OPERATION MANUAL

AHUJA®

LOUDSPEAKER
Management System

LMS-408

- Thank you for purchasing the AHUJA Loudspeaker Management System.
- Please read this manual thoroughly before making connections and turning on the power. Following the instructions in this manual will enable you to obtain optimum performance from your new AHUJA Loudspeaker Management System.
- Please retain this manual for future reference.

• Safety Instructions

Read the Instructions: Please read all the instructions in this section carefully before installation or use of the product. All the safety instructions must be followed.

Retain the Instructions: Please retain this Instruction Manual for future reference.

This symbol, wherever it appears, alerts you to the presence of uninsulated hazardous voltage that may be sufficient to constitute a risk of electric shock. External wiring to any terminal marked with this symbol must be done by a trained and instructed person only.

This symbol, wherever it appears adjacent to a component, alerts you that the concerned component can only be replaced by another of the exact same specifications.

WARNING

To reduce the risk of electric shock, do not remove the cover. No user serviceable parts inside. Refer all servicing to qualified personnel only.

CAUTIONS

Water & Moisture: To reduce the risk of fire or electrical shock, do not expose this set to rain or moisture. Do not use this set near water or in a wet location. Do not keep any object filled with liquid, such as a vase, on top of this set. Do not insert or remove the AC mains plug with wet hands.

Power Source: The supply voltage to which this set can be connected is marked on the rear panel of the set.

Operation on Generator: When operating this set on a generator, make sure the set is switched off till the generator voltage has stabilized.

Stability: This set must be kept in a stable and flat horizontal position, and never in a tilted position. Do not place this set on an unstable stand, tripod, bracket or mount. Do not use attachments which are not supplied or explicitly recommended by the manufacturer.

Cleaning: Disconnect this equipment from the AC mains before cleaning. Clean with a damp cloth, but do not allow any liquid to enter the set. Do not clean with liquids or aerosols.

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• Features / Front & Rear Panel Controls

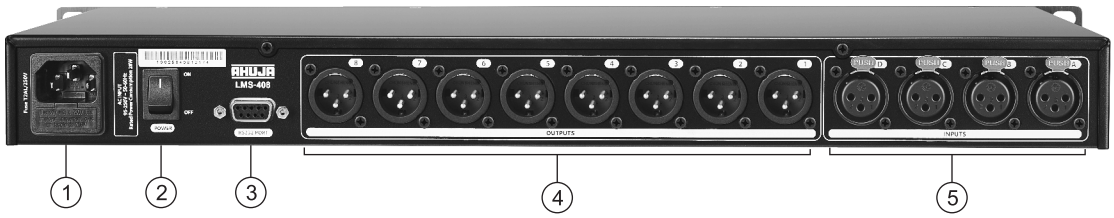
Overview

- 32-bit DSP, 48kHz sampling rate, 24bit AD/DA convertor.
- Input settings include high-cut, low-cut, 5 band PEQ, noise gate, gain, mute, phase, link adjustment.
- Output settings include X-over, 7 band PEQ, Gain, mute, compressor/limiter, phase, delay and link adjustment.
- Matrix selection for inputs and outputs. Each Input and output channel can be named.
- All high cut, low-cut filter type can be select as Butterworth, Link Witz-Riley, or Bessel. Slope can be chosen at 6dB to 48dB/Oct.
- Compressor/limiter threshold, ratio, attack time and release time can be adjusted continuously for outputs.
- Delay time setting is upto 680ms.
- Pre settings can be copied for every single channel. Linked channels will have automatic setting adjustment.
- Every input and output channel PEQ curve adjustment graph can be viewed in respective input/output channels.
- Built-in signal generator with pink, white noise and 20~20K sine wave, signal amplitude adjustable.
- 30 user presets, where each preset can be saved and recalled. Password protection function.

