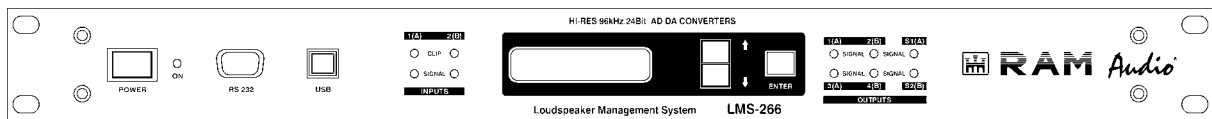


**RAM**

*Audio*<sup>®</sup>

# **LMS 266 / LMS 221 Digital Controllers**

## **Loudspeaker Management System**



## **HARDWARE MANUAL**



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## WELCOME

You have just started working with the digital processors RAM AUDIO LMS Series.

Before starting to use the processor we recommend reading this manual carefully; you will find instructions for use, programming examples and practical advices, which will be of great help to you.

The digital processors RAM AUDIO include the latest digital technology advances. With a maximum of precision and numerous features they are designed to meet the best professionals' highest expectations in the sound environment.

If you wish to change some configuration parameters or create new configurations for your sound system, we recommend to carefully read this manual and the manual for the software of LMS processors.

We hope that LMS 221 / LMS 266 will meet your expectations as a technician and user and will make your work easier.

Welcome to RAM AUDIO!  
([www.ramaudio.com](http://www.ramaudio.com))

## IMPORTANT INFORMATION ON SECURITY



The CE mark on the processor LMS 221 / LMS 266 indicates that it is verified and tested to entirely fulfil the European and international regulations concerning electromagnetic compatibility and electric safety.

Radiated emissions:	EN55013-1 (1996)
RF Immunity:	EN55103-2 (1996)
Electric Safety:	EN60065 (1993) IEC65 (1985) and amendments 1, 2 and 3

This product fulfils also the specifications of the following safety directives:

Directive of low voltage: 73/23/EEC

Directives EMC: 89/336/EEC and amendment 93/68/EEC

This product is totally designed and manufactured in the European Union.



**CAUTION  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN**



These symbols are internationally accepted and warn of potential damages caused by the improper manipulation of electric appliances.

The beam pointing down inside an equilateral triangle warns of dangerous voltage existing inside the appliance. The exclamation mark inside an equilateral triangle reminds the user to pay attention to the safety indications shown in this manual.

Some of the indications which this sign refers to are:

**Do not expose the processor to dust or humidity.**

**Do not open the processor's lid.**

**To avoid damages caused by electric shock, do not manipulate interior elements.**

**Only use appropriate and intact power cables.**

**In case of any strange performance, always contact the technical service.**

### Unpacking the processor LMS 221 / LMS 266

Before unpacking your processor, make sure that the packing is neither damaged nor deformed. In case of important anomalies, please contact your transport agency. After unpacking the product and checking the equipment's perfect working order, please keep the original packing just in case you have to return the processor to the distributor.

## 1.- INTRODUCTION

With its 60 user's memories **LMS 221 / LMS 266** will allow you to configure your settings for your systems. **LMS 221 / LMS 266** disposes of the software **LMS 221 / LMS 226 Control** (under Windows 95/98/ME/NT/2000/Me/XP), which makes it possible to modify all the parameters of the system. We recommend to carefully reading the manual of the software before making any configurations. You will find the explanation of the working order and all the possibilities of the processor **LMS 221 / LMS 266** explained in this manual.

**LMS 221 / LMS 266** offers all the necessary elements for the installation to the sound technician.

- 2 inputs / 6 outputs (2 inputs / 3 outputs for LMS 221).
- Independent output delays.
- 34 EQ filters absolutely configurable (17 for LMS 221).
- 6 Crossovers up to 24 dB/Oct (3 for LMS 221).
- Gains, mutes and phase inversion per way.
- Dynamic control with Limiter/ compressor and noise gate.
- etc...

all this together with the best electronic components to guarantee as clearest and most accurate sound possible with all the necessary protections for your system.

### Processor Description LMS 221 / LMS 266

**LMS 221 / LMS 266** audio digital controller is an audio digital processor, configurable by the user, with two inputs / three outputs and two inputs / 6 outputs respectively, designed to cover uses like:

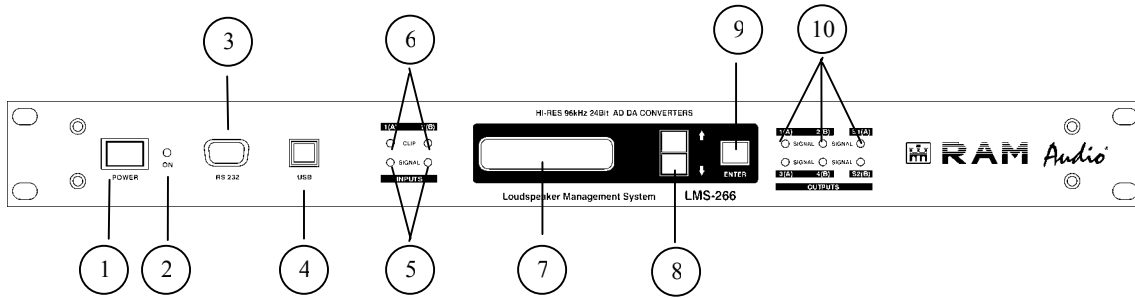
#### **LMS 221:**

- Full range stereo processor plus sub.
- 2 way stereo processor plus mono sub output.
- 3 way mono processor complete for installations (High-Mid-Low).
- Stereo paragrahpic equalizer.
- Stereo Compressor / Limiter
- Etc.

