling IP Speaker/10W w/ mic

2.7   Wallmount IP speakers

2.7.1   PBC6/PBC10CX
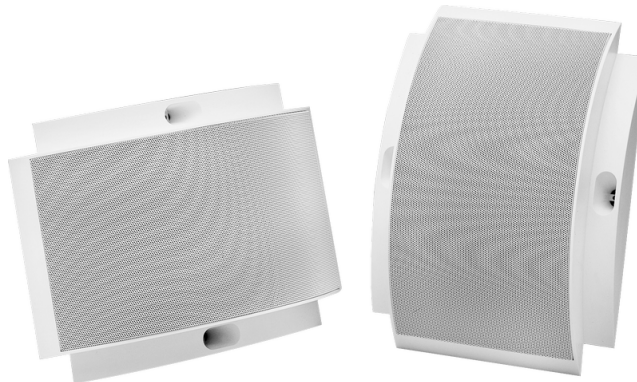
❖ Ordering information

Models	Model Description
PBC6-IP	Open-Back Wall-Mount IP Speaker/10W
PBC6-IPM	Open-Back Wall-Mount IP Speaker/10W w/ mic
PBC10CX-IP	Open-Back Wall-Mount Coaxial IP SPK/20W
PBC10CX-IPM	Open-Back Wall-Mount Coaxial IP SPK/20W w/ mic

2.8   Lay-in tile IP speakers

2.8.1   LIS8/LIS8CX

❖ Ordering information

Models	Model Description
LIS8-IP	Lay-In Tile IP Speaker/10W
LIS8-IPM	Lay-In Tile IP Speaker/10W w/ mic
LIS8CX-IP	Lay-In Tile Coaxial IP Speaker/20W
LIS8CX-IPM	Lay-In Tile Coaxial IP Speaker/20W w/ mic

2.9 Vertical line array IP speakers
2.9.1 SmartVox

❖ Ordering information

Models	Model Description
SmartVox-IP	Vertical Line Array IP Speaker/40W
SmartVox-IPM	Vertical Line Array IP Speaker/40W w/ mic

3 Configuration

More advanced configuration such as audio streaming, volume adjustment, source selector, relay output control, event, DSP setting etc.. can be configured by a dedicated web browser.

3.1 Web browser

3.1.1 Getting started

1. Connect the IP speaker to network switch.

2. Open the web browser on your PC/laptop. The IP speaker is compatible with and optimized for the latest version of these web browsers:

   - Chrome (we recommend to use it)
   - Firefox
   - Safari
   - Opera
   - Edge

   Internet Explorer is not supported.

3. Enter the default IP address into the address bar, then you can open the webpages of IP speaker.

Default setting	Web browser
IP address	192.168.100.49
Subnet Mask	255.255.255.0
Gateway	192.168.100.254

3.1.2 Login/logout
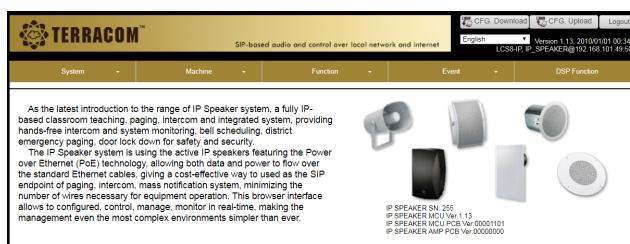
Please Login
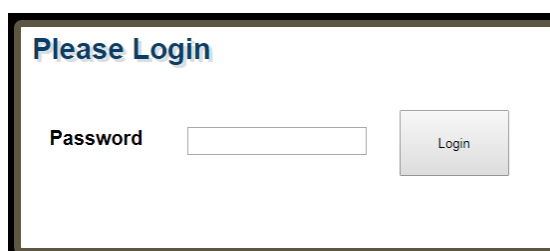
Password [   ] [Login]

1. If you haven't set the custom password for login yet, please enter admin for password (default).

2. Click [Login] button to enter the main window of IP speaker. After login, you can start to program the settings of IP speaker.

4. To logout, click [Logout] button on the right top section of the webpage.
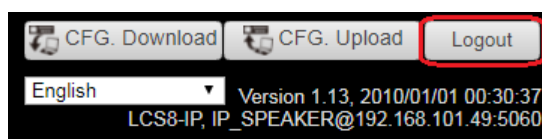
3.1.3   CFG. upload/download & language

Click [CFG. Upload] button to load the configuration file from the selected path of PC/laptop to web browser.

Click [CFG. Download] button to download the configuration file to the selected path of PC/laptop.

3.1.4   System

3.1.4.1   Remote

This function is currently reserved.

3.1.4.2   Site device list

List the TERRACOM devices located in the same LAN.

System ▼	Machine ▼	Function ▼	Event ▼	DSP Function

Number	Name	URI	Type	Status
1	IP_SPEAKER	IP_SPEAKER@192.168.101.49:5060	LCS8-IP	online
2	PPM-K	PPM-K@192.168.103.203:5060	ppmk	online
3	FXO_198	FXO_198@192.168.101.198:5060	fxo	online
4	TerraManager	TerraManager@192.168.100.147:5060	manager	offline
5	177	177@192.168.101.177:5066	fdx	online
6	13	13@192.168.101.13:5060	ppmk	online
7	EX_127	EX_127@192.168.101.127:5060	ex	online
8	IT5_215	IT5_215@192.168.101.215:5060	touch	online
9	IEX_213	IEX_213@192.168.101.213:5060	iex	online
10	TerraManager	TerraManager@192.168.100.163:5060	manager	online
11	IDA8C1	IDA8C1@192.168.103.188:5060	ida8c	online
12	DS_61	DS_61@192.168.101.61:5060	drs	online

- Name: The name of device.
- URI: The URI of device.
- Type: The type of device.
- Status:
    - Online: Device is online (connected).
    - Offline: Device is offline (disconnected).
    - Paging: Device is currently paging.
    - Phone: Device is currently in intercom.

3.1.4.3   Update

Update the firmware of IP speaker to the latest version, follow the steps as below.

1. Click [Browse File…] button to choose a firmware file (.xdu) specified to the IP speaker.
2. Click [Update] to proceed the Update action, users can see whether the Update action has completed or not via the progress bar.

3. At last, click [Reboot] button to apply this firmware file to the IP speaker.

3.1.5   Machine

3.1.5.1   Settings

3.1.5.1.1 IP

Enable [DHCP]

Disable [DHCP]

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

3.1.5.1.2 Date/time

Enable the [NTP Client Server]

Disable the [NTP Client Server]

- NTP Client Server: Enable the NTP setting. If the NTP is activated, the system date/time of the IP speaker will be synchronized by NTP server.

  o NTP Server IP: Set the IP address of NTP Server.

  o Time zone: The timezone of the IP speaker.

  o 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 IP speaker.

3.1.5.1.3 SIP

Enable [SIP Server]

Enable [TERRA Net]

- Firewall Traversal Mode: Use [TERRA Net] to relay the audio packet through TCP/UDP or use [SIP Server].

  o Username:

    - TERRA Net: Set the calling name for SIP call, normally this username is set in 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.

  o 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.

  o SIP server call only (SIP Server only): Once this function is enabled, the IP speaker can ONLY pick up the SIP call via SIP Server.

