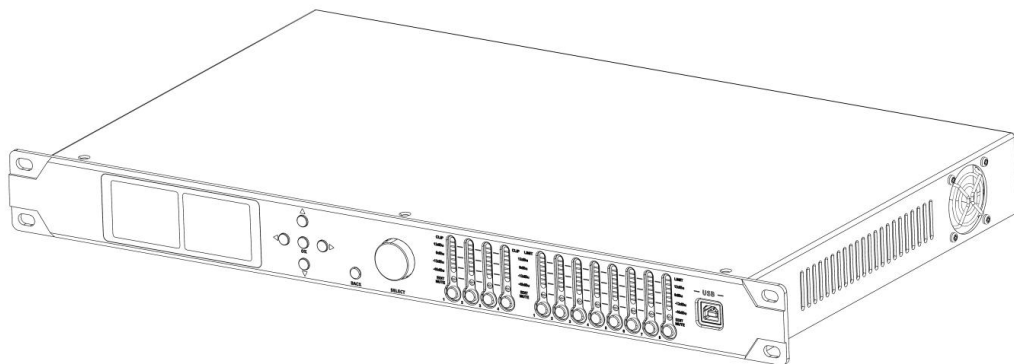




VERA-C48 / VERA C48D

4-In / 8-Out Professional Audio Processor



USER MANUAL

Revision A — Read the safety information on the following pages before use.

Important Safety Information

Read this section completely before connecting or powering the VERA-C48 / VERA-C48D. This unit is a loudspeaker management processor. It sits between your console and your amplifiers, and its settings directly control what reaches your loudspeakers. Incorrect settings can destroy drivers in a fraction of a second and can cause hearing injury.

Symbols used in this manual

Symbol	Meaning
WARNING	A hazard that can cause injury, hearing damage, or destroyed loudspeaker components.
CAUTION	A condition that can damage the processor, the amplifiers, or the loudspeakers.
NOTE	Information that helps you get correct or faster results.

Electrical safety

- Read these instructions, keep them, and heed all warnings printed on the unit and in this manual.
- The unit operates on AC 100–240 V, 50/60 Hz. Connect it only to a properly earthed (grounded) three-conductor mains outlet. Do not defeat the safety purpose of the grounding pin, and do not use a two-pin adapter.
- Replace the mains fuse only with a fuse of the same type and rating. Disconnect the mains cord before opening the fuse holder.
- Protect the power cord from being walked on or pinched, particularly at the plug and at the point where it exits the unit.
- Unplug the unit during lightning storms or when it will be unused for long periods.
- Do not expose the unit to rain or moisture. Do not place objects filled with liquid on or above the unit. If liquid enters the chassis, disconnect mains power immediately and have the unit inspected.
- There are no user-serviceable parts inside. Refer all servicing to qualified service personnel. Service is required if the power cord or plug is damaged, liquid has been spilled into the unit, the unit has been exposed to rain, the unit does not operate normally, or the unit has been dropped.
- Clean the unit only with a dry cloth. Do not use solvents, abrasives, or aerosol cleaners.

Installation and ventilation

- The unit is a 1U 19-inch rack device with rear-panel forced-air cooling. Do not block the side vents or the rear fan.
- Do not install the unit directly above or below high-power amplifiers or other significant heat sources. Leave a ventilation gap where rack airflow is limited.
- Support the rear of the chassis in mobile or touring racks. The front rack ears alone are not intended to carry transport shock loads.
- Operating ambient temperature is –20 °C to +60 °C (–4 °F to 140 °F). Do not operate the unit in an enclosed rack that exceeds this range.

WARNING — LOUDSPEAKER DAMAGE

This processor controls the crossover filters, limiters, gain, delay, and equalization that protect your loudspeakers. A wrong setting can destroy drivers instantly and is not covered by warranty.

Before sending signal to a system, always confirm: the correct **speaker preset** is loaded on every output; the **high-pass and low-pass filters** assigned to each output match the driver connected to it; the **limiter threshold** and **amplifier gain** parameters have been set for the amplifier actually in use.

Never connect a high-frequency driver to an output whose high-pass filter has not been verified.

WARNING — MUTE BEFORE YOU CHANGE ANYTHING CRITICAL

Recalling a device preset, loading or editing a speaker preset, resetting a channel, clearing the matrix, or upgrading firmware changes crossover points, limiter thresholds, and routing immediately, with no confirmation.

Mute the outputs or turn the amplifiers down before performing any of these operations.

WARNING — POWER SEQUENCE

Power the processor ON first and the amplifiers LAST.

Power the amplifiers OFF first and the processor LAST.

This prevents switch-on and switch-off transients from reaching the loudspeakers.

WARNING — HEARING DAMAGE

This processor can drive systems capable of sound pressure levels that cause permanent hearing loss. Wear hearing protection when working near loudspeakers at high level.

The built-in test signals (sine, pink noise, white noise) are generated after the input source selector and are not attenuated by any upstream fader. Set the test level low and raise it gradually. Always return the channel to Priority Input when testing is finished.

CAUTION — CONNECTIONS AND SIGNAL INTEGRITY

Outputs are electronically balanced line-level XLR connections. Do not connect them to microphone inputs, and never to an input with phantom power enabled. Phantom power applied to the outputs can damage the output stage.

Make all audio and network connections with the unit and the amplifiers powered off.

When using AES/EBU or Dante sources, confirm that the digital source is locked and present before unmuting.

Configure backup sources so that loss of a digital source does not leave a channel silent.

Do not interrupt mains power during a firmware upgrade.

NOTE — PROTECT THE CONFIGURATION

Once a system is commissioned, use Panel Lock, Preset Lock, and Speaker Preset protection to prevent accidental or unauthorized changes. Verify which preset is set as the Boot preset: a unit that powers up into the wrong preset can send full-range signal to high-frequency drivers.

Export the finished configuration to a file and keep a copy off-site.

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1. Introduction

1.1 Overview

The Sound Barrier VERA-C48 is a professional 4-in / 8-out loudspeaker management processor. It combines input source selection and redundancy, dynamics processing, parametric and dynamic equalization, delay, FIR filtering, a routing matrix, and a protected speaker-preset output section in a single 1U chassis.

All processing runs at 96 kHz on a 32-bit floating-point DSP. The unit can be configured from the front panel or, more completely, from the MConsole PC application over USB, Ethernet, or serial. Configurations can be stored in the device, exported to disk, and copied between devices.

1.2 Model variants

Feature	VERA-C48	VERA-C48D
Analog inputs	4 (female XLR)	4 (female XLR)
Analog outputs	8 (male XLR)	8 (male XLR)
AES/EBU inputs	4 channels	4 channels
Dante network audio	—	8 in / 8 out, primary + secondary
Ethernet control (TCP/IP, web)	Yes	Yes
RS-232 / RS-485 / GPIO	Yes	Yes
USB control port	Yes	Yes
DSP processing	Identical	Identical

Except where a paragraph is marked "VERA-C48D only", everything in this manual applies to both models.

1.3 Applications

- Performance halls and theatres
- Stadiums and sports venues
- Touring and professional live event systems
- Auditoriums and multi-purpose halls
- Conference and paging systems
- Fixed-install loudspeaker systems requiring locked, protected presets

1.4 Key features

- 96 kHz sampling with 24-bit conversion; 20 dBu maximum input and output level; 113 dB signal-to-noise ratio.
- 4 analog line inputs and 8 analog line outputs on XLR connectors.
- 4 channels of AES/EBU digital input.
- VERA-C48D: 8 channels in and 8 channels out of Dante network audio with primary and secondary network ports for redundancy.
- Automatic source redundancy: each input channel selects one main source and two backup sources with priority switching.

- FIR filtering at 96 kHz: 4 × 1280 taps on the inputs and 8 × 2048 taps on the speaker preset outputs, with the built-in FIR Designer for magnitude and phase correction.
- Per input channel: noise gate, compressor, expander, 15-band PEQ with high-pass and low-pass filters, 3-band dynamic EQ, and delay.
- Per output: 10-band PEQ, delay, and gain, followed by a speaker preset section with FIR, 15-band PEQ, 3-band dynamic EQ, delay, compressor, and limiter.
- Filter types include parametric, low shelf, high shelf, all-pass (180° and 360°), VariQ low/high pass, elliptic low/high pass, band-pass, and notch.
- Up to 2000 ms of delay per delay stage with 0.01 ms resolution.
- Speaker preset library: create, protect, import, and export presets for specific loudspeaker models; presets can be locked against editing.
- 79 device preset memories, plus import and export of individual presets and preset packages.
- USB plug-and-play connection, TCP/IP multi-device management, web control, RS-232 / RS-485 central control, and GPIO.
- MConsole management software with offline editing, cross-device parameter copying, and channel linking.
- Panel lock and preset lock with password protection for installed systems.

1.5 Unpacking

Inspect the carton for shipping damage before opening. Retain the packaging until you have confirmed that the unit operates correctly. Report any damage to the carrier and to your supplier immediately.

The shipping carton contains the processor, an IEC mains cord, a Phoenix-type connector for the RS-232 / RS-485 / GPIO port, and this manual. Confirm the exact accessory list against the packing list supplied with your shipment.

2. Technical Specifications

2.1 Digital signal processing

Parameter	Specification
DSP	32-bit floating point, 1 GHz
Sampling rate	96 kHz
Conversion	24-bit A/D and D/A
System latency	Approximately 2.0 ms, analog input to analog output, excluding user-set delay and FIR filter latency
FIR capacity	Inputs: 4 × 1280 taps. Speaker preset outputs: 8 × 2048 taps

2.2 Analog audio

Parameter	Specification
Input channels	4, electronically balanced, line level
Input connectors	Female XLR
Input impedance	20 kΩ
Maximum input level	20 dBu (7.75 Vrms)
Output channels	8, electronically balanced, line level
Output connectors	Male XLR
Output impedance	50 Ω
Maximum output level	20 dBu

2.3 Digital audio

Parameter	Specification
AES/EBU input	4 channels, carried on the input XLR connectors as AES 1&2 and AES 3&4
AES input selection	Selected in MConsole or from the front panel display
Dante (VERA-C48D only)	8 channels in / 8 channels out
Dante connectors	2 × RJ-45 (primary and secondary for network redundancy)

2.4 Audio performance

Parameter	Specification
Frequency response	20 Hz – 20 kHz, ±0.5 dB
Signal-to-noise ratio	113 dB (20 dBu, 1 kHz, A-weighted)
Residual noise	−93 dBu (20 Hz – 20 kHz, A-weighted)
THD+N	−92 dB (0 dBu, 1 kHz, A-weighted)
Channel separation	−100 dB (0 dBu, 1 kHz)

2.5 Control and connectivity

Parameter	Specification
Control network	RJ-45 Ethernet, TCP/IP and web control
Serial and logic	RS-232, RS-485, and GPIO on a removable Phoenix-type connector
USB	Front-panel USB Type B, plug-and-play; built-in 252 MB flash storage
Front panel indicators	CLIP, LEVEL, LIMIT, EDIT, MUTE
Software	MConsole for Windows 7 / 8 / 10 / 11 (x86 / x64), Microsoft .NET Framework 4.0 required

2.6 Processing capacity

Stage	Capacity
Input source	1 main source plus 2 backup sources per channel, with priority switching
Input dynamics	Noise gate, compressor, expander per channel
Input PEQ	15 bands per channel, plus high-pass and low-pass filters
Input dynamic EQ	3 bands per channel (PEQ, low shelf, or high shelf)
Input delay	Up to 2000 ms, 0.01 ms resolution
Matrix	Matrix 1: 4 inputs × 4 FIR channels. Matrix 2: 4 FIR channels × 8 outputs
Output PEQ	10 bands per output
Output delay	Up to 2000 ms, 0.01 ms resolution
Speaker preset PEQ	15 bands per output, plus high-pass and low-pass filters
Speaker preset dynamic EQ	3 bands per output
Speaker preset delay	Up to 2000 ms, 0.01 ms resolution
Speaker preset dynamics	Compressor and limiter per output, with amplifier gain matching
Maximum filter slope	48 dB per octave
Device presets	79 storable positions, plus a live "auto" position
Speaker preset library	Up to 1024 presets stored in the device

2.7 Electrical and physical

Parameter	Specification
Mains supply	AC 100–240 V, 50/60 Hz
Operating temperature	–20 °C to +60 °C (–4 °F to 140 °F)
Dimensions (W × D × H)	483 × 276 × 44.5 mm (19.0 × 10.9 × 1.75 in), 1U
Chassis width behind rack ears	440 mm (17.3 in)
Net weight	3.6 kg (7.9 lb)
Gross weight, single unit	4.6 kg (10.1 lb)
Single-unit pack (W × D × H)	542 × 393 × 77 mm
Master carton, 5 units (W × D × H)	560 × 415 × 425 mm
Master carton gross weight	23.1 kg (50.9 lb)

Specifications are subject to change without notice.

3. Signal Flow

Understanding the order of processing is the fastest way to work with this unit. Signal passes through the input section, then through the FIR and routing section, then through the speaker preset section, and finally to the physical outputs.

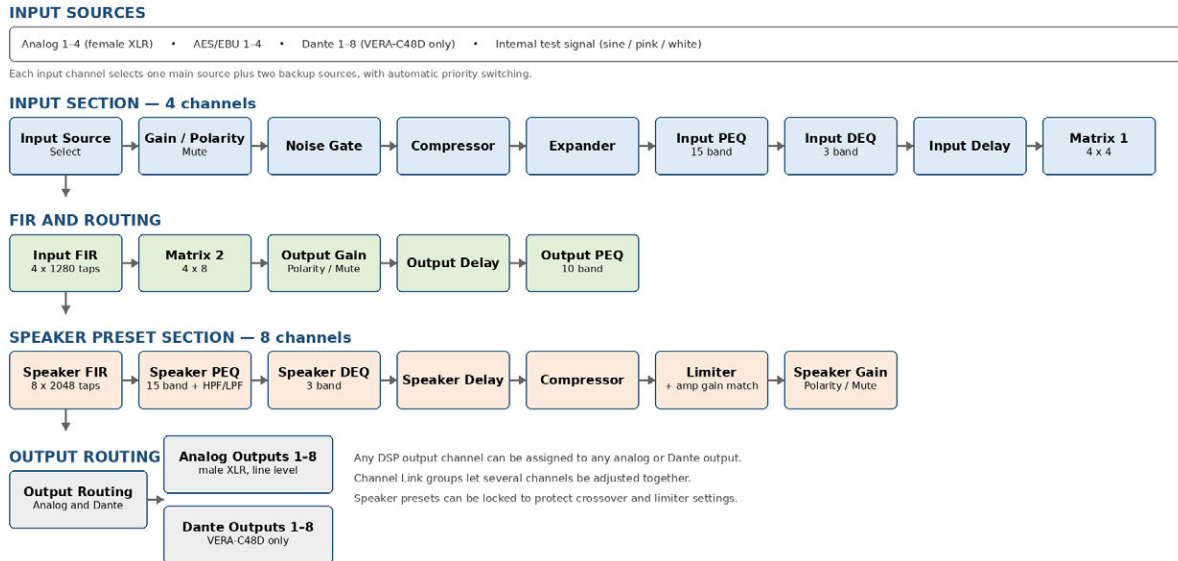


Figure 1. VERA-C48 / VERA-C48D signal flow

Two matrices, one FIR block. Matrix 1 assigns the four processed input channels to the four FIR channels. Matrix 2 assigns the four FIR channels to the eight output channels. The front-panel display shows Matrix 1 on the home screen; press the right arrow key to view Matrix 2.

Where to set crossovers. High-pass and low-pass filters are available in the input PEQ and in the speaker preset PEQ. In normal loudspeaker management practice the crossover filters belong in the **speaker preset** section, so that they travel with the loudspeaker preset and can be locked. Use the input filters for source conditioning only.

Where to set protection. The limiter is the last dynamics stage before the output. Set it after the amplifier gain parameters have been entered, so that the threshold corresponds to a real acoustic and electrical limit rather than an arbitrary number.

4. Hardware Description

4.1 Front panel

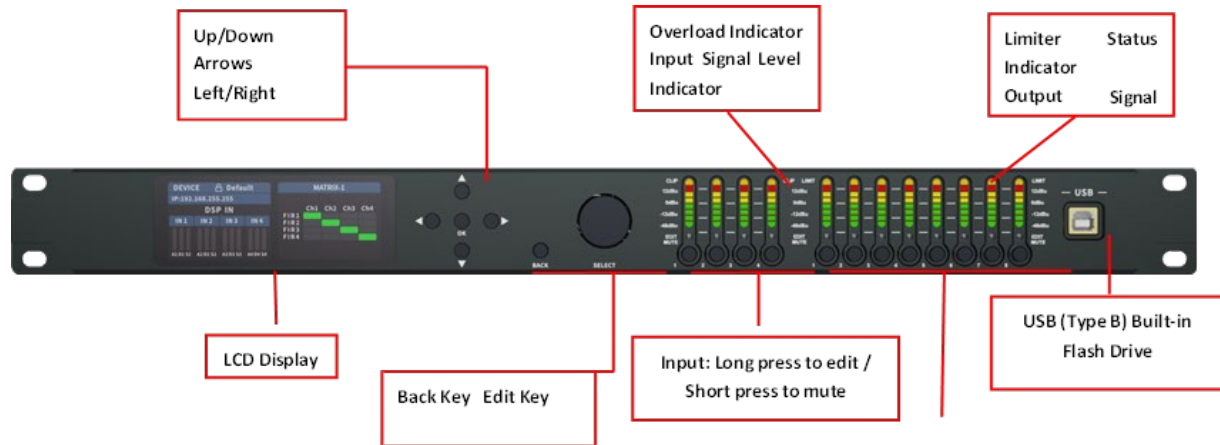


Figure 2. Front panel

Control	Function
LCD display	Shows device name, IP address, panel lock status, current preset, input channel levels, and the matrix routing view.
Arrow keys (up / down / left / right)	Move through menus, functions, and parameters.
OK	Enters the main menu, enters parameter editing, and confirms a selection.
BACK	Exits the current editing state or returns to the previous menu.
SELECT encoder	Enters menus and edits parameter values; press to confirm.
Input meters 1–4	Five-segment level display with CLIP indicator. Scale: CLIP, 12 dBu, 0 dBu, –12 dBu, –48 dBu.
Input EDIT/MUTE keys 1–4	Long press for channel edit mode (blue). Short press to mute (red). Purple indicates edit and mute together. Several blue keys at once indicate linked channels.
Output meters 1–8	Five-segment level display with CLIP and LIMIT indicators.
Output EDIT/MUTE keys 1–8	Same behavior as the input EDIT/MUTE keys.
USB Type B port	Connects to a PC running MConsole. Also presents the built-in 252 MB flash storage.

