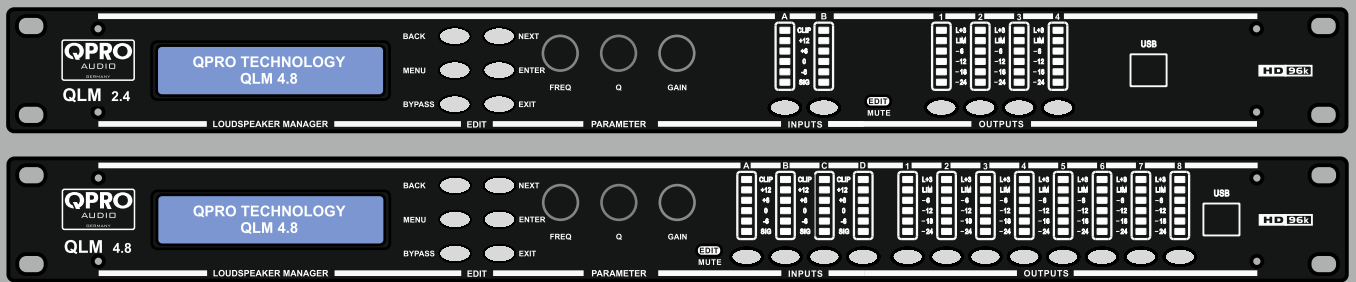




Loudspeaker Management System

QLM - Series



MANUAL

# Introduction

1. Read these instructions.
2. Keep these instructions.
3. Read all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacture's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Use only attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lighting storms or when unused for long periods of time.
14. Refer all servicing to qualified service personal. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection.
16. Where the MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.



The symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure—voltage that may be sufficient to constitute a risk of shock.



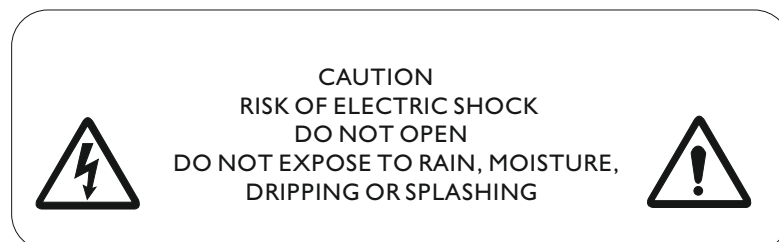
The symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

To reduce the risk of electric shock, do not remove the top cover (or the rear section). No user serviceable parts inside. Refer servicing to qualified personnel.

To reduce the risk of fire or electric shock, do not expose this appliance to rain and moisture. The apparatus shall not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, shall be placed on the apparatus.

These service instructions are for use by qualified service personnel only.

To reduce the risk of electric shock do not perform any servicing other than that contained in the operation instructions. Repairs have to be performed by qualified service personnel.



---

# Introduction

The QLM Series are powerful DSP based loudspeaker processors, ideally suited for install application, where they combine the functions of a multitude of conventional products in a compact I U unit with extensive remote control capabilities. To achieve this, two models of the QLM Series are available.

QLM 2.4 with two inputs - four outputs

QLM 4.8 with four inputs - eight outputs

Base crossover modes:

8 Outputs have 2x2 way, 2x3 way, 2x4 way, 4 + 4 way, 5 + 3 way and 6 + 2 way.

4 Outputs have 2x2 way, 3 + 1 way, 4 way and 2 MonoSub.

Units also offer "Source" for free assign signal, which allows completely flexible routing of any output from any combination of inputs.

Each input has a gain control, variable delay line, multi-type filters. Filter types included parametric equalisation, high & low shelving, notch, band-pass, all-pass, variableQ highpass & lowpass.

Each output has a gain control, variable delay line, highpass and lowpass crossover filters, seven band multi-type filters, polarity, input signal source, a limiter. The crossover filters offer slopes of up to 48dB/Octave.

