iSpeaker CM365

Ceiling Array Microphone

SOFTWARE OPERATION USER MANUAL

Version 1.0 | 2026

www.infobit.com

1. Product Overview

1.1 Product Overview

The **INFOBIT iSpeaker CM365** is an intelligent ceiling array microphone engineered for transparent sound reinforcement and professional conferencing environments. The device integrates **129 high-fidelity microphones** in a composite circular array layout, providing the acoustic sampling density required for advanced beamforming and signal processing.

The processor core features a professional audio processing unit (8-core CPU, 6T computing power) running a suite of industry-leading algorithms:

- ClearVoice AI algorithm
- Real-time Anti-Feedback Suppression Engine
- Adaptive Acoustic Field Control technology
- Multi-modal AI noise reduction system
- Spatial acoustic field modeling
- Traditional DSP + AI deep-learning dual-engine architecture
- Dynamic beamforming

Key performance capabilities:

- **Multiple zones:** 33 amplification zones and 33 pickup zones
- **Amplification range:** up to 4 meters
- **Pickup range:** up to 8 meters — captures audio from any position within the pickup zone
- **Built-in cascade module** — supports multi-unit cascading for large venues
- **Built-in Dante module** — supports digital audio network transmission

2. Product Interface Description

The **iSpeaker CM365** provides the following physical connectors and status indicators:

Interface / Indicator	Description
DC 12–48V	Power input connector. Accepts DC 12V to 48V power supply.

PWR / RUN	Indicators — **PWR**: solid red when device is powered on. RUN: solid green when operating normally.
RESET	Factory reset button. Restores all settings to factory defaults.
DANTE / LAN / POE+	Dante digital audio transmission port / Ethernet network port / PoE+ power input.
LINK IN	Cascade link input port for multi-unit daisy-chain configurations.
LINK OUT	Cascade link output port for multi-unit daisy-chain configurations.
USB (Type-C)	Firmware upgrade interface (Type-C connector) and USB 2.0 audio transmission interface.
RS485	RS-485 device control interface. Provides DC 12V / 0.4A auxiliary output.
WL / LINE IN	Wireless microphone analog input and external audio source (PC line-out) analog input.
AEC IN 1/2	Remote audio analog input for echo cancellation reference signal.
AEC OUT 1/2	Remote audio analog output — carries the post-echo-cancellation signal.
SPK OUT 1/2	Speaker analog audio output — carries the post-feedback-suppression local amplification signal.

3. PC Management Software

> **NOTE:** *Default device network settings:* ***IP Address: 192.168.1.100*** *|* ***Subnet Mask: 255.255.255.0*** *|* ***Gateway: 192.168.1.1****. Before connecting, configure the PC with an IP address in the same subnet (must differ from the device IP to avoid conflicts). It is recommended to disable the Windows Firewall and any antivirus software to ensure normal device connectivity.*

3.1 Software Overview

The PC management software interface is divided into the following functional areas:

Area	Function
1 — Search & Save	Discovers devices on the local network. Saves configured parameters to the device.
2 — Device List	Displays discovered device IP addresses. Double-click an IP to connect.
3 — Signal Flow Diagram	Graphical display of the audio signal processing chain. Click module icons to access parameter settings.
4 — Main Parameters	Shows device SN, firmware version, runtime, MAC address, and editable device name.
5 — Flow Control Area	Tab-based parameter control for each processing module (INPUT, AEC PATH, AFC PATH, OUTPUT, etc.).
6 — Processor Control	Expandable/scrollable panel for detailed parameter adjustment of the selected module.

Figure 3.1 — Software Main Interface (SYS CTRL tab shown)

3.2 System Signal Flow

The following describes the audio processing chain within the **iSpeaker CM365**:

- MIC1 / MIC2 → AEC Cancel → AEC Dodge → AEC → ARR → ANC → AGC → EQ → Mix Matrix → AEC OUT
- AFC Cancel → AFC Dodge → AFC → ARR → ANC → AGC → EQ → Mix Matrix → SPK OUT
- Additional inputs: WL/LINE IN, AEC IN, USB IN feed into the processing chain as configured.

Signal indicator colors: Green = enabled / active. Red = disabled / muted.