4.2 Rear panel



Figure 3. Rear panel

Connector	Function
AC inlet	IEC mains inlet, AC 100–240 V, 50/60 Hz.
Power switch	Mains on / off.
Fuse holder	Mains fuse. Replace only with the same type and rating.
Chassis ground stud	Technical earth connection point.
ETHERNET (RJ-45)	TCP/IP control and web interface.
Network audio (2 × RJ-45)	VERA-C48D only: Dante primary and secondary network ports.
RS-232 / RS-485 / GPIO	Removable Phoenix-type connector for serial control and logic input/output.
OUTPUT 1–8	Eight male XLR line-level outputs, numbered 8 to 1 from left to right as viewed from the rear.
INPUT 1–4	Four female XLR line-level inputs. The same connectors carry the AES/EBU signals, labelled AES 1&2 and AES 3&4. Analog or AES operation is selected in software or from the display.

4.3 Dimensions

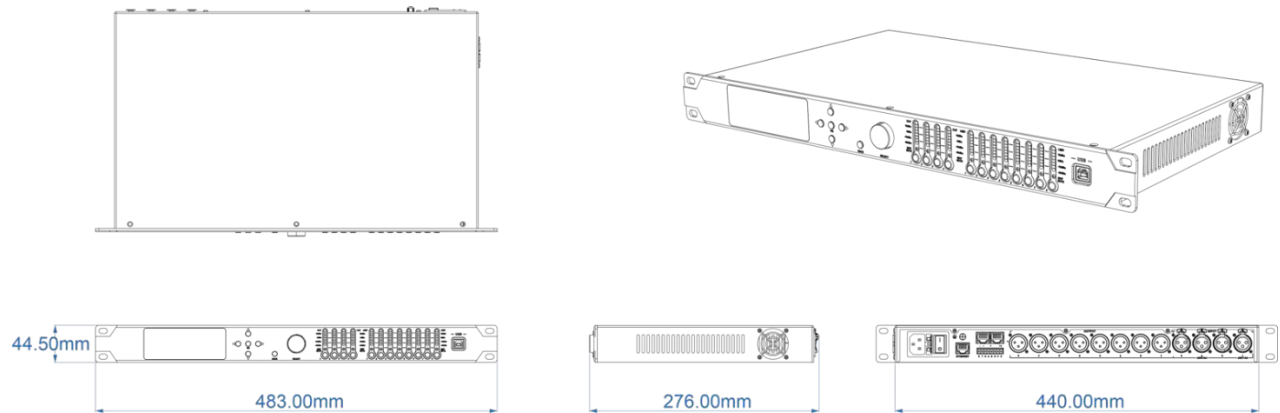


Figure 4. Chassis dimensions

4.4 LCD home screen



Figure 5. LCD home screen

1. Device name. Editable from MConsole or the front panel.
2. Device IP address. When connecting over TCP/IP, the device and the computer must be on the same subnet.
3. Panel lock. When the padlock icon is shown, the keys and encoder are disabled. Press any function key to open the unlock screen; a password is required.
4. Current preset. The preset currently loaded. "Default" is the factory preset.
5. Input channel level display. The letters below each meter indicate the available sources: A = analog, D = Dante, S = AES. A green bar marks the active source. If two sources are present, the main source is shown in green and the backup in grey.
6. Matrix routing view. Shows Matrix 1 (inputs to FIR channels). Press the right arrow key to display Matrix 2.

4.5 Navigation controls

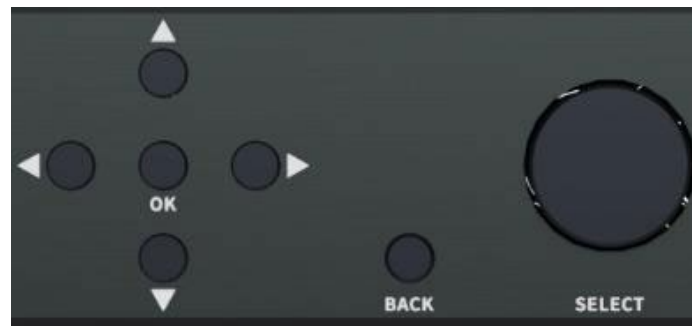


Figure 6. Navigation keys and SELECT encoder

Control	Function
Up / Down / Left / Right	Select a function or a parameter.
OK (menu key)	Enter the main menu, enter parameter editing, confirm a selection, and change a value.
SELECT (edit encoder)	Enter the main menu, enter parameter editing, confirm a selection, and change a value.
BACK (exit key)	Exit the current editing state or menu.

4.6 Input metering section



Figure 7. Input metering and EDIT/MUTE keys

Long press EDIT/MUTE — the key lights blue and the channel enters edit mode. If several keys light blue at once, those channels are linked.

Short press EDIT/MUTE — the key lights red and the channel is muted. Purple indicates that the channel is both selected for editing and muted.

Once a channel is in edit mode, use the arrow keys to move between functions and parameters.

4.7 Output metering section



Figure 8. Output metering and EDIT/MUTE keys

The output EDIT/MUTE keys behave exactly as the input keys described above. The output meters add a LIMIT indicator that lights when the output limiter is reducing gain.

5. Installation and Wiring

5.1 Rack mounting

- Install the unit in a standard 19-inch rack using all four front rack screws.
- Do not obstruct the rear fan or the side vents.
- In touring racks, support the rear of the chassis.

5.2 Mains connection

- Connect the unit to an earthed AC 100–240 V, 50/60 Hz supply using the supplied IEC cord.
- Where the system produces hum, investigate signal grounding and cable screening first. Never disconnect the mains safety earth.

5.3 Audio connections

- Analog inputs are balanced female XLR: pin 1 screen, pin 2 hot (+), pin 3 cold (–).
- Analog outputs are balanced male XLR with the same pinout.
- AES/EBU sources connect to the input XLR connectors. Two connectors carry four AES channels as AES 1&2 and AES 3&4. Select AES operation in MConsole or from the front panel.
- Use screened, twisted-pair cable for all analog runs. For AES/EBU, use 110 Ω digital cable rather than standard microphone cable, particularly on long runs.

5.4 Network connections

- Connect the ETHERNET port to the control network for MConsole and web control.
- VERA-C48D: connect the Dante ports to the audio network. Use the secondary port for a redundant network where reliability is required.
- Keep the audio network separate from general office traffic. Use managed switches with IGMP snooping and QoS configured for Dante.

5.5 First power-up

1. With the amplifiers switched off, connect mains and switch the processor on.
2. Confirm on the LCD home screen which preset has loaded and note the IP address.
3. Mute all outputs.
4. Connect the PC and establish a connection in MConsole (Chapter 6).
5. Load or build the correct speaker presets and verify every crossover filter and limiter setting.
6. Switch on the amplifiers, then unmute the outputs one at a time at low level.

6. MConsole Software Installation

6.1 System requirements

MConsole runs on Windows 7, 8, 10, and 11 (x86 or x64) and requires Microsoft .NET Framework 4.0.

6.2 Installing the software

MConsole is a portable application and does not require installation. Copy the complete program folder to the PC and run it from there. All files in the folder are required; do not delete or move individual files.

The .NET Framework is not included. If it is not already present on the PC, download and install it from Microsoft before running MConsole.

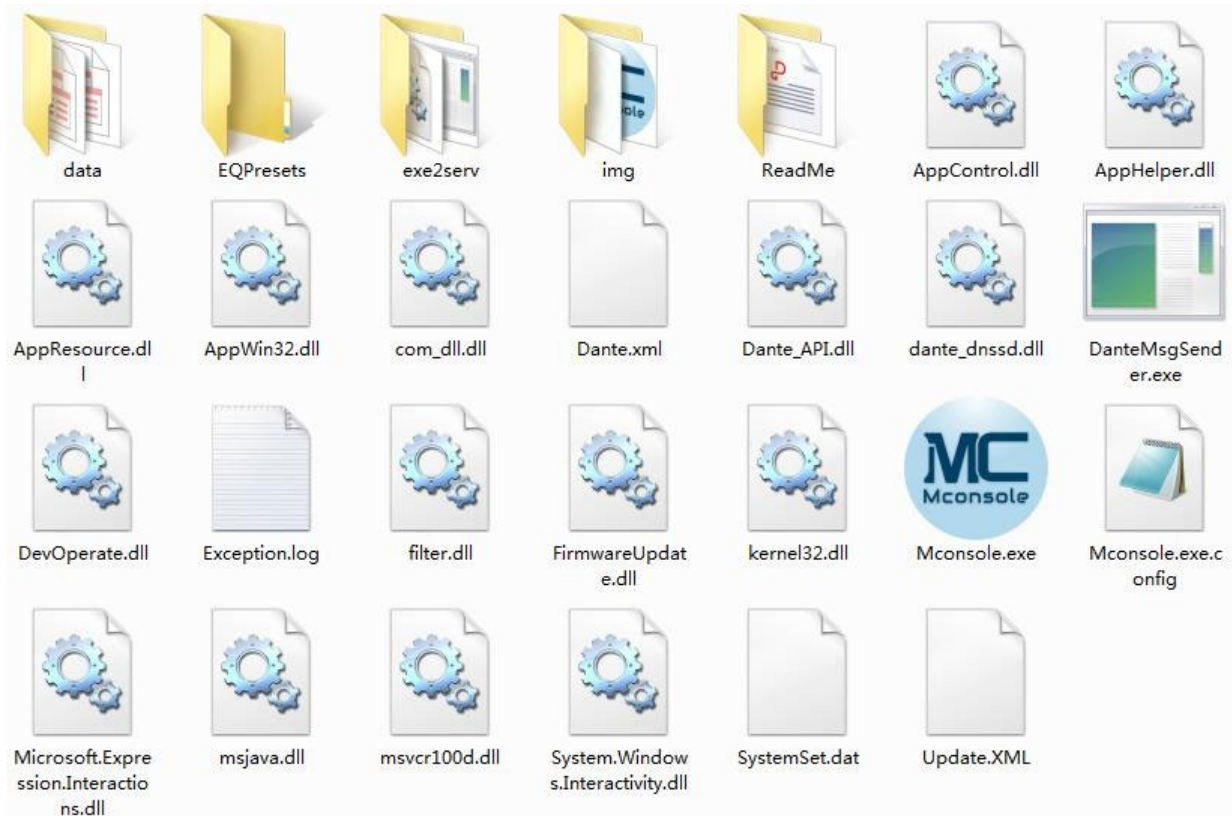


Figure 9. Contents of the MConsole program folder

6.3 Running the software

Action	Icon
Double-click Mconsole.exe to open the main window.	

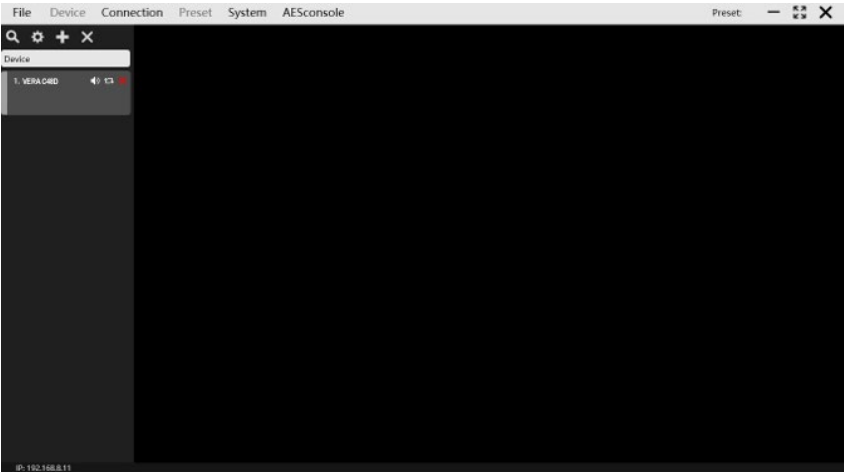


Figure 10. MConsole main window

NOTE

Only one instance of MConsole may run on a computer at a time.

7. Software Interface Overview

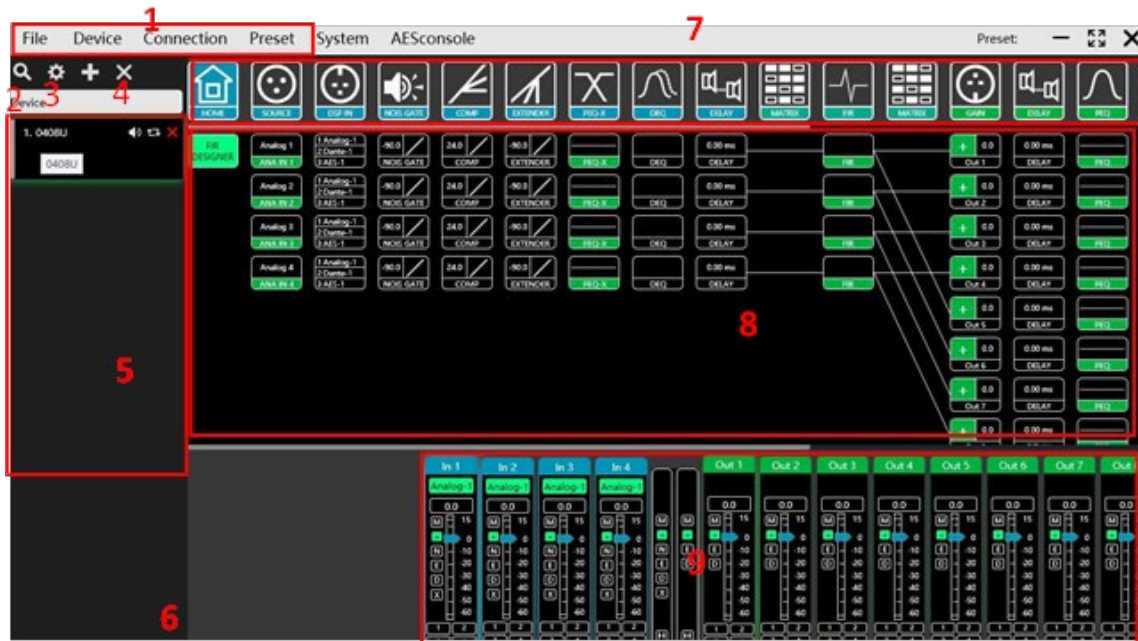


Figure 11. MConsole working window

The working window is divided into the following areas:

1. Menu bar
2. Scan button
3. Port settings button
4. Remove device button
5. Device list
6. Computer IP address display
7. Function control keys (the module toolbar)
8. Function module area, showing the processing chain
9. Input and output channel level monitoring

7.1 Menu bar

7.1.1 File

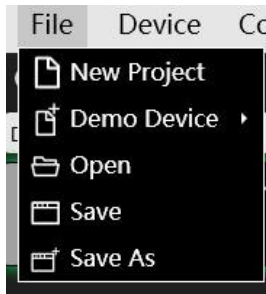


Figure 12. File menu

Item	Function
New Project	Creates a new project and returns the software to its initial state.
Demo Device	Adds a virtual device for offline configuration and preset creation. A virtual device is not connected to real hardware.
Open	Opens an existing project file from disk.
Save	Saves the current project to disk.
Save As	Saves the current project to disk under a new name.

7.1.2 Device

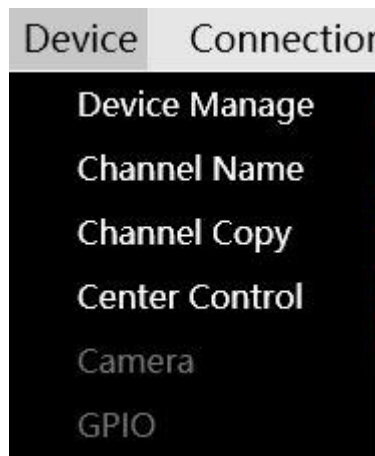


Figure 13. Device menu

Item	Function
Device Manage	View and edit firmware version, device name, IP address, and lock settings. See section 13.3.
Channel Name	Set channel names, saved automatically. See section 13.4.
Channel Copy	Copy input or output channel parameters between channels and between devices of the same model. See section 13.5.
Center Control	Central control protocol settings.
GPIO	General purpose input / output configuration.