Front Panel

1. **Input Mute Edit Keys:** There are four MUTE EDIT keys, one for each input channel. These are used for selecting each channel individually for adjusting various parameters.
2. **Main Menu Edit Keys:**These keys are used to adjust all system menu/ input channel parameters/ output channel parameters. “EXIT” is the return key in any state.
3. **LCD:** Shows all the related operation parameters and status of current settings.
4. **Parameter Knob:** This encoder knob can be rotated clockwise or counterclockwise to edit the menu and parameter settings. To confirm the settings, press the encoder knob and the settings will be stored.
5. **Output Mute Edit Keys:** There are eight MUTE EDIT keys, one for each output channel. These are used for selecting each output channel individually for adjusting various parameters.
6. **USB:** Used to connect the system with PC or laptop and use with the supplied software.
7. **Output Level Indicators:** 4-segment high precision LED displays the output signal level. LIMIT LED glows when the output signal is too high.
8. **Input Level Indicators:** 5-segment high precision LED shows the input signal level of the corresponding channel. LIMIT LED glows when the input signal is too high. Please reduce the input signal.

Rear Panel



1. **Power Socket:** Plug in the detachable AC mains cord to provide the input power supply. The device can operate between 95V-250V ~50-60Hz.
2. **Power On/off Switch:** Press the top of the switch to switch ON,
3. **RS232 Interface:** Used for connecting the device to central control for remote connectivity.
4. **Signal Output Connection:** 1-8- Balanced male XLR connectors for signal output.
5. **Signal Input Connection A-D:** Balanced female XLR connectors A, B, C, D for providing the signal input.

1. Boot Interface

1.1	LMS-408 DSP Processor Version 1.11c	After power is switched on, the display shows the model number, software version etc.
1.2	LMS-408 F00 Default Preset	Once the system is ready for use, the LCD will show the model number and default user preset, which is the settings last saved in the system memory.

2. "UTIL" Main Menu Interface

The Unit shall not have any factory preset password. Incase the display prompts for a password then the default password is "1234". The user may enter the password by rotating the parameter knob and pressing it to select the desired numeral. Once all four digit have been entered, select "Y" and press the knob. This will enter the password to unlock the unit.

Please follow steps to 2.1 to 2.4 for selecting desired option in the UTIL main menu interface.

2.1	LMS-408 Unit Lock Password [1234]	Press "UTIL" key once to enter the password setting, press the encoder to enter the password field. If the user desires to set a password then the following steps can be performed: Rotate the encoder and press the knob to select the desired alphabet or digit. Repeat the same step till the "Y" starts blinking in RED text. On selecting "Y" the password is saved successfully.
2.2	LMS-408 Input Select ANALOG INPUT	Press the "▼" key, to enter signal source selection: Analog input, pink noise, white noise and sine wave 20Hz-20kHz. It is recommended to use the "Analog input " mode. The user may select pink noise, white noise and sine wave options to perform various acoustical test.
2.3	LMS-408 Copy CH Select InA→In	Press the "▼" key again to enter copy channel selection. The input or output channel parameters can be copied freely. **NOTE:** This function may be used when the input channel settings have been done and the user desires to replicate the same setting in a different input channel also.
2.4	LMS-408 LCD Disp Time 10 second	Press "▼" key again to enter LCD backlight time setting interface. The default backlight time out is 10s.

3. Recall Preset

3.1	LMS-408 Load Preset U01 Default Preset	Press “RECALL” key to enter preset selection menu. Users can transfer the saved settings U01-U30 and the initial setting F00. Use the rotary encoder select the desired preset and press the recall key.

4. Save Preset

4.1	LMS-408 Store Preset U01 Default Preset	Press “SAVE” key to enter preset save menu. Users can save the adjusted settings in U01- U30. User the rotary encoder knob to enter the preset naming menu. After renaming the preset use the “SAVE” key to save the settings.