3.3 Software Features

3.3.1 Device Search & Connection

Click Search to discover all devices on the same local area network. Discovered devices appear with their IP addresses. Select the target IP and double-click to connect. Click Save Param to save the current parameter configuration to the device.

3.3.2 Main Parameters Panel

The left-side Main Parameters panel provides the following read-only and editable fields:

Field	Description

SN	Device serial number (read-only)
Firmware	Installed firmware version number (read-only)
Run Time	Elapsed device runtime since last restart (read-only)
Mac Addr	Device hardware MAC address (read-only)
Name	Device display name — editable. Type a new name in the field and press Enter to apply.

3.3.3 Flow Control Area

Click any module icon in the signal flow diagram to select it and configure its parameters in the tabbed processor control area.

3.4 Processor Modules

3.4.1 INPUT — Input Settings

The INPUT tab provides gain, mute, and level metering controls for all audio input channels.

Figure 3.4.1 — Main Interface with INPUT Tab Selected

Parameter	Range / Values	Description
MIC1 / MIC2	Array microphone	Ceiling array microphone channels 1 and 2. Mute toggles the signal on/off. Level meter displays real-time signal level (read-only). These channels feed into the AEC processing path.
WL-MIC	Gain: −18 to +18 dB	Wireless microphone analog input. Adjustable gain fader and numeric input. Set MAX (≤+18) and MIN (≥−18) gain limits to restrict adjustment range.
PC-IN (LINE IN)	Gain: −18 to +18	External audio source (PC) analog input. Same gain

	dB	controls and limit settings as WL-MIC.
AEC-IN	Gain: –18 to +18 dB	Remote audio reference signal input for acoustic echo cancellation. Same gain controls and limit settings as WL-MIC.
USB IN 1/2	Gain: –18 to +18 dB	USB audio input channels. In remote interaction mode, can be selected as the echo reference signal source.
DANTE IN 1/2	Gain: –18 to +18 dB	Available in Dante mode only. DANTE IN1 is the remote interaction input channel. DANTE IN2 is the local amplification input channel.
Teacher Dual Mic	Toggle ON/OFF	Enables teacher dual-microphone mode for classroom deployments requiring split-zone microphone tracking.

For each adjustable channel, the following controls are provided:

- Mute: Enables or disables the input channel signal.
- Level Meter: Displays real-time signal level — read-only display, not adjustable.
- Gain Fader: Drag to adjust the channel gain within the configured MAX/MIN limits.
- Numeric Input: Type a gain value directly to set the level precisely.
- MAX: Sets the maximum allowable gain limit (up to +18 dB).
- MIN: Sets the minimum allowable gain limit (down to –18 dB).

3.4.2 AEC PATH — Acoustic Echo Cancellation

The **AEC PATH** tab configures the Acoustic Echo Cancellation processing chain. These parameters control the output quality of AEC OUT / USB OUT / DANTE OUT 1 (remote interaction output).

