INVOTONE

USER'S MANUAL

SYSTEMDRIVE206

NF04111-1.0

IMPORTANT SAFETY INSTRUCTION

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

TO REDUCE THE RISK OF ELECTRIC SHOCK PLEASE DO NOT REMOVE THE COVER OR THE BACK PANEL OF THIS EQUIPMENT. THERE ARE NO PARTS NEEDED BY USER INSIDE THE EQUIPMENT. FOR SERVICE, PLEASE CONTACT QUALIFIED SERVICE CENTERS.

This symbol, wherever used, alerts you to the presence of un-insulated and dangerous voltages within the product enclosure. These are voltages that may be sufficient to constitute the risk of electric shock or death.

This symbol, wherever used, alerts you to important operating and maintenance instructions. Please read.

⏚ Protective Ground Terminal
~ AC mains (Alternating Current)
ǂ Hazardous Live Terminal
ON: Denotes the product is turned on.
OFF: Denotes the product is turned off.

CAUTION
Describes precautions that should be observed to prevent damage to the product.

1. Read this Manual carefully before operation.
2. Keep this Manual in a safe place.
3. Be aware of all warnings reported with this symbol.
4. Keep this Equipment away from water and moisture.
5. Clean it only with dry cloth. Do not use solvent or other chemicals.
6. Do not damp or cover any cooling opening. Install the equipment only in accordance with the Manufacturer's instructions.
7. Power Cords are designed for your safety. Do not remove Ground connections! If the plug does not fit your AC outlet, seek advice from a qualified electrician. Protect the power cord and plug from any physical stress to avoid risk of electric shock. Do not place heavy objects on the power cord. This could cause electric shock or fire.
8. Unplug this equipment when unused for long periods of time or during a storm.
9. Refer all service to qualified service personnel only. Do not perform any servicing other than those instructions contained within the User's Manual.
10. To prevent fire and damage to the product, use only the recommended fuse type as indicated in this manual. Do not short-circuit the fuse holder. Before replacing the fuse, make sure that the product is OFF and disconnected from the AC outlet.

WARNING
To reduce the risk of electric shock and fire, do not expose this equipment to moisture or rain.

Dispose of this product should not be placed in municipal waste and should be separate collection.

11. Move this Equipment only with a cart, stand, tripod, or bracket, specified by the manufacturer, or sold with the Equipment. When a cart is used, use caution when moving the cart / equipment combination to avoid possible injury from tip-over.

12. Permanent hearing loss may be caused by exposure to \ extremely high noise levels. The US. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible exposure to noise level.
These are shown in the following chart:

HOURS X DAY	SPL	EXAMPLE
8	90	Small gig
6	92	train
4	95	Subway train
3	97	High level desktop monitors
2	100	Classic music concert
1,5	102	
1	105	
0,5	110	
0,25 or less	115	Rock concert

According to OSHA, an exposure to high SPL in excess of these limits may result in the loss of heat. To avoid the potential damage of heat, it is recommended that Personnel exposed to equipment capable of generating high SPL use hearing protection while such equipment is under operation.

The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

The mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

9. TROUBLE SHOOTING

Symptom	Likely Cause	What to do
No sound	Speaker not connected to active AC power	Verify that speaker is connected and that the circuit is on
	Power not switched on	Switch on power and verify that power Led is on
No sound, speaker is connected to working AC power but won't come on	Speaker power cable is faulty or improperly connected.	*Re-seat the power cable at both ends; *Substitute a known-good power cable
	Blown fuse	*Check fuse & replace with same type "spare fuse in holder"
No sound Speaker comes on	Signal source (mixer, Amp instrument) is not sending	*Check if the signal LED indicators are lit on *Verify that the tape or CD is playing; *Use headphones to verify that the instrument is actually sending an audio signal
	Faulty cables & connections	*Disconnect and re-seat signal cables; *Replace suspected cable with a known-good cable
No sound with microphone connected to MIC / LINE input	Microphone requires phantom power	The EON does not supply phantom power. Switch to a dynamic microphone, use a battery powered microphone (if possible), use and external phantom power supply for condenser type microphones.
Signal sounds distorted and very loud LIMIT light is lit most of the time	Excessive input signal, trying to exceed the capabilities of the speakers	*Reduce the output level of the source; *Turn down the level controls on the speaker; *Use additional EON speakers
Lots of hiss in sound, mixer controls are at very low settings	Improper gain structure	*Make sure that the MIC / LINE switch is in the LINE(disengaged) position; *Reduce the level settings at speaker, Review the Owner's Manual for your mixer and adjust controls as needed: *Input sensitivity(gain); *Channel faders; *Master faders;
Hum or Buzz	Improper A/Cgounding, ground loops	*"lift" audio ground by using XLR/F to XLR/M adapter on one end *Re-route audio cables away from AC power and lighting cables.
	Excessively long unbalanced cable run	*Use the balanced outputs(if available)of your mixer or source equipment to drive your EON speakers. *Use"DI"(direct injection) box to convert unbalanced equipment output to a balanced output.
	Improper system gain structure	Reduce the INPUT level controls and increase the output level of your source devices.

INDEX

1. INTRODUCTION

Thank you for purchasing INVOTONE product, the SYSTEMDRIVE206. SYSTEMDRIVE206 is 2 In / 6 Out Digital Signal Processor for speaker management. For the input section, there are Input Gain, 8 bands Parametric Equalizer (PEQ) and Delay functions for the stereo input signal processing. In the 6 output channels section, there are equipped with Input selection, 5-band Parametric Equalizer, Crossover, Delay, Gain, Limiter, and Mute. In order to make the users understand the ways of operation conveniently, it uses the LEDs and LCD to indicate the respective parameter settings.

Please read this manual carefully so you can take advantages of all the features of the SYSTEMDRIVE206 Thanks again for choosing INVOTONE.