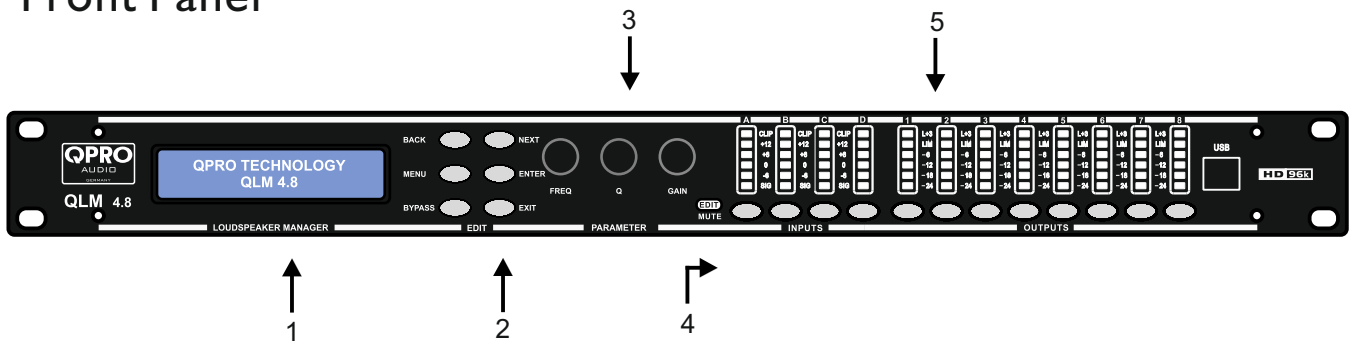
Security lock-out is available for each parts.

Supply external device remote controls.

Remote port is USB and RS485.

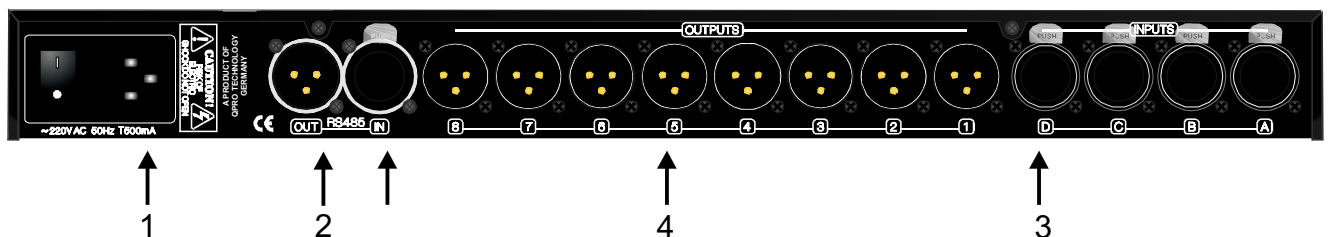
---

## Front Panel



1. LCD Screen: Show the name of last recalled memory on the bottom line of the screen, and current device model name on the top line. Also used to show all parameters as they are edited, and all menu selections.
2. BACK/ NEXT: Moves backwards or forward through list of parameters.  
MENU: Activates the main menu.  
BYPASS: Bypass filter.  
QUIT: Quit key.  
ENTER: Enter key.
3. Rotary Encoders: Three velocity encoders adjust parameters.
4. MUTE: These buttons illuminate when pressed and mute audio for that channel.  
(Press and Hold 3 seconds) Access current channel parameters.
5. Meters: Input and Output meters show dB from clipping point. Red CLIP LED show signal overflow, Yellow LED show signal near -3dB.

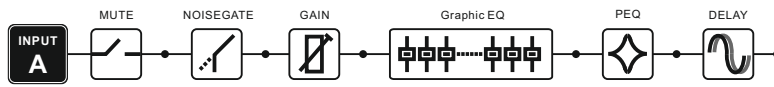
## Rear Panel



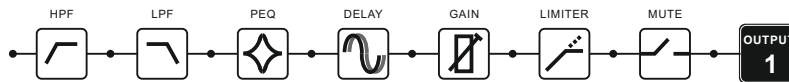
1. Power Switch: turns the device's mains supply off and on.
2. RS485: 3 pin XLR sockets. Used for transmission of remote control data over long distance or multiply device applications.
3. Audio Inputs: 3 pin XLR sockets are provided for each channel. All are fully balanced, pin 2 hot, 3 cold, 1 screen.
4. Audio Outputs: 3 pin XLR sockets are provided for each channel. All are fully balanced, pin 2 hot, 3 cold, 1 screen.