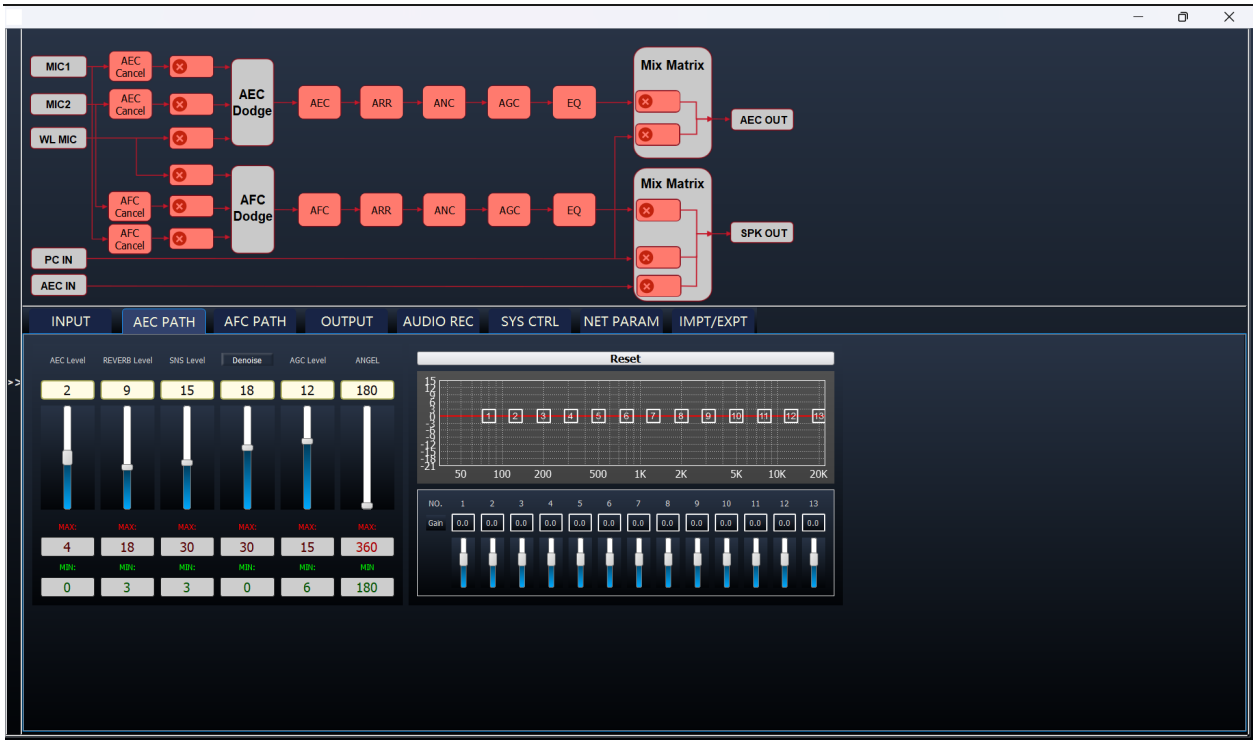

Figure 3.4.2 — AEC PATH Tab

Parameter	Range / Values	Description
AEC Level	0 – 4 (Max: 4, Min: 0)	Acoustic echo cancellation depth. Increase when the far-end participant reports hearing their own voice echoed back. Default level suits most rooms.
REVERB Level	3 – 18 (Max: 18, Min: 3)	Reverberation suppression strength. Increase in acoustically reflective environments (open spaces, hard surfaces). Decrease in treated rooms to preserve voice naturalness.
SNS Level	3 – 30 (Max: 30, Min: 3)	Stationary Noise Suppression level. Removes continuous background noise such as HVAC, fans, and projectors.
Denoise (AI)	0 – 30 (Max: 30, Min: 0)	AI-powered transient noise suppression. Reduces impulse and non-stationary noise events. Higher values suppress more noise but may affect voice clarity.
AGC Level	6 – 15 (Max: 15,	Automatic Gain Control ceiling. Maintains consistent

	Min: 6)	output level by dynamically adjusting gain.
ANGLE	180° or 360°	Pickup beam angle for the AEC processing path. 180° = directional, 360° = omnidirectional.
13-Band EQ	Gain per frequency band	Parametric equalizer with 13 frequency bands spanning 50 Hz – 20 kHz. Drag band markers up/down to adjust amplitude; type gain values directly; or use the faders.
Reset	Button	Resets all AEC PATH parameters to factory default values.

> **NOTE:** *Commissioning tip: Higher REVERB, SNS, and Denoise values reduce noise but degrade voice naturalness. In acoustically treated rooms, leave suppression values at defaults and only adjust gain.*

3.4.3 AFC PATH — Anti-Feedback Control

The AFC PATH tab configures the Anti-Feedback Control processing chain. These parameters control the output quality of SPK OUT / DANTE OUT 2 (local amplification output).