5. Input Channel Setting Interface

5.1	GAIN INA +0.0dB MuteON Phase0	Long press input channel “MUTE/EDIT” key to enter gain control interface, gain setting range is -60dB—+12dB. The channel mute control and phase adjust function are displayed below the gain setting. Short press the “MUTE/EDIT” key to mute the corresponding output channel. Short press again to cancel mute function.
5.2	PEQ:1 INA GAIN +0.0dB Frequency 40.2Hz Q1.7 TypePEAK Bypass OFF	Press “▼” key to enter PEQ setting interface,” PEQ” current number is 1, the scale of “Gain” adjust is -12dB to +12dB, “Frequency” range is 20Hz-20kHz, “Q” is 0.4-128, “TYPE” with PEAK, L-SHELF, H-SHELF, LOW CUT, HIGH CUT, ALLPASS1, ALLPASS2, Bypass (ON/OFF). The user has the option to adjust five PEQs starting from PEQ:1 to PEQ:5.
5.3	XOVERINA High pass 19.6Hz Slpoe BYPASS Low pass 20K 15Hz Slpoe BYPASS	Press “▼” key again to enter crossover setting interface. The scale of “HIGH PASS” frequency is 20Hz-20kHz, “LOW PASS” frequency is 20Hz-20kHz. “SLOPE” of three types can be select: Butterworth, Link witz-Riley, Bessel, slope can be chosen at -6dB- -48dB/Oct.
5.4	GATEINA Threshold -70.0dB Attack 50ms Release 500ms Hold 100ms	Press “▼” key again to enter noise gate setting interface. The scale of “THRESHOLD” is -70dB-0dB. “ATTACK” range 1mS-999mS, “RELEASE” is 1mS-3000mS,” Hold” is 10mS-999mS.
5.5	IN-LINKINA A: √ B: C: D:	Press “▼” key again to enter link setting interface. If the current channel is INA, it can choose INB, IBC, IND channel to adjust the parameters with INA synchronization.

NOTE: Press and release the parameter knob to select the desired parameter for setting. The selected parameter will blink and the text will be in RED colour.

6. Output Channel Setting Interface:

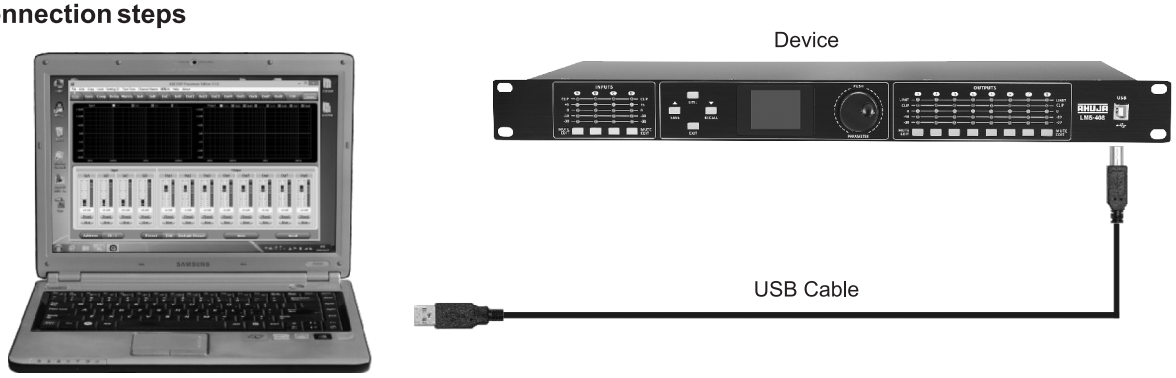
6.1	GAINOUT1 +0.0dB MuteON Phase 0	Long press output channel "MUTE/EDIT" key to enter gain control interface. Gain setting range is -60dB-+12dB. The options for channel mute control and phase adjust function are also displayed below the gain setting. Short press the "MUTE/EDIT" key to mute the corresponding output channel. Short press again to cancel mute function.
6.2	PEQ:1 OUT1 GAIN +0.0dB Frequency 40.2Hz Q1.7 TypePEAK Bypass OFF	Press "▼" key to enter PEQ PARAMETER SETTING." PEQ" current number is 1. The Gain setting range is -12dB- +12dB, FREQUENCY range is 20Hz-20kHz, "Q" is 0.4-128 . TYPE of filter which can be selected are Peak, Low-shelf, High-shelf, High-cut, Low-cut, Allpass1, Allpass2, Bypass (ON/OFF). The user has the option to adjust seven PEQs starting from PEQ:1 to PEQ:7.
6.3	XOVEROUT1 High pass 19.6Hz Slope BYPASS Low pass 20K 15Hz Slope BYPASS	Press "▼" key again to enter the crossover. the scale of "High Pass" is 20Hz- 20kHz, "Low Pass" is 20Hz- 20kHz,.3 The filter types low/high pass filter can be selected as Butterworth, Bessel, Linkwitz-Riley with slope rates from -6dB- -48dB.
6.4	MATRIXOUT1 A: √ B: C: D:	Press "▼" key again to enter matrix setting. The output channels can choose one or several input signal.
6.5	DELAYOUT1 0.000ms 0.000m 0.000ft	Press "▼" key again to enter delay unit setting. The delay can be adjusted in ms(0-680mS), m(0-234m), ft(0-766ft) . Changing any one parameter will correspondingly change the other parameters accordingly.
6.6	COMPOUT1 Threshold +20.0dB Attack 50ms Release 500ms Ratio 1:1.0 Knee 0dB	Press "▼" key again to enter compressor setting interface, The "THRESHOLD" range is (-60dB---+20dB), "ATTACK" range is (1mS-999mS), "RELEASE" range is (1mS-3000mS), "RATIO" compressing rate is 1:1, 1:10 LIMIT. "KNEE" inflection point range is 0-12dB.
6.7	OUT-LINK OUT1 1:√ 2: 3: 4: 5: 6: 7: 8:	Press "▼" key again to enter link setting: if for example the current channel is "OUT1" then the user can choose OUT2, OUT3, OUT4, OUT5, OUT6, OUT7, OUT8 channel to adjust parameters simultaneously.