---

## Diagram of input channels



## Diagram of output channels

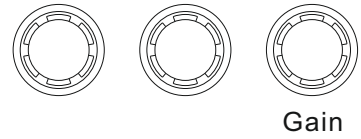


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## Input Gain

The range of the control over the input gain is -40dB to +6dB in 0.1 dB steps.

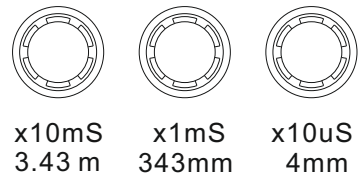
InputA                      Gain  
Gain = +0.0dB



## Input Delay

The maximum available delay depend on different devices.

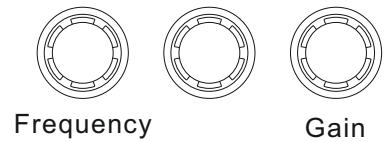
InputA                      Delay  
Delay = 0.000mS



## Input Graphic EQ

The Graphic EQ only available some devices.  
The equaliser can be 1/3 Octave, and a gain range of -12dB ~ +12dB in 0.1 dB steps.

InputA                      GEQ: 1  $\diamond$   
1k00Hz    -----    +0.0dB



Pressing BYPASS will bypass the entire Graphic EQ.

InputA                      GEQ: 1  $\equiv$   
1k00Hz    -----    +0.0dB



---

## Input NoiseGate

Pressing BYPASS will switch the NoiseGate On or OFF.

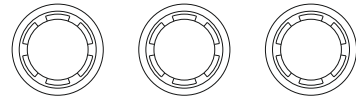
InputA            NGate SW  
Enable = Off



Bypass

The NoiseGate on each input has adjustable attack time, release time and threshold.  
The range of attack time 1 to 100mS, the range of release time 0.1 to 2.0 second, the range of threshold -80dB to -40dB in 1dB steps.

InputA            NGate  
A:45mS R:2.0S -80dB

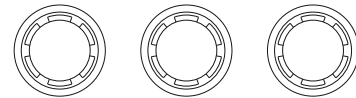


Attack    Release    Threshold

## Input Link

Set link value for channel, while modify parameters, the channel of have same link value will modify together.

InputA            Link  
Link = None



Link

---

# Input Parametric EQ

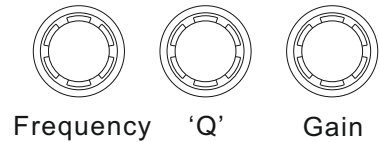
Pressing BYPASS will bypass the All bands EQ.

InputA      All-EQ  
 Bypass = Off



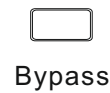
The range of frequency is 20Hz to 20kHz in 1/36 Octave. The range of Q is 0.4 to 128. The range of gain is -30dB to +15dB in 0.1dB steps.

InputA      PEQ: 01   
 1k00Hz Q=3.0 +0.0dB



Pressing BYPASS will bypass the current band EQ.

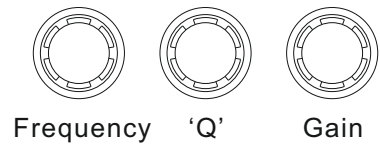
InputA      PEQ: 01   
 1k00Hz Q=3.0 +0.0dB



While filter was in BYPASS ON, Changing the filter type is achieved by pressing ENTER.