- 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.

- Global Priority: When TERRACOM devices are calling (SIP intercom) to IP speaker via 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.

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

- Audio Delay Buffer: Set the delay 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.

- Ring Tone Level: The level of ring tone.

- Monitor Tone Interval (second): Set the interval of how much time (second) the monitor tone will be played. The monitor tone allows users to identify if the IP speaker (with mic input) is currently monitoring the audio.

3.1.5.1.4 Third party control

Allow 3rd party devices to control the events such as Level Control event, Level Read event etc. via Ethernet (UDP), see Event for details.

```
┌─ Third Party Control ──────────────────────────────┐
│                                                     │
│   IGMP Enable        ⦿ Enable  ○ Disable            │
│                                                     │
│   IGMP address       239.240.100.135                │
│                                                     │
│   Port               8010                           │
│                                                     │
│                                          [ Save ]   │
│                                                     │
└─────────────────────────────────────────────────────┘
```

- IGMP Enable: Enable/disable to use IGMP address.

- IGMP Address: Set the IGMP address.

- Port: Set the local network port, the default network port is 8010.

3.1.5.1.5 Control input

3.1.5.1.5.1 Control input calibration

❖ Calibrate the push button (logic control)

1. Connect the push button to your IPSM-1C40/IPSM-1C40M module, make sure which pin is short with GND-pin. For example, we use IN1 (short G-pin and control input 1-pin).

```
┌─ Control Input Calibration ─────────────────────────┐
│                                                      │
│   Monitored Control Input :   [1 ▼]  [ Minimum ]  [ Maximum ]│
│                                                      │
└──────────────────────────────────────────────────────┘
```

2. Press and hold the push button, and click [Minimum].

3. Release the push button, and click [Maximum].

4. After the calibration has completed, go to Control_input_>_Control_calibrate and check if the Minimum value & Maximum value are correct. If the min./max. value is too close, overlap with other one or the min. value is above the max. value, please proceed the calibration again.

Logic

Name	Minimum	Maximum	Now
Control In 1	5	255	255
Control In 2	5	255	255
Control In 3	5	255	255

3.1.5.1.5.2 Control input response time

Control Input Response Time

Monitored Control Input 1 Response Time :	50	(ms)
Monitored Control Input 2 Response Time :	50	(ms)
Monitored Control Input 3 Response Time :	50	(ms)

Save

- Monitor control input 1/2/3 response time: Set how much time will the state changing of control input be activated.

3.1.5.1.5.3 Control calibrate

Display the calibration status of control input.

Logic

Name	Minimum	Maximum	Now
Control In 1	5	255	255
Control In 2	5	255	255
Control In 3	5	255	255

RAC

Mode: ○ Automate ● Manual

RAC-5

Name	Level1	Level2	Level3	Level4	Level5
Control In 1	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0
Control In 2	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0
Control In 3	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0

RAC-8

Name	Level1	Level2	Level3	Level4	Level5	Level6	Level7	Level8
Control In 1	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0
Control In 2	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0
Control In 3	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0	0 ~0

Save

❖ Logic: Display the calibrated two-state value of control input (Minimum and Maximum), the value is between 0~255. It is commonly used for RAC 5/8 remote controller or a two-state push button.

❖ RAC: The 5/8 steps knobs on RAC 5/8 can be programmed for switching the audio channel and adjusting the audio level remotely.

- Automate (default): After the RAC 5/8 controller is connected to the control input, the system will load the default value into the RAC 5/8 automatically, then go to Function > Source Selector to assign the 5 steps/8 steps of source selection on RAC 5/8.

- Manual: If the [Automate] mode does not function or the channel selection on RAC 5/8 does not work correctly, users can switch to [Manual mode], and manually define the value of each channel of RAC 5/RAC 8. To set the correct level values, please see the example picture as below.

  o Channel 1: The Level1 (17~22) on Channel 1 does not overlap the Level2 (51~59), and so does other values on Channel 1.

  o 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.

Name	Level1		Level2		Level3		Level4		Level5		
Channel 1	17	~ 22	51	~ 59	60	~ 87	99	~ 107	118	~ 122	✓
Channel 2	16	~ 20	20	~ 39	38	~ 69	69	~ 109	108	~ 129	✗

3.1.5.2 Log

- Start: 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 left field. For example, if the setting of entries of log is 100, click [Start] button to read from 1 to 100 logs; click [Start] button again, then the list will show 1~200 logs on the list.

- Already read: List the total entries of log displayed on the window.

- 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.

- Reset: Click this button to reset the log list. The [Already Read] log will also be reset.

- 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.

3.1.5.3 Password manager

Once the new password is enabled, please use this password to login the IP speaker web browser.

- New password: The password must contain at least one number or letter, and cannot leave blank on Password field.

- Re-enter password: Set the same password as the one you set in [New Password] to make sure this password will be validated for login.

📝Please DO NOT forget the new password which you have set, otherwise, you cannot login the IP speaker web browser interface.

3.1.5.4 About

3.1.6 Function

3.1.6.1 Ethernet audio stream

Receive the audio streaming from network, and use the IP speaker to play the audio (Ethernet source 1 ~ Ethernet source 8).

- Activation source (Ethernet 1~Ethernet 8): Select a Ethernet source, and the IP speaker will receive the audio streaming from the selected source.

- Mode:

  o Audio stream: Receive the audio streaming from network, and use the IP speaker to play the audio (Ethernet source 1 ~ Ethernet source 8).

  o TM: Receive the source of audio streaming from other TERRACOM devices via TerraManager. TerrraManager will ask TERRACOM devices to send the audio streaming to IP speaker.

- Number: The number of source (Ethernet 1~Ethernet 8).

- Source: The display name of source (Ethernet 1~Ethernet 8).

- IP & port: Set the Multicast IGMP IP address (224.0.0.0 ~ 239.255.255.255) or Unicast IP address and the network port which allows the IP speaker to receive the audio streaming from network.

- Buffer: Set the delay 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.

3.1.6.2 Call in

After the selected control input is triggered, the IP speaker will call a target device such as TERRACOM device. If this target device is connected to the loudspeaker, it can monitor the audio come from the IP speaker.

Function	Disable
Monitored Control Input	1	URI	test@192.168.100.100:5060
Activation Mode	High to start Low to stop

Save

- Function: Enable/disable the [Call In] function.

- Monitored control input: The selected control input will be used for triggering the action, 1 means the control input channel 1.

- Activation mode:

  o High to start, Low to stop: The control input channel is opened when the action is triggered.

  o Low to start, High to stop: The control input channel is closed when the action is triggered.

  o Toggle: Trigger the relay switch of control input channel between open and close.

- URI: Set the SIP address of the target device, or click ▼ button select a target device from the drop-down box.

3.1.6.3 Source selector

Connect the control input of IP speaker to RAC 5/RAC 8 device for music/message selection, IP speaker shall trigger the message event based on the selection knob of RAC 5/8, the audio refers to the Ethernet audio streaming which you set in Function > Ethernet Audio Stream.