NOTE: Press and release the parameter knob to select the desired parameter for setting. The selected parameter will blink and the text will be in RED colour.

• PC Software

Note: PC connectivity software is provided in the USB drive supplied with the product. Please use the supplied software along with your LMS-408 processor.

USB connection steps



1. Install the software on your PC/laptop.
2. Connect the processor to the computer using USB cable provided, after turning on the device, the computer will search for the new hardware automatically. Once the hardware is detected successfully, then the processor is ready for use with the software.

3. On the software once the device is connected then the “offline” key on the top right corner will change in to “online” showing that the device and software are now ready to be used.

1. Volume Control Interface

a. File: Under this menu the user will get option to open, save, upload or download the preset parameter.

Setting: Under this menu the user will get option to rename the channel, select a test tone, lock the unit.

Help: Under this menu the user can access the Rs232 code table.

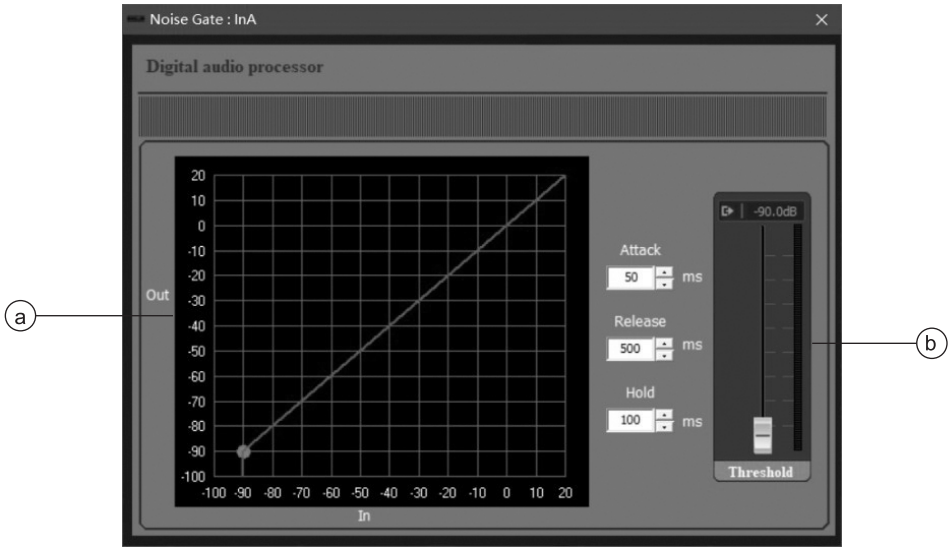
About: This option will display the software version and its corresponding details.

b. Setting Interface: The user can select the Input channel and Output Channels with their corresponding settings such as Gain, PEQ, Phase, Filter etc. The user can make use of the Matrix Interface to Link the input and output channels as desired.

c. The Volume Control Area: Gain, Phase, Mute control for all input & output channels.

d. Normal: This option allows the user to select the phase between NORMAL/INVERSE.