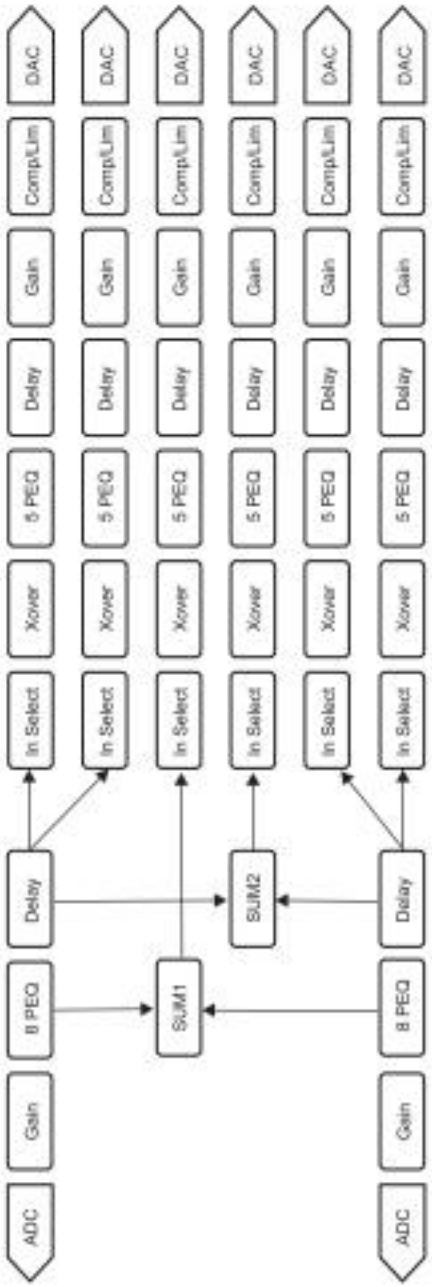
2. FEATURES

- 2 balanced / unbalanced Inputs and 6 balanced Outputs
- 10 Factory Presets and 70 User Presets
- 7 LEDs for every Channel Level Display
- Digital Audio Input with Sample Rate Converter
- Bypass button
- Output Mute button for every output channel
- USB user interface for PC software control
- RS-485 multi-units linking interface
- Input Gain Control from +12 to -40 dB
- 8-band Input parametric EQ with 1 / 32 Oct. Frequency step
- 5-band Output parametric EQ with 1 / 32 Oct. Frequency step
- 1364 ms Delay Line Support for Speaker Placement
- Re-routable input selection for the output management
- -3 dB to -48 dB Butterworth, Bessel, Link-Riley Crossover Types
- Output Volume Control from +12 to -40 dB
- Comp / Lim Function for every output channel
- 0.5 dB / step for Parametric EQ Boost and Cut
- Auto-detectalbe Digital Input enable

8. TECHNICAL SPECIFICATIONS

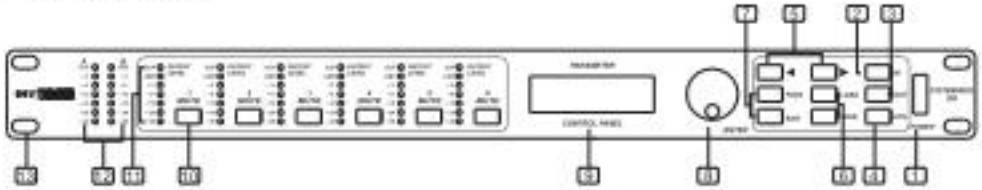
System Specification	Frequency Response	20 Hz~20 kHz, +/-0.5 dB
	S/N Ratio	>115 dBu
	Distortion (THD)	<0.01% at 1 kHz (-10 dBv)
	Cross-talk	<100 dB below full scale
Input Section	Digital	AES/EBU
	Type	Balanced XLR
	Sensitivity	-20 dBu
	Max. Input level	+20 dBu
	Impedance	1 MΩ/Stereo; 500 kΩ/Mono
Output Section	Six Channels	
	Type	Balanced XLR
	Max. Output level (bypass)	+20 dBu
	Impedance	<500 Ω
Digital Processing	24-bit sigma-delta converters	
	48 kHz Sampling Rates	
Bypass	Bypass all the DSP function	
Display	16x2 LCD Display for parameters setting and function select	
	7x8 LED for Input and Output Level Display	
Control	9 buttons for different DSP functions selection	
	6 buttons for Outputs channels Muting	
Power Supply	AC90-264V, 50/60Hz	
Dimension (WxDxH)	483x210x40 mm (19"x8.3"x1.6")	
Weight	2.5 Kg (5.51 lb)	

7. BLOCK DIAGRAM



3. CONTROL ELEMENTS

FRONT PANEL



1. POWER ON / OFF
This switch is used to turn the main power ON / OFF.

2. INPUT
As the input gain control, the control range is from +12dB to -40 dB, it includes 8-band Parametric EQ and Delay for adjustment.Due to the Gain is adjusted by digital, user can set the input level to suit the application. But be careful not to set the volume too high to let the signal clipped.

3. OUTPUT
As the output gain control, the control range is from +12 dB to -40 dB, it includes Input selection, Crossover, 5-band Parametric EQ,Delay, Gain and Compress / Limit functions. Due to the Gain is adjusted by digital, user can adjust the output level to appropriate situation. The output level display was useful to the gain setting, as it can avoid the volume too high to let the signal clipped.

4. UTILITY
Several functions parameters setting, such as ID number setting, Digital and Analog Input selection are used for different application.

5. Edit Controls
These two buttons allow you to turn over the pages and / or a variable number of parameters.

6. LOAD & SAVE
These buttons are used to load and save the user's presets. Up to 80 presets can be used or parameters setting. (10 Factory Presets and 70 User's Presets)

7. PASS / EXIT
The button "PASS" is used to bypass the DSP PEQ, HP / LP, and Volume functions,also send the input signal to the SYSTEMDRIVE206 outputs directly. The button "EXIT" is used to return to previous operation

8. ENTER Control
This control is used to select the preset and modify the parameter's value.

9. Parameter Display
All the functions' parameters setting are showing on the 2x16 characters LCD display. User can combine Enter control and function buttons for different channels and parameters setting.

10. MUTE Button

All the output channels have mute button with on / off LED display for the quick silence function. The default mute function was enabled when power on the unit.

11. OUTPUT LEVEL Meter

The entire outputs' channels have level display to indicate the signal level on the panel. The output limiter function also display on it when it was enabled.

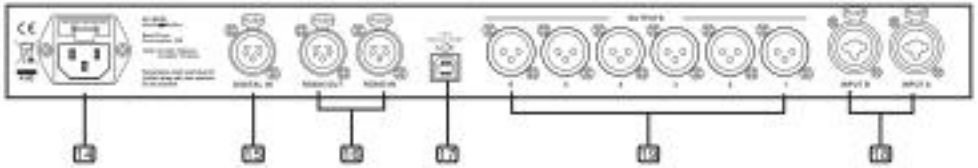
12. Input Level Meter

These 2 LED lines are used to display the level of Input A / B connectors. In order to get an up-front distortion

13. Mounting Ear

This detachable mounting ear is used for your convenient installation.

REAR PANEL



14. AC Inlet and Fuse holder

This inlet is used to connect the supplied power cord. Please check the voltage accepted by the unit and the voltage (90V~264V AC) from your AC sockets before connecting the unit to the Mains.

15. DIGITAL IN

AES / EBU Digital input selection, it can receive standard digital signal input by the interface. And it has Sample Rate Convert inside, it can receive digital input of different sampling ratios.

16. RS485 IN / OUT

This interface is suitable for daisy-chaining several units by using XLR plugs. The maximum quantity is 32 units.

17. USB Port

The common PC USB Port can be used; it is the interface for PC Software to control the parameter settings.