Function	Enable
Logic Channel	Input 2	Control Device	RAC 5

Logic	Message event
Logic 1	Ethernet 1
Logic 2	Ethernet 2
Logic 3	Ethernet 3
Logic 4	Ethernet 4
Logic 5	Ethernet 5

Save

- Function: Enable/disable the [Source Selector] function.

- Logic: The logic refers to the 5/8 steps on RAC 5/RAC 8, each step can be programmed to individual audio streaming source, allowing to switch the audio channel using the RAC 5/RAC 8.

- Control device: Choose a model of RAC controller (RAC 5 or RAC 8).

- Logic: The number of logic channel of RAC 5/8.

- Message event: Assign the Ethernet streaming source to the corresponded logic channel of RAC 5/8.

3.1.6.4 Volume adjustment

Connect the control input of IP speaker to RAC 5/RAC 8 device, and use its analog knob for volume adjustment. Please note 1 volume source can be programmed into the analog knob of RAC 5/8.
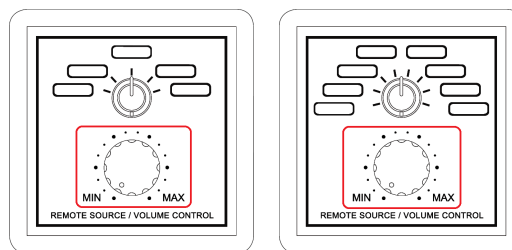
Number	Function	Logic	Source Level	Delete or Add
1	Enable ▼	Logic 1 ▼	Ethernet Audio Stream ▼	⊖
2	Disable ▼	Logic 2 ▼	VOIP Input ▼	⊖
3	Disable ▼	Logic 3 ▼	AMP-OUT ▼	⊖
				⊕

Save

1. Function: Enable/disable a [Volume Adjustment] setting function.

2. Logic Input: Choose a control input, and it will be used for adjusting volume via the analog knob on RAC 5/8.

3. Source level: Choose a source (Ethernet audio stream, VOIP input, VoIP output, AMP-OUT) from the drop-down box, the volume of the selected source can be adjusted via the analog knob on RAC 5/8.

4. Delete or add:

   o ⊕ Add button: Create a new [Volume Adjustment] setting function.

   o ⊗ Delete button: Delete the selected [Volume Adjustment] setting function.

3.1.6.5   Relay control out

Relay Control Out

SIP Active	-- ▼
SIP Inactive	-- ▼
Ringing Active	-- ▼
Ringing Inactive	-- ▼

Save

- 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 and Event (3rd party).

- 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 and Event (3rd party).

3.1.7   Event

Allow other devices to control the IP speaker through 3rd party control.

Public Level Read OUT1 x	Public Level Control OUT All x

Event name   Public Level Read OUT1

Function   Level Read ▼

Source   AMP OUT VOL ▼

Save

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

Interface		Function
Connection	**Settings**	
Ethernet (UDP)	UDP Port = 8010	• Level Control/Read • Relay Out Control • Netstream Select • Control I/O Read

- Source: Choose the source which allows the 3rd party device to control the logic/control the level etc..

3.1.7.1   Level control/level read

❖ Level Control: Set the 3rd party command to control the audio level (Ethernet audio, VoIP RX, VoIP TX, AMP OUT VOL).

Event name   Public Level Control OUT All

Function   Level Control ▼

Source   AMP OUT VOL ▼

Save

- Event name: The event name is the command string for a 3rd party action, this command string sent from the 3rd party device must be the same as the [Event Name] here.

The table below indicates all the sources and their corresponded adjustable range. For example, add [:], [:Increase] or [:Decrease] command string and the specific range (level adjustment/ mute) behind the listed source to adjust its level. add [:Mute] to mute/unmute the selected audio source.

Source	Command	Range (Level/Mute/Bypass)	Unit (dB)
Ethernet audio, VoIP RX	:Mute	N/A	N/A
	:Increase :Decrease	-90~ +20	1
	:	-90~ +20	
AMP OUT VOL VoIP TX	:Mute	N/A	N/A
	:Increase :Decrease	-90~ +20	1
	:	-90~ +20	

- Command-Level Control:
    - **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).

- Examples:

    Assume the value of Name is "TARGET".

    - To adjust the level of Ethernet audio input to 10dB, select Ethernet audio source from drop-down box. The command string is TARGET:10.

    - To decrease 3 dB level on VoIP RX output, select VoIP RX source from drop-down box. The command string is TARGET:Decrease 3.

    - To mute/unmute the AMP OUT VOL output, select AMP OUT VOL source from drop-down box. The command string is TARGET:Mute.

❖ Level Read: Set the 3rd party commend to read back the audio level.

From the example picture above, if you wish to read the level of AMP OUT VOL source, please send a commend string: Public Level Read OUT1, the IP speaker will send back the value of level.

3.1.7.2 Relay out control

❖ Relay out control: Set the 3rd party commend to control the relay output of IP speaker. The relay output can be programmed and send a pulse or a static closing/opening to an external device (NO = normally open and NC = normally close).

- Event name: The event name is the command string for a 3rd party action, this command string sent from the 3rd party device must be the same as the [Event Name] here.
- Type:
    - CLOSE: The contact output's channel is close when the event is triggered.
    - OPEN: The contact output's channel is open when the event is triggered.
    - TOGGLE: Trigger the event contact output's channel relay switch between open and close.

- o PULSE (cycle is from OPEN to CLOSE): The contact is close during the [Close] period then open during [Open] period.
  - ▪ Close period (ms): Set the time to close the contact output's channel.
  - ▪ Open period (ms): Set the time to open the contact output's channel.
  - ▪ Times: The times of OPEN-CLOSE phase.

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

3.1.7.3 Control I/O read

Read back the logic status which is connected to the control input or the relay output of IP speaker.

Event name	Read Control Input-1
Function	Control I/O Read
Source	Control In 1

Save

- Event name: The event name is the command string for a 3rd party action, this command string sent from the 3rd party device must be the same as the [Event Name] here.

- Response command: The 3rd party device shall receive the response command after the IP speaker has transmitted the command string successfully. See the response command and the meaning of each command from the table as below.

Response Command	Meaning
Button: Press	The control input is set as logic control for controlling a two-state push button.
Button: Release	
RAC5: X/5	the current logic step of RAC 5 unit (x = step)
RAC8: X/8	the current logic step of RAC 8 unit (x = step)
Analog: X/255	the current analog step of RAC unit (x = step)
OUT OPEN	this output is short circuit
OUT CLOSE	this output is open circuit
Channel Error	The command string is incorrect

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

3.1.7.4 Netstream select

Set the 3rd party commend, and choose to receive which channel of the Ethernet audio streaming (CH1~CH8).

Event name	Netstream Select:7
Function	NetStream Select ▼

Save

- Event name: The event name is the command string for a 3rd party action, this command string sent from the 3rd party device must be the same as the [Event Name] here.

- Command: To choose to receive which audio stream source channel (1~8) in a quicker way, send string:c commend string behind the [Name] string.

Command	Meaning	Range
:c	c indicates the source channel	1~8

- Command-Netstream Select:

  From the example picture above, if you wish to receive the network audio stream, please send a commend string: CMDSTR. The TERRACOM device will send back in ASCII code as below.

  o **200** (ASCII Code) indicates OK (received).