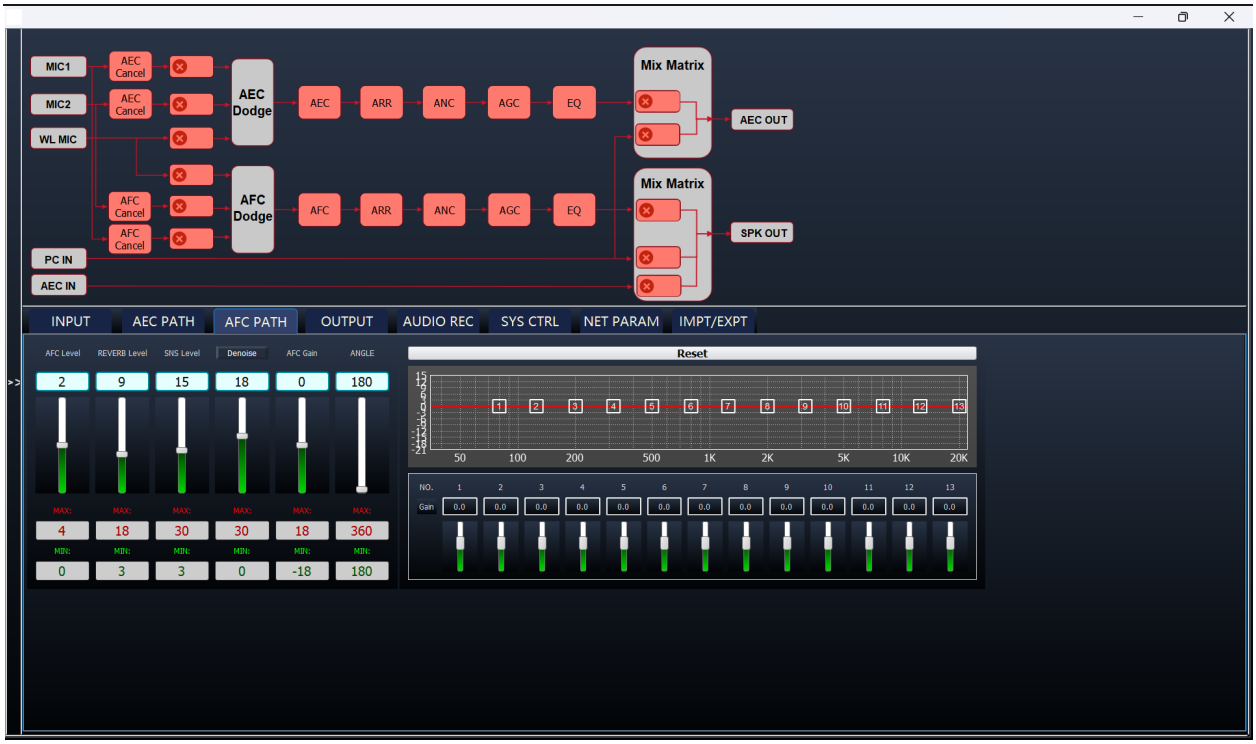

Figure 3.4.3 — AFC PATH Tab

Parameter	Range / Values	Description
AFC Level	0 – 4 (Max: 4, Min: 0)	Anti-feedback suppression depth for the local amplification output.
REVERB Level	3 – 18 (Max: 18, Min: 3)	Reverberation suppression strength for the local amplification signal.
SNS Level	3 – 30 (Max: 30, Min: 3)	Stationary noise suppression level for the AFC path.
Denoise (AI)	0 – 30 (Max: 30, Min: 0)	AI transient noise suppression for local amplification output.
AFC Gain	–18 to +6 dB (Max: +6, Min: –18)	Output gain for local amplification. Controls the speaker volume. Excessive values cause audio feedback (howling). Commission by gradually increasing from minimum. This value is linked to the remote control volume buttons — set a safe upper limit to prevent over-

		amplification.
ANGLE	180° or 360°	Amplification beam angle: 180° (half-space / directional) or 360° (full-space / omnidirectional).
13-Band EQ	Gain per frequency band	Parametric EQ for the local output path. 13 bands from 50 Hz – 20 kHz. Same controls as AEC PATH EQ.
Reset	Button	Resets all AFC PATH parameters to factory default values.

> **NOTE:** *Commissioning tip: Increase AFC Gain gradually during initial setup. Reduce immediately if feedback (howling) occurs. For EQ: if the room has noticeable echo/reverberation, reduce EQ bands above 1 kHz. If audio sounds thin, add a slight low-frequency boost.*

3.4.4 OUTPUT — Output Settings

The **OUTPUT** tab provides gain, mute, and level controls for the two main output channels.