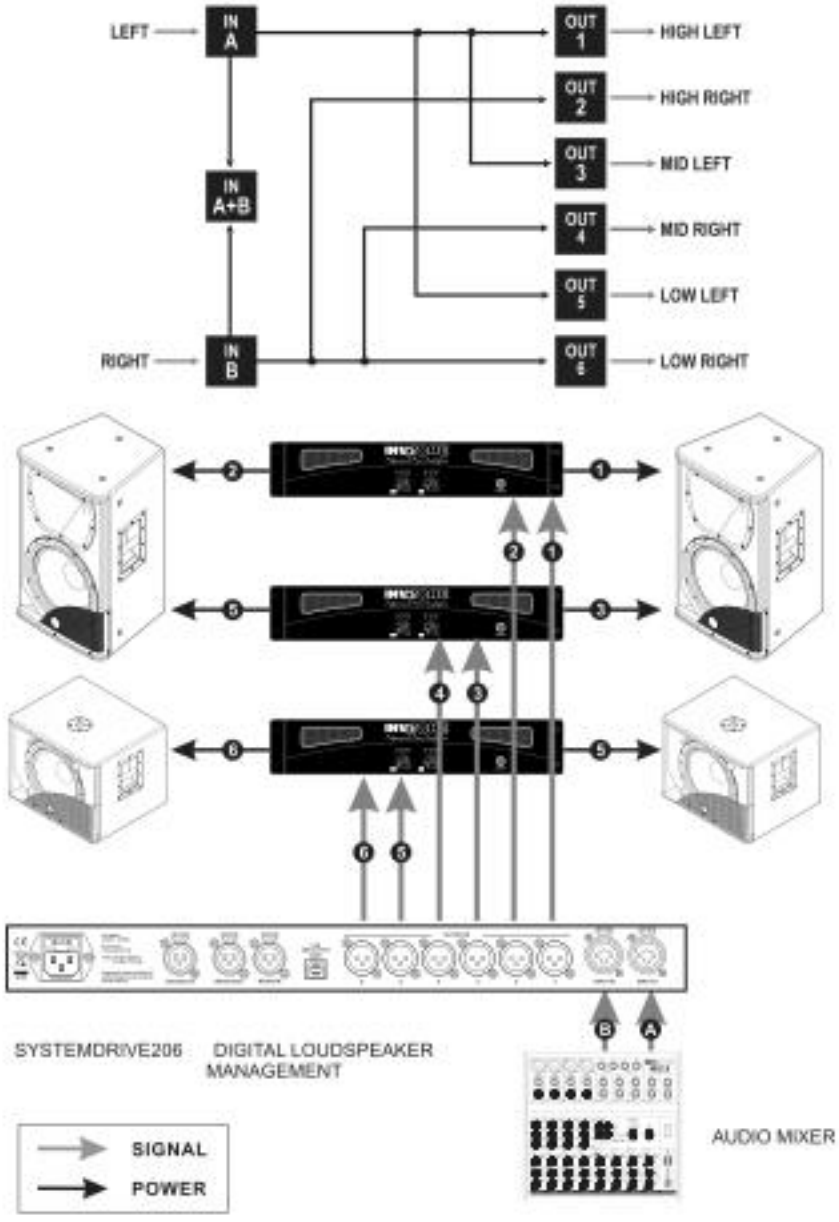
18. INPUT A / B Connectors

These are balanced XLR connectors, which are used to connect devices such as the channel inserts of a mixing console.

19. OUTPUT Connectors

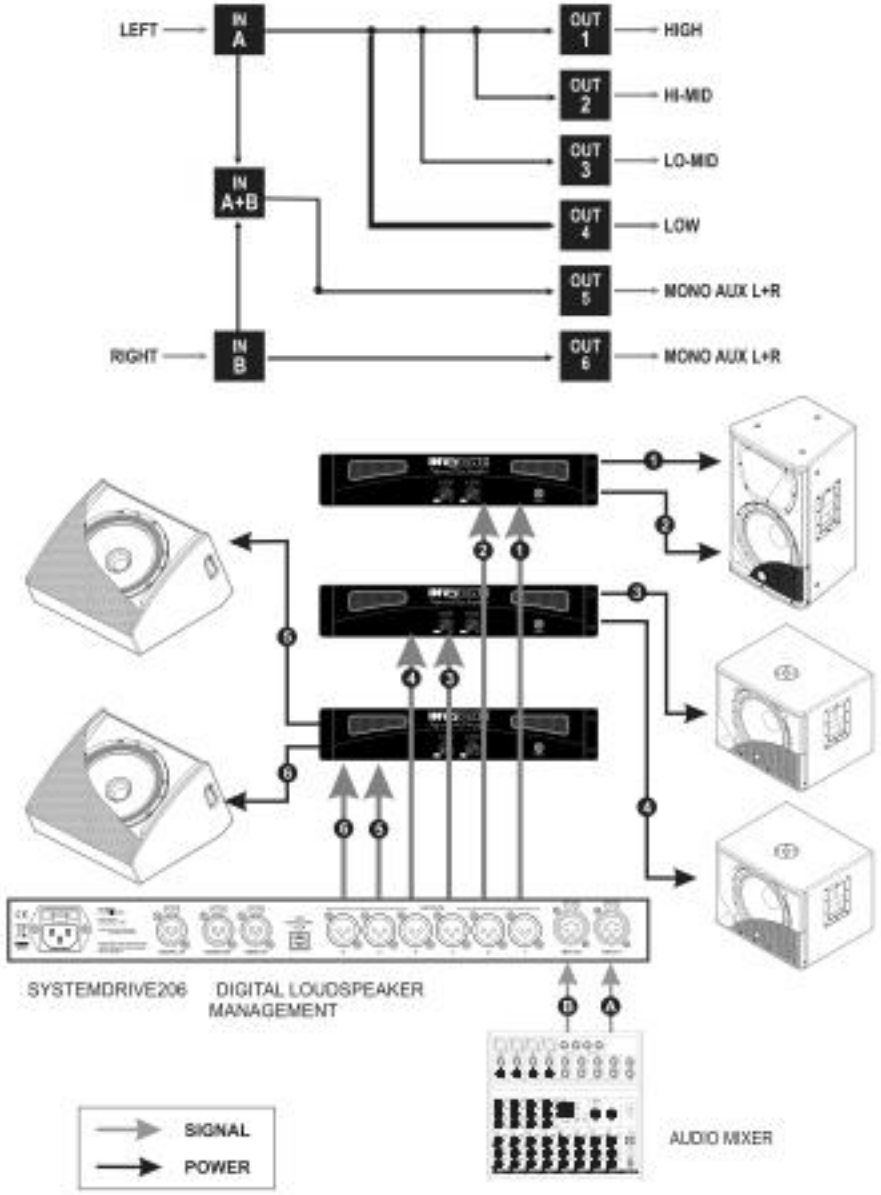
These are balanced XLR connectors, which are used to connect source such as the channel inserts of a mixing console or power amplifier's inputs.

2. A135 B246 3-WAY STEREO [2X3WAY]



The following examples will help you better use and connect the unit.

1.A1324 S56 4-WAY4 MONO + 2 MONO AUX [4WAY+BP]



4. CONFIGURATION & FUNCTIONS

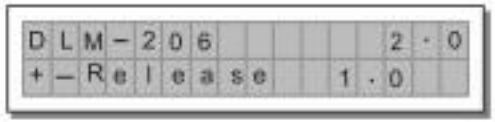
GETTING STARTED

The powerful versatile signal processor SYSTEMDRIVE206 is mainly designed for use with audio systems. Its routing configurations of the input and output can be only set by recalling one of the PRESETS included in the internal memory. So the user must be very clear about the main function of the unit in order to get best operation of SYSTEMDRIVE206. Before you start your operation, please read the follows carefully:

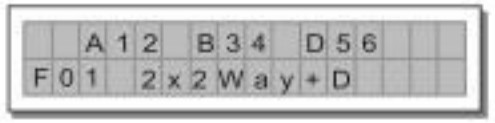
1.Configuration of the system

At first, switch off the equipment, carry out the audio and power connection from the various components of your sound system.

Then, connect the main cord and only switch on the SYSTEMDRIVE206. The display will show the data regarding with the operating system release for a few seconds.



Meanwhile, the system will restore the exact operating conditions at the time of switching off. And the system will enter into default status, showing the main operating information on the display.



- Press **LOAD** key
- Load the **configuration** you've found.
- Use the **DIAL** to select the **PRESET**.