#### **LMS 266:**

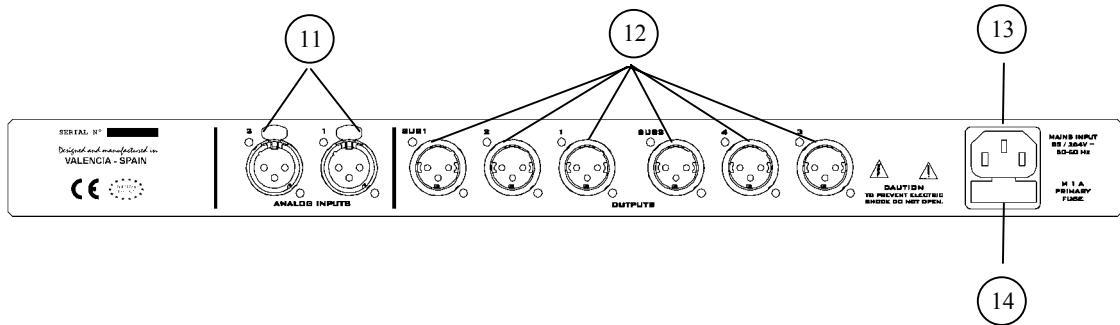
- 3 way stereo processor (High-Mid-Low).
- 4 way mono processor plus 2 sub outputs.
- Etc.

**Front Panel Description LMS 266**



- 1.- MAIN POWER SWITCH  
Connects and interrupts the processor's current feed.
- 2.- SWITCH ON INDICATOR LED  
Indicates that the processor is switched on.
- 3.- RS-232C CONNECTOR  
Male Sub-D connector of 9 contacts for communication with PC.
- 4.- USB CONNECTOR  
Type B female USB connector for communication with PC.
- 5.- INPUT SIGNAL INDICATOR LEDS  
Indicate presence of signal at the inputs.
- 6.- INPUT CLIP INDICATOR LEDS  
These LEDs when illuminated indicate that the corresponding channel is clipping the processor's input, producing a trim and distortion of the signal. These LEDs should never illuminate.
- 7.- DISPLAY  
Shows the menus, information on working order as well as diverse modifiable parameters by the user.
- 8.- MENU KEYS  
Permit to move up and down in the menus and to increase and decrease different parameters.
- 9.- ENTER KEY  
Allows access to menus and submenus and confirms actions.
- 10.- OUTPUT SIGNAL INDICATOR LEDS  
Show the presence of signal in the outputs.

**Rear Panel Description LMS 266**



**11.- SIGNAL INPUTS**

Female XLR connectors of 3 contacts.

**12.- SIGNAL OUTPUTS**

Male XLR connectors of 3 contacts.

**13.- IEC POWER SUPPLY CONNECTOR**

The mains cable is supplied with the processor. LMS 221/ LMS 266 incorporates a precise switching power supply which accepts voltages from 85 to 265V.

The power supply is continually regulating itself and guarantees a perfect working order even with bad regulated supplies.

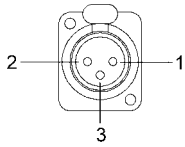
**14.- FUSE HOLDER**

Location of 1 A fuse. (Only replace with fuses of the same value)

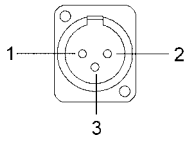
## 2.- INSTALLATION AND ASSEMBLY

### Connectors and connections.

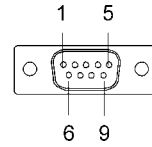
#### XLR CONNECTORS



**INPUTS**  
 1.- GROUND  
 2.- HOT (+)  
 3.- COLD (-)



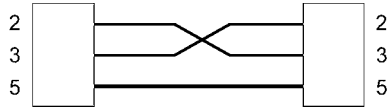
**OUTPUTS**  
 1.- GROUND  
 2.- HOT (+)  
 3.- COLD (-)



#### 9 Contacts Male SUB-D CONNECTOR (Communication PC-User interface)

Pin 1 : n.c.  
 Pin 2 : RxD - Received Data  
 Pin 3 : TxD – Transmitted Data  
 Pin 4 : n.c.  
 Pin 5 : Ground  
 Pin 6 : n.c.  
 Pin 7 : n.c.  
 Pin 8 : n.c.  
 Pin 9 : n.c.

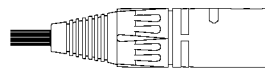
#### CONEXION CABLE PC – LMS 221 / LMS 266 (Supplied)



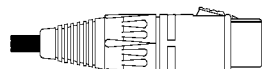
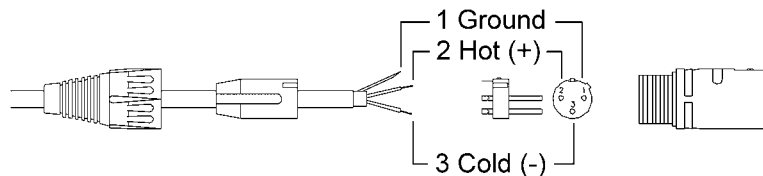
9 Contacts Female  
 Sub-D (PC)