7.1.3 Connection

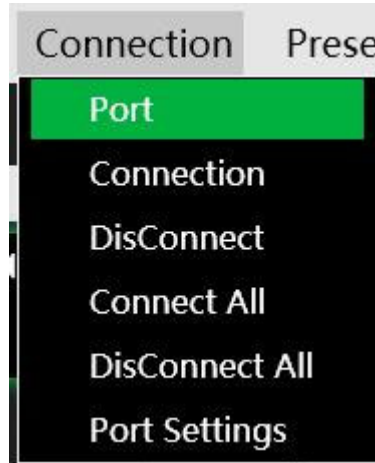


Figure 14. Connection menu

Item	Function
Port	Set the connection method, port number, and baud rate.
Connection	Connect to the selected device and download its parameters.
DisConnect	Disconnect the selected device.
Connect All	Connect to all devices in the list and download their parameters.
DisConnect All	Disconnect all connected devices.
Port Settings	Opens the port configuration dialog described in section 7.3.

7.1.4 Preset

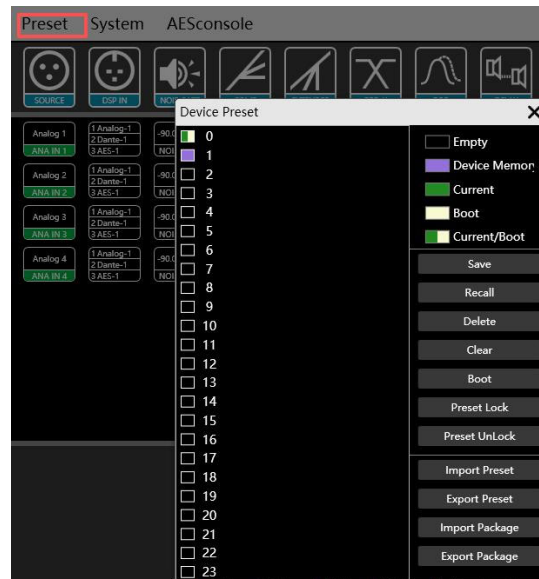


Figure 15. Device Preset window

Position 0 is the live position. It always holds the current state of the device. Every recall overwrites position 0, and every save writes the contents of position 0 to the target position.

Command	Function
Save	Saves the current live state to a device preset position (2–79).
Recall	Loads a stored preset into the live position.
Delete	Deletes a stored preset. The Default preset cannot be deleted.
Clear	Deletes all stored presets.
Boot	Sets the preset that loads automatically at power-up. Setting the live position as the boot preset causes the device to retain its last settings.
Preset Lock	Locks a preset with a password.
Preset UnLock	Unlocks a preset after the password is entered.
Import Preset	Imports a single preset file.
Export Preset	Exports all current parameters to a single preset file.
Import Package	Imports a package containing multiple presets.
Export Package	Packages several presets into a single file for export.

CAUTION

Delete, Clear, and Import require the password **8888**.

Recalling a preset changes crossover, limiter, and routing settings immediately. Mute the outputs first.

7.1.5 System

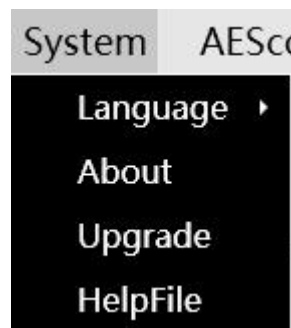


Figure 16. System menu

Item	Function
Language	Switches the interface language (Simplified Chinese, Traditional Chinese, English).
About	Shows the MConsole version and the connected device firmware version.
Upgrade	Opens the firmware upgrade utility. See section 13.6.
HelpFile	Opens the software help file.

7.2 Scan button

Click the magnifier icon  to scan for devices. A progress bar is displayed while the scan runs.

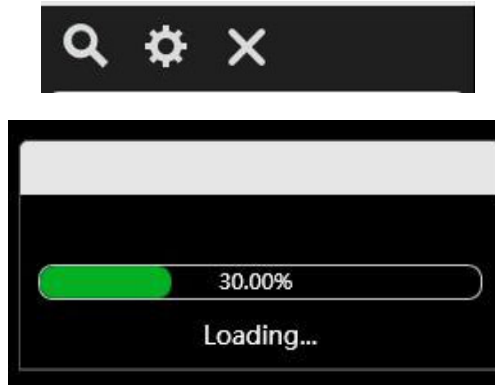


Figure 17. Scan progress

7.3 Port settings

Click the gear icon  to open the port connection dialog. Choose the connection method — COM, USB, TCP, or UDP — and confirm. If the available ports change while the software is open, click Refresh.



Figure 18. Port connection dialog

7.4 Device list

Devices appear in the list when they are found by a scan or added manually. Commands can be applied to an individual device or to a group of devices.



Figure 19. Device list

7.5 Computer IP address

MConsole detects the IP address of the computer automatically and displays it at the bottom left of the window. If two addresses are shown, one belongs to the wireless adapter and one to the wired adapter. The computer and the device must be on the same subnet; change either the device IP or the computer IP if they do not match.

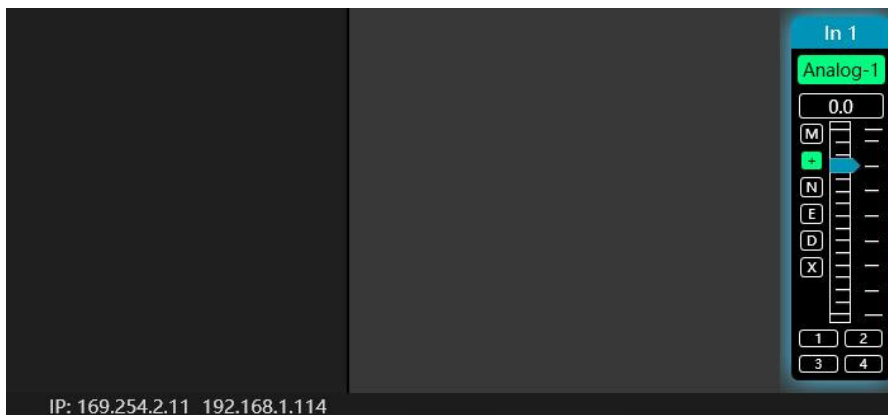


Figure 20. Computer IP address display

7.6 Function control keys



Figure 21. Module toolbar

Double-click a key to open or close the corresponding module window. Single-click a key to jump to that module in the function module area. When the toolbar is wider than the window, click the arrows at either end to reveal the remaining modules.



Click to reveal additional content when the main page is crowded.

7.7 Function module area

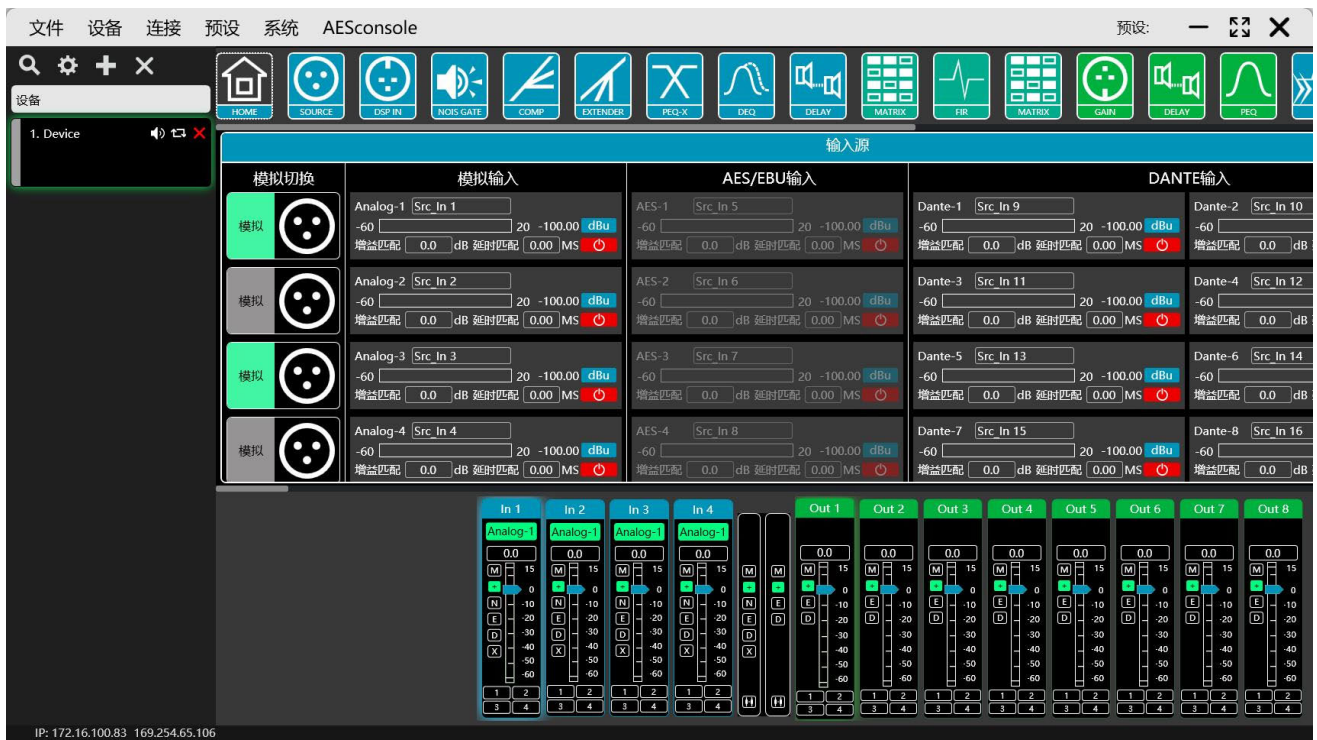


Figure 22. Function module area

The function module area shows the complete processing chain for the selected device. Modules open and close from the toolbar, and function names can be dragged to move between pages.

7.8 Channel level monitoring

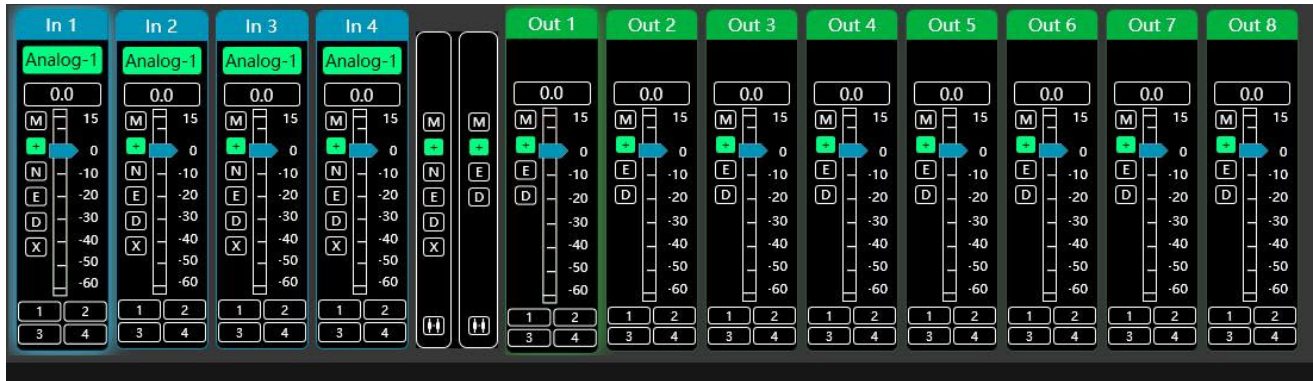


Figure 23. Input and output channel strips

The channel strips along the bottom of the window show the level, gain, input mode, and name of every input and output. Each strip also carries the channel gain fader, the mute control, and the DSP block indicators. Channels can be assigned to link groups from here.

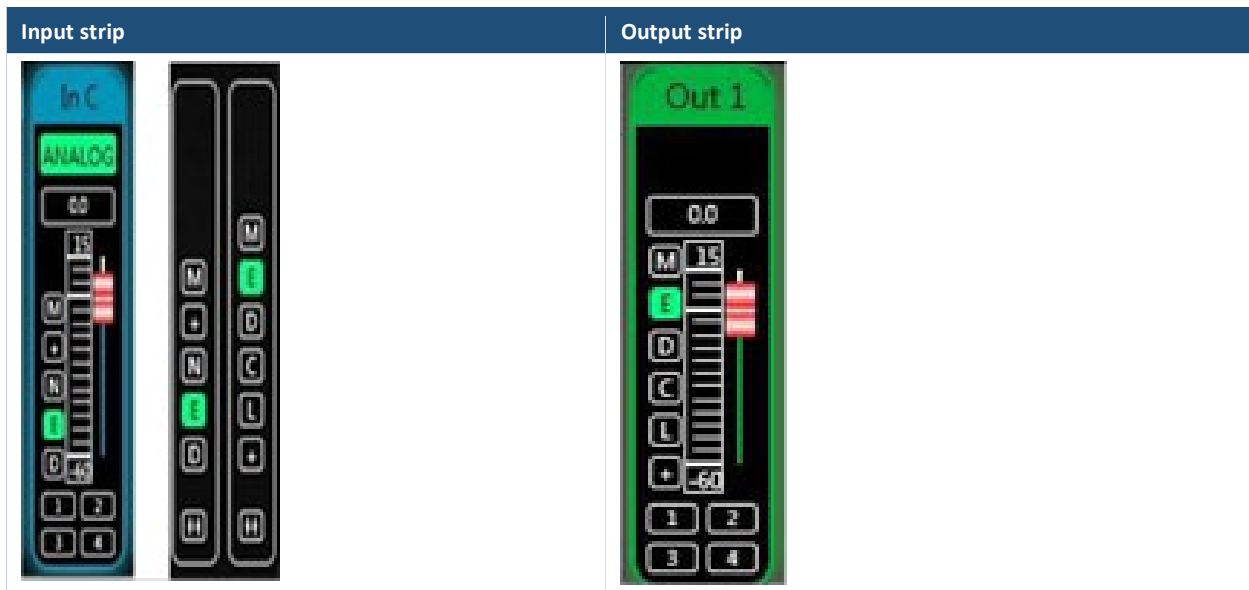


Figure 24. Input and output channel strip indicators

The letters beside each strip identify the processing blocks assigned to that channel, and the link buttons between the input and output groups open the channel link dialog described in section 11.9.

Indicator	Input strip	Output strip
M	Mute	Mute
+	Polarity	Polarity
N	Noise gate	—
E	PEQ	PEQ
D	Delay	Delay
C	—	Compressor
L	—	Limiter

8. Input Channel Processing

8.1 Input source

Action	Icon
Double-click the SOURCE key to open the input source window.	

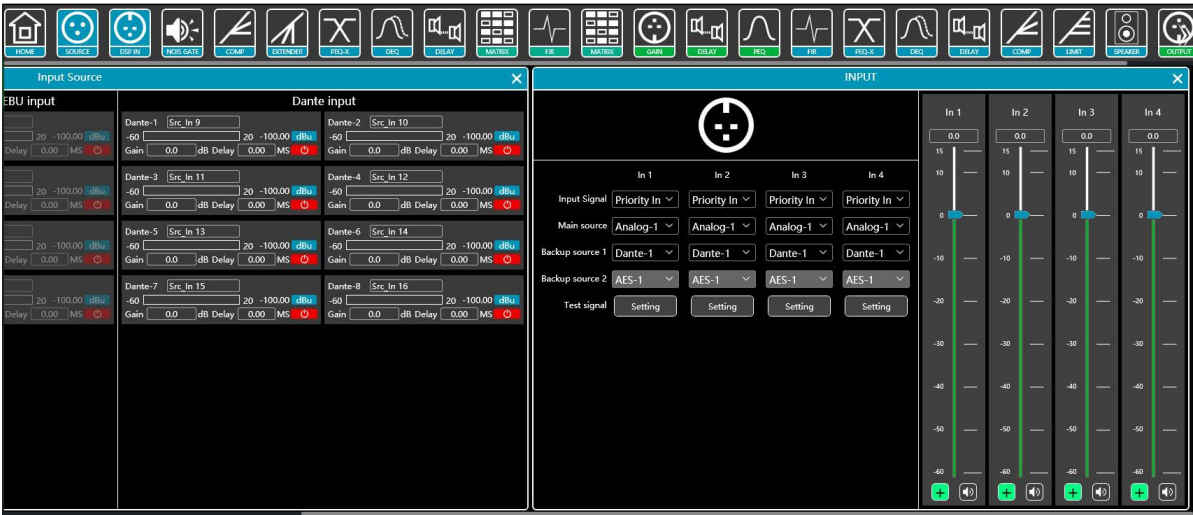


Figure 25. Input source and channel input modules

The input source module selects between analog, AES/EBU, and — on the VERA-C48D — Dante inputs. Only one source is active on a channel at a time, but the levels of the inactive sources can still be monitored.

8.2 Channel input module

Action	Icon
Double-click the DSP IN key to open the channel input window.	