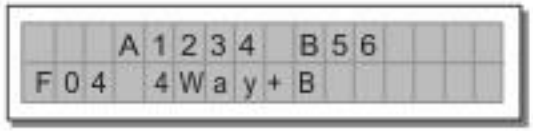
The display will show the **Load PRESET** page:

(example)

- Use the **DIAL** to find the necessary Factory PRESET (indicated by the letter **F**). Check that if, among the PRESETS available, there are already some optimised for the specific speaker enclosures being used.

- Press **DIAL**.

  The display shows the PRESET loaded in the units memory and the relative configuration:



(example)

2. Adjusting the input signal

It is much more important to set the input signal of a digital unit than that of an analog unit, because excessively high input signals will make any saturation of the A / D converters cause a typical particularly distinct noise (high level square wave).

Proceed as follows:

- Keep the SYSTEMDRIVE206 outputs in **MUTE** status (LEDs light on).
- Feed a signal in on the SYSTEMDRIVE206 's input and watch the **INPUT LEVEL A-B** LED meter to obtain a good signal / noise ratio, i.e. an up-front distortion-free signal, keep the signal quite high, but make certain the red **CLIP** LED doesn't light up continually.
- Find out the output level setting for your mixer (or other unit) and connect it to the input of the SYSTEMDRIVE206.
- Adjust the SYSTEMDRIVE206 input gain if necessary:

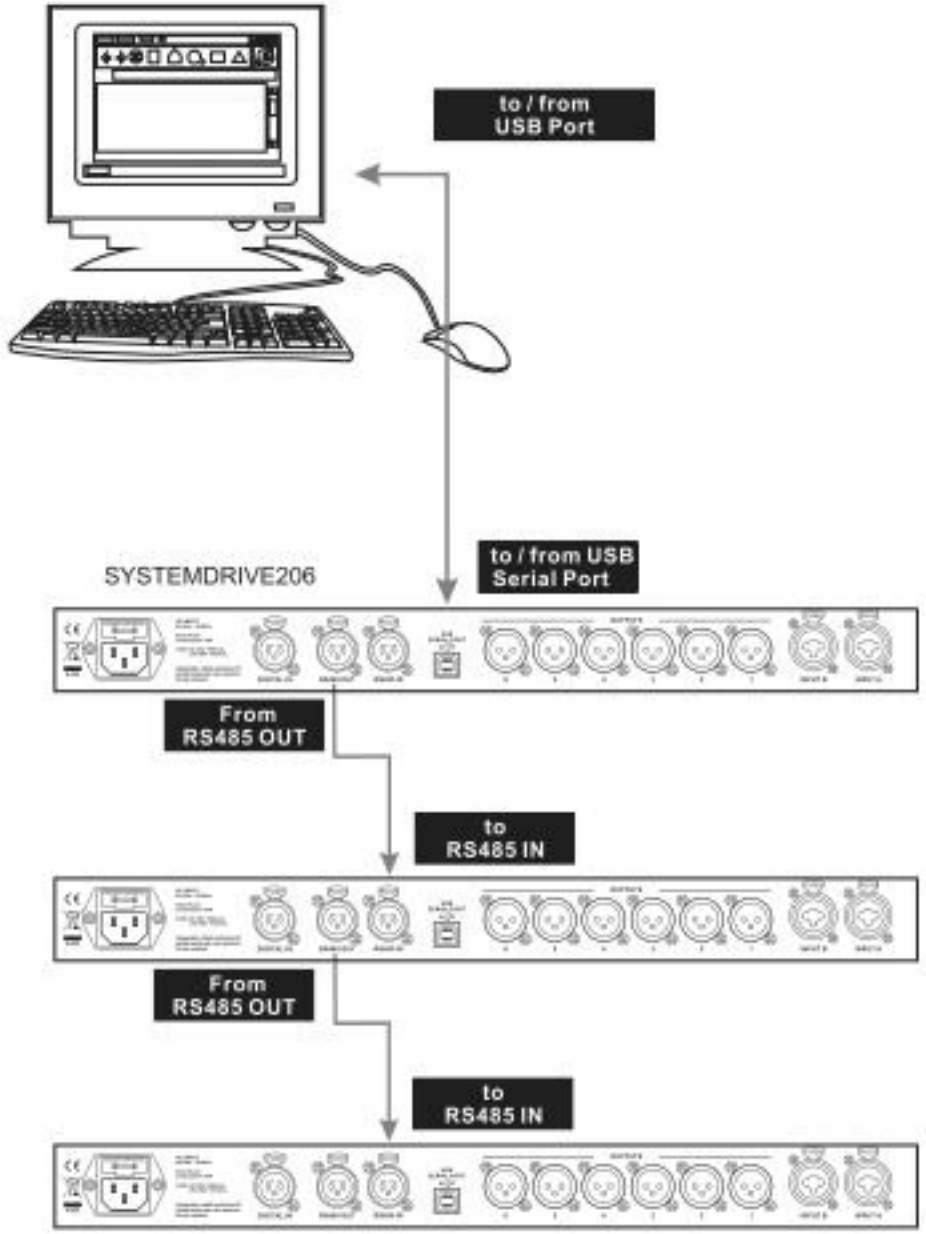
  Press the **IN** key to enter into **INPUT GAIN**
  Use the **DIAL** to increase clockwise or decrease counterclockwise with gain range from -40dB to +12dB.

- Press **DIAL**.

  The display will show the **INA Gain or INB Gain** page (using **IN** key to convert INA or INB) in the memory:

6. REMOTE CONTROL

Communications: PC & one or more SYSTEMDRIVE206 connection

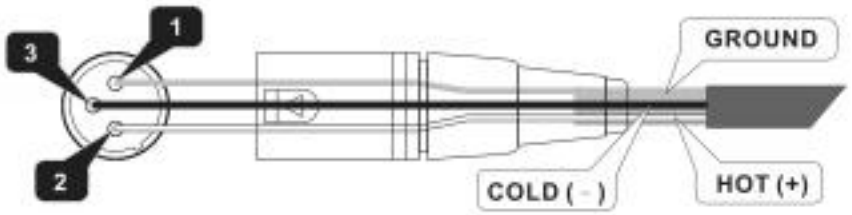


5. CONNECTIONS

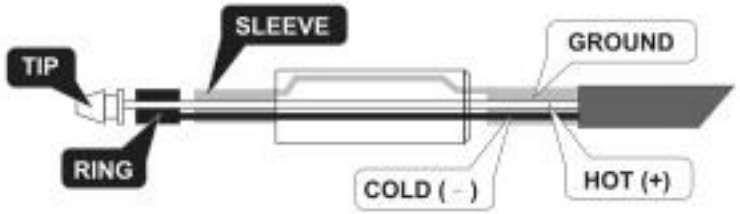
The adapter that meets all the international safety regulations is supplied with your INVOTONE SYSTEMDRIVE206. Before power on the DLM Series, please make sure all connections have been made correctly and the volume controls of the amplifier or mixer are turned down completely.

The following diagrams show the schemes of the recommended cables and some connection examples referred to various system configurations.

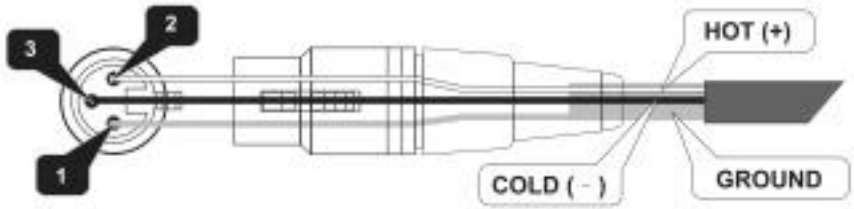
BALANCED XLR-M (Inputs A & B, RS-485 IN)



BALANCED JACK (Inputs A & B)



BALANCED XLR-F (Outputs 1–2, RS485 OUT)



USB Connection

Use the **DIAL** to change the gain value and watch the level of the signal on the LED meter until the ideal values are reached.