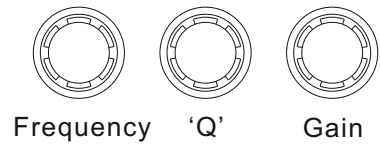
(LoShelf)      

InputA      LSF: 01   
 1k00Hz Q=.71 +0.0dB



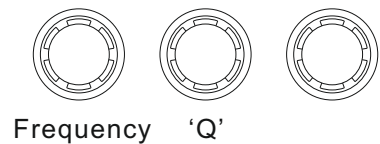
(HiShelf)      

InputA      HSF: 01   
 1k00Hz Q=.71 +0.0dB



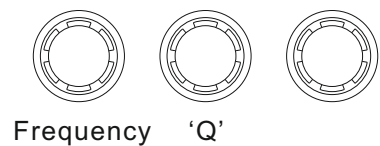
(Allpass)      

InputA      APF: 01   
 1k00Hz Q=.71 -----



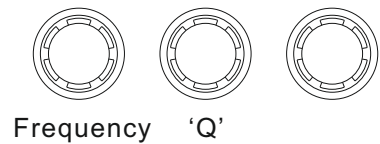
(Bandpass)      

InputA      BPS: 01   
 1k00Hz Q=.71 -----



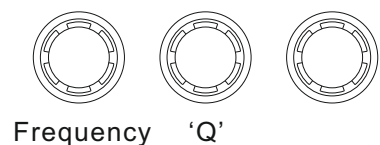
(Notch)      

InputA      NOT: 01   
 1k00Hz Q=.71 -----



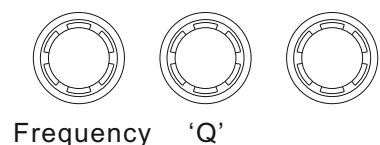
(Lowpass)      

InputA      LPF: 01   
 1k00Hz Q=.71 -----



(Highpass)      

InputA      HPF: 01   
 1k00Hz Q=.71 -----

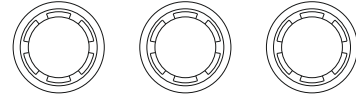


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## Output Gain

The range of the control over the input gain is -40dB to +15dB in 0.1dB steps.

Out1 Output1 Gain  
Output Gain = +0.0dB

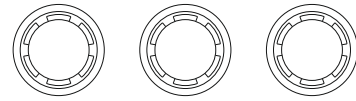


Gain

## Output Polarity

The polarity (or phase) of each output may be switched individually.

Out1 Output1 Polarity  
Polarity = [+]

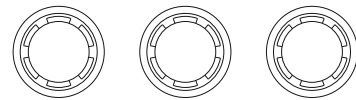


- or +

## Output Delay

The maximum available delay depend on different devices.

Out1 Output1 Delay  
Delay = 0.000mS



x10mS  
3.43 m

x1mS  
343mm

x10uS  
4mm

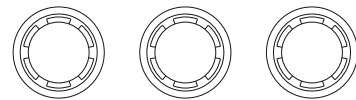
## Output Highpass/Lowpass Filter

The highpass/lowpass filter on each output has a frequency range of 20Hz to 20kHz in 1/36 Octave steps.

Crossover slope can be 6dB, 12dB, 18dB, 24dB, 36dB and 48dB/Octave.

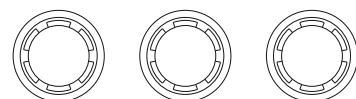
Filter type can be Butterworth, Linkwitz-Riley, Bessel.

Out1 Output1 HPF  
20.5Hz Butwrth 24dB



Frequency Slope

Out1 Output1 LPF  
20k2Hz Lnk/Ril 48dB



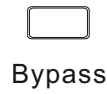
Frequency Slope

---

# Output Parametric EQ

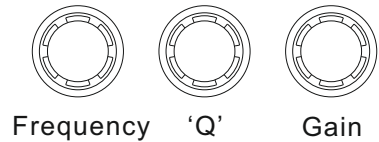
Pressing BYPASS will bypass the All bands EQ.