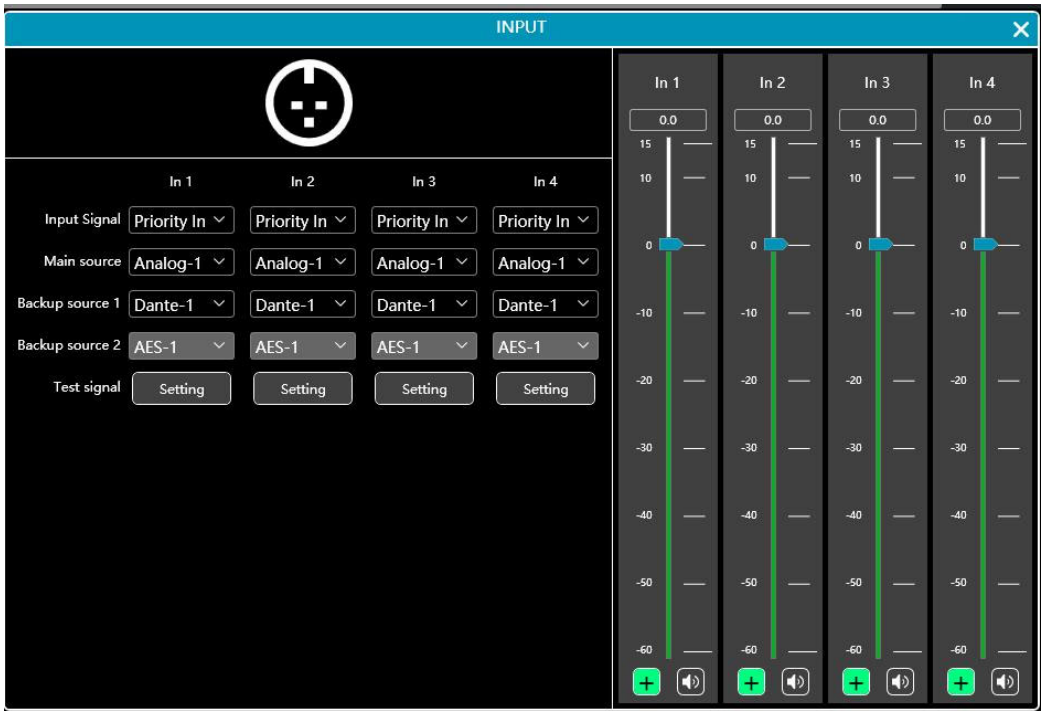


Figure 26. Channel input module

This module sets polarity, mute, gain, and input mode for each of the four input channels.

Control	Function
Input Signal	Selects Priority In (normal operation with automatic source switching) or a fixed test signal.
Main source	The preferred source for the channel.
Backup source 1	Used automatically if the main source is lost.
Backup source 2	Used automatically if the main source and backup 1 are both lost.
Test signal	Opens the test signal settings for the channel.
Fader and mute	Channel gain and mute, with level metering.

NOTE

Source priority is what keeps a system alive when a digital source drops. Set a realistic backup for every channel that carries programme material, and test the changeover before the system goes into service.

8.3 Test signal

Click Setting next to Test signal on any input channel to open the test signal window.

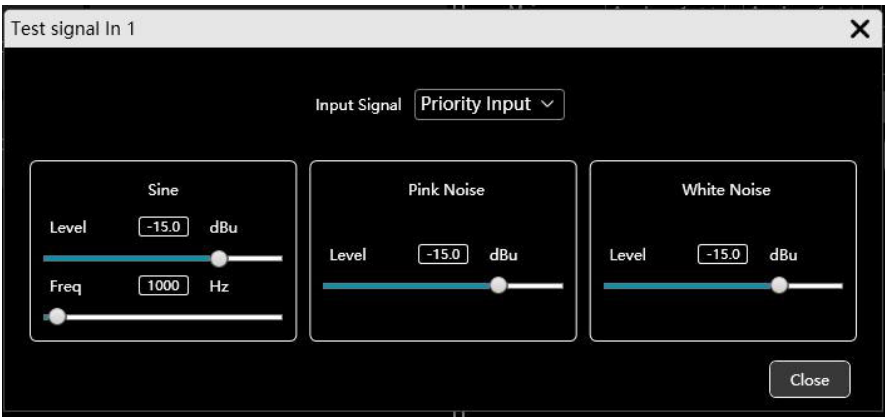


Figure 27. Test signal settings

Sine, pink noise, and white noise generators are available, each with an adjustable level. The sine generator also has a frequency control. Select the generator you want for the channel output, and switch the channel back to Priority Input to return to normal operation.

WARNING

Test signals are generated after the source selector. Start at a low level and raise it gradually, and remember to return every channel to Priority Input before the system is used.

8.4 Input noise gate

Action	Icon
Double-click the NOIS GATE key to open the noise gate window	

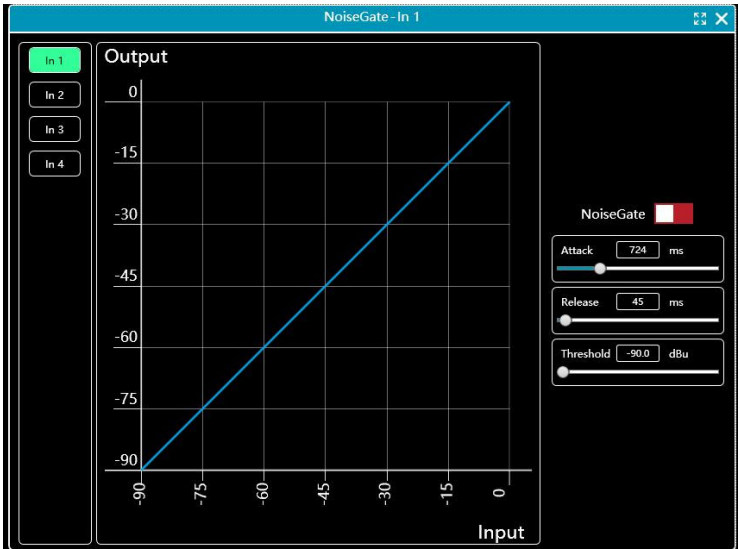
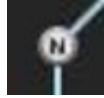


Figure 28. Input noise gate

Action	Icon
Click the NoiseGate switch to enable the gate (green = on, red = off). Attack time, release time, and threshold can be set with the sliders or by typing values into the fields.	
When the gate is enabled, the threshold can also be set by dragging the control point on the transfer curve	

Parameter	Function
Threshold	The level below which the gate closes. Set it just above the ambient noise floor.
Attack	How quickly the gate opens once the signal exceeds the threshold.
Release	How quickly the gate closes once the signal falls below the threshold.

8.5 Input compressor

Action	Icon
Double-click the COMP key to open the compressor window.	

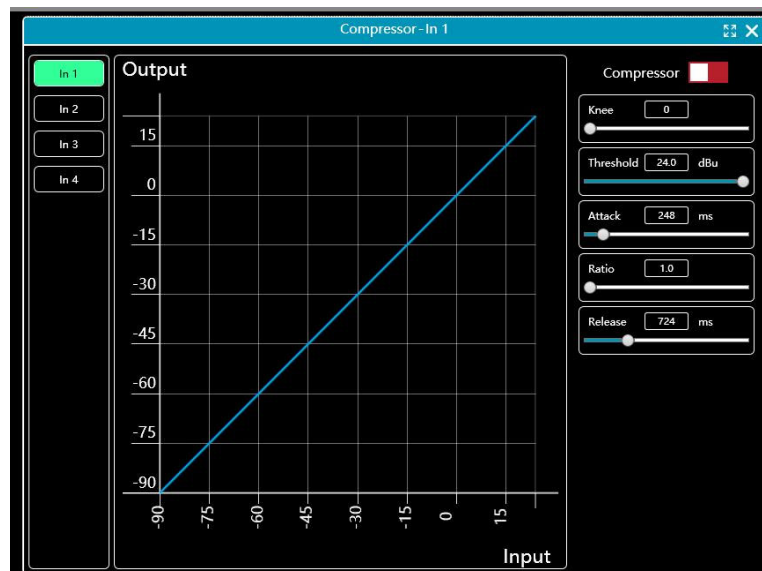


Figure 29. Input compressor

Parameter	Function
Knee	Sets a soft-knee transition region around the threshold, over which the ratio moves gradually from 1:1 to the set ratio.
Threshold	The level above which gain reduction begins. The further the signal exceeds the threshold, the more attenuation is applied.
Ratio	The amount of attenuation applied above the threshold. At 2:1, a signal 2 dB above the threshold produces an output 1 dB above the threshold. Range 1 to 20.
Attack	How quickly gain reduction is applied. Slower attack preserves transients.
Release	How quickly gain recovers after the signal falls below the threshold.
Output gain	Make-up gain, applied uniformly, to restore level lost to compression.

8.6 Input expander

Action	Icon
Double-click the EXTENDER key to open the expander window.	

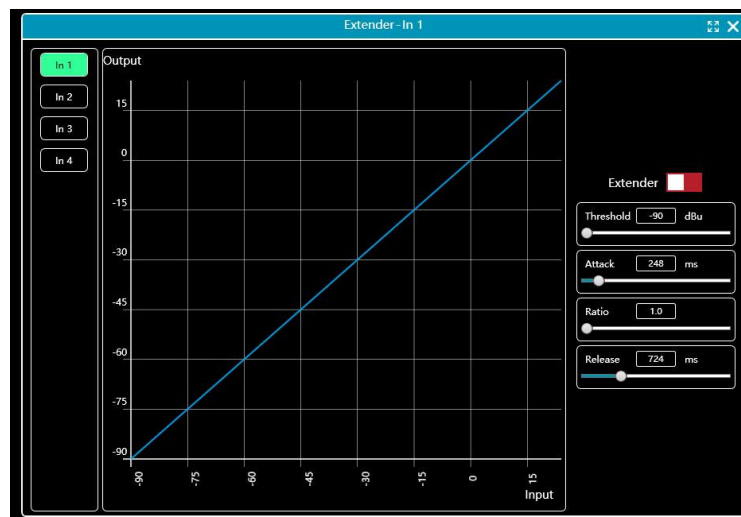


Figure 30. Input expander

Parameter	Function
Threshold	The level the signal must exceed for the expander to open. Typically set at the ambient noise level.
Attack	How long the signal must exceed the threshold before the expander opens. A faster setting gives a quicker transient response.
Ratio	The slope applied below the threshold. Higher ratios behave increasingly like a gate.
Release	The time taken for gain to return to its below-threshold value.

NOTE

The module is labelled EXTENDER in the software toolbar. It is a downward expander.

8.7 Input parametric equalizer

Action	Icon
Double-click the PEQ-X key to open the input PEQ window. Use the maximize button for easier adjustment.	

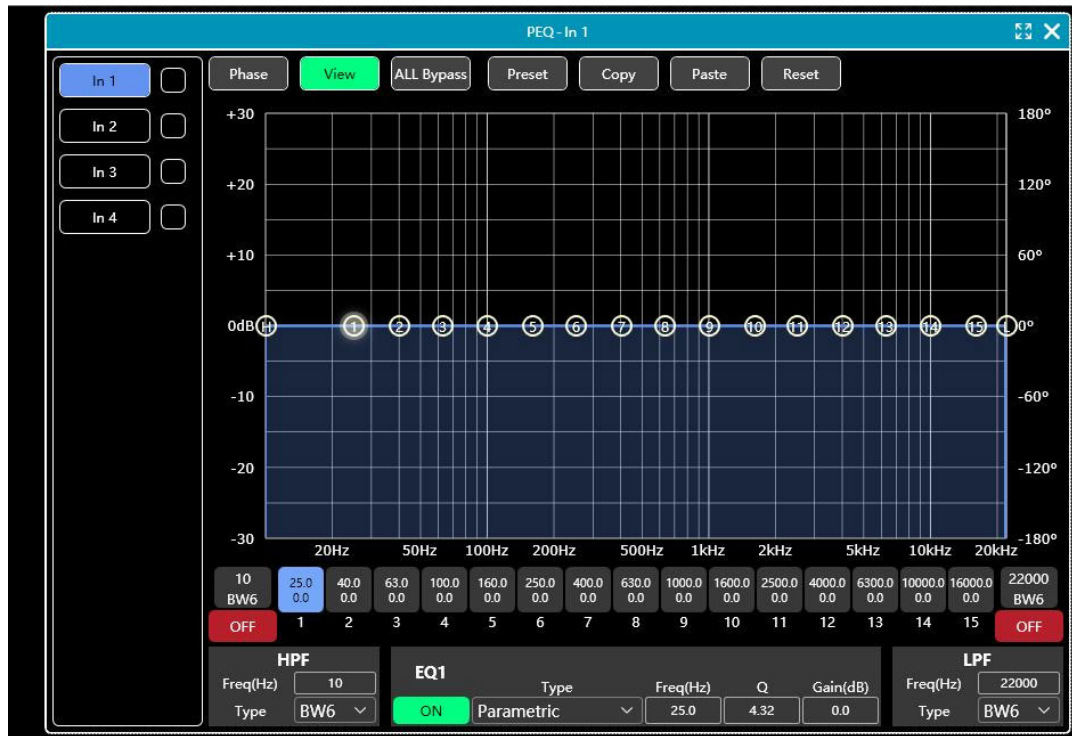


Figure 31. Input equalizer

8.7.1 Function buttons

Button	Function
Phase	Displays the phase curve for the current channel.
View	Shows or hides the EQ control points on the graph.
ALL Bypass	Enables or disables all EQ bands on the current channel.
Preset	Saves and recalls channel EQ settings. Works across channels and across devices.
Copy	Copies the EQ settings of the current channel.
Paste	Pastes the last copied EQ settings into the current channel. Only channels of the same type can be used.
Reset	Restores the EQ to defaults. Requires the password 8888.

8.7.2 Multi-channel curve display

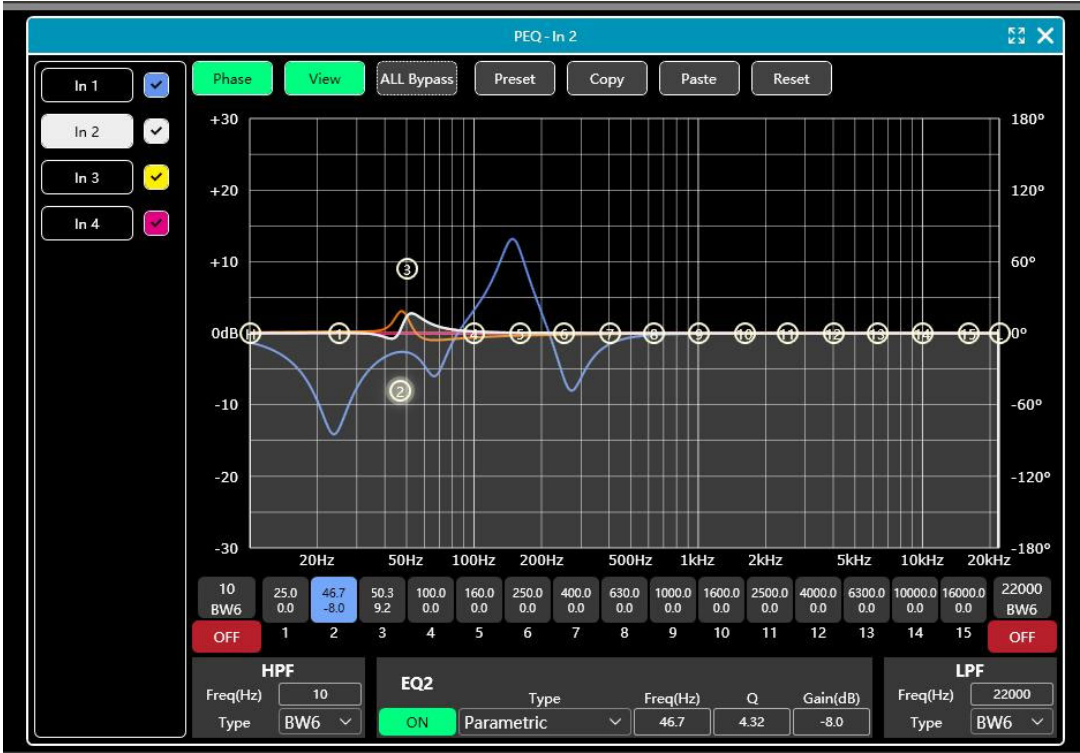


Figure 32. Multi-channel EQ display

The channel buttons on the left select which channel is being edited; the colour identifies the selected channel.

Action	Icon
Tick the checkbox beside any other channel to overlay that channel's curve for comparison.	In 1 ☐ ☒

8.7.3 Adjusting the curve

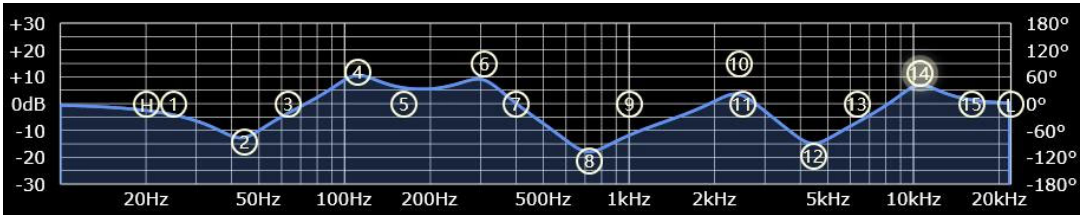


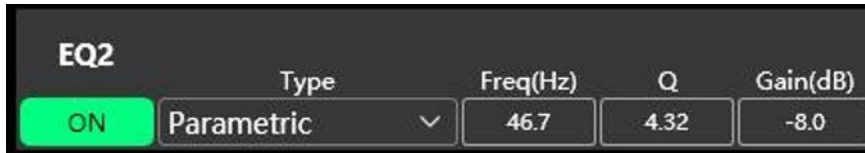
Figure 33. EQ curve chart

Drag a control point to change frequency and gain. Right-click and hold on a control point to adjust its Q. The numbered fields below the graph show the frequency and gain of each band and can be typed into directly for precise values.