3. First Setup

At this point, the first custom setup can be prepared.
The following is only the description of setup procedure.
The detailed specifications of each parameter are shown in the respective paragraphs of the manual.

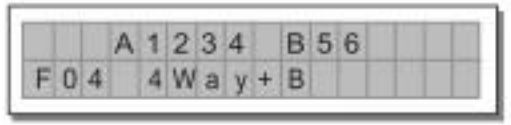
- Firstly, set the following parameters shown in order:
  Output Pol. Polarity of the outputs
  Output Delay Alignment of the speaker enclosure components
  Output Gain Levels of the outputs

Note: The regulation of the SYSTEMDRIVE206's parameters is closely related to the characteristics of the components of the sound system. So if you're not the expert, please refer to the documentation and technical specifications of your power amplifiers, loudspeaker enclosures, monitors, etc.. This will enable you to work faster and safely.

- Disable the **MUTE** function on the outputs you intend using and listen the sound, carry out instrumental checks (if you have the necessary equipment) and any corrections required.
- Then, if necessary, adjust the values of the following functions:
  Output EQ Output equalizers
  Output Limiter Output limiters

Note: In this first phase of setting up your sound system, the adjustment of these functions (which if not Indispensable during installation) can wait. But do remember that adjusting the equalizers can also affect the single Level. If considerable equalization changes are made, remember to check & adjust the output levels too.

Explanations of letters



The letters indicate the inputs:

A=Input A
B=Input B
S=SUM(sum of inputs A and B)
D=post Delay(Sum 1)
P=post PEQ (Sum 2)
Numbers 1, 2, 3, 4, 5 and 6indicate the respective outputs.
In the example:
The signal connected to Input A is assigned to outputs 1, 2, 3 and 4.
The signal connected to Input B is assigned to outputs 5 and 6.

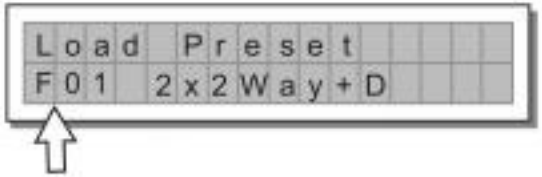
4. THE MENU MAP CONFIGURATION DESCRIPTION

The control software is organized in **IN, OUT, LOAD, SAVE** and **UTILITY** menus, each of which contains the relative types of parameters and functions.

Load & Save PRESET

1) Load PRESET

This menu page allows the required PRESET to be loaded and made operatively.



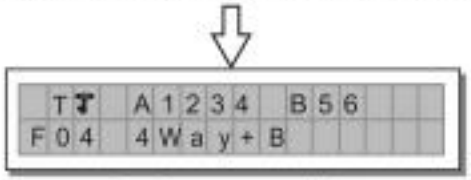
To load a PRESET:

- Use the **DIAL** to reach the required PRESET.
  10 Factory PRESETS, 70 User PRESETS are available.

Note: since the system must always be configured, there are no empty memory areas. All the User areas unused by custom **PRESETS** are automatically occupied by the **"Default" PRESET**, which contains a standard start configuration with all the values of the various parameters at zero.

Note: Confirmation is only accepted if the cursor is positioned on one of the passwords four characters. This allows to avoid accidental enabling, without having seen the password. Protection is enabled and the system takes up default status. How to disable the **protection**

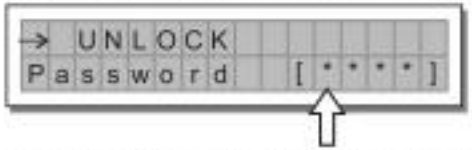
If the protection is enabled, when the system is in default status (i.e. when none menu **LEDs** are lit and therefore no type of editing is enabled), the following appears on the display:



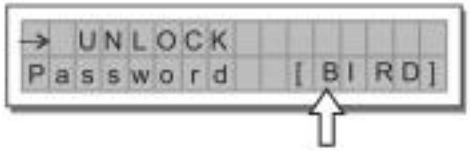
Total Protection enabled

To unlock the protection:

- Access the **LOCK** Submenu.
  The display shows the prompt for entering the password to unlock the protection.
  The four alphanumeric characters of the password are encrypted.



Enter in the **password** using the combination of the ◀ **and** ▶ keys and the **DIAL,** then press **ENTER.**
Note: in the event of an incorrect password, the display prompts again, encrypting all the characters again.



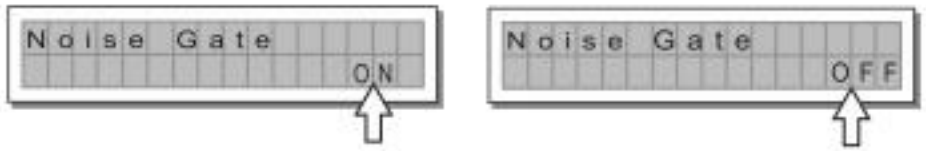
Protection is unlocked and the system enters default status.

Important! If you can't remember the password, there is an easy way to unlock the protection. Turn the unit on, press "**MUTE1**" & " **UTIL**" keys at same time. Now, the protection is unlocked..

Note: by means of this way to unlock the system, the user's memory will be eliminated, that is, all the user presets will be lost. Please use carefully!

PASS key

Press **PASS** key to go into system bypass status.



3) LOCK SUBMENU

Used to enable or disable the protection of the system against accidental or unauthorized changes.

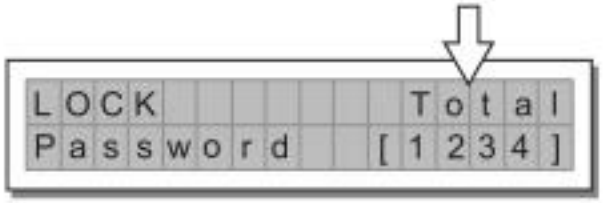
This function is very useful whenever even temporary changes or tampering with the settings stored in the system must be prevented. For example: fixed installations used by several operators (discotheques, clubs, conference halls, etc.), sound system rental,etc.

How to enable **protection**

- First of all, choose the protection mode:

Total:

all editing functions are blocked and access to the PRESET menu is disabled



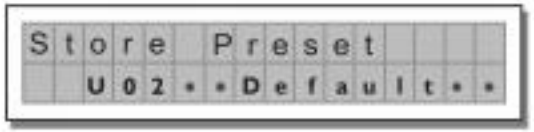
- Then use the ◀ and ▶ keys and **DIAL** to access the area in which the **password** is entered. Also choose protection modes from U01-U64 with same operation procedures as Total.

  IMPORTANT! The protection cannot be unlocked without the **password!** So write it down or at least choose a word that is easily remembered. The password is made up of four alphanumerical characters, obtainable using the ◀ and ▶ keys & editable with the **DIAL.**

- After entering the password, press **ENTER.**

2) Store & Naming PRESET

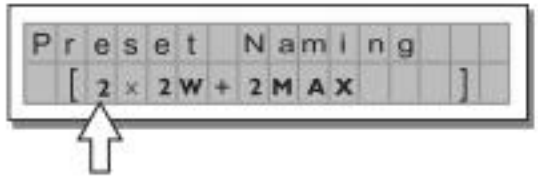
Use **SAVE** key to create new PRESETS, i.e. to save all the current system settings.