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

- Example:

  1. Assume the value of Name is "TARGET".

  2. To choose to receive the [Ethernet Source 7], the command string is TARGET:7.

3.1.8   DSP function

The IP speaker web browser provides a vareity of DSP functions. Click the component button, and the setting window of DSP element will pop up.
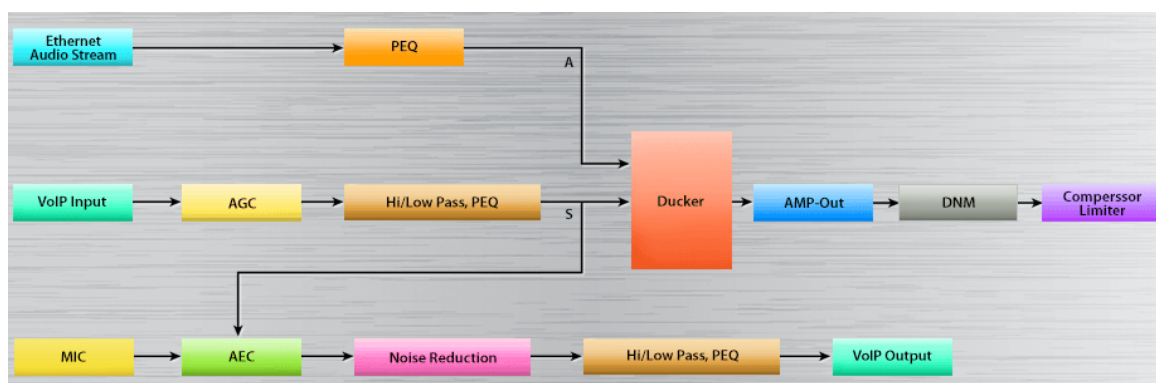
3.1.8.1   Ethernet Audio Stream/VoIP input

The DSP settings of input sources including Ethernet Audio Stream, VoIP input and Mic input. The control window of the source settings are similar, see as below.
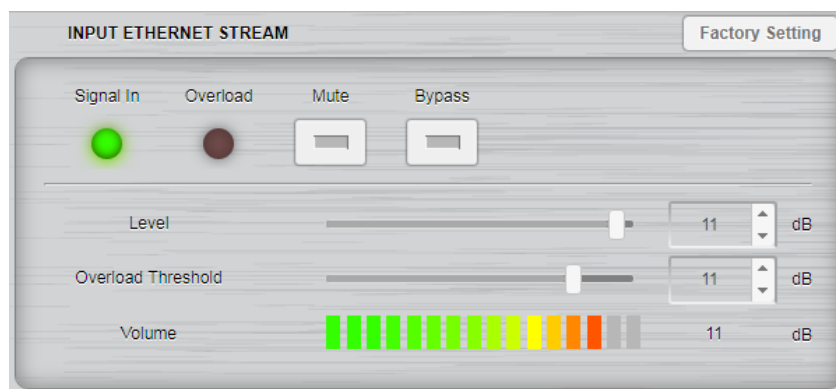
- Signal in LED: Light up when the level of mic input is above -30 dB.

- 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.

- 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.

3.1.8.2   MIC

The IPSM-1C40M module is equipped with a microphone input channel. The **YMC0101-004** mic capsule could be connected to this microphone input.
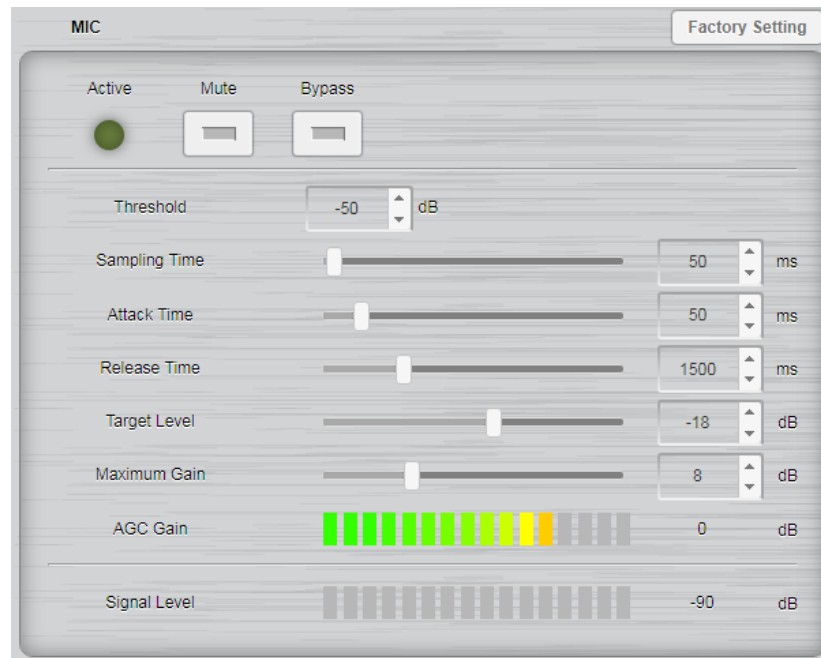
- Active LED: Light up when the microphone is activated.

- Mute: Mute/unmute the mic input, the LED will light in red while the mic input channel is muted.

- Bypass: Bypass the input signal to the output of microphone.

- Threshold (dB): When the mic input level is above this Threshold value, the AGC function will be activated.

Don't set the threshold too low, otherwise it will hear unexpected sounds such as ambient noise.

- Sampling time (ms): The time interval which measures the mic input level.

If the sampling time is too long, it will make the AGC too insensitive on the short peaks.

- Hold time: As opposed to the release time. When the mic channel signal continues below the [Threshold] after this Hold time, it will start to fade-out the gain. A correct setting of hold time can avoid inopportune deactivation such as the pause in speech.

- Target level (dB): The target level that the AGC attends to reach.

- Maximum gain (dB): The maximum gain for AGC to increase.

In order to keep natural audio sound, please avoid setting the max. gain too high.

- AGC gain (dB): Display the gain that the AGC increases/decreases the signal of input.

- Signal level (dB): Display the current level of mic input.