25.0	44.0	63.0
0.0	-14.1	0.0
1	2	3

8.7.4 Band parameters

Each band has an on/off switch, a filter type, a frequency, a Q value, and a gain. Available types include parametric, low shelf, high shelf, and all-pass.



8.7.5 EQ presets

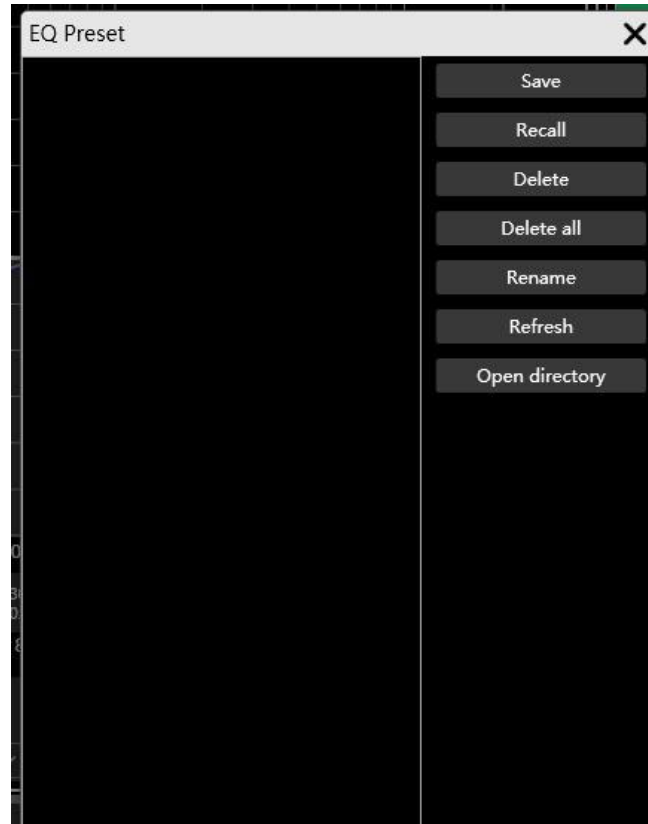


Figure 34. EQ Preset window

Select a preset from the list on the left, then use the buttons on the right to save, recall, delete, rename, or refresh. Open directory shows where the EQ preset files are stored on the PC.

8.7.6 High-pass and low-pass filters



Figure 35. High-pass and low-pass filter sections

The HPF and LPF sections at either end of the band strip set the filter on/off state, corner frequency, and filter type. The maximum available slope is 48 dB per octave.



CAUTION

Filters set here apply to the input channel and affect every output fed from it. For loudspeaker crossovers, use the speaker preset PEQ described in section 11.2 instead.

8.8 Input dynamic equalizer

Action	Icon
Double-click the DEQ key to open the dynamic equalizer window.	

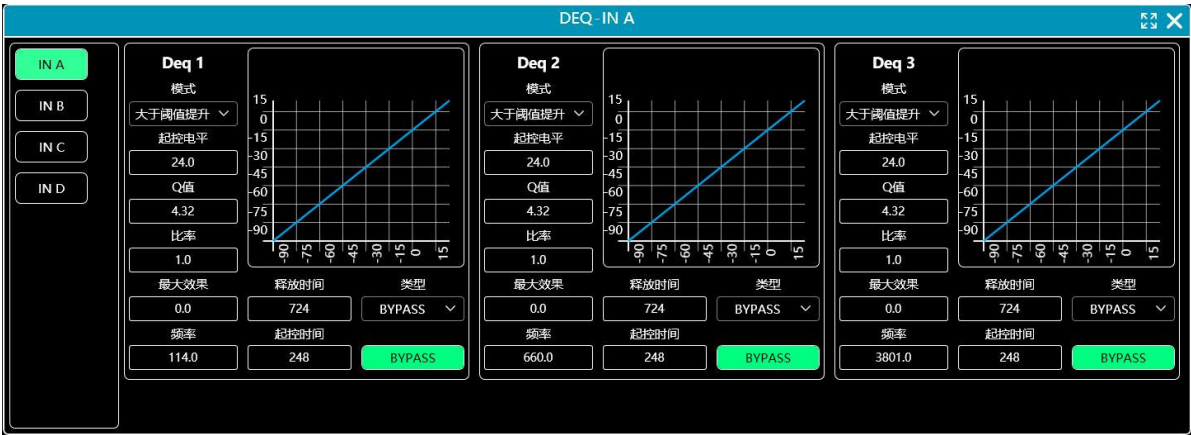


Figure 36. Dynamic equalizer

Each input channel has three independent dynamic EQ sections. Use the channel buttons on the left to switch channels.



Parameter	Range and function
Mode	Boost Above, Boost Below, Cut Above, or Cut Below threshold.
Type	BYPASS disables the section. Select PEQ, LSLV, or HSLV to enable it.
Threshold	–90 to 24 dBu. The section acts when the signal at the selected frequency reaches this level.
Frequency	Centre frequency of the section.
Q	0.27 to 15.
Ratio	1 to 100. Higher values produce a more pronounced effect.
Maximum effect	0 to 12 dB. Limits the total boost or cut.
Attack	1 to 2895 ms. Delay before the effect is applied.
Release	Duration of the effect after the trigger condition ends.

8.9 Input delay

Action	Icon
Double-click the DELAY key to open the input delay window	

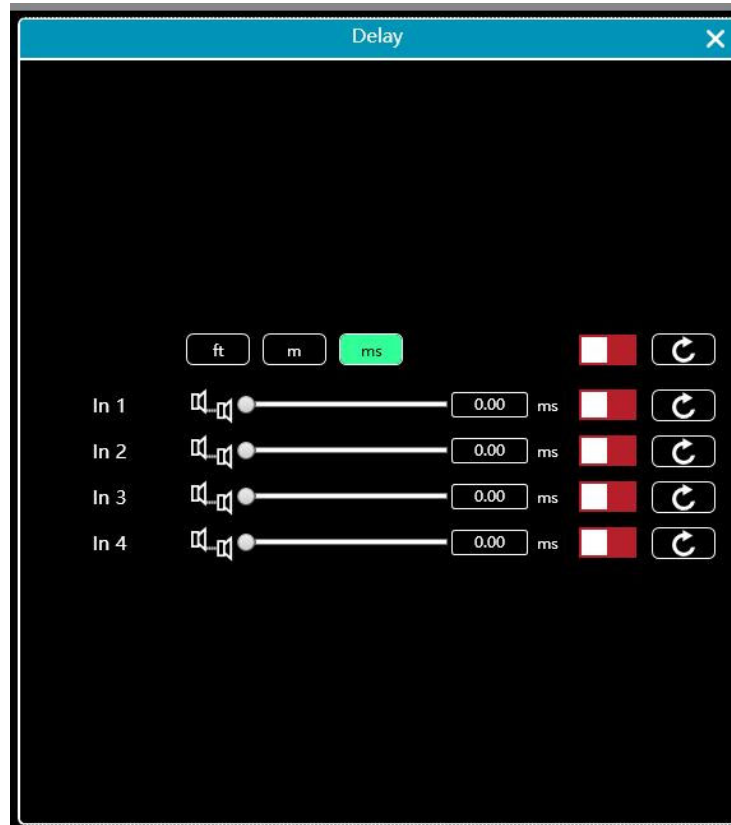


Figure 37. Input delay

All four input delays are shown together. Values can be set with the sliders or typed into the fields, and displayed in feet, metres, or milliseconds. The switch beside each channel enables the delay (green = on, red = off), and the reset button restores the default value.



8.10 Input FIR

Action	Icon
Double-click the FIR key to open the input FIR window.	

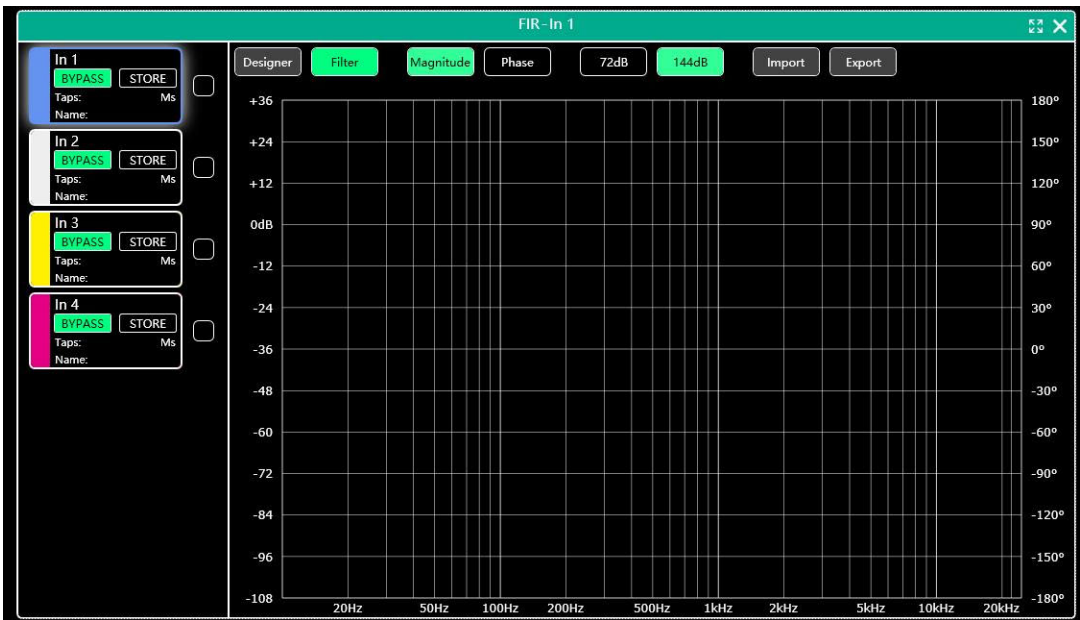


Figure 38. FIR window

Each input channel has an FIR filter of up to 1280 taps. The window shows the stored filter name, tap count, and resulting latency, and provides BYPASS, STORE, Import, and Export controls, together with magnitude and phase display at 72 dB or 144 dB vertical scale.

FIR filters are created in the built-in FIR Designer, which is described in Chapter 14.

Action	Icon
Click the Designer button in this window, or FIR DESIGNER in the main window, to open it.	

NOTE

A stored FIR filter has no effect until BYPASS is released. This is the most common reason an imported filter appears to do nothing.

9. Matrix Mixer

Action	Icon
Double-click to open the matrix mixer interface.	

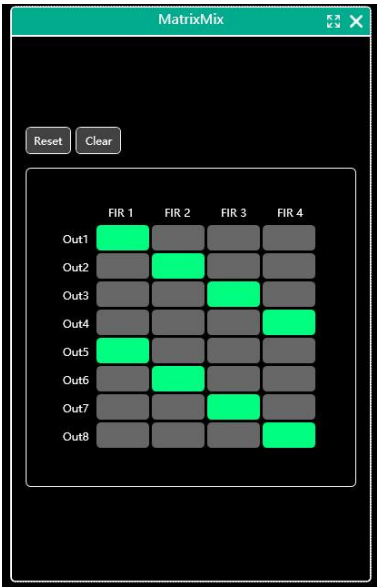


Figure 39. Matrix mixer

The rows are output channels and the columns are the FIR channels feeding them. Double-click a cell to switch that crosspoint on (green) or off. Right-click a cell to enter a gain value for that crosspoint.

Button	Function
Reset	Returns the matrix to its default one-to-one assignment.
Clear	Removes all routing. No signal reaches any output until crosspoints are re-enabled.



CAUTION

Clear silences the entire device. Reset re-establishes a default routing that may not match your system design. Mute the outputs before using either command.

10. Output Channel Processing

10.1 Output gain

Action	Icon
Double-click the GAIN key to open the output gain window.	



Figure 40. Output gain

Sets polarity, mute, and gain for each of the eight output channels.

10.2 Output delay

Action	Icon
Double-click the output DELAY key to open the output delay window.	

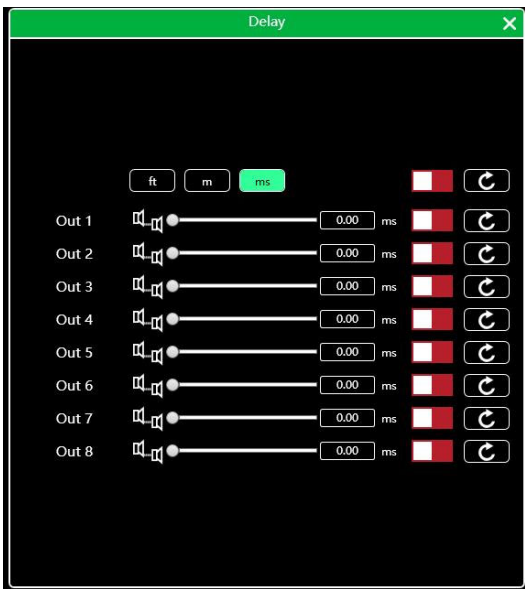
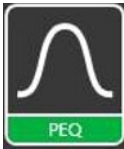


Figure 41. Output delay

The output delays work exactly as the input delays described in section 8.9, with one delay per output channel.

10.3 Output parametric equalizer

Action	Icon
Double-click the output PEQ key to open the output equalizer window.	

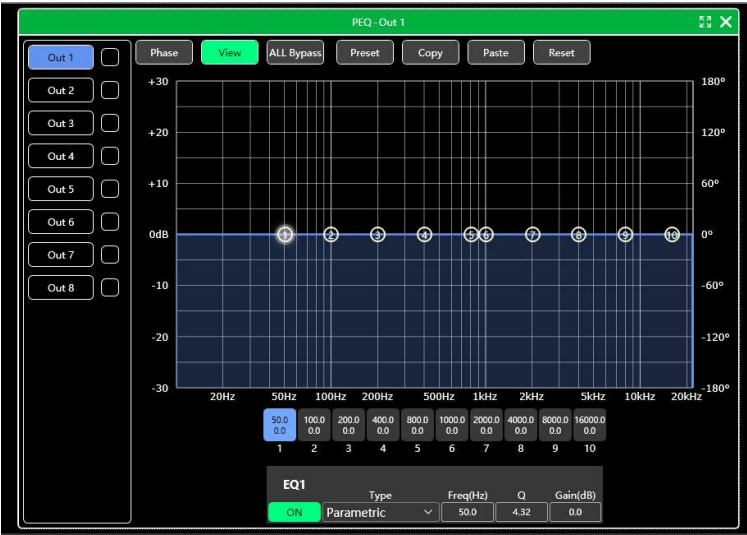


Figure 42. Output equalizer

The output equalizer provides 10 bands per output channel. The controls are identical to the input equalizer described in section 8.7.

11. Speaker Preset Processing

The speaker preset section is the final processing stage before the outputs. It carries the crossover filters, equalization, delay, and protection that belong to a specific loudspeaker model, and it can be locked so that these settings cannot be altered in the field.

11.1 Speaker preset FIR

Action	Icon
Double-click the speaker preset FIR key to open the window.	



Figure 43. Speaker preset FIR

Each of the eight speaker preset channels supports an FIR filter of up to 2048 taps. The controls are the same as the input FIR window described in section 8.10.

11.2 Speaker preset PEQ

Action	Icon
Double-click the speaker preset PEQ-X key to open the window.	

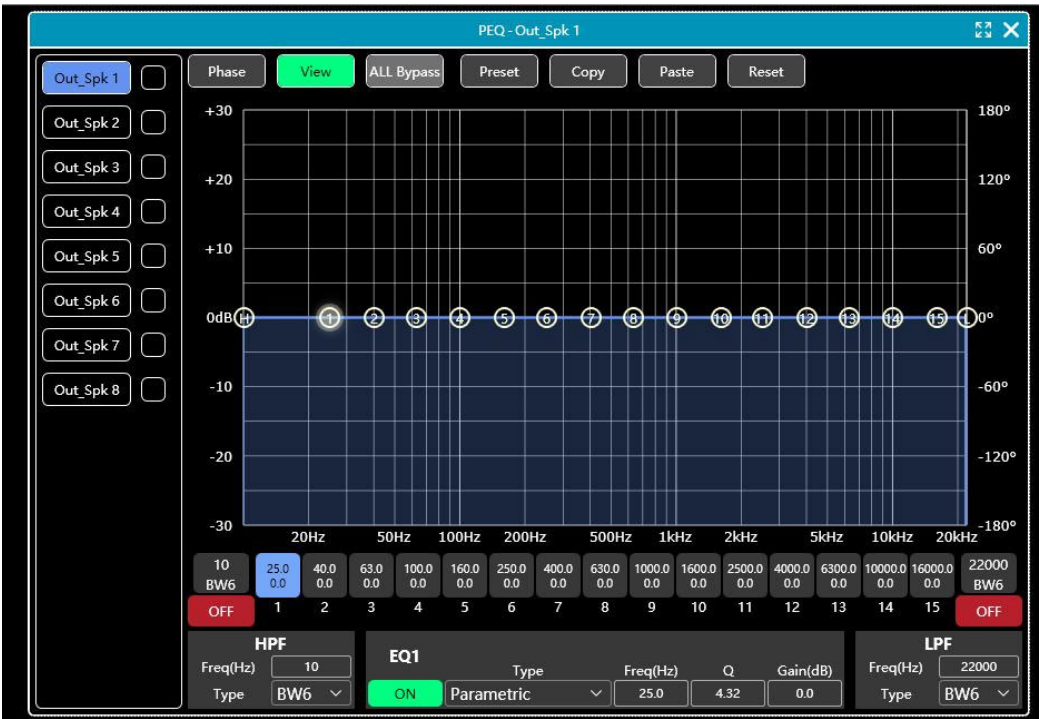


Figure 44. Speaker preset equalizer

Fifteen bands per output channel plus high-pass and low-pass filters. The controls are identical to the input equalizer described in section 8.7.