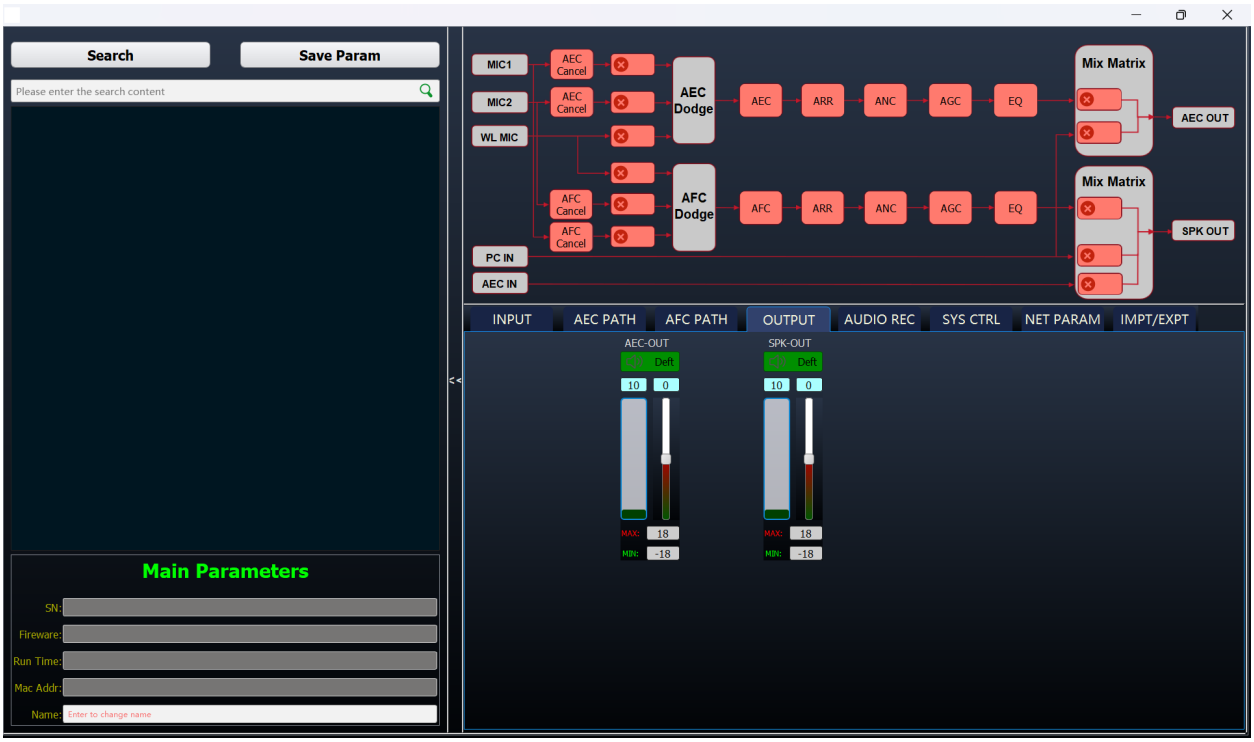

Figure 3.4.4 — OUTPUT Tab

Parameter	Range / Values	Description
AEC-OUT	Gain: −18 to +18 dB	Remote interaction output (post-echo-cancellation signal). Feeds the AEC OUT 1/2 physical connectors, USB OUT, and DANTE OUT 1.
SPK-OUT	Gain: −18 to +18 dB	Local amplification output (post-anti-feedback-processing signal). Feeds SPK OUT 1/2 physical connectors and DANTE OUT 2.
Mute	Toggle ON/OFF	Mutes the output channel. Green = active/unmuted.
Audio Output Mode	Yellow / Gray toggle	Yellow: output signal is processed through the AFC anti-feedback path. Gray: standard output per the defined channel function.
Level Meter	Read-only	Displays the real-time output signal level.
Gain Fader	−18 to +18 dB	Adjusts the channel output gain within the configured MAX/MIN limits.
MAX / MIN	Input fields	Sets the maximum (+18 dB limit) and minimum (−18 dB limit) for the output gain adjustment range.
Output dB Preset	0 / −12 / −18 / −24 dB	Selects a preset output attenuation level. Click the Set button to apply the selected preset.