Out1 Output1 All-EQ  
Bypass = Off



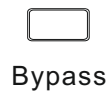
The range of frequency is 20Hz to 20kHz in 1/36 Octave. The range of Q is 0.4 to 128. The range of gain is -30dB to +15dB in 0.1dB steps.

Out1 Output1 PEQ:01  
1k00Hz Q=3.0 +0.0dB



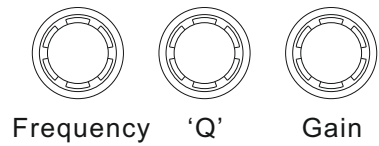
Pressing BYPASS will bypass the current band EQ.

Out1 Output1 PEQ:01  
1k00Hz Q=3.0 +0.0dB

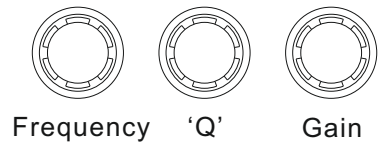


While filter was in BYPASS ON, Changing the filter type is achieved by pressing ENTER.

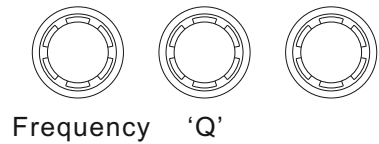
(LoShelf) Out1 Output1 LSF:01  
1k00Hz Q=.71 +0.0dB



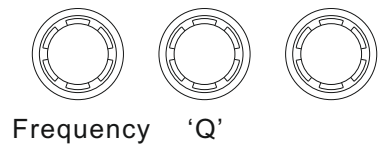
(HiShelf) Out1 Output1 HSF:01  
1k00Hz Q=.71 +0.0dB



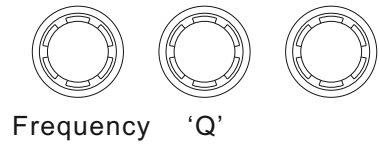
(Allpass) Out1 Output1 APF:01  
1k00Hz Q=.71 -----



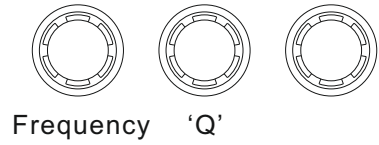
(Bandpass) Out1 Output1 BPS:01  
1k00Hz Q=.71 -----



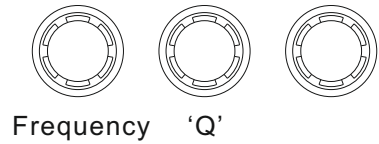
(Notch) Out1 Output1 NOT:01  
1k00Hz Q=.71 -----



(Lowpass) Out1 Output1 LPF:01  
1k00Hz Q=.71 -----



(Highpass) Out1 Output1 HPF:01  
1k00Hz Q=.71 -----

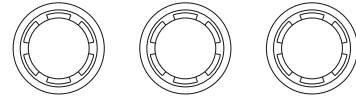


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## Output Limiter

The limiter on each output has adjustable attack time, release time and threshold.  
The range of attack time 1 to 100mS, the range of release time 0.1 to 2.0 second, the range of threshold -20dB to +20dB in 1dB steps.

Out1 Output1 Limiter  
A:45mS R:2.0S +20dB

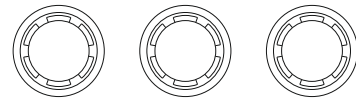


Attack Release Threshold

## Output Channel Name

For edit channel name by pressing ENTER. Cursor will blink on first character position.  
Turn rotary encoder and modify character, move cursor position by pressing BACK or NEXT.  
Pressing ENTER again for confirm and store channel name.

Out1 Output1 Name  
Name = Output1

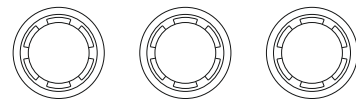


Char

## Source

The source on each output, can assign signal routing from input channel, create free Xover combination.

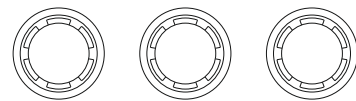
Out1 Output1 Source  
Source = A



Source

Pressing ENTER will switch each input channel mix gain.