WARNING
Set your loudspeaker crossover filters here. Verify the **high-pass** filter on every output that feeds a high-frequency driver before applying signal.

11.3 Speaker preset dynamic equalizer

Action	Icon
Double-click the output DEQ key to open the window.	



Figure 45. Speaker preset dynamic equalizer

Three dynamic EQ sections per output channel. The parameters are the same as the input dynamic equalizer described in section 8.8.

11.4 Speaker preset delay

Action	Icon
Double-click the speaker preset DELAY key to open the window.	

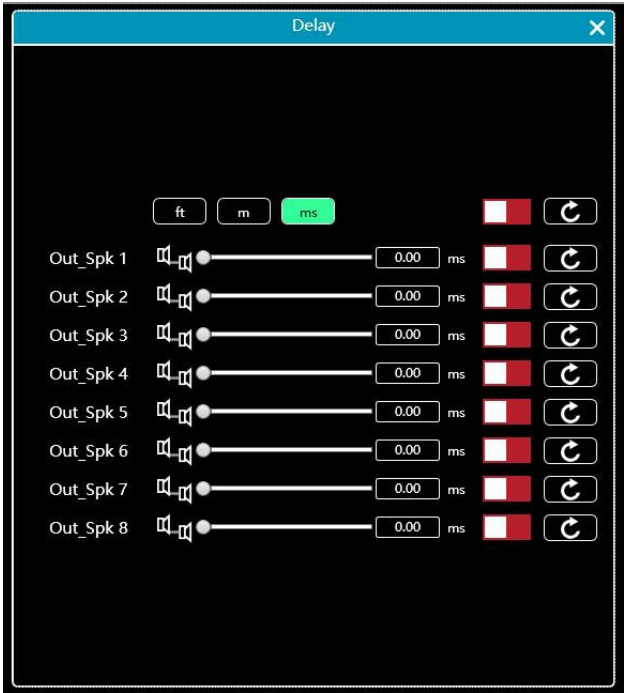


Figure 46. Speaker preset delay

One delay per speaker preset channel, operating as described in section 8.9. Use this delay for driver alignment within a cabinet or between cabinets in an array.

11.5 Speaker preset compressor

Action	Icon
Double-click the output COMP key to open the window.	

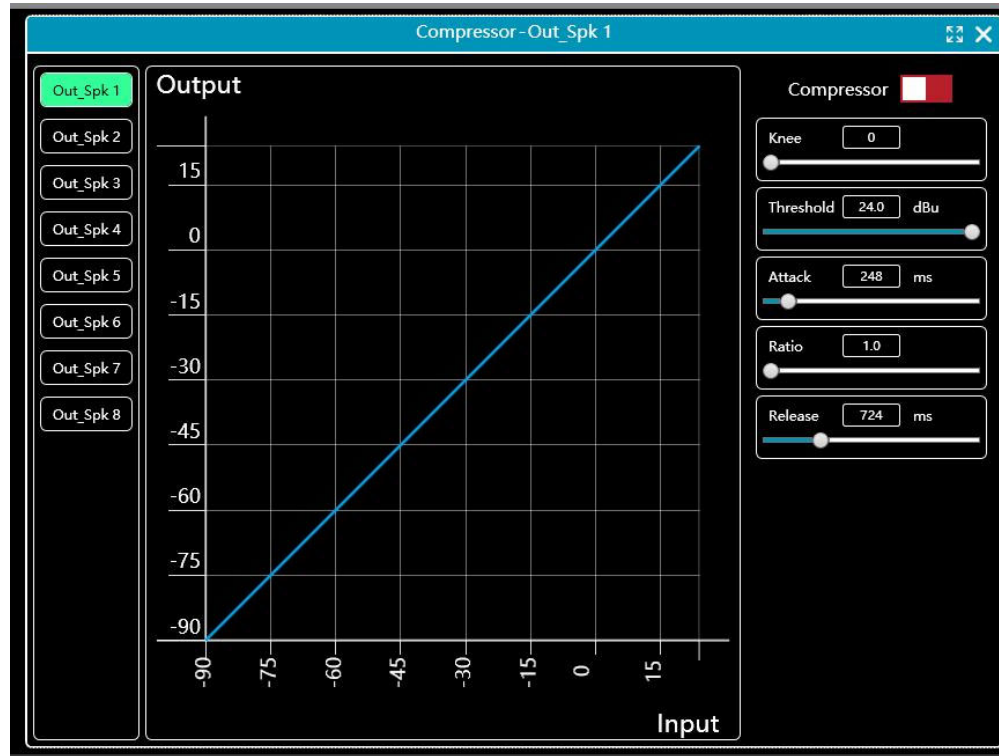


Figure 47. Speaker preset compressor

One compressor per output channel, with the same parameters as the input compressor described in section 8.5.

11.6 Speaker preset limiter

Action	Icon
Double-click the LIMIT key to open the limiter window.	

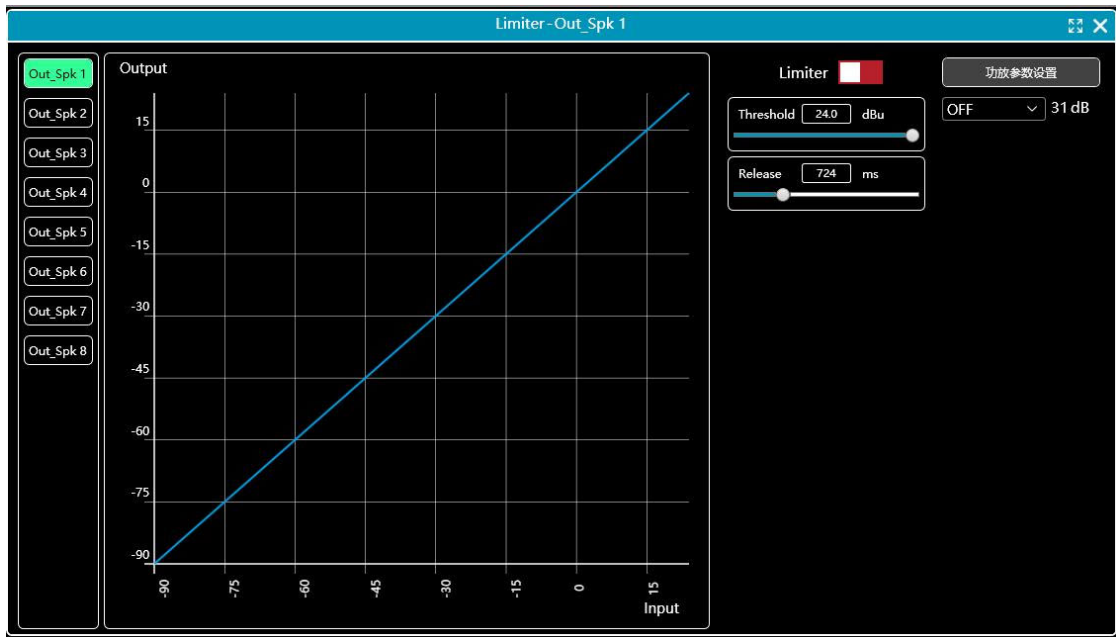


Figure 48. Speaker preset limiter

Parameter	Function
Threshold	Below the threshold the signal passes unchanged. At and above the threshold the limiter reduces the output amplitude.
Release	The time taken for gain to return to its below-threshold value.
Amplifier Parameters	Opens the amplifier gain matching dialog described below.

11.6.1 Amplifier parameters

The amplifier parameters dialog calibrates the relationship between the processor output level and the amplifier, so that limiter thresholds correspond to real amplifier output. This is what makes the limiter a genuine loudspeaker protection device rather than an arbitrary ceiling.

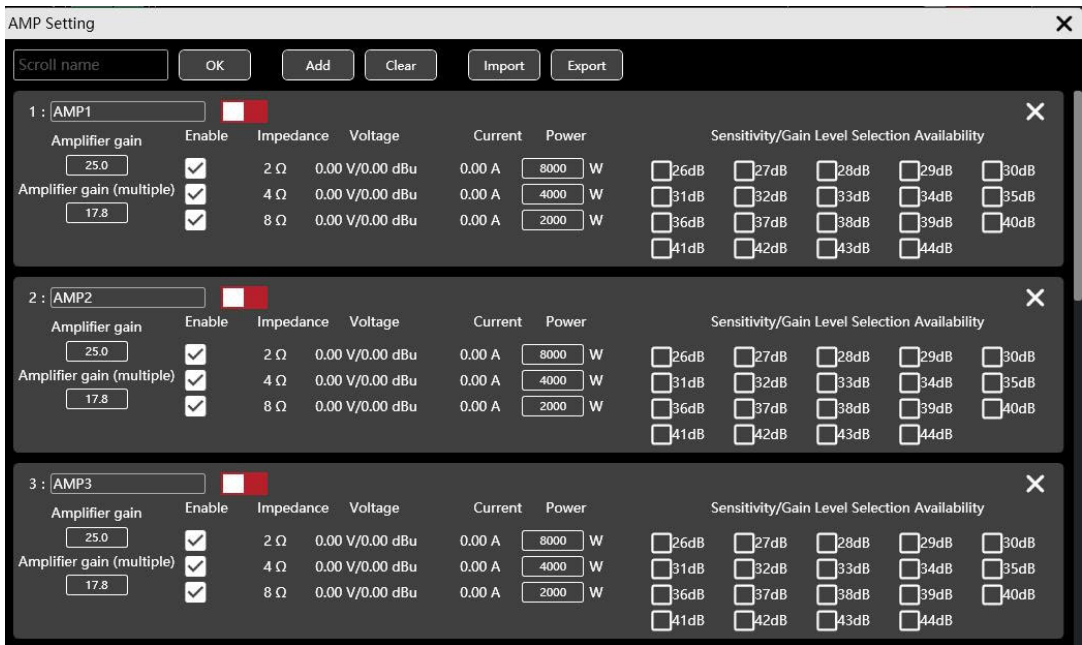


Figure 49. Amplifier parameter settings

Control	Function
Name	Editable amplifier name. The switch beside it enables the entry (green = on, red = off). 
Amplifier gain	Entered manually to match the amplifier in use.
Amplifier gain (multiple)	Calculated automatically from the gain value.
Enable	Ticks the impedance rows for which parameters are displayed.
Impedance	Default 8 Ω. Select 2 Ω, 4 Ω, 8 Ω, or 70 V / 100 V constant-voltage operation.
Power	Amplifier power per channel at the selected impedance, or at 70 V / 100 V.
Voltage / Current	Calculated automatically from the power setting.
Sensitivity	Amplifier input sensitivity, 26 dB to 44 dB.
Import / Export	Saves and loads amplifier parameter sets.

WARNING

Enter amplifier gain, sensitivity, impedance, and power before setting limiter thresholds. If these values do not match the amplifier actually installed, the limiter will not protect the loudspeaker.

Re-check these values whenever an amplifier is replaced or its sensitivity switch is changed.

11.7 Speaker preset gain

Action	Icon
Double-click the SPEAKER key to open the speaker preset window.	

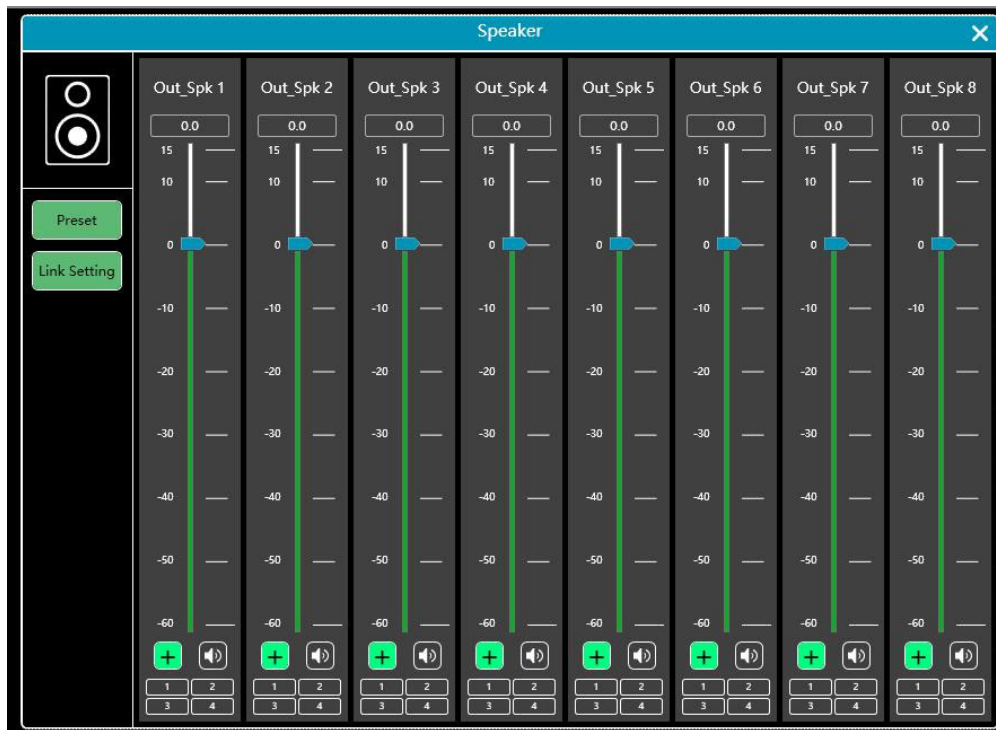


Figure 50. Speaker preset module

Sets polarity, mute, and gain for each speaker preset channel. The Preset and Link Setting buttons open the preset library and the channel link dialog.

11.8 Speaker preset library



Figure 51. Speaker preset library

The library window has three panes: the channel status of the device, the preset list stored on the PC, and the preset list stored in the device (up to 1024 presets).

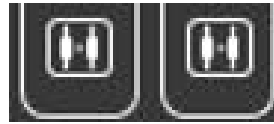
Command	Function
Reset	Restores the selected channel to its default settings.
Reset All	Restores all channels to their default settings.
Create	Creates a preset from the selected channel, and optionally protects it.

Command	Function
Import	Loads a configured preset onto a channel.
Edit Preset	Edits the functions included in a preset and its protection status.
New directory	Creates a folder in the PC preset library.
Batch import / Batch export	Transfers several presets between the PC and the device at once.
Delete / Clear	Removes one preset or all presets from the selected list.

NOTE

Protect finished loudspeaker presets before they leave the shop. A protected preset can be recalled and used but its crossover, limiter, and EQ settings cannot be altered.

11.9 Channel link

Action	Icon
Click link button between I/O channels to open channel link interface.	

Click the link button between the input or output channel strips, or Link Setting in the speaker preset module, to open the channel link dialog.

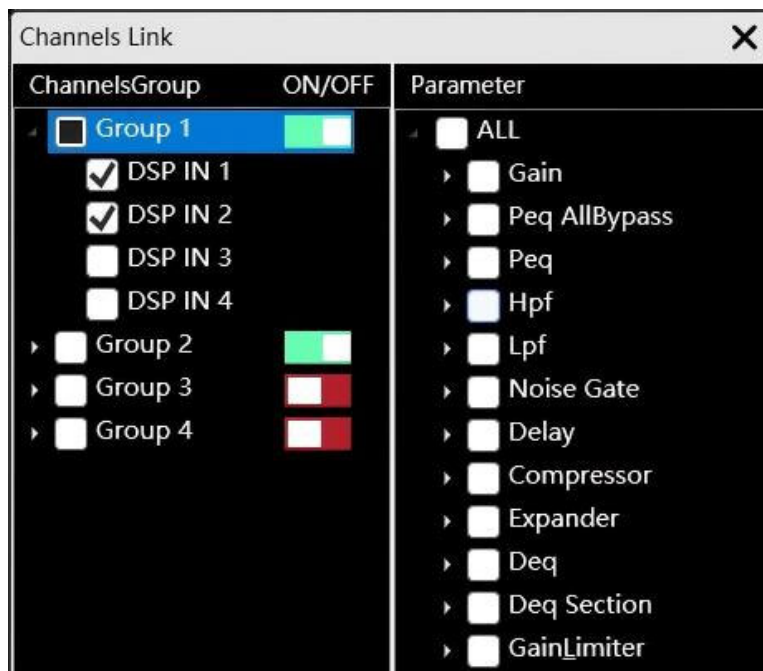


Figure 52. Channel link

The dialog has two lists. The left list contains the channels available for linking, arranged into four groups. The right list contains the parameters to be linked. Tick a channel to add it to a group, and tick a parameter to make that parameter adjust simultaneously across the group.