3.4.5 AUDIO REC — Audio Recording

The **AUDIO REC** tab enables simultaneous multi-channel audio recording from the device for diagnostic analysis, system tuning, or archival purposes.

Figure 3.4.5 — AUDIO REC Tab

Parameter	Range / Values	Description
Audio Save Path	Folder path	Click Open to browse and select the destination folder on the PC where recorded audio files will be saved.
VOLUME	Multiplier (e.g. 1.0x)	Playback volume multiplier for monitoring recorded audio.
All/Cancel	Checkbox	Selects or deselects all available recording channels simultaneously.
MIC1/2/WL-I	Checkbox	Records the MIC1, MIC2 array microphone channels and the WL-MIC input channel.
PC-IN	Checkbox	Records the PC/LINE IN input channel.
AEC-OL	Checkbox	Records the AEC output level monitor signal.

AEC-I	Checkbox	Records the AEC reference input signal.
SPK-OL	Checkbox	Records the SPK output level monitor signal.
Start / Stop	Buttons	Start: begins recording all selected channels simultaneously. Stop: ends recording and saves the audio files to the configured path.
Detailed Logging	Log display area	Displays real-time device operational log information during the recording session.

3.4.6 SYS CTRL — System Control

The **SYS CTRL** tab provides device management functions including firmware upgrade, diagnostic log retrieval, and system reset.

Figure 3.4.6 — SYS CTRL Tab

Parameter	Range / Values	Description
SN Setting / Write SN	Text input + button	Enter the device serial number in the text field and click Write SN to write it to the device. A confirmation dialog appears on success.
Upgrade (Firmware)	File path + button	Click Open to locate the firmware upgrade file (.bin) on the PC. Select the file, then click Upgrade to begin the upgrade process. A success dialog appears and the device restarts automatically. Use Search to rediscover the device after the upgrade.
Log Crawling / Grab Logs	File path + button	Click Open to select the destination folder for log files. Click Grab Logs to retrieve and save the current device diagnostic log.
Speaker Selecting	Dropdown + Setting btn	Selects the speaker output configuration mode (e.g., ONE). Click Setting to apply the selection.
Log Mode	Dropdown + Setting btn	Sets the diagnostic log output mode: Output (terminal display) or Write File. Log levels: INFO, DEBUG, WRN (Warning), ERR (Error). Click Setting to apply.
Restart	Button	Restarts the device software while preserving all current parameter settings.
Reset	Button	Performs a factory reset — restores all parameters to their factory default values. All configured settings will be overwritten.

> **NOTE:** *After performing a firmware upgrade or factory reset, the device will restart automatically. Use the Search function in the software to rediscover the device on the network.*

3.4.7 NET PARAM — Network Parameters

The **NET PARAM** tab configures the device IP address, subnet mask, and gateway for network communication.

Figure 3.4.7 — NET PARAM Tab

Parameter	Range / Values	Description
IP Mode	Dropdown (Auto / Manual)	Auto obtain IP: device receives its IP address via DHCP. The IP address fields are read-only in this mode (default: 192.168.1.100). Switch the dropdown to the static IP option to enable manual configuration.
IP Address	e.g. 192.168.1.3	Static IP address to assign to the device.
Mask	e.g. 255.255.255.0	Subnet mask for the device network.
Gateway	e.g. 192.168.1.1	Default gateway address for the device network.
Determine	Button	Applies the configured IP settings. A confirmation dialog appears on success, and the device restarts automatically. Use Search to rediscover the device at its

		new IP address.

Cascade & Audio Streaming Settings

Additional advanced settings available in the NET PARAM section:

- **Audio Streaming:** Enter the target device IP address and select the streaming port to enable audio network streaming output.
- **Cascade Settings:** Assign the device role as Master Mic or Slave Mic, then click Confirm. After setting the master device, all connected slave device IP addresses will be listed.

3.4.8 IMPT/EXPT — Import / Export Configuration

The **IMPT/EXPT** tab enables saving and loading of device configuration presets. The device supports up to 10 independent configuration scenes.