Out1 Output1 InputA  
Mix Gain = +0.0dB

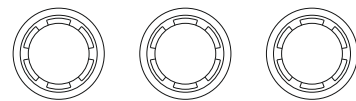


MixGain

## Output Link

Set link value for channel, while modify parameters, the channel of have same link value will modify together.

Out1 Output1 Link  
Link = None



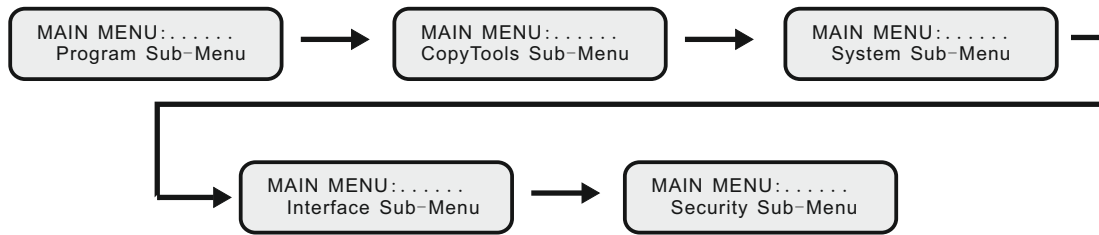
Link

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# Menu System

Pressing MENU will enter menu system. Pressing ENTER will enter sub-menu.



## Program Sub-menu

Load Factory Program.  
Load User Program.  
Design a Xover.  
Save User Program.  
Delete User Program.

PROGRAM MENU: . . .  
Load User Program

Pressing ENTER will enter Load User Program sub-menu.

Load User Program  
01: 2x3 Way Xover

Turn rotary encoder to change program index,  
Pressing ENTER

[ENTER] for Recall.  
01: 2x3 Way Xover

Pressing ENTER for confirm and load program.

Loading New Program  
01: 2x3 Way Xover

PROGRAM MENU: . . .  
Design a Xover

Pressing ENTER will enter Design a Xover sub-menu.

Design a Xover  
Type: 2x2 WAY XOVER

Turn rotary encoder to change Xover mode,  
Pressing ENTER

New Xover  
[ENTER] to Confirm

Pressing ENTER for confirm and change Xover mode.

About Xover mode details, see Appendix I.

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PROGRAM MENU: . . .  
Save User Program

Pressing ENTER will enter Save User Program sub-menu.

Save User Program  
01: 2x3 Way Xover ?

Turn rotary encoder to change program index,  
Pressing ENTER.

[ENTER] to Overwrite  
01: 2x3 Way Xover ?

Pressing ENTER for confirm and overwrite program.  
Pressing QUIT for exit.

Set Program Name  
01: 2x3 Way Xover ?

Program name length is 16 character.  
Turn rotary encoder and modify character, move cursor position  
by pressing BACK or NEXT.  
Pressing ENTER again for confirm and store program name.  
Pressing QUIT for exit.

[ENTER] to Save  
01: 2x3 Way Xover ?

Pressing ENTER for confirm and Save program.

Saving to Memory  
01: 2x3 Way Xover ?

PROGRAM MENU: . . .  
Delete User Program

Pressing ENTER will enter Delete User Program sub-menu.

Delete User Program  
01: 2x3 Way Xover

Turn rotary encoder to change program index,  
Pressing ENTER.

[ENTER] to Delete.  
01: 2x3 Way Xover

Pressing ENTER for confirm and delete program.

Deleting Memory. . .  
01: 2x3 Way Xover

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## CopyTools Sub-menu

Copy Input Section  
Copy Output Section

COPYTOOLS MENU: . . .  
Copy Input Section

Copy Input Section  
Source: A Target: B

On Copy Input Section screen, Turn rotary "FREQ" encoder change source channel,  
Turn rotary "Q" encoder change target channel.  
Pressing ENTER to confirm and copy input channel parameters.