To save a PRESET:

Use **DIAL** to reach the memory area in which the PRESET is to be saved.

Note: In this procedure, the **Factory PRESET** areas aren't available, since the **Factory PRESETS** can not be permanently remember that it is possible to load a Factory **PRESET,** modified. Nevertheless save it in a **User PRESET** area, modify it as required and then store it again in the same **User.**
Press **DIAL.** The **PRESET Naming** page appears, by means of which it s possible to edit the name of the PRESET to be saved. The name of the start PRESET (i.e. of the PRESET currently loaded) is proposed as default. The cursor takes up position on the first of the twelve character spaces available.

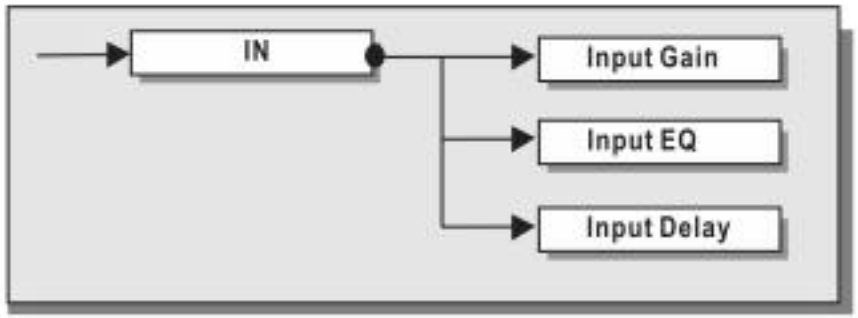


At this point:

- If you decide to accept and confirm the name suggested, press **ENTER.**
- If you want to abort **Naming** procedure (for example because you've chosen the wrong memory area) and return to **Store PRESET** procedure, press **EXIT.**
- If you want to assign a new name to the **PRESET** you're storing:
  - use the ◀ and ▶ keys to position the cursor on the required character
  - use **DIAL** to enter the alphanumeric value wanted
  - after finishing, press **ENTER.**

5. Function Keys

IN key



1) Input Gain

Press **IN** key to go into Input Gain page. Use **DIAL** to control input gain. Rotate the **DIAL** clockwise to increase and counterclockwise to decrease.

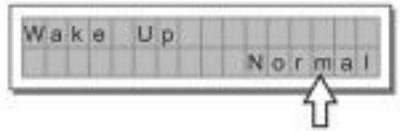
Allows to adjust the amplification of the signal fed in through Inputs A and B. Editing values are in the range **+12**dB ~ -40dB, with 0.5dB steps.

Note: Setting the input signal of a digital unit is particularly important, much more than on an analog unit, as any saturation of the A / D converter due to an excessively high input signal causes a typical particularly distinct noise. To achieve a good signal / noise ratio, i.e. an up-front distortion free signal, feed a signal in on the SYSTEMDRIVE206 's input and watch the **INPUT LEVEL A-B** LED meter. Keep the signal quite high, but make certain the red **CLIP** LED doesn't light on continually.

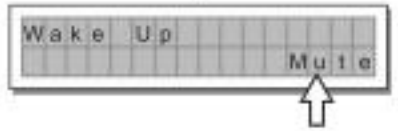
(B) Wake Up

Allows to choose the mode in which **MUTE** functions are restored when the SYSTEMDRIVE206 is switched on. The options include:

Normal
when switched on, the system restores the last MUTE configuration before switching off



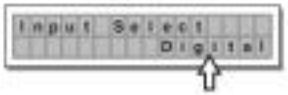
Mute
when switched on, the system automatically sets all the outputs in MUTE



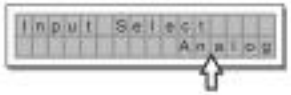
(C) Input Select

Used to choose inputs. The options include:

Digital Inputs



Analog Inputs

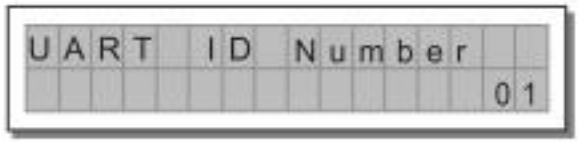


Auto Inputs

The inputs selected become **Input A** and **Input B**.
Any signal on the inputs not selected is ignored.

(D) UART ID Number

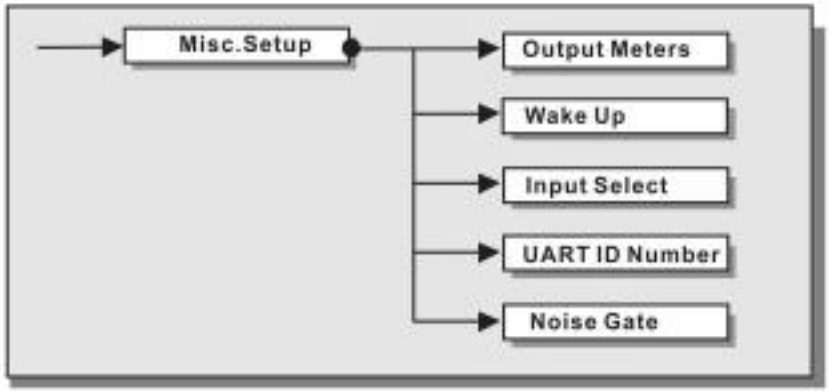
Range from 01 to 31



(E) Noise Gate

Controls the noise gate on / off.

2) Misc. Setup submenu



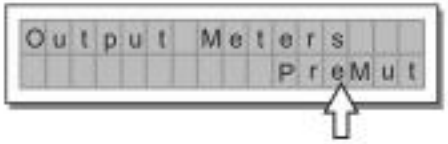
Use **ENTER** key to set a series of system options.

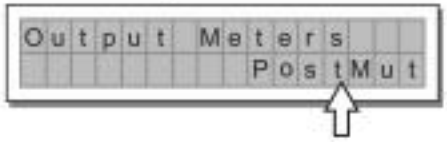
(A) Output Meters

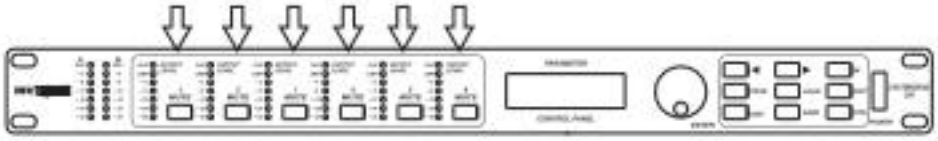
Used to decide whether to display the outputs signal before or after MUTE.
The options include:

PreMute
the signal is always shown
no matter what the MUTE status

PostMute
the signal is only shown when
the output isn't in MUTE



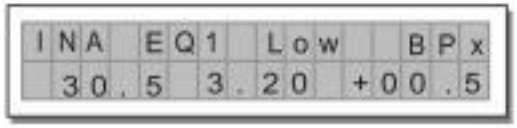




2) Input EQ

8-band Input parametric EQ with 1 / 32 Oct. Frequency step allows to alter the overall tone of the signal connected to the respective input.
This component's characteristic quality and programmability enable it to be used so effectively and flexibly as to make the use of graphic equalizers often unnecessary.