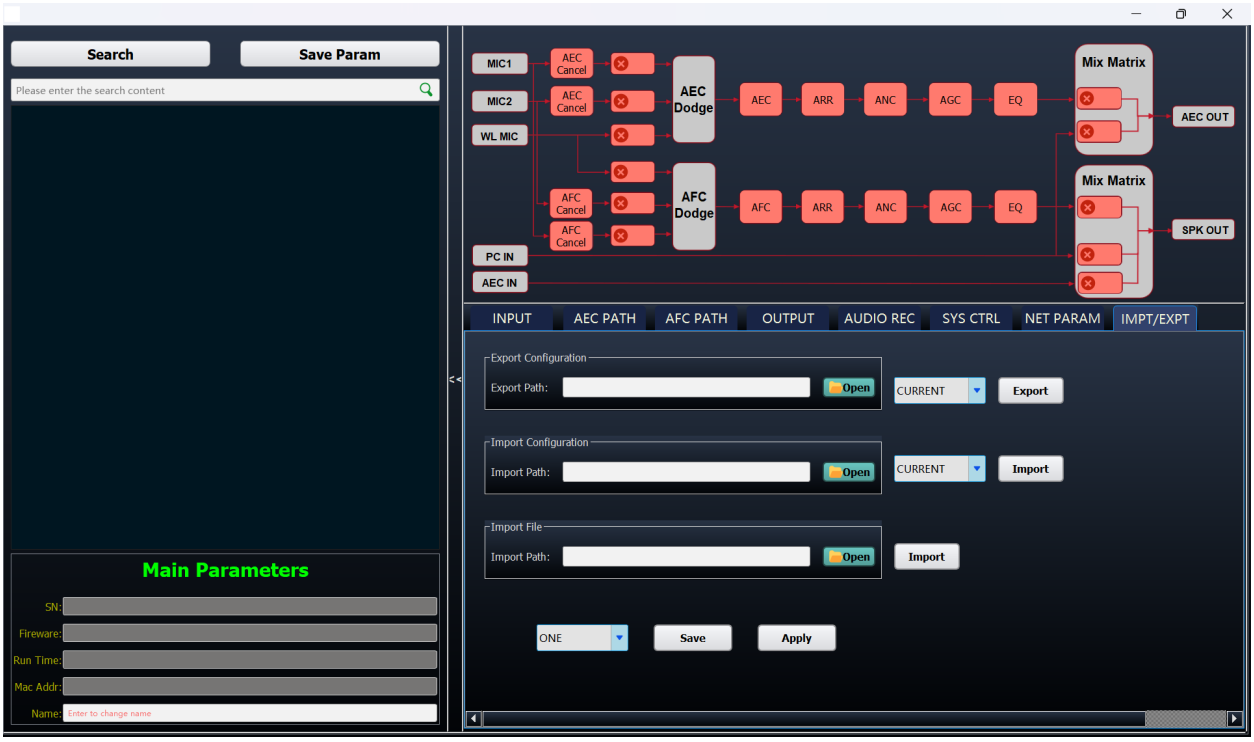

Figure 3.4.8 — IMPT/EXPT Tab

Parameter	Range / Values	Description
Export Configuration	Path + scene + Export btn	Click Open to select the destination folder. Use the scene dropdown (CURRENT or a numbered scene) to select which configuration to export. Click Export. A confirmation dialog confirms success.
Import Configuration	Path + scene + Import btn	Click Open to navigate to the saved configuration file. Use the scene dropdown to select the target scene slot for import. Click Import. A confirmation dialog confirms success.
Import File	Path + Import btn	Click Open to locate a raw device configuration file. Click Import to load it directly into the device.
Scene Selector	1 – 10 scenes (ONE default)	Selects one of 10 available configuration scene slots. The default scene is labeled CURRENT (Clear Mode).
Save	Button	Saves the current active parameter configuration to the selected scene slot.
Apply	Button	Activates the selected scene configuration immediately on the device.

4. Commissioning Quick Reference

Recommended parameter settings for common deployment scenarios.