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

3.1.8.3   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. It is commonly used in audio recording and live sound reinforcement. The gain of each band can be controlled, the center frequency can be shifted, and bandwidth ("Q") can be widened or narrowed.
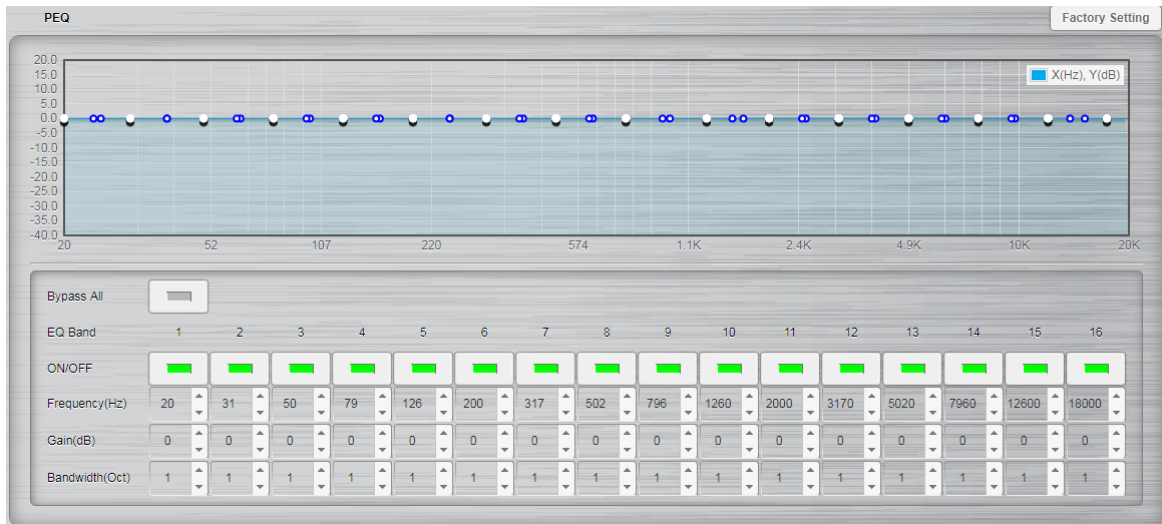
- Bypass all: Disable the PEQ function.

- 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.

❖ 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.

- o Axis-X: Frequency of output signal (Hz).

- o Axis-Y: Level of EQ gain (dB).

- o Blue control point: Adjust bandwidth.

- o White control point: Adjust EQ gain (using vertical direction) and frequency (using horizontal direction).

- o Green control point: Adjust the frequency of High/Low Pass filter.

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

3.1.8.4   AGC

With Automatic Gain Control (AGC), the input signal can be increased or decreased to a target level automatically. The AGC will effectively reduce the volume if the signal is too strong or raises the volume when the signal is weak. You can adjust the gain automatically by setting a target level.
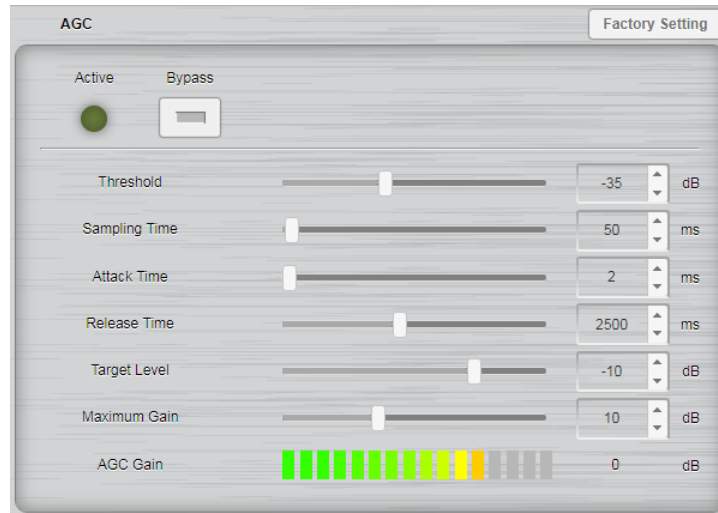
- Active LED: Light up when the AGC is activated.

- Bypass: Bypass the input signal to the output of AGC component.

- Threshold (dB): When the audio input level is above this Threshold value, the AGC function will be activated.

> Don't set the threshold too low, otherwise it will hear unexpected sounds such as ambient noise.

- Sampling time (ms): The time interval which measures the input level.

> If the sampling time is too long, it will make the AGC too insensitive on the short peaks.

- Attack time (ms): The attack time is the fade-in time when the AGC starts to reach the target level.

- Release time (dB): The release time is the fade-out time it takes to release the gain (dB) when AGC is no longer working.

- Hold time: As opposed to the release time. When the mic channel signal continues below the [Threshold] after this Hold time, it will start to fade-out the gain. A correct setting of hold time can avoid inopportune deactivation such as the pause in speech.

- Target level (dB): The target level that the AGC attends to reach.

- Maximum gain (dB): The maximum gain for AGC to increase.

> In order to keep natural audio sound, please avoid setting the max. gain too high.

- AGC gain (dB): Display the gain that the AGC increases/decreases the signal of input.

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

3.1.8.5   Hi/Low Pass, PEQ

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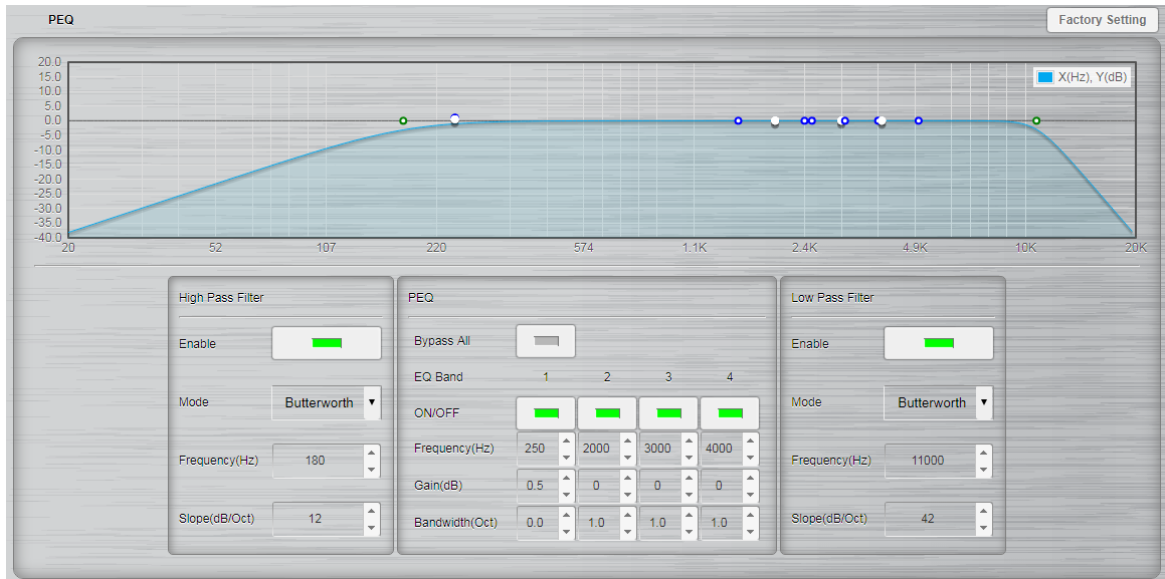
❖ High/low pass filter

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.

❖ PEQ

See PEQ component to know its DSP settings.

3.1.8.6 AEC

AEC (Acoustic Echo Cancellation) is to eliminate the echoes when under a full-duplex teleconferencing. When the near-end microphone picks up the audio from the far-end via the near-end loudspeaker, it will remove the echoes.

For example, see the figure on the right.

If Room A and Room B are under teleconferencing, speech from Room B transmits via Room A's open microphone with reverberation, and is sent right back to Room B. This process will continue again and again.