2. Noise Gate Interface

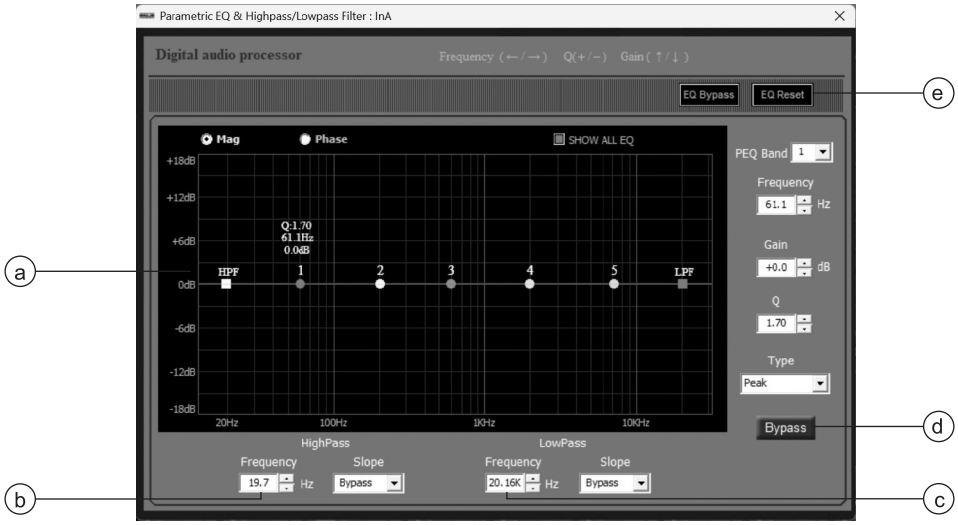


a. Displays the current noise gate status curve.

b. All input channels noise gate parameters can be set. Noise gate threshold(-70~0dB), attack time (1~999ms), hold time(10~999ms), release time(10~3000ms) can be adjustable continuously for input.

• PC Software Specifications

3. Input Channel PEQ Interface



a. Select the MAG interface to adjust the parameter balance and high and low tangent curve of the input channel, and select the PHASE interface to adjust the Phase curve of the current channel. Quick parameter setting with mouse and keyboard.

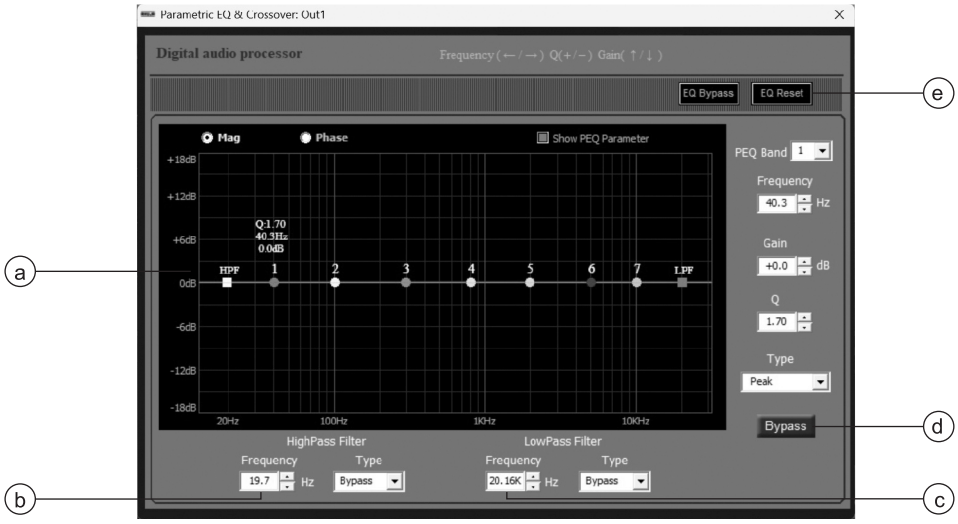
b. The low-cut frequency can be adjusted from 20HZ to 20KHZ, and the slope can be selected from "Butterworth", "Bessel", "Link witz-Riley". The range is adjustable from -6dB to -48dB.

c. The High-cut frequency can be adjusted from 20HZ to 20KHZ, and the slope can be selected from "Butterworth", "Bessel", "Link witz-Riley". The range is adjustable from -6dB to -48dB.

d. All PEQ gain, Q value, frequency, type can be adjusted, and the bypass button can be selected. PEQ type options are: equalization; low shelf; high shelf; low cut; high cut; phase 180 degrees; phase 360 degrees adjustment.

e. The PEQ of the current channel can be completely bypassed or reset.