Press **IN** key and use **DIAL**, **PREV & NEXT** to adjust **Input EQ**

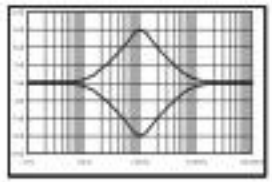


Each equalizer has 5 pages (one for each filter), showing the name of the input it affects & the number of the filter.
The following editable parameters are available for each filter:

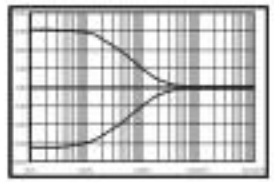
(A) Type of filter

Allows to choose among Peaking, Low or High Shelving with a slope of 6 or 12 dB per octave.

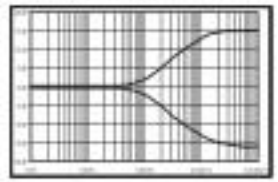
Peaking



Low Shelving

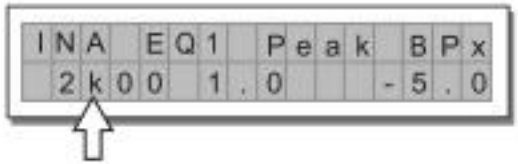


High Shelving

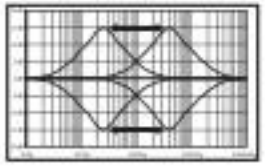


(B) Centre Frequency / Cutoff Frequency

Allows to choose the centre frequency of the Peaking curve, or the cutoff frequency of Shelving curves.

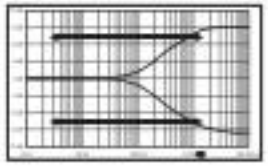


Peaking



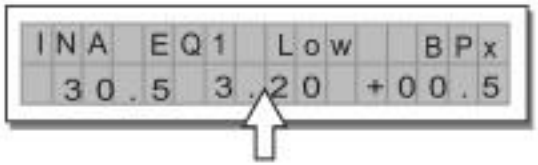
Low Shelving

High Shelving

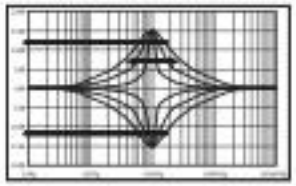


(C) Bandwidth

Allows to choose the width in octaves of the Peaking.

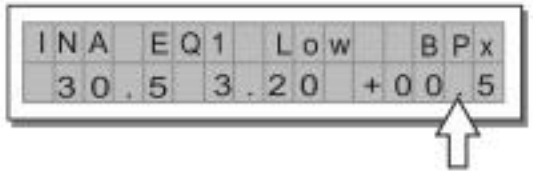


Peaking

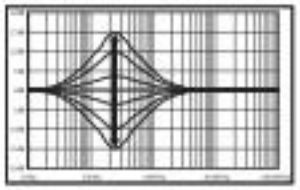


(D) Gain

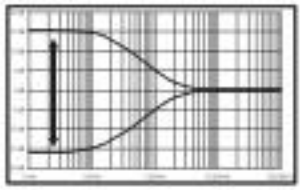
Allows to control the boost or cut of the selected frequencies.



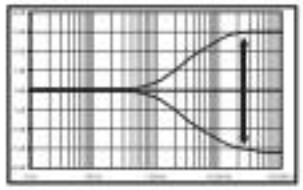
Peaking

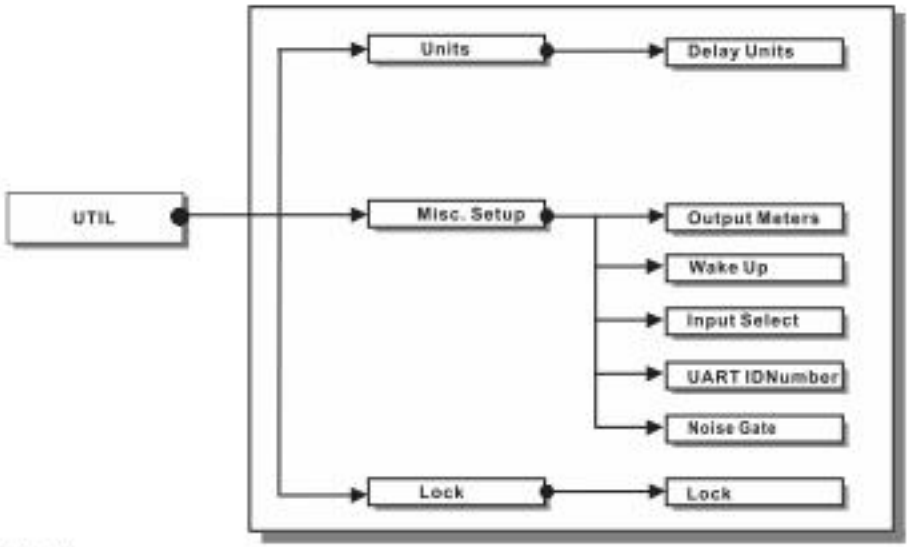


Low Shelving



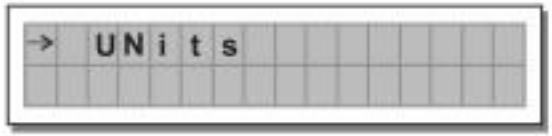
High Shelving





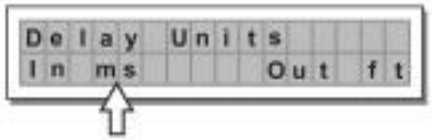
1) Units

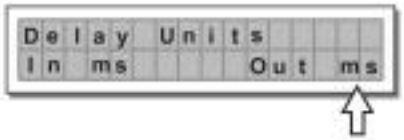
Used this submenu to choose the measurement units to be used with certain functions.

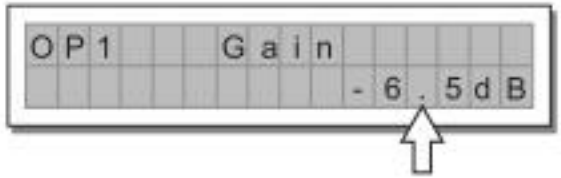


Delay Units

Used to set the measurement units in which Delays are expressed (DELAY menu).
The options include: **m**=meter - **ms** = milliseconds - **ft** = feet
Measurement units for Input Delay





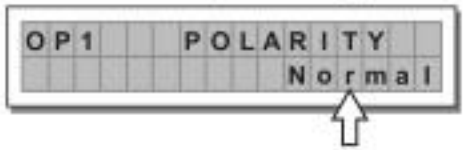


Note: The level of each output is shown by the respective **OUTPUT LEVEL LED** meter. To avoid distortion, don't Let the red **CLIP LED** lights up. As automatic protection, you can also enable the **LIMITER** (EDIT menu) on the outputs that require it. In this case, remember that enabling the LIMITER changes the display mode on the relative LED meter: in fact, the level shown is no longer the absolute output level, but the level of the signal in relation to the **LIMITER** threshold.

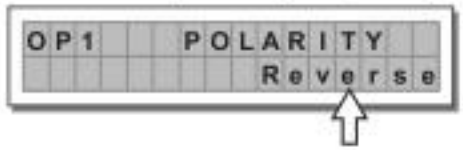
6) Output Pol

Controls the output's polarity. Allows to invert the phase of the signal of individual outputs.Press **OUT** key, use **DIAL** to adjust output polarity as shown in following

Normal: leaves the phase unchanged



Reverse: shifts the phase through 180°, inverting it.