9 Contacts Female  
 Sub-D (RS-232 IN)

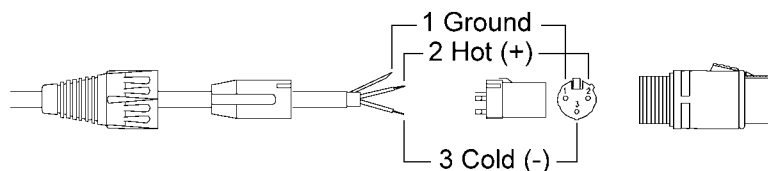
#### AERIAL XLR CONNECTORS



Connect to input processor

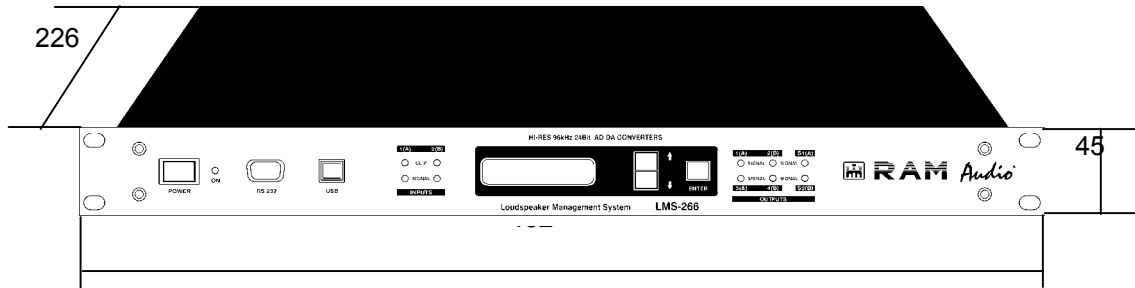


Connect to output processor

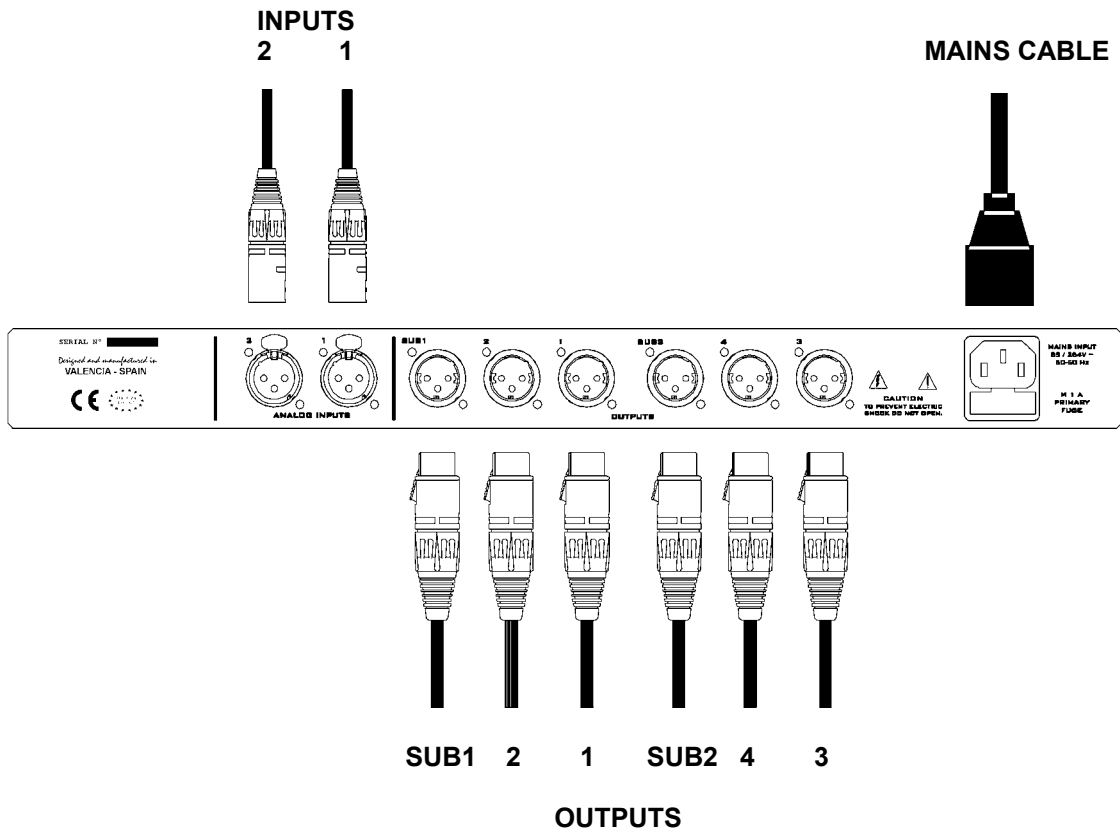




**Dimensions LMS 221 / LMS 266 (mm)**



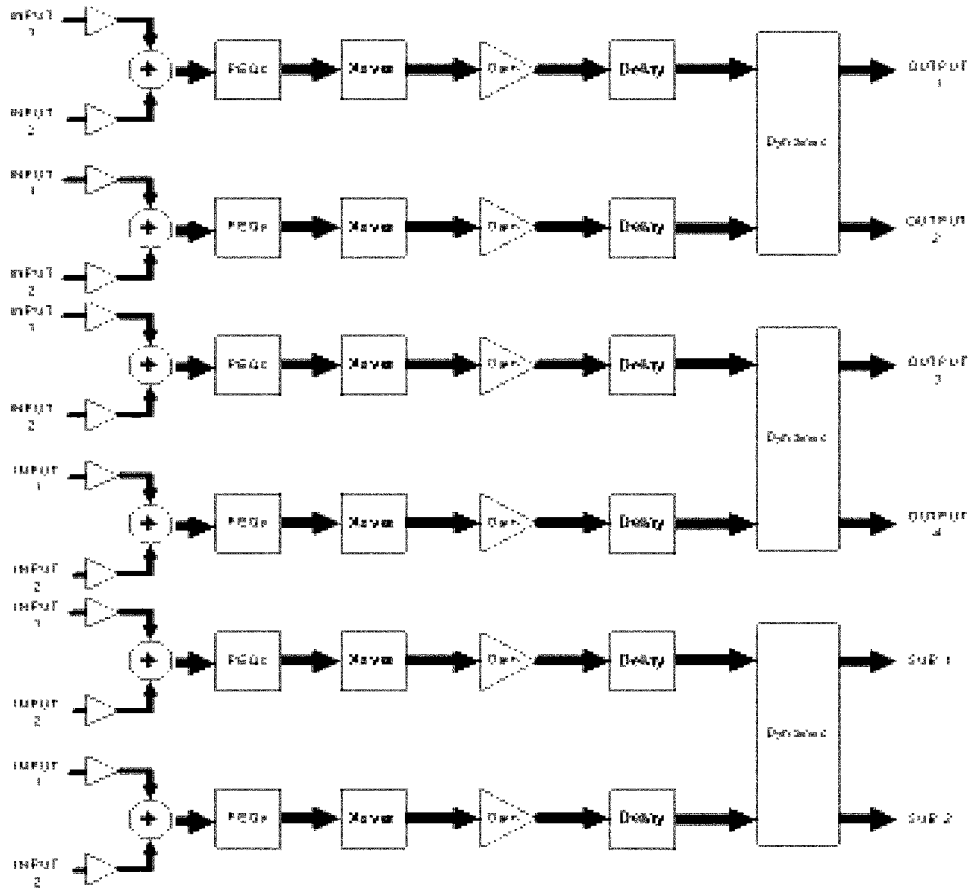
**How to connect LMS 266**



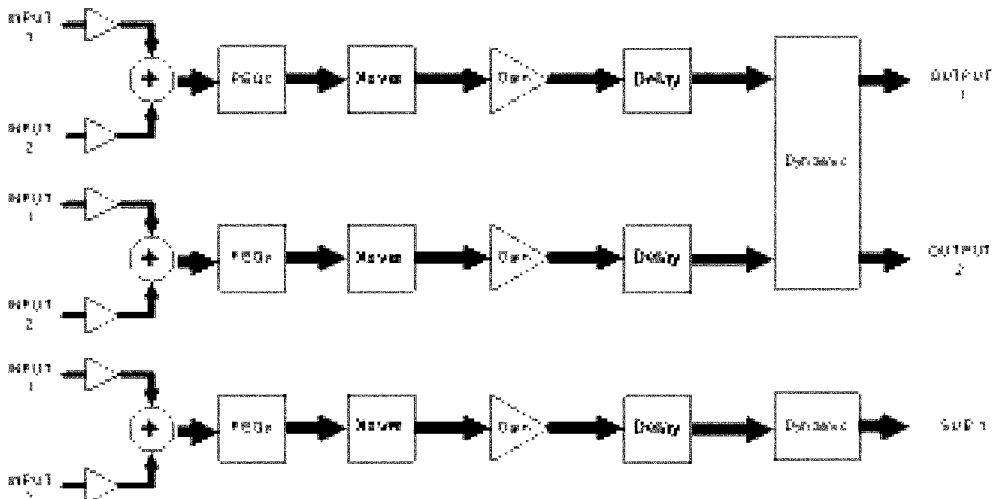
### 3.- PROCESS DIAGRAM

Once the analogical input signal is converted into a digital input signal, the process inside the DSPs is the following:

**Block diagram LMS 266**



**Block diagram LMS 221**





**GAIN:** Gain control. Adjust every way's gain to adapt the signal level received from the mixing desk and adjust the level delivered to each amplifier and level the sensibility of each way.



**DELAY:** Configurable delay. In each output we dispose of 4.85mseg. With the delay it is possible to correct the sound boxes' positioning in a multi way system and avoid cancellation problems caused by phase problems.



**PEQ:** Equalization. There are 7 totally configurable filters per way. These filters can be Parametric, Shelving of Low and High of 6dB/oct, LowPass, HighPass (with and without Q), BandPass, StopBand and AllPass of first and second order. PEQs mission is to correct and optimize each transducer and its enclosure's respond, obtaining a flat frequency or other, as required.



**CROSSOVER:** Bands separating filters. There are Linkwitz-Riley, Butterworth and Bessel filters up to 24dB/oct. You can also put them into Bypass, inactivating them, so this way disposing of the corresponding way in full band.



**DYNAMICS:** Dynamics section. The **LMS 221 / LMS 266** has a sophisticated algorithm of dynamics which uses a RMS detector with attacks and liberation controllable through the respond speed constants of the dynamics. Includes dynamic curves C. R. I. (Continuous Ratio Increment). These dynamic curves work like a compressor-limiter with ratio depending of the signal level, progressively passing from a relation 1:1 to 1:∞. This way the dynamics control beginning is gradual and totally transparent and guarantees much more headroom than a traditional limiter. There is also a noise gate available, which will respond with the time constants of the general dynamics.