4. Output PEQ Interface



a. Use the interface to adjust the high and low frequency curves of the input channel.Select the PHASE interface to adjust the Phase curve of the current channel. Quick parameter setting can be done using this interface.

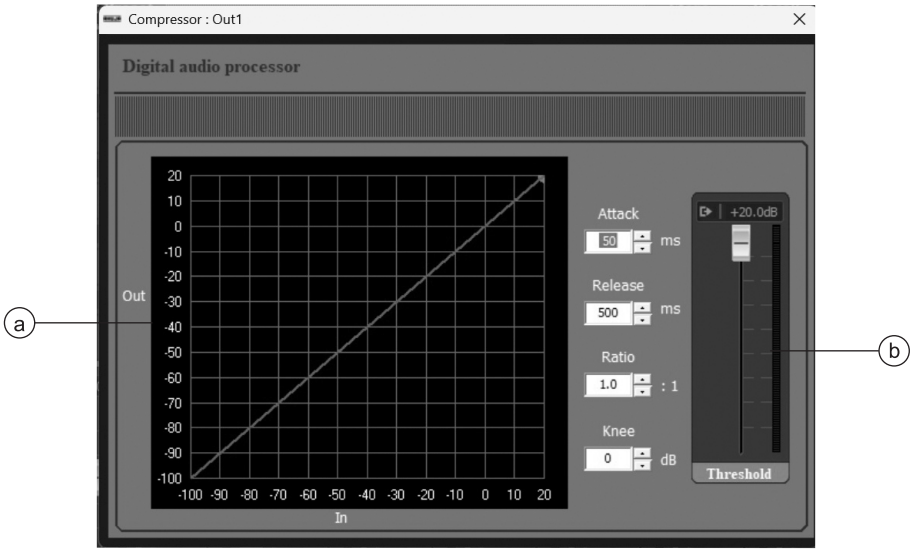
b. The low-cut frequency can be adjusted from 20HZ to 20KHZ, and the slope can be selected from "Butterworth", "Bessel", "Link witz-Riley", and the range is adjustable from -6dB to -48dB.

c. The High-cut frequency can be adjusted from 20HZ to 20KHZ, and the slope can be selected from "Butterworth", "Bessel", "Link witz-Riley", and the range is adjustable from -6dB to -48dB.

d. All PEQ gain, Q value, frequency, type can be adjusted, and the bypass button can be selected. PEQ type options are: equalization; low shelf; high shelf; low cut; high cut; phase 180 degrees; phase 360 degrees adjustment.

e. The PEQ of the current channel can be completely bypassed or reset.

5. Compressor Interface



a. Shows the compression status of all channels.

b. The user can set the compression parameters for output channel. The compression range is -60dB-+20dB, ratio is selectable between 1:1, 1:10, LIMIT, attack time is selectable between: 1-999ms, release time is selectable 10-3000ms, soft knee compression range is 0dB-12dB

6. Delay Interface

a. Can adjust delay parameter of all channels, the scale is 0-680ms, there are millisecond, meter and feet units for converting. The units get converted according to the setting chosen . For example if the user selects the delay as 100ms then the corresponding distance in meter and feet will be displayed.

• Specifications

LMS-408	
Frequency Response	20Hz-20,000Hz, -0.3dBu
Signal to Noise Ratio	>105 dBu
THD	<0.008 at 1kHz(0dBu)
Crosstalk	>70dBu
Input	Balanced XLR
Max. Input Level	+15dBu
Impedance	20K/Stereo; 10K/MONO
Output	Balanced XLR
Max. Output Level	+15dBu
Impedance	<500Ω
Digital Processing	24-bit sigma-delta converters 48kHz Sampling Rates
Display	Dot matrix screen display
Power Supply	AC: 220-240V 50/60Hz
Protection	AC: Fuse 1 × 2A (T 2A L)
Dimension	W482 × H44 × D210mm
Weight	2.42 kg Approx

ACCESSORIES: 1 USB drive (Includes PC software), 1 USB Cord, 1 AC mains Cord, 1 Spare AC Fuse, 4 Base feet

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