COPYTOOLS MENU: . . .  
Copy Output Section

Copy Output Section  
Source: 1 Target: 2

On Copy Output Section screen, Turn rotary "FREQ" encoder change source channel,  
Turn rotary "Q" encoder change target channel.  
Pressing ENTER to confirm and copy output channel parameters.

## System Sub-menu

SYSTEM MENU: . . . . .  
LCD Contrast

Turn rotary encoder to change LCD contrast,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
LED Brightness

Turn rotary encoder to change LED brightness,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
Wake-up Time

Device startup wake up time.  
Mute Hold, set to keep mutes on when powered up.  
0 secs.....60 secs, set wait time before the audio fades in.  
Turn rotary encoder to change parameter,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
Filter Q or BW

Select filter Q or Bandwidth display unit.  
Turn rotary encoder to change parameter,  
Pressing ENTER to confirm and save.

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SYSTEM MENU: . . . . .  
DelayTime/Distance

Select delay time or distance.  
Turn rotary encoder to change parameter,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
Output LED Meter

Select output meter indicate style.  
output Level or attenuate on limiter.  
Turn rotary encoder to change parameter,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
Load Program Option

Select load program option.  
AutoMute: Force all output mute on after loading program.  
LoadMute: Load output MUTE status in program stored.  
Turn rotary encoder to change parameter,  
Pressing ENTER to confirm and save.

SYSTEM MENU: . . . . .  
Device Name Title

Change device title name on LCD screen top line.  
Pressing ENTER to edit.

[ENTER] to Editing  
Tit: Speaker Processor

Device name length is 16 character.  
Turn encoder and modify character.  
move cursor position by pressing BACK or NEXT.

Set Device NameTitle  
Tit: Speaker Processor

Pressing ENTER for confirm.  
Pressing QUIT for exit.

[ENTER] to Store  
Tit: Speaker Processor

Pressing ENTER again for confirm and store.

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## Interface Sub-menu

INTERFACE MENU: . . . .  
Interface Setup

Interface Setup  
Master Source: RS232

Select communication port: USB, RS232 or RS485.

Interface Setup  
Master Source: USB

Interface Setup  
Master Source: RS485

Interface Setup  
RS485 Baud: 9.6k

While select RS485.  
Need assign a remote Baudrate.  
4.8k, 9.6k, 19.2k, 38.4k.

Interface Setup  
Remote ID Num: 1

While select RS485.  
Need assign a remote ID number(1-32).

INTERFACE MENU: . . . .  
Protocol Setup

Protocol Setup  
Select: PCsw Ctrl

Select control protocol.  
PCsw: select PC control.  
ESRP: select external simple control device.

Protocol Setup  
Select: ESRP Ctrl

# Security Sub-menu

Pressing ENTER will enter Security sub-menu.

Lock status setting:

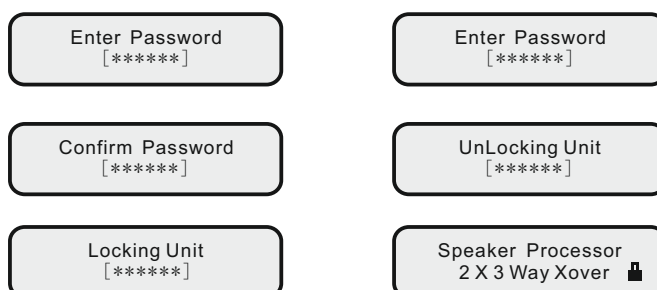
No Lock: without lock out.

Control: cannot change.

Display: cannot view.