## 4.- OPERATION

### Use Procedures

#### a.- Before switching on

**LMS 221/ LMS 266** includes a precise self-regulated switching power supply. This means that it can adapt to every voltage between 85 and 265 volts and frequencies between 50 and 60Hz. This way the processor's perfect working order is guaranteed under any voltage supply, so the final sound quality does not depend of the mains voltage state or generator used. Nevertheless, it is always recommendable to check the net voltage first to avoid possible problems as to connect the controller to 380 volts. **LMS 221 / LMS 266** includes a fuse holder with a spare fuse (1A) in the connector's input IEC of the mains cable.

Please turn the volume of the amplifier down before you switch the processor on. This way later we can check that every processor's output is connected to its corresponding amplifier, avoiding possible irreparable damages of the loudspeaker (mainly the drivers).

In an installation it is convenient to connect the audio and lighting systems in independent voltage lines to separately protect two parts and minimize the interferences between the systems.

#### b.- After switching on

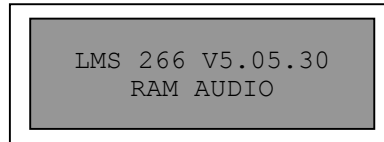
Turning on the **LMS 221 / LMS 266**, the audio outputs will remain short-circuited to ground for a few seconds in order to avoid the dangerous transitories in the switching on, so the processor waits for a stable voltage and carries out intern verifications (working order of converters, check the work memory, DSP processors starting and loading of the actual configuration.). Afterwards, if all is working well, all the outputs commute at the same time introducing the audio in each output.

To check the correct connection between **LMS 221 / LMS 266** and the power amplifier, introduce audio into the processor (the green front LEDS signal will light) and increase the volume of the amplifiers channel by channel, checking that every way outputs attacks its corresponding amplifiers.

### Display and edition elements

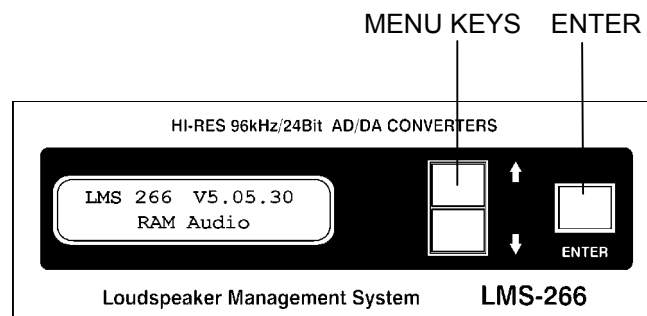
For the programming of some of its functions, the processor **LMS 221 / LMS 266** has a LCD screen, two menu keys and an enter key, for the detailed configuration of the actions on the different menus. For its entire configuration, the software LMS 221 / LMS 266 Control is necessary.

On the display you will find the specific information on the actions to which you can gain access to the configuration menus.



### DESCRIPTION OF THE ELEMENTS FOR THE EDITION

The elements for the edition permit the modification of the options inside the menus, as well as the navigation through the menus and submenus.



**MENU KEYS:** allows us to move up and down in the menu, as well as to increase and decrease the edited parameters' value.

Pushing the upper key we move upward in the menus or increase the parameters' value.

Pushing the lower key we move downward in the menus until the main menu or decrease the parameters' value.

**ENTER:** Key to confirm the actions in the menus.  
Allows the access to the menus and submenus.

## Program menu

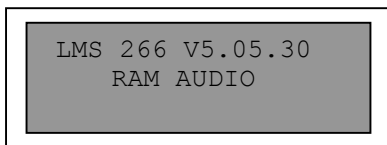
The processor **LMS 221 / LMS 266** has a LCD screen on which you can find configuration menus which allow you to store and modify the working order options of the processor, as well as to protect and have access to your stored data.

These menus are:

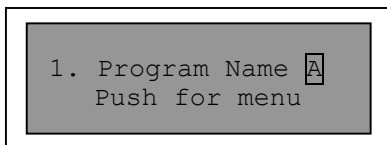
- 1.- CONFIGURATION
- 2.- INFORMATION
- 3.- COMMUNICATION

In each of them exist different submenus, which allow a total and easy configuration of the processors working order parameters.

When you switch on the processor, the following session start menu appears:



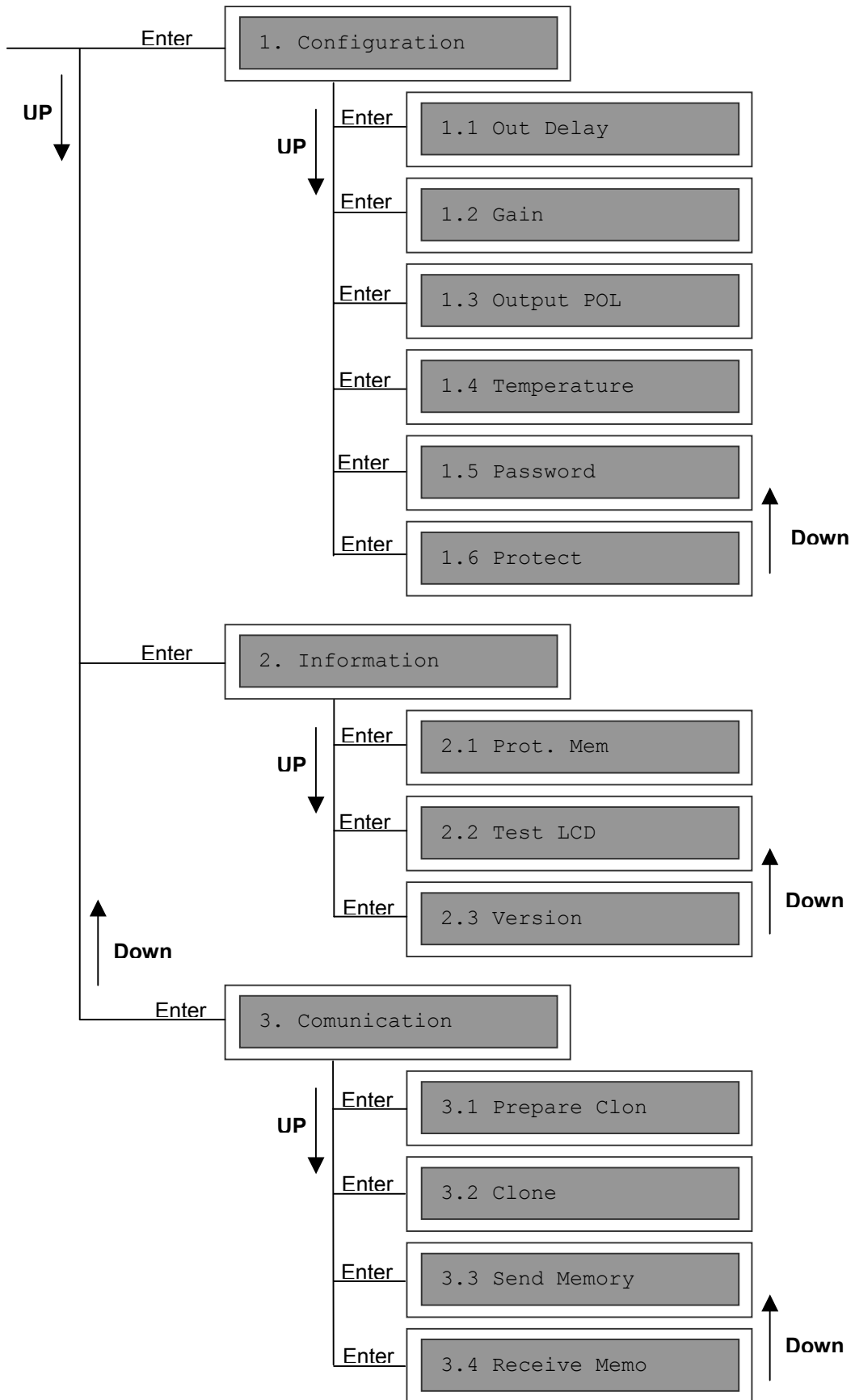
Welcome menu. It shows the version of the microcontroller software in the first line.



Program access menu. The name of the actual program appears in the first line. Pressing the **Enter** key allows you to enter in the detailed configuration of the processor's functions. The letter **A** indicates that the access is analogical.

The menu keys allows to directly select another program. Once you have chosen a new configuration, press **Enter**. This way you can avoid accidental program changes.

Menu hierarchy



## 1.- CONFIGURATION

When pressing the **Enter** key after the welcome menu, the configuration menu is the first menu you find. It allows the access to diverse configuration submenus. **LMS 221 / LMS 266** disposes of 60 memories in which you can store your configurations. The user can dispose of all configurations stored on his hard disk's PC, introducing the 60 necessary into the processor.

### Submenu 1.1. Out Delay.-

Pressing the **Enter** key from the **Configuration** menu we pass to the **OUT DELAY** submenu, where we can select the output Delay of each way we have.

```
1.1. Out Delay
```

```
Delay Out 1
0 ms | 0 cm
```

```
Delay Out 2
0 ms | 0 cm
```

```
Delay SUB 1
0 ms | 0 cm
```

```
Delay Out 3
0 ms | 0 cm
```

```
Delay Out 4
0 ms | 0 cm
```

```
Delay SUB 2
0 ms | 0 cm
```

```
1.1. Out Delay
```

Pressing the **Enter** key, from the main menu, we have access to the submenu in which we will introduce the Delay value in milliseconds or centimetres for the output 1.

If we press the **Enter** key again, we reach the output 2, in which we repeat the process. Like this we continue introducing all of the outputs delay

By pressing the **Enter** key a last time we return to the **Out Delay** menu.

The Delay values for the outputs can vary between 0 and 4.84ms (milliseconds), in steps of 0.02ms or between 0 and 168cm (centimetres).

The processor will indicate for each output, the name defined by the user through the LMS 221 / LMS 266 Control Software.



### Submenu 1.2. Gain

Once we have finished with the **Out Delay** submenu, if we press the upper key, we will find the submenu **GAIN**. It allows to individually defining the input gain for each of the processor's ways. To be able to move among the submenus, push the Enter key, inserting the gain values for each way in the following manner:

```
1.2. Gain
```

From the main menu push the **Enter** key, which will allow us to enter into the submenu where we introduce the gain in dB for Out 1.

```
1.2. Gain  
Out 2 : 00.0 dB
```

If we push the Enter key again, we will enter into the Out 2 submenu where we will repeat the process, continuing this way until all gains are defined.

```
1.2. Gain  
SUB 1 : 00.0 dB
```

Once all values have been inserted, we will push the **Enter** key again to return to the **Gain** menu.

```
1.2. Gain  
SUB 1 : 00.0 dB
```

The gain values can vary from Mute, 30.0dB to +6db, in steps of 0.1db.

```
1.2. Gain  
Out 3 : 00.0 dB
```