With the patented RAPIDO[TM] AEC algorithm, this will filter out all the echo from Room A, preventing Room B's microphone from transmitting it back to Room B.
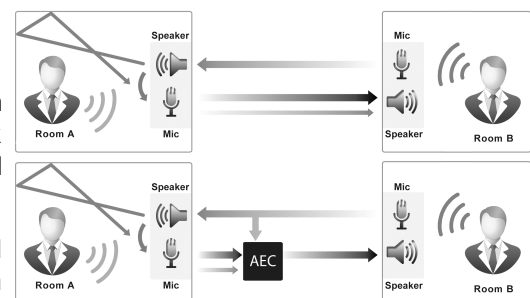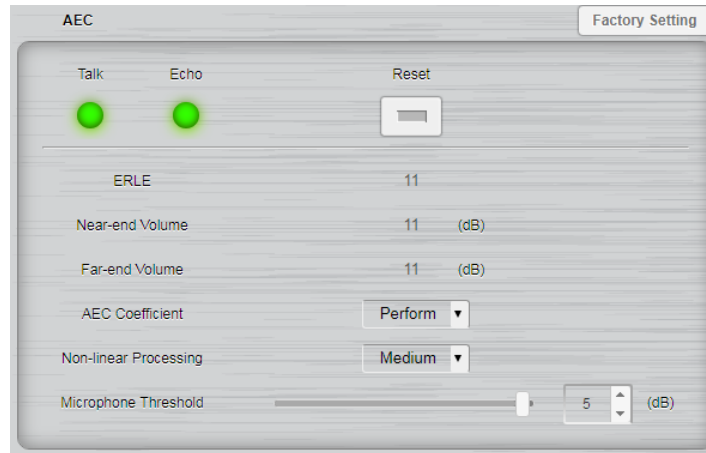
- Talk LED: This LED lights up when the signal is detected.

- Echo LED: This LED lights up when the echo is detected.

- Reset: When the echo cancellation does not function well as intended, click this button to reset.

- ERLE (dB): ERLE (Echo Return Loss Enhancement) is the attenuation value (dB) of acoustical echo achieved by AEC.

  > The bigger ERLE value indicates more echo is being removed, which means the AEC function is working harder. For example, an ERLE "30.0 dB" is better than ERLE "20 dB".

- Near-end volume (dB): The audio level of the near-end audio signal.

- Far-end volume (dB): The audio level of the far-end audio signal.

- AEC coefficient: Choose [Perform], [Bypass] or [Hold].

  o Perform: Enable the AEC function.

  o Bypass: Disable the AEC function.

  o Hold: Hold the AEC coefficient which stops at the end.

- Non-linear processing (NLP)

  o Off: Disable the non-linear processing function. Please note that some echo may occur.

  o Soft: For minor acoustical echo environments.

  o Medium: For most applications (recommended).

  o Aggressive: For very difficult acoustical echo environments.

  > If the Aggressive option is enabled, the NLP will remove the far-side echo powerfully, but it may attenuate some of the near-end signal as well.

- Microphone threshold (dB): The threshold value of microphone.

  > If the value is too high, it will render the echo cancellation nonfunctional. In contrast, if the value is too low, it may not be good to keep the AEC coefficients at speaking volume.

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

3.1.8.7   Noise Reduction

Allow to reduce the background noise, and improve the audio input quality of Mic input.

- Bypass: Bypass the input signal to the output of Noise Suppressor component.
- Threshold (dB): The background noise is analysed and calculated for reduction data based on this threshold setting.
- Volume (dB): Display the volume of microphone input.
- Factory setting: Click to restore all settings to factory setting.

3.1.8.8   Ducker

Ducker is a type of switch that allows the background music attenuates to a low level or switch off when someone needs to make an announcement.
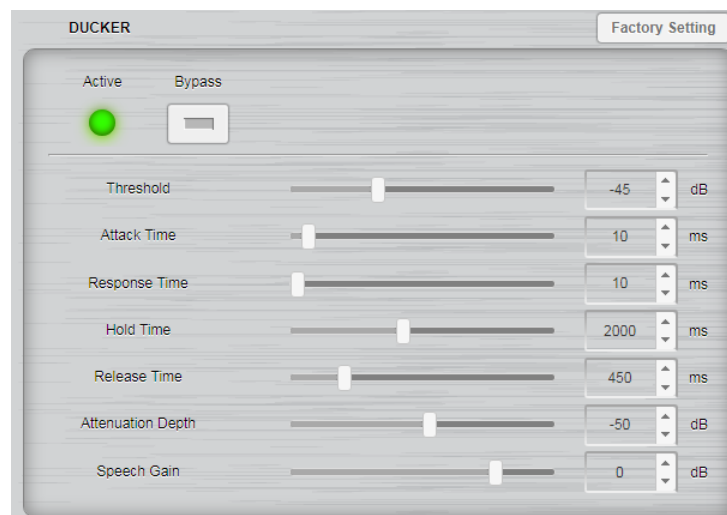
- Active: Light up when Ducker is activated while the source signal has been detected.
- Bypass: Disable the Ducker function.
- Threshold (dB): The threshold of detection on input S channel. The input A channel is attenuated when the input S channel goes above this threshold.

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

- Response Time (ms): The time between the level detection of input S and the beginning of the Ducker's operation on input A channel.

Don't set the "response time" too long, otherwise you won't hear the beginning of input S channel (as the first word of a speech). Attack Time (ms): The fade-in time of input S channel when the Ducker is activated.

- Hold Time (ms): The time interval between the signal of input S is below the Threshold.

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

- Release Time (ms): The fade-out time of input S channel when the Ducker is not activated.
- Attenuation Depth (dB): Set the attenuated level of input A channel when Ducker is activated.
- Speech Gain (dB): The level of input S channel when the Ducker is activated.
- Factory Setting: Click to restore all settings to default factory setting.

3.1.8.9   AMP Out

The internal amplifier output of IP speaker.
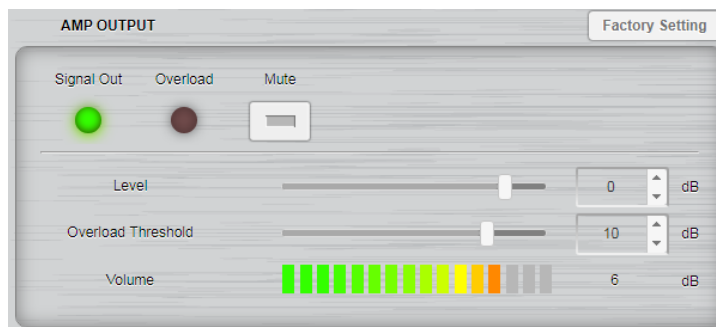
- Signal out LED: Light up when the signal level of output > -30 dB.
- Overload LED: Light up when the channel level is above the Overload Threshold (dB).
- Mute: Mute/unmute the output signal, the LED will light in red while the output channel is muted.
- Level (dB): The level of output channel.
- Overload 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.

3.1.8.10   VoIP output

The audio output of VoIP call.

The setting window of VoIP output is identical to Amp Output component.

3.1.8.11   DNM

This function is currently reserved.