4.1 Local Sound Reinforcement

For local speaker amplification, configure the **AFC PATH** parameters:

Parameter	Commissioning Recommendation
REVERB Level	Increase for open, acoustically reflective spaces (e.g., large halls, conference rooms with glass walls). Decrease in acoustically treated rooms to preserve voice naturalness.
AFC Gain	Start at minimum and increase gradually. Reduce immediately if audio feedback (howling) occurs. Set a safe MAX limit to prevent over-amplification via the remote control.
EQ (above 1 kHz)	If the room has noticeable reverberation tail, reduce the high-frequency EQ bands (above 1 kHz) slightly.
EQ (low frequencies)	If the audio sounds thin or lacking body, add a moderate boost to the low-frequency EQ bands.

4.2 Remote Conferencing / AEC Path

For remote interaction **(AEC path)**, the same principles apply using AEC PATH parameters:

- **AEC Level:** Increase when the far-end reports hearing their own voice echoed back.
- **REVERB Level, SNS Level, Denoise:** Apply the same logic as section 4.1 above.
- **EQ tuning** principles for AEC OUT are identical to AFC PATH EQ.

> **NOTE:** *General principle: Suppression parameters (REVERB, SNS, Denoise) reduce noise artifacts but degrade voice naturalness at high values. In acoustically treated environments, minimize suppression and focus tuning on gain levels only.*

5. Troubleshooting

Symptom	Cause / Solution
Software cannot connect / Device not found in search	Verify the PC firewall and antivirus software are disabled. These applications commonly block the device discovery protocol. Disable them and retry the Search function.
Input level meters show no activity, but audio is present in the room	Multiple software instances may be running simultaneously. Close all instances and reopen the software once. Also verify the device is properly connected and the correct IP is selected.
Local amplification feedback / howling	The connected amplifier or speaker output level is too high, or the AFC Gain is set too high. Reduce AFC Gain incrementally. If the issue persists, use the IMPT/EXPT tab to restore factory defaults for the mix matrix configuration.
No audio output from the device	Verify the output cable is connected to the SPK OUT port (not AEC OUT). Check the device LED: green or amber LED = normal operation. Confirm that the amplification mode is enabled in the software.
Connected audio has accompaniment but no vocal audio	The source device outputs an unbalanced 3.5mm signal, but it is wired using a balanced connector wiring scheme. This causes the left and right channels to cancel each other (phase inversion). Rewire using the correct unbalanced (mono) connection method.
Dante Controller cannot discover the device	The device Dante interface and the control PC are on different network subnets. Open Dante Controller, view the device information to check the current Dante IP address, and update it to match the PC's subnet.

6. Product Specifications

6.1 Algorithm Specifications

Parameter	Specification
Supported Algorithms	AFC, ANS, AEC, AGC, ARR
Feedback Gain Suppression	≥ 18 dB
Noise Reduction	≥ 30 dB
Echo Cancellation Depth	≥ 90 dB
Echo Tail Cancellation Length	≥ 1 second
Reverberation Suppression	≥ 18 dB
Maximum Gain	≥ 30 dB
AI Noise Reduction	Supported
Automatic Mixing (Auto Mix)	Supported
Beamforming	Supported
Sound Source Localization	Supported

6.2 Microphone Specifications

Parameter	Specification

Number of Microphone Elements	129
Sensitivity	−32 ± 2 dB
Signal-to-Noise Ratio	70 dB
Frequency Response	75 Hz – 20 kHz

6.3 Hardware & System Specifications

Parameter	Specification
Sample Rate	48 kHz
Frequency Response	20 Hz – 20 kHz, ±0.5 dB
Signal-to-Noise Ratio	100 dB
Total Harmonic Distortion (THD)	≤ 0.1%
Input Impedance (Balanced)	20 kΩ
Output Impedance (Balanced)	200 Ω
Maximum Input Level (Balanced)	+4 dBu
Maximum Output Level (Balanced)	+10 dBu
Dante Audio Networking	Supported
Unit Cascade	Supported
RS-485 Control Interface	Supported

Power Input	DC 12V – 48V / PoE+
Power Consumption	25 W
Dimensions (L × W × H)	600 × 600 × 42.8 mm
Net Weight	6 kg
Operating Temperature	0°C – 40°C
Storage Temperature	–20°C – 60°C
Color	Pearl White