7) Output CompLim

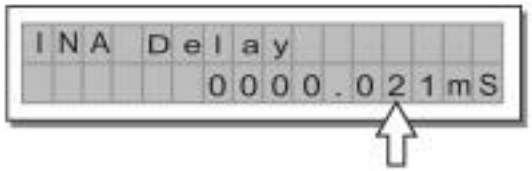
Allows to keep the signal of each individual output within a set level, which can be used effectively to protect the components of a sound system.

UTIL menu

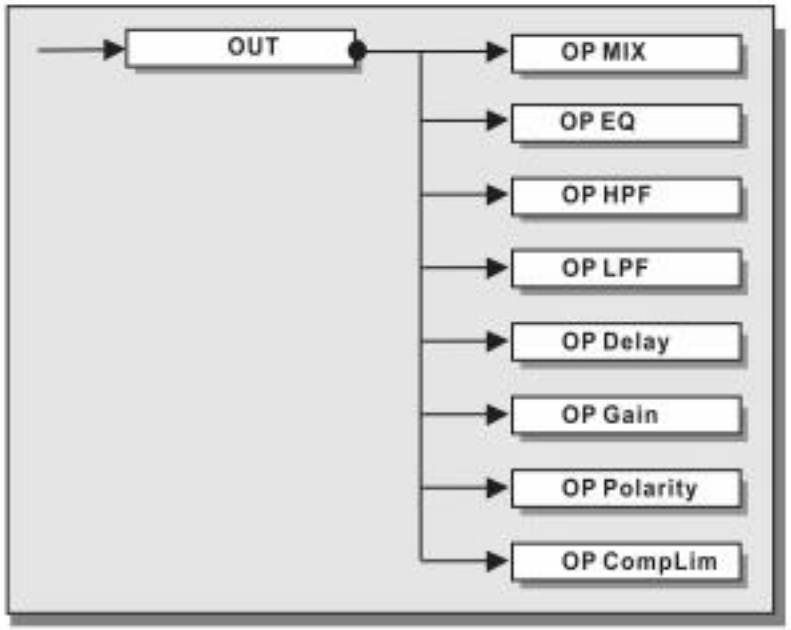
This menu comprises a series of submenus that allow to set a series of system options and access certain utilities, such as the control of protection against accidental or unauthorized changes:

3) Input Delay

Press **IN** key and **PREV & NEXT** keys to adjust the delay lines of **Input A, Input B.** Input delay ranges from 0 to 1364mS with 0.021 step.

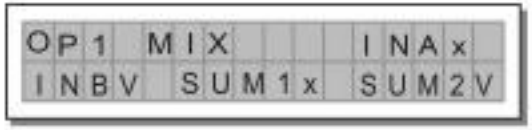


OUT key



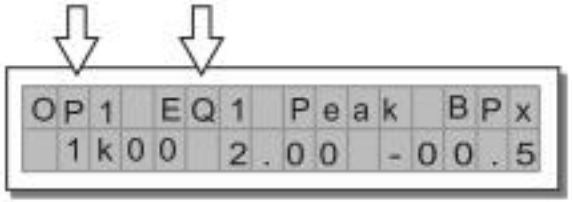
1) OP MIX

Press **OUT** key to access output mix page, use **ENTER, PREV** & **NEXT** and **DIAL** to adjust values.



2) OP EQ

Output equalizer with 5 parametric filters.
Also called Channel EQ, allows to alter the tone of each individual output.
The characteristics of quality & programmability are identical to those of the Input Equalizer & enable this unit to be used extremely effectively and flexibly.
Each equalizer has 5 pages (one per filter), indicating the name of the output effects and the number of the filter.

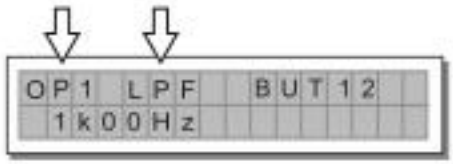


Example: Output I - Filter I

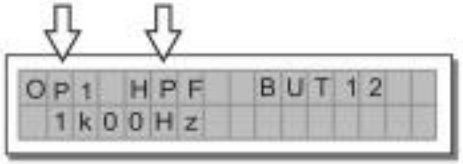
Since technical specifications and editing fields of the **Output EQ** are identical to those of the **Input EQ**, please refer to **INPUT EQ** section for descriptions.

3) OP HPF & LPF

Each Xover has 2 slightly different pages (one for each filter), where the name of the output it affects and the type of filter are shown.



Output 1- low pass filter



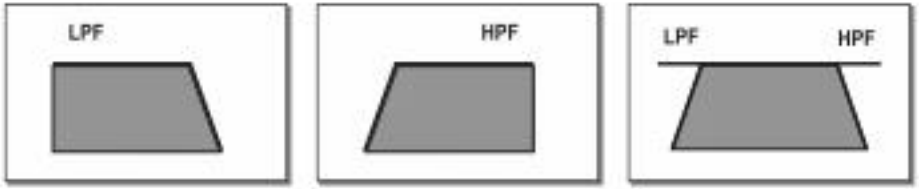
Output 1- high pass filter

Low Pass Filter

The low-pass filter allows all the frequencies below a specific frequency to pass, whereas it cuts all the frequencies above it.

High Pass Filter

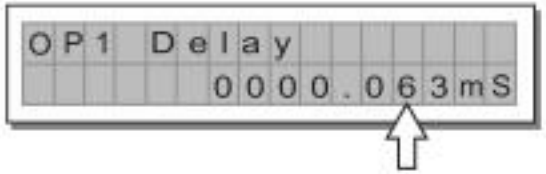
The high-pass filter allows all the frequencies above a specific frequency to pass, whereas it cuts all the frequencies below it.



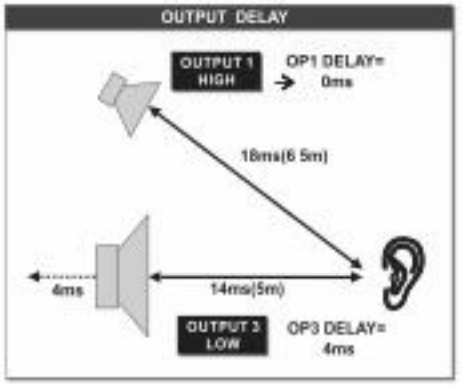
Signal segment obtained with the combination of **LPF and HPF.**

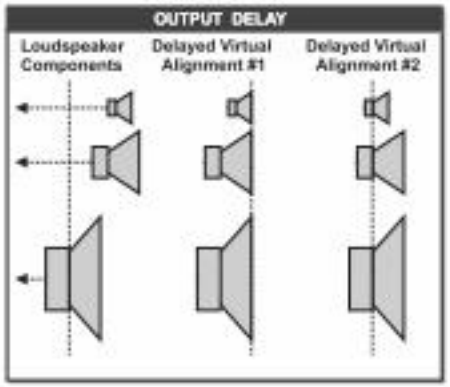
4) Output Delay

Only delays the signal of a specific output.
Internal alignment of a speaker enclosure components.
Use **OUT key**, **DIAL** , **PREV** and **NEXT** keys to adjust the delay lines of outputs 1, 2, 3, 4, 5, and 6.



The values can be set in the following ranges:





5) Output Gain

Output level control. Allows to adjust the signal level of each individual output.
Editing values are between +12dB ~ - 40dB, with 0.5dB steps.