3.1.8.12 Compressor & Limiter

Comp-limiter is a combination of the Compressor and the Limiter Component.
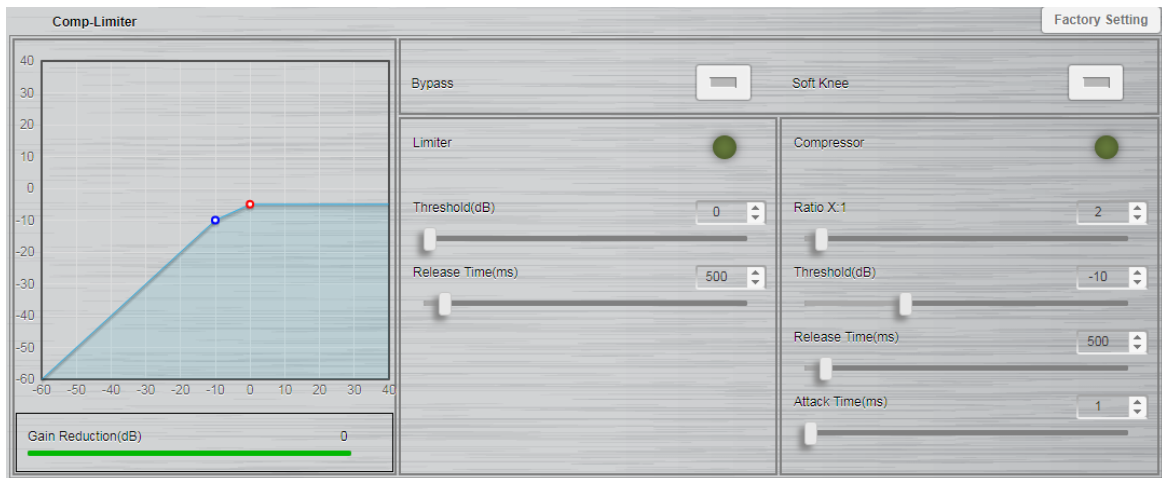
- Bypass: Disable the Comp-limiter function.

- 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.
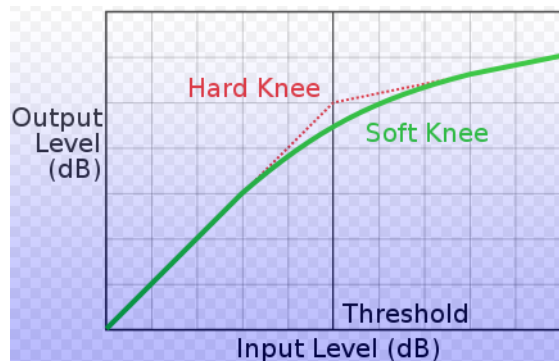
  Enable to smoothly increase the audio level to reduce distortion.

- Limiter:

  o Limiter LED: Light up when the limiting is activated.

  o Threshold (dB): Activate the Limiter function when input level above this value.

  o Release time (ms): The time it takes to release gain reduction.

- Compressor:

  o Compressor LED: Light up when the compression is activated.

  o 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.

  o Threshold (dB): Activate the Compression function when input level above this value.

  o 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.

o 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

  o Axis-X/Y: Input/output signal level (dB).

  o Blue control point: Threshold (Compressor).

  o Red control point: Threshold (Limiter).

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

4   Technical data

4.1   IPSM-1C40/IPSM-1C40M

IPSM-1C40/IPSM-1C40M	
Electrical	Power over Ethernet (POE+), IEEE802.3af, class 3
	DC power input: 24VDC (18 ~ 24VDC)
	Minimum power supply: 2A
Audio characteristics (amplified output)	Rated output power: 40W x 1CH (Class-D)
	Frequency response: 50 Hz ~ 20 kHz (±3 dB) @ 0 dBu
	THD+N@20W/40W: 1% (50 ~ 20 kHz @ full power)
	SNR: > 85 dB
Audio characteristics (mic input)	Phantom power: 2VDC
	Frequency response: 50 Hz ~ 20 kHz (±1 dB) @ 0 dBu
	Input impedance (unbalanced): 1k ohm
	EIN: < -90 dBra @ 14 dB gain
	THD+N: 0.1% (50 ~ 20 kHz @ 14 dBu gain)
Control inputs	Type: Euro-block terminal
	Mode (analog/TTL): max. 3.3 VDC
	TTL logic input (max.): HIGH active 3.3 VDC, LOW active 1.2 VDC
Contact output	Type: Euro-block terminal
	Default status: OPEN (N.O.)
	Maximum voltage: 100 VDC
	Maximum current: 0.5A
Interconnection	Female RJ45 socket, CAT5/6 cables
	Max. cable length: 100m
Supported Protocol	SIP 2.0 (peer and proxy) IETF SIP (RFC3261) IETF IGMP version 2 (RFC2236) IETF RTP(RFC1889)
Audio	Audio compression: G.711, G.722, Wav, MP3
Network	10/100 Mbps Base TX Ethernet RJ45
	Manual or Dynamic Host Conguration Protocol (DHCP) IP address setup
	Time and date synchronization using NTP
Dimension & weight	Dimensions (W x H x D): 98 x 35 x 70 mm (3.8 x 1.37 x 2.75 inch)
	Weight: 0.53 kg (0.66 lbs)
Environmental	Operating temperature: -5 °C ~ +55 °C (+ 23 °F ~ +131 °F)
	Storage temperature: -40 °C ~ +70 °C (-40 °F ~ +158 °F)
	Relative humidity: 20% to 95%
	Air pressure: 600 to 1100 hPa
	Heat dissipation: 6.82 BTU/hr
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.2   LCS8

LCS8-IP / LCS8-IPM	
Electrical	Rated power (24 VDC, 1.8A external power supply): 20W
	Rated power (POE+, IEEE802.3af, class 3): 10W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range (BSEN60268-5): 60 ~ 20,000 Hz ± 6 dB
	SPL @ 1m, 1 watt: 96 dB
	Dispersion at 2 kHz (6 dB down): 100°
	Directivity Q factor @ 2 kHz: 6.9
Mechanical	Dimensions (W x H x D): 321 x 80mm (12.6 x 3.15 inch)
	Cutout: 215mm
	Weight: 1.7 kgs (3.7 lbs)
	Cone speaker size: 8" (203 mm), twin-cone
	Cone material: Cone material
	Color: RAL 7035
	Baffle material: Steel
	Finish: Non-reffective white powder-coated epoxy paint
	Mounting accessories: 4 ea. 1-1/2 phillips-head screws
	Suggested mounting accessories: • BBX8B steel backbox • BRG8 tile bridge • MBK8 mounting bracket
Environmental	Ambient temperature: 25°C ~ 70°C (77 °F ~ 158 °F)
	Relative humidity: 95 %
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.3   CCS4/CCS6