The processor will indicate for each output, the name defined by the user with the LMS 221 / LMS 266 Control Software.

```
1.2. Gain  
Out 4 : 00.0 dB
```

```
1.2. Gain  
SUB 2 : 00.0 dB
```

```
1.2. Gain
```

### Submenu 1.3. Output POL

Using the upper menu key in the submenu **Gain** we will go to the next level above, we will reach the **OUTPUT POL**, where we will be able to choose the output's polarity [+] or [-] of each of the ways.

```
1.3. Output POL
```

In the main menu we press the **Enter** key and we will have access to the submenu in which we will insert the polarity chosen for the output 1.

```
1.3. Output POL
Out 1 : [+]
```

With the upper and lower menu keys we will change the polarity. Push the **Enter** key to insert the actual polarity and pass on to the next way.

```
1.3. Output POL
Out 2 : [+]
```

Repeat this process with the rest of the outputs.

```
1.3. Output POL
SUB 1 : [+]
```

The processor will indicate for each output, the name defined by the user with the LMS 221 / LMS 266 Control Software.

```
1.3. Output POL
Out 3 : [+]
```

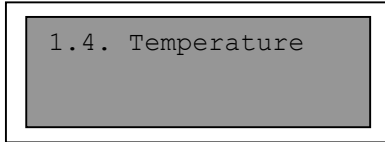
```
1.3. Output POL
Out 4 : [+]
```

```
1.3. Output POL
SUB 2 : [+]
```

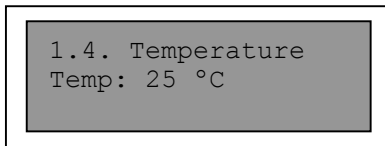
```
1.3. Output POL
```

### Submenu 1.4. Temperature

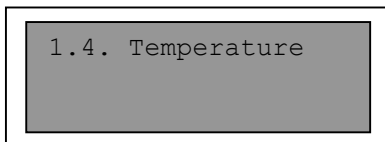
If we press the upper menu key in the **OUTPUT POL** submenu we will go to the next level above, **Temperature**. Here we can choose the temperature for the work environment, which will be used in the calculation of the delay distances.



Pressing the **Enter** key, we will enter into the value's edition.

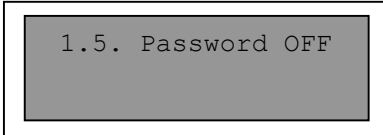


To change the value we will press the upper or lower menu keys. Pressing **Enter** we validate the value.

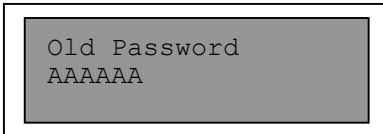


### Submenu 1.5. Password

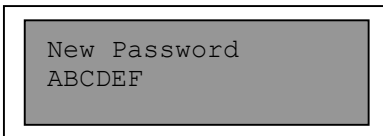
Going to the next upper level from the submenu **Temperature**, we will reach the submenu **PASSWORD OFF (ON)**, in which we can include an access password to protect the setting data loaded in the processor.



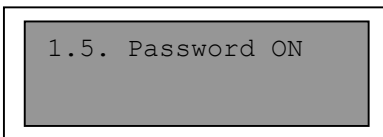
1.5. Password OFF




Old Password  
AAAAAA



New Password  
ABCDEF



1.5. Password ON



1.5. Password OFF

In the main menu we press the **Enter** key and will have access to the submenu where we will be asked for the current password. We will dispose of 6 alphanumeric characters.

If we do not know it or if we enter a wrong access password, the message **Password ERROR** will appear on the screen and will return to the main submenu screen.

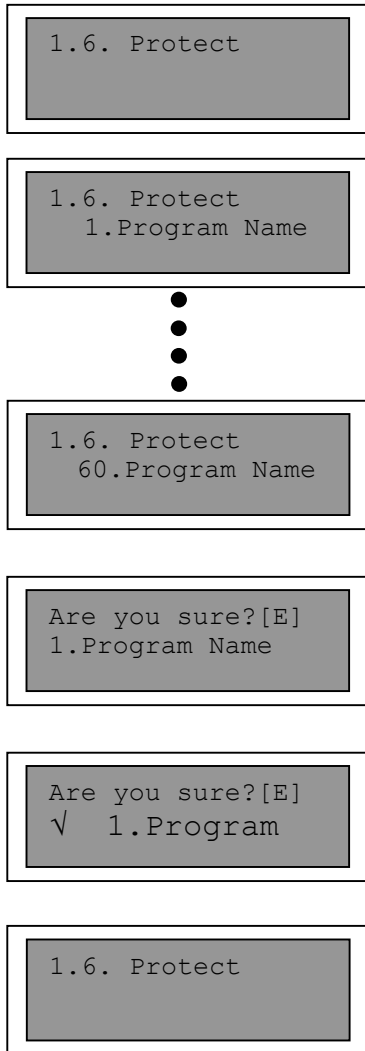
If we enter the correct access password we can change and activate it or not.

If you press the **Enter** key after activating it, it will be deactivated again.

NOTE: If you cannot change the password because you do not know it, you have to connect the processor to a PC and with the help of the software **LMS 221 / LMS 266 Control System**, program a new password.

### Submenu 1.6. Protect

Going up from the submenu **PASSWORD** with the upper menu key, we reach the submenu **PROTECT** where we can activate and deactivate the protection of each of the 60 memories that we have.