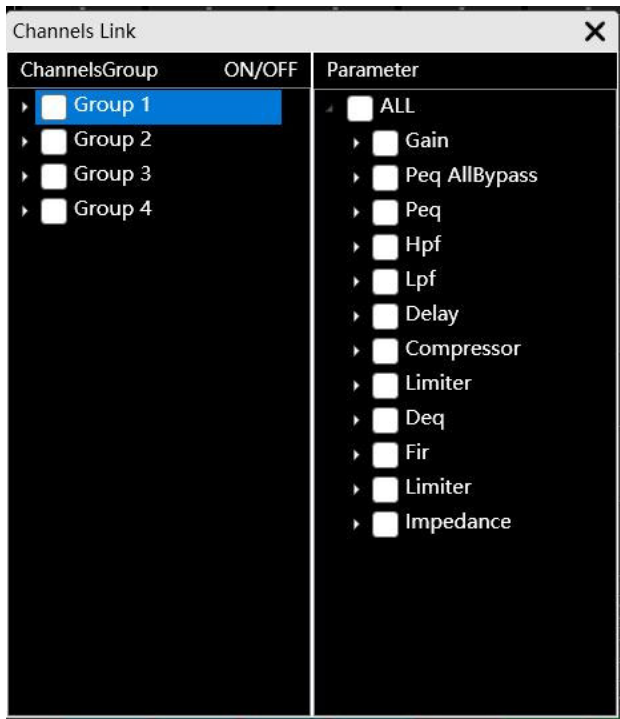


Figure 53. Channel link parameter list for speaker preset channels

Linkable parameters include gain, PEQ and PEQ bypass, high-pass and low-pass filters, delay, compressor, limiter, dynamic EQ, FIR, noise gate, expander, and impedance settings, depending on whether input or output channels are selected.

The two lists are summarised below.

Command	Function
Channel List	All Linkable Channels. Check to Link
Parameter List	simultaneous group adjustment.

12. Output Routing

Action	Icon
Double-click the OUTPUT key to open the output settings window.	

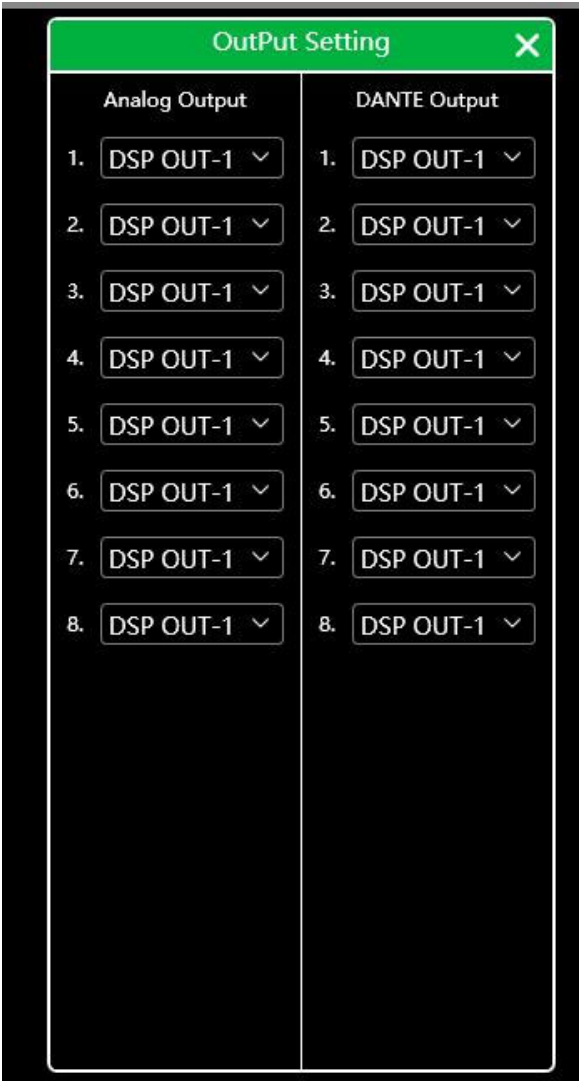


Figure 54. Output routing

Each physical output can be fed from any DSP output channel. The left column assigns the eight analog outputs. On the VERA-C48D the right column assigns the eight Dante outputs, which can carry the same or different DSP channels.

13. Device, Preset and Firmware Management

13.1 Device list



Figure 55. Device list entry

Devices are numbered in the order they are found by a scan. The device name can be edited; the factory name is read-only. When connected over TCP, the IP address is displayed and the WEB button opens the device web interface in a browser.



The three icons at the top right of each entry are, from left to right, mute, connect / disconnect, and remove.



A green bar at the left edge indicates that the device is online.



Click a device to switch the function module area to that device.

13.2 Adding a device manually

Choose File > Demo Device and select the model.

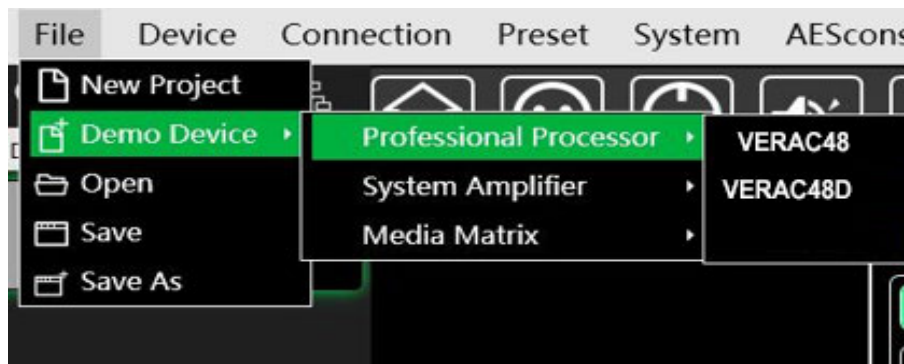


Figure 56. Adding a virtual device

A virtual device allows a complete configuration to be built and saved offline, then transferred to hardware later. Virtual devices do not connect to real hardware.

13.3 Device management

Click Menu > Device > Device Manage.

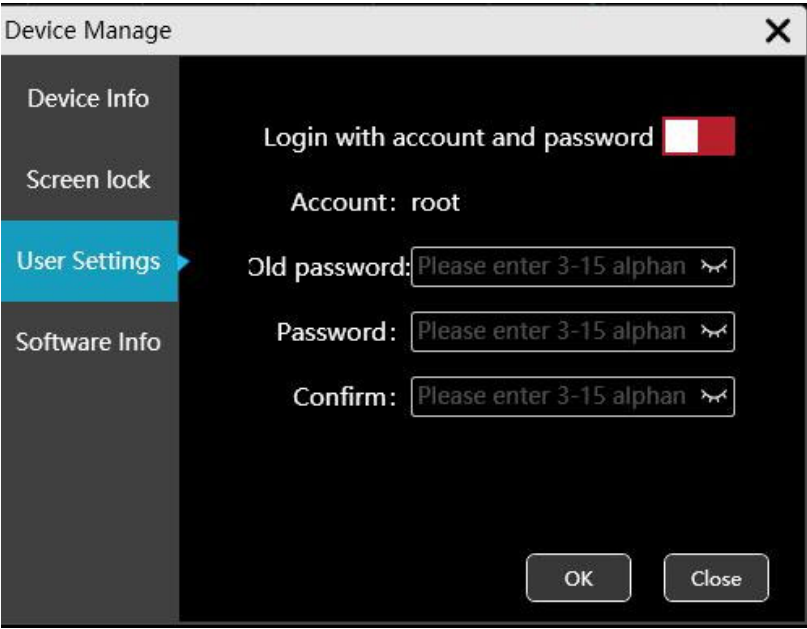


Figure 57. Device management

Page	Function
Device Info	Edit and save the device name.
Screen lock	Enter a four-digit numeric code to lock the front panel. To unlock, enter the password and click Cancel Lock.
User Settings	Enables account login for the web interface. The ROOT account has the highest permission level. The default password is 8888, digits only. Once enabled, the password is requested on the next scan.
Device IP	Shows the IP address, gateway, and MAC address. IP and gateway are editable, and DHCP can be enabled. Changes take effect after the network module restarts.
Software Info	Shows the current software and firmware versions.

NOTE

Front panel unlock: press any key to open the unlock screen, then use the arrow keys and encoder to enter the digits. After six failed attempts the panel can only be unlocked from MConsole or the web interface.

13.4 Channel names

Click Menu > Device > Channel Name.

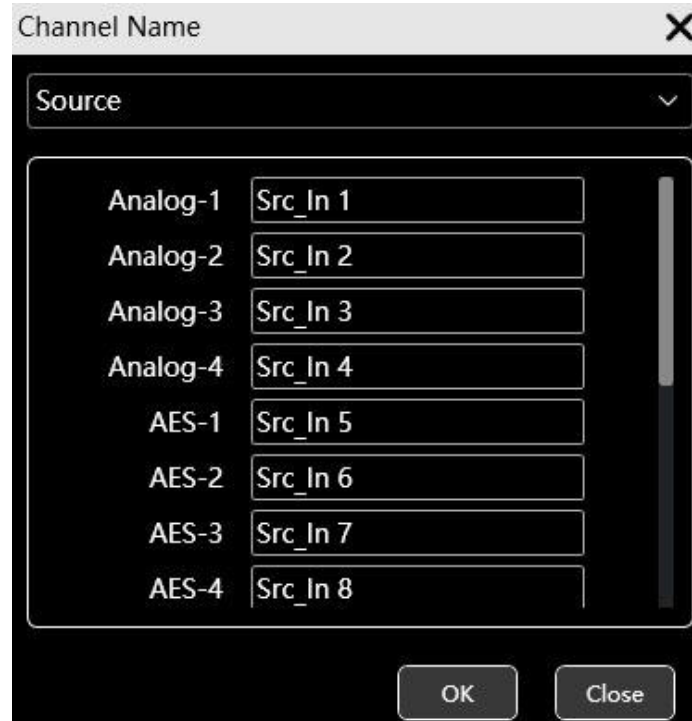


Figure 58. Channel name management

Select the channel group from the drop-down list, type the new names, and click OK. Names are limited to five letters or digits and are saved automatically.

13.5 Channel copy

Click Menu > Device > Channel Copy.

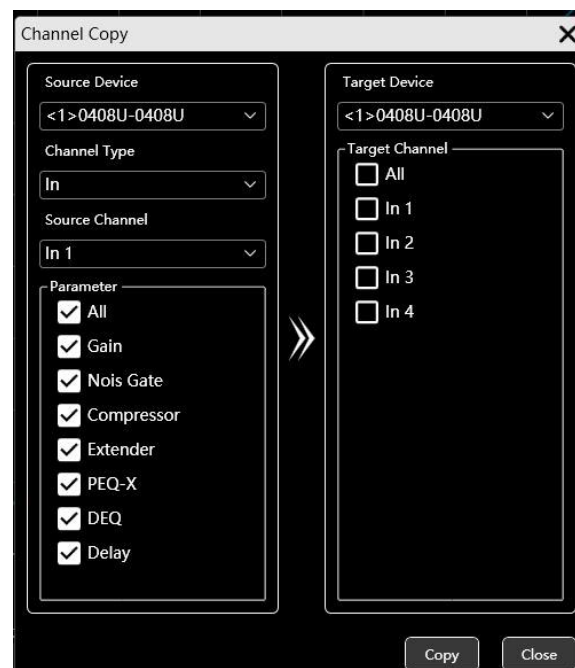


Figure 59. Channel copy

Select the source device, channel type, and source channel, tick the parameters to be copied, then tick the target channels and click Copy. Copying is possible between devices of the same model. Input and output channels cannot be cross-copied.

13.6 Firmware upgrade

Click Menu > System > Upgrade.

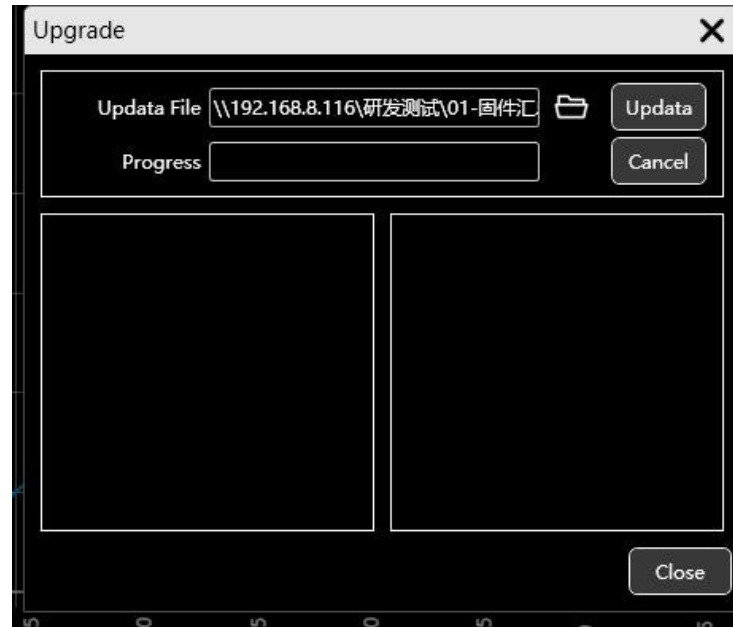


Figure 60. Firmware upgrade

Select the upgrade file and click Update. The software transfers and installs the file, logging progress. The device restarts automatically when the upgrade completes, or it can be restarted manually.

CAUTION

Mute the outputs and switch off the amplifiers before upgrading. Do not interrupt mains power or the network connection during the transfer.

14. FIR Filters and FIR Designer

14.1 Why FIR

When a conventional IIR parametric equalizer is used to flatten a magnitude response, it also changes the phase response. An FIR filter can correct magnitude while leaving phase linear, or correct phase independently of magnitude. The VERA-C48 provides FIR filtering on both the input channels and the speaker preset outputs, together with a built-in designer for generating the filters.



Figure 61. IIR equalization changes both magnitude and phase

14.2 Taps, resolution, and latency

The number of taps determines both the lowest frequency the filter can act on and the latency it introduces:

Frequency resolution = sample rate ÷ taps

Lowest usable frequency ≈ frequency resolution × 3

Latency = (1 ÷ sample rate) × taps ÷ 2

More taps give a steeper filter and extend its action to lower frequencies, at the cost of latency.

Taps	48 kHz	96 kHz
256	2.67 ms, down to 563 Hz	1.33 ms, down to 1125 Hz
512	5.33 ms, down to 279 Hz	2.67 ms, down to 558 Hz
768	7.99 ms, down to 188 Hz	4.00 ms, down to 375 Hz
1024	10.67 ms, down to 141 Hz	5.33 ms, down to 281 Hz
2048	21.33 ms, down to 70 Hz	10.67 ms, down to 141 Hz

NOTE

The VERA-C48 runs at 96 kHz. The 48 kHz column is provided for reference when comparing with measurement software or other equipment.

14.3 Typical applications

- Linearizing the phase response of a loudspeaker.
- Matching the phase and magnitude of different loudspeaker models within a product line, or of different models within one installation, so that groups and arrays are easier to align.
- Optimizing line array systems for audience coverage.
- Improving the consistency of frequency response across the coverage angle of a multi-way loudspeaker.

14.4 Equipment required for measurement

Item	Quantity
Measurement microphone	1
Audio interface	1
Windows PC with measurement software (for example Smaart), rePhase or FIR Designer, and MConsole	1
VERA-C48 processor or DSP network amplifier	1
Loudspeaker under test	1

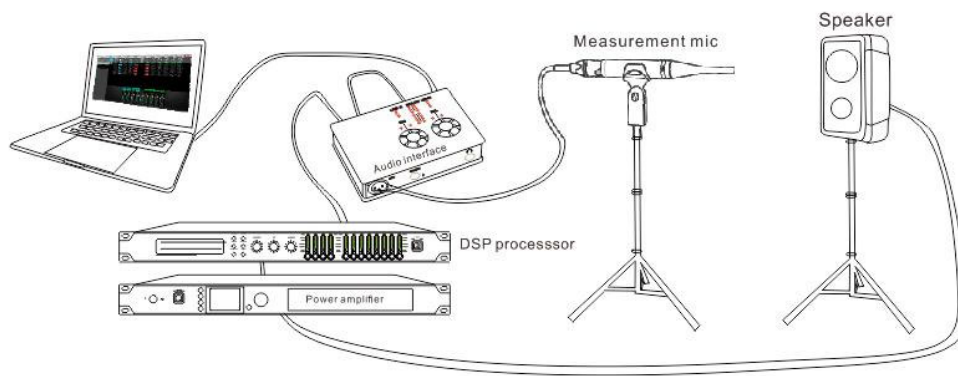


Figure 62. Measurement connection diagram

14.5 Opening FIR Designer

There are two ways to open the FIR Designer:

1. From the FIR window, click the Designer button.
2. From the main window, click FIR DESIGNER. This returns you to the page you were last working on.