CCS4-IP / CCS4-IPM / CCS6-IP / CCS6-IPM	
Electrical	Rated power (24 VDC, 1.8A external power supply): • CCS4-IP / CCS4-IPM: 20W • CCS6-IP / CCS6-IPM: 30W
	Rated power (POE+, IEEE802.3af, class 3): 20W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range (BSEN60268-5): • CCS4-IP / CCS4-IPM: 65 ~ 19,500 Hz • CCS6-IP / CCS6-IPM: 70 ~ 20,000 Hz
	SPL @ 1m, 1 watt (test signal bandwidth 100 Hz ~ 10 kHz) • CCS4-IP / CCS4-IPM: 86 dB • CCS6-IP / CCS6-IPM: 88 dB
	SPL @ 1m, full power, octave bandwidth • CCS4-IP / CCS4-IPM: 101 dB • CCS6-IP / CCS6-IPM: 104 dB
	Dispersion at 1k/2k Hz • CCS4-IP / CCS4-IPM: 86° • CCS6-IP / CCS6-IPM: 88°
	Acoustic power (dB-PWL@1 watt) 1k/2k Hz • CCS4-IP / CCS4-IPM: 86/88 • CCS6-IP / CCS6-IPM: 88/93
	Directivity axial Q factor, 1k/2k Hz • CCS4-IP / CCS4-IPM: 2.4/4.5 • CCS6-IP / CCS6-IPM: 2.3/6.9
Mechanical	Dimensions (W x H x D): • CCS4-IP / CCS4-IPM: 195.5 x 206.75 mm • CCS6-IP / CCS6-IPM: 263 x 214 mm
	Cutout: • CCS4-IP / CCS4-IPM: Ø 168 mm • CCS6-IP / CCS6-IPM: Ø 230 mm
	Weight: • CCS4-IP / CCS4-IPM: 3 kgs (6.6 lbs) • CCS6-IP / CCS6-IPM: 4 kgs (8.8 lbs)
	Color: White RAL9016
	Baffle material: High-impact PVC
	Mounting: Rotary compression clamp
Environmental	Ambient temperature: -10°C ~ 55°C (14°F ~ 131°F)
	Relative humidity: 95 %
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.4 APH30

APH30-IP / APH30-IPM	
Electrical	Rated power (24 VDC, 1.8A external power supply): 30W
	Rated power (POE+, IEEE802.3af, class 3): 20W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range (BSEN60268-5): 260 ~ 16,000 Hz
	S.P.L. @ 4m, 1 watt (1/3 octave, 1k Hz): 82 dB
	S.P.L. @ 1m, 1 watt (test signal bandwidth 100 Hz ~ 10k Hz): 108 dB
	S.P.L. @ 4m, full power (1/3 octave, 1k Hz): 94 dB
	S.P.L. @ 1m, full power (test signal bandwidth 100 Hz ~ 10k Hz): 122 dB
	Dispersion at 1k/2k Hz: 100°
Mechanical	Dimensions (W x H x D): 258 x 180 x 280mm
	Weight: 2.53 kgs (5.6 lbs)
	Color: RAL 7035
	Material: Low smoke zero halogen UL-94V0 plastic with UV inhibitors
	Finish: Non-reffective white powder-coated epoxy paint
	Mounting: Stainless steel U bracket, and hardware
Environmental	Ambient temperature: 25°C ~ 70°C (77 °F ~ 158 °F)
	Relative humidity: 95 %
	IP rating: 66
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.5 JD20W/JD20B

JD20W-IP / JD20W-IPM / JD20B-IP / JD20B-IPM	
Electrical	Rated power (24 VDC, 1.8A external power supply): 20W
	Rated power (POE+, IEEE802.3af, class 3): 20W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range (BSEN60268-5): 63 ~ 20,000 Hz
	S.P.L. @ 1m, 1 watt (test signal bandwidth 100 Hz ~ 10k Hz): 84 dB
	S.P.L. @ 1m, full power (test signal bandwidth 100 Hz ~ 10k Hz): 97 dB
	Dispersion at 1k/2k Hz: 180°/100°
	Acoustic power (dB-PWL@1 watt) 1k/2k Hz: 78/75
	Directivity axial Q factor, 1k/2k Hz: 3.5/7.1
Mechanical	Dimensions (W x H x D): 146 x 229 x 150mm
	Weight: 2.43 kgs (5.4 lbs)
	Color: • JD20W-IP/JD20W-IPM: White • JD20B-IP/JD20B-IPM: Black
	Material: ABS molded housing
	Finish: Non-reffective white powder-coated epoxy paint
	Mounting: Die-cast Aluminum Swivel Bracket
Environmental	Ambient temperature: -10°C ~ 55°C (14°F ~ 131°F)
	Relative humidity: 95 %
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.6 LIS8/LIS8CX

	LIS8-IP / LIS8-IPM / LIS8CX-IP / LIS8CX-IPM
Electrical	Rated power (24 VDC, 1.8A external power supply): 20W
	Rated power (POE+, IEEE802.3af, class 3): • LIS8-IP/LIS8-IPM: 10W • LIS8CX-IP/LIS8CX-IPM: 20W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range: • LIS8-IP/LIS8-IPM: 60 ~ 20,000 Hz (± 6 dB) • LIS8CX-IP/LIS8CX-IPM: 50-16,000 Hz (± 6 dB)
	Directivity Q factor @ 2k Hz • LIS8-IP/LIS8-IPM: 6.90 • LIS8CX-IP/LIS8CX-IPM: 6.80
	S.P.L. @ 1m, 1 watt: • LIS8-IP/LIS8-IPM: 95 • LIS8CX-IP/LIS8CX-IPM: 94
	Dispersion at 2k Hz (6 dB down): • LIS8-IP/LIS8-IPM: 100° • LIS8CX-IP/LIS8CX-IPM: 96°
Mechanical	Cone speaker size: 8" (203 mm), twin-cone
	Cone material: self-edged paper
	Dimensions (W x H x D): 604 x 326.8 x 114mm (23.78 x 12.87 x 4.49 inch)
	Weight: • LIS8-IP/LIS8-IPM: 4.7 kgs (10.4 lbs) • LIS8CX-IP/LIS8CX-IPM: 5.2 kgs (11.5 lbs)
	Color: RAL 7035
	Baffle material: ABS with molded-in UV inhibitor
	Finish: Non-reflective white powder-coated epoxy paint
Environmental	Ambient temperature: 25°C ~ 70°C (77 °F ~ 158 °F)
	Relative humidity: 95 %
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

4.7 PBC6

PBC6-IP / PBC6-IPM	
Electrical	Rated power (24 VDC, 1.8A external power supply): 6W
	Rated power (POE+, IEEE802.3af, class 3): 10W
	Driver impedance: 8 ohm
Audio characteristics	Effective frequency range (BSEN60268-5): 160 ~ 18,000 Hz
	S.P.L. @ 4m, 1 watt (1/3 octave, 1k Hz): 70 dB
	S.P.L. @ 1m, 1 watt (test signal bandwidth 100 Hz ~ 10k Hz): 96 dB
	S.P.L. @ 4m, full power (1/3 octave, 1k Hz): 75 dB
	S.P.L. @ 1m, full power (test signal bandwidth 100 Hz ~ 10k Hz): 104 dB
	Dispersion at 1k/2k Hz: 119°/100°
Mechanical	Dimensions (W x H x D): 330 x 243.5 x 90mm
	Weight: 1.68 kgs (3.7 lbs)
	Color: White RAL9016
	Material: Low smoke zero halogen UL-94V0 plastic with UV inhibitors
	Mounting: Keyhole and/or screws
Environmental	Ambient temperature: -10°C ~ 55°C (14°F ~ 131°F)
	Relative humidity: 95 %
	IP rating: 21
Certifications	Europe - CE/EMC • EN 55032 • EN 55035 • EN 61000-3-2 • EN 61000-3-3

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