	Xover Only	Xover + Trim	Xover + Trim + Mute	Changes Only	Changes + View	Changes + Mutes	EVERYTHING
Input Gain	No Lock	No Lock	No Lock	Control	Display	Control	Display
Input Delay	No Lock	No Lock	No Lock	Control	Display	Control	Display
Input PEQs	No Lock	No Lock	No Lock	Control	Display	Control	Display
In GraphEQ	No Lock	No Lock	No Lock	Control	Display	Control	Display
Input Links	No Lock	No Lock	No Lock	Control	Display	Control	Display
Input Noisegate	No Lock	No Lock	No Lock	Control	Display	Control	Display
Output Gain	No Lock	Display	Display	Control	Display	Control	Display
Output Delay	Display	Display	Display	Control	Display	Control	Display
Output PEQs	Display	Display	Display	Control	Display	Control	Display
HPFs & LPFs	Display	Display	Display	Control	Display	Control	Display
Output Links	Display	Display	Display	Control	Display	Control	Display
Output Phase	Display	Display	Display	Control	Display	Control	Display
Limiters	Display	Display	Display	Control	Display	Control	Display
Matrix Gains	Display	Display	Display	Control	Display	Control	Display
Input Mutes	No Lock	No Lock	No Lock	No Lock	No Lock	Control	Control
Output Mutes	No Lock	No Lock	Control	No Lock	No Lock	Control	Control
Output Name	Control	Control	Control	Control	Control	Control	Control
Menu System	No Lock	No Lock	No Lock	No Lock	No Lock	No Lock	Control
Memory Store	No Lock	No Lock	No Lock	No Lock	No Lock	No Lock	Control
Memory Load	No Lock	No Lock	No Lock	No Lock	No Lock	No Lock	Control
File Operation	No Lock	No Lock	No Lock	No Lock	No Lock	No Lock	Control

In "User Specific" setting, you can free set up lock status depend on each function part.



Pressing ENTER will enter password.

Turn rotary encoder and modify character, move cursor position by pressing BACK or NEXT.

Pressing ENTER for enter password again.

while twice time password match, system will lock unit.

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# Specifications

Inputs: 2/4 electronically balanced.

Impedance: > 10k ohms.

CMRR: > 75dB 50Hz ~ 10kHz.

Outputs: 4/8 electronically balanced.

Source Imp: < 60ohms

Min. Load: 600ohm

Max. Level: +20dBu

Digital Audio Sample Rate: 96kHz

Frequency Response: +/- 0.5dB, 20Hz ~ 20kHz

Distortion: < 0.004% @ 1kHz, +15dBu

ADC Dynamic Range: > 114dB, 20Hz ~ 20kHz (A-Weight)

DAC Dynamic Range: > 114dB, 20Hz ~ 20kHz (A-Weight)

Propagation Delay: 0.66mS (4in 8 out / 4in 6 out / 3in 6 out)

0.65mS (4 in 4 out / 2 in 6 out / 2 in 4 out)

Delay: 1500mS(Input), 1500mS(Output)

Min Step Size: 0.010mS(4mm)

Input Gain: -40dB to +6dB in 0.1dB steps

Output Gain: -40dB to +15dB in 0.1dB steps

Multi-Type Filters

10 per Input, 10 per Output.

Freq. Range: 20Hz ~ 20kHz, 1/36 Octave steps.

Filter Q/BW: 0.4 to 128.

Filter Type: Parametric Equaliser

HiShelf, LoShelf

Variable Q Highpass, Lowpass

Bandpass, Notch, Allpass.

High and Lowpass Filters

Freq. Range: 20Hz ~ 20kHz, 1/36 Octave steps.

Slope: 6/12/18/24/36/48 dB/Octave.

Type: Butterworth, Linkwitz-Riley, Bessel.

Limiters

Threshold: -20 ~ +20dB, 1dB steps.

Attack time: 1 ~ 100mS.

Release time: 0.1 ~ 2.0 second.

Display: 2x20 Character LCD

Connectors

Inputs: 3 pin female XLR

Output: 3 pin male XLR

RS232: 9 pin DEE connector

RS485: 3 pin XLR

Power: 3 pin IEC

Power Voltage: ~220V @50/60Hz

Power Consumption: < 20 watts

Weight: 3.3kg. Net (4.5kg. Shipping)

Size: 1.75"(1U) x 19" x 9.4" (44 x 482 x 240 mm)

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