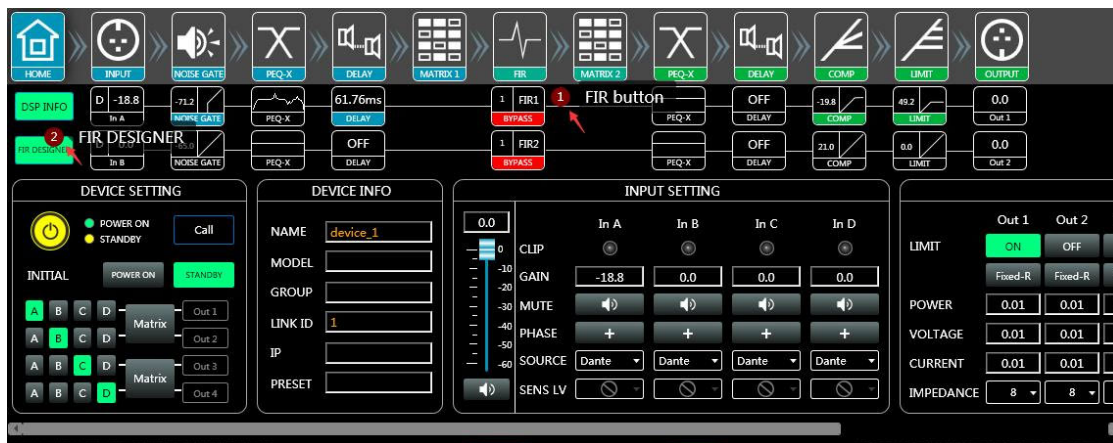


Figure 63. Opening FIR Designer from the main window



Figure 64. The Designer button in the FIR window

14.6 Step 1 — Import

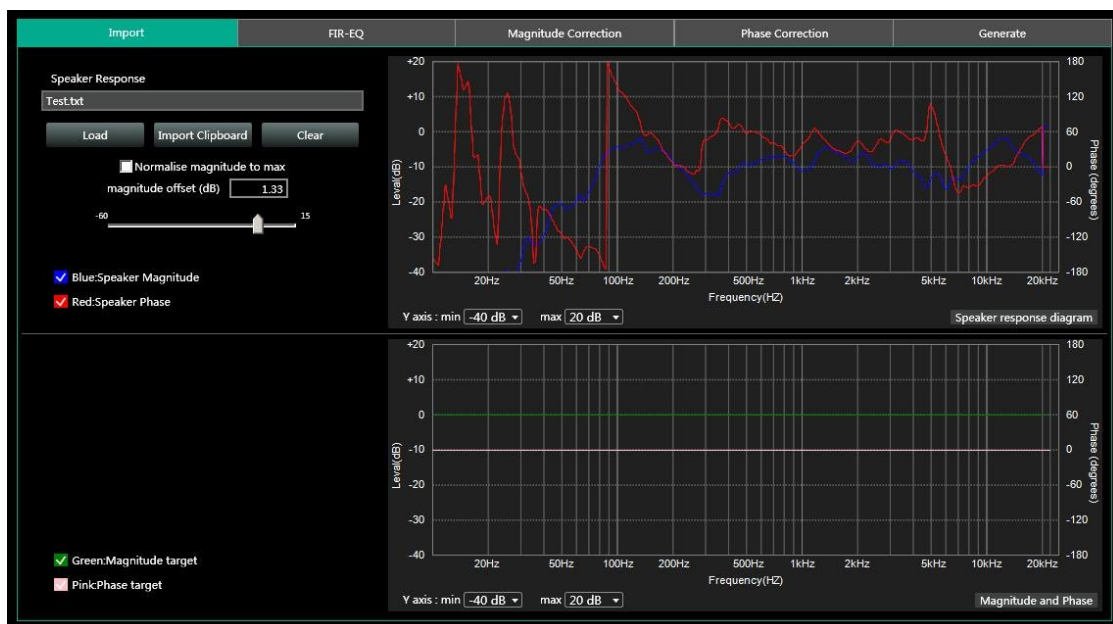


Figure 65. FIR Designer, Import page

Control	Function
Load	Loads a speaker measurement file, normally a .txt file exported from Smaart.
Import Clipboard	Loads ASCII measurement data directly from the clipboard.
Clear	Clears the measurement data and any loaded curves.
Normalise magnitude to max / Magnitude offset (dB)	Shifts the measured magnitude by a fixed amount so that the correction curve needs to move as little as possible.

The Import page is divided into the following areas.

- 1 Designer function bar.** Switches between the five FIR Designer pages.
- 2 Speaker response.** Loads a speaker curve file, or imports a curve from measurement software. Clear removes the loaded curves and resets the page.
- 3 Amplitude average.** Untick to shift the average gain of the FIR curve to 0 dB or to another value, so that the correction curve has to move as little as possible.
- 4 Curve colours.** Blue is the measured speaker amplitude; red is the measured speaker phase.
- 5 Speaker response graph.** Shows the speaker amplitude and phase after the file has been loaded or trimmed.
- 6 Y-axis range.** Minimum –80 dB, maximum +40 dB.
- 7 Target response.** Loads or imports the target curve. With both Amplitude and Phase ticked, the speaker curve and the target curve are merged into a single curve; unticking either one applies only the remaining correction.
- 8 Amplitude average.** Works as item 3, applied to the target curve.
- 9 Target colours.** Green marks the amplitude adjustment range; pink marks the phase adjustment range.
- 10 Target response graph.** Shows the target amplitude and phase after loading or trimming.

The vertical range of both graphs is set from the drop-down lists beneath them.

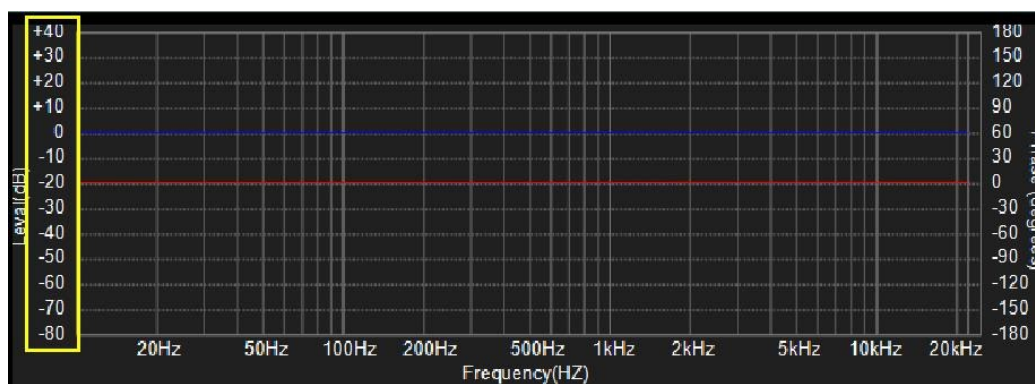


Figure 66. Y-axis scale, –80 dB to +40 dB

14.7 Step 2 — FIR-EQ

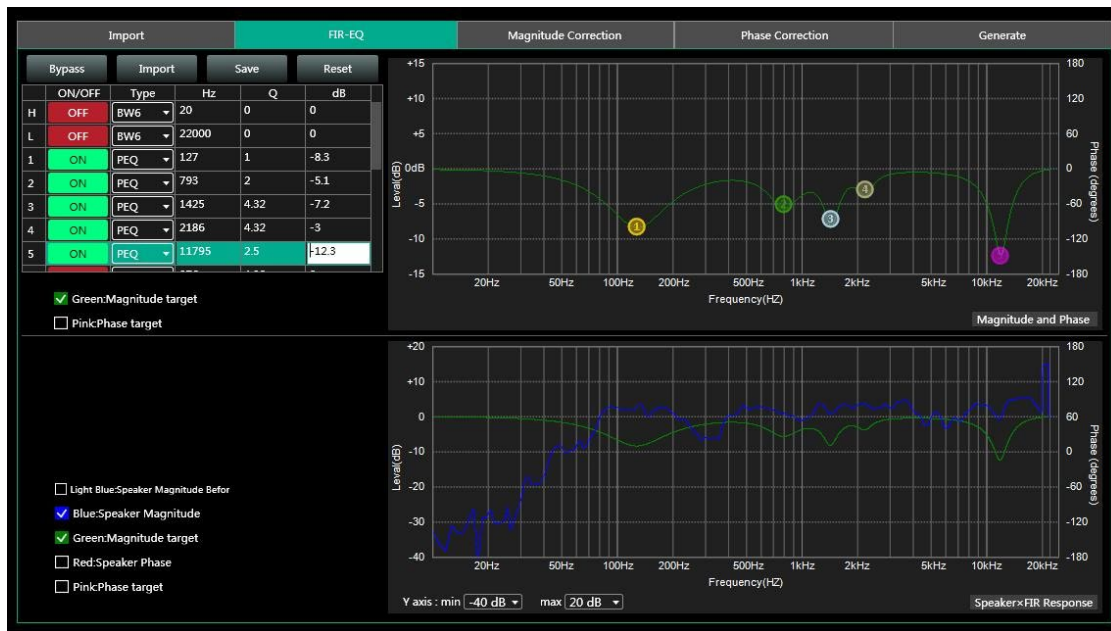


Figure 67. FIR Designer, FIR-EQ page

This page provides a high-pass filter and a low-pass filter for setting the crossover, plus 15 bands of PEQ, low shelf, and high shelf for shaping the magnitude. Work towards a linear magnitude response for the target loudspeaker. Bypass disables all bands; Import, Save, and Reset manage the settings.

- 1 Filter list.** Add the high-pass and low-pass filters, then set the type, frequency, Q, and gain of each band. Bypass All disables every band, and Import, Save, and Reset manage the settings.
- 2 FIR-EQ graph.** The upper graph draws the EQ adjustment on the current FIR curve.
- 3 Response graph.** The lower graph shows the resulting FIR amplitude against the speaker response.

NOTE

Changing the FIR magnitude on this page does not affect its phase.

14.8 Step 3 — Magnitude Correction

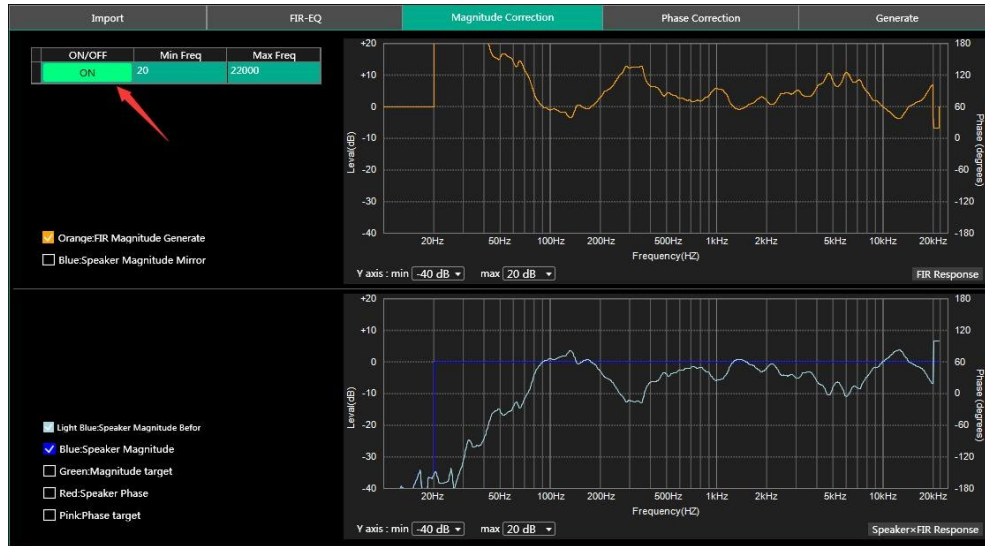


Figure 68. FIR Designer, Magnitude Correction page

Where many loudspeakers have to be corrected, adjusting each magnitude by hand is slow. Magnitude Correction does the work automatically: set the minimum and maximum frequency over which correction should act, and switch the section **ON**. Restricting the frequency range keeps the correction inside the loudspeaker's usable bandwidth and avoids wasting filter effort on frequencies the driver cannot reproduce.

- 1 **Min Freq / Max Freq.** Set the lowest and highest frequency over which correction will act, then switch the section **ON**.
- 2 **FIR response.** The upper graph shows the generated FIR magnitude against the mirrored speaker magnitude.
- 3 **Speaker response.** The lower graph shows the corrected speaker amplitude.

14.9 Step 4 — Phase Correction



Figure 69. FIR Designer, Phase Correction page

Once the magnitude has been corrected, set the frequency range for phase correction and switch the section **ON** to linearize the phase response of the loudspeaker.

- 1 **Min Freq / Max Freq.** Set the lowest and highest frequency over which phase correction will act, then switch the section ON.
- 2 **FIR response.** The upper graph shows the generated FIR phase against the mirrored speaker phase.
- 3 **Speaker response.** The lower graph shows the corrected speaker phase.

14.10 Step 5 — Generate



Figure 70. FIR Designer, Generate page

Select the number of taps for the filter, give the filter a name, and choose the FIR channel it will be stored in. Click Generate to store the filter in the device, or Export to save it as a .KF file for use on another device.

Num. Taps ranges from 256 to 1280 on an input FIR channel and up to 2048 on a speaker preset channel. The resulting latency in milliseconds is calculated automatically from the tap count, and the design sample rate is fixed at 96 kHz. The FIR Name field is free text, and the Channels list selects the FIR channel that will hold the filter. Generate stores the filter in the device; Export writes it to a .KF file.



Figure 71. The generated filter shown in the FIR window

After generating the filter, return to the FIR window and release the BYPASS button on that channel to bring the filter into circuit.

15. Troubleshooting

Symptom	Things to check
No audio at any output	Outputs muted at the front panel or in software. Matrix has been cleared — no crosspoints enabled (Chapter 9). Input source selection does not match the connector in use. Speaker preset limiter threshold set very low. A speaker preset with an inappropriate high-pass or low-pass filter has been recalled.
No audio on one output only	That output muted, or its gain fully down. No matrix crosspoint enabled for that output. Output routing (Chapter 12) assigns a different DSP channel than expected. Speaker preset for that channel band-limits the signal outside the programme range.
AES/EBU input is silent	Channel input mode still set to analog. Signal connected to the wrong AES pair (AES 1&2 versus AES 3&4). Source not locked, or sample rate not accepted. Backup source has taken over — check the source priority settings.
Dante channels silent (VERA-C48D)	Subscriptions not made in Dante Controller. Device on a different network or VLAN from the transmitter. Channel has switched to a backup source. Network switch not configured for the audio network.
MConsole does not find the device	Computer and device are on different subnets — compare the addresses shown at the bottom of the MConsole window with the address on the LCD. Two network adapters active; disable the one not in use. Windows firewall blocking MConsole. A second instance of MConsole is already running. Wrong connection method selected in Port Settings.
Front panel does not respond	Panel lock is engaged. Press any key and enter the password. After six failed unlock attempts, the panel can only be unlocked from MConsole or the web interface.
Distorted or clipped sound	Input CLIP indicator lit — reduce the source level or the input gain. Maximum input is 20 dBu. Excessive EQ boost accumulating through several stages. Output level above the amplifier input sensitivity.
Limiter engages constantly	Threshold set too low for the amplifier in use. Amplifier parameters (gain, sensitivity, impedance, power) not entered or incorrect. Excessive gain earlier in the chain.
An imported FIR filter has no effect	BYPASS is still engaged on that FIR channel. Too few taps for the frequency range being corrected — see the table in section 14.2. The filter was stored on a different channel than the one carrying the signal.
A preset cannot be deleted	The Default preset cannot be deleted. The preset is locked — unlock it first. The password 8888 is required for Delete, Clear, and Import.
Hum or buzz	Ground loop between the processor and other equipment. Investigate signal screening; never disconnect the mains safety earth. Unbalanced or damaged cable. Audio cable routed alongside mains cable.
Firmware upgrade fails	Network connection interrupted during transfer. Wrong upgrade file for the model. Retry the upgrade; do not power the device down partway through.

If a fault persists after these checks, note the firmware and MConsole versions shown under System > About and contact your Sound Barrier dealer or distributor.

16. Appendices

Appendix A — Default passwords

Function	Default password
Preset Delete, Clear, and Import	8888
EQ Reset	8888
ROOT web interface account	8888
Front panel screen lock	Four digits, set by the user
Preset lock	Set by the user

CAUTION

Change the default passwords before an installed system is handed over. Record the new passwords in the project documentation.

Appendix B — Parameter ranges

Parameter	Range
Input / output gain	−60 dB to +15 dB
Delay (each stage)	0 to 2000 ms, 0.01 ms resolution
Noise gate threshold	Down to −90 dBu
Compressor threshold	Up to 24 dBu
Compressor ratio	1:1 to 20:1
Compressor knee	Soft knee, adjustable
Expander ratio	1:1 upward
Dynamic EQ threshold	−90 to 24 dBu
Dynamic EQ Q	0.27 to 15
Dynamic EQ ratio	1 to 100
Dynamic EQ maximum effect	0 to 12 dB
Dynamic EQ attack	1 to 2895 ms
PEQ frequency	20 Hz to 20 kHz
Filter slope (HPF / LPF)	Up to 48 dB per octave
FIR taps, input	256 to 1280
FIR taps, speaker preset	Up to 2048
Amplifier sensitivity setting	26 dB to 44 dB
Amplifier impedance setting	2 Ω, 4 Ω, 8 Ω, 70 V, 100 V

Appendix C — Commissioning checklist

1. Confirm the firmware version and record it in the project file.
2. Set the device name, IP address, and channel names.
3. Assign input sources and configure backup source priority for every channel.
4. Set input gain structure and confirm no stage clips at maximum programme level.
5. Load or build the speaker preset for every output; verify high-pass and low-pass filters against the connected driver.
6. Enter the amplifier parameters for every output, then set limiter thresholds.
7. Set output delays for driver and cabinet alignment.
8. Verify the matrix routing and the output routing assignments.
9. Save the configuration to a device preset and set it as the boot preset.
10. Export the configuration to a file and store a copy off-site.
11. Protect the speaker presets, lock the presets, and enable the front panel lock.
12. Record all passwords in the project documentation.

Appendix D — Warranty Coverage & Registrations

This product includes a 1-year standard limited warranty, extended to 3 years total at no additional cost when the product is registered within 90 days of purchase. Proof of purchase is required. Statutory consumer rights are not affected.

Register your product at soundbarrier.com/warranty. For complete warranty details, please visit <http://www.soundbarrier.com/warranty>.