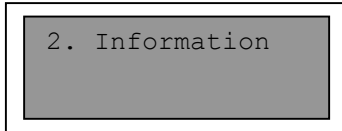
In the main menu we press the **Enter** key and enter into the submenu in which we activate the protection of the memory 1. Activating this option, on the left side of the memory number, there will appear the mark (√) indicating that it is now protected.

With the menu key we navigate through the different memories, activating and deactivating the protection for each of them.

If we press the **Enter** key, in any window of the program's submenu, we will reach a window of confirmation of our action (activation or deactivation of the protection). Once finished all the actions in the memories, we will press the lower menu key until we reach the main screen of the submenu **PROTECT**.

## 2.- INFORMATION

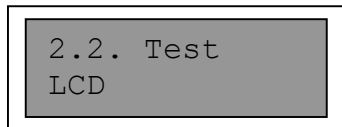
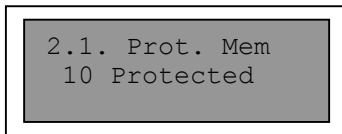
In this menu and the associated submenus, the user is informed of a series of parameters contained in the processor. Some of them are part of the software and others part of the personalized configuration, like free and protected memories.



### Submenu 2.1. Protect Memory

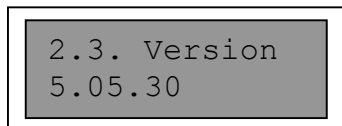
When we press the **Enter** key on the Information screen, the submenu Prot. Mem is the first we reach. Pressing the **Enter** key, here we will be given **INFORMATION** on how many program memories are protected.

In this case there are 10 memories protected.



### Submenu 2.2. Test LCD

If we go up with the upper menu key we reach the submenu **Test LCD**. From this screen we can carry out a LCD check and see if all the pixels are correct.

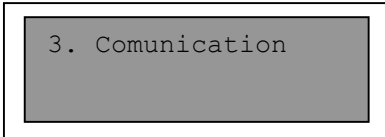


### Submenu 2.3. Version

If we continue going up, we reach the submenu version. On this screen we receive information on the microcontroller software **Version** installed in our processor.

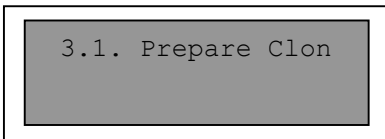
### 3.- COMMUNICATION

If we go one level up from the Information menu, the Communication menu appears. This menu is the one which allows the communication between two processors by cloning, creating an exact copy of the information of the first processor (the loaded configurations as well as the operative system of the processor). In our case the processor receives the information of another processor, working as a master.

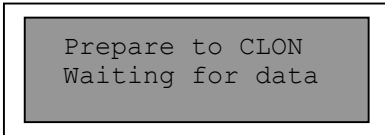


#### Submenu 3.1. Prepare Clon.-

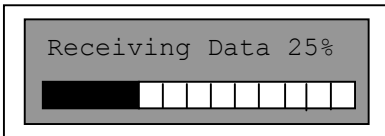
If we press the **Enter** key in the main menu, the submenu 3.1, **PREPARE CLON**, appears.



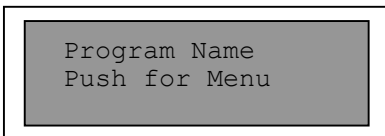
This screen advises us to keep the processor ready to be cloned.



A second screen informs us that the processor is prepared to receive information from the master processor (the one which sends the information).



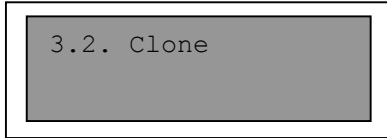
A next screen informs us of the process of cloning, showing the percentage of information receiving.



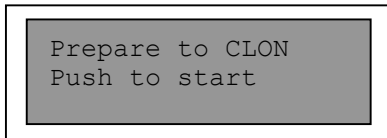
When the process has terminated a window with the program's name appears.

### Submenu 3.2. Clone

Going up from the submenu Prepare Clon, the submenu **CLONE** appears. This menu allows the cloning (make an exact copy) using our processor as the master, meaning that this processor is going to send the information to the other processor.



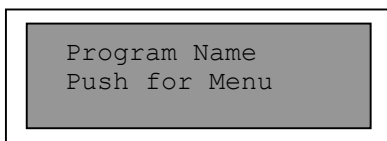
If we press the **Enter** key on the menu's main screen, the submenu 3.2. **Clone** appears.



Here we receive the advice to prepare the processor to be cloned and to press the **Enter** key to start the process.



A next screen informs us of the cloning process, showing the percentage of information, which is being sent.



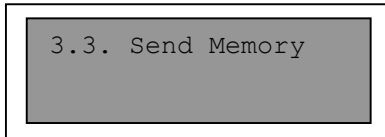
When the process has terminated a window with the program's name appears.

**NOTE:** In the case of data transmission's problems or when the processors are not correctly connected, a screen with the words: **Communic. Error** will appear.

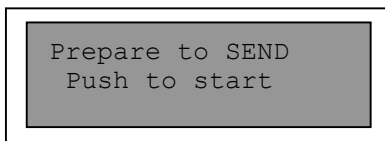


### Submenu 3.3 Send Memory

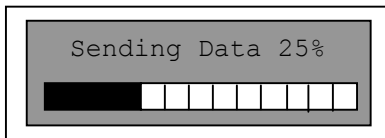
Going up from the submenu **Clone** the submenu **SEND MEMORY** appears. This menu allows to copy a particular memory from a unit of **LMS 221 / LMS 266** to another, using our processor as a master meaning that it is going to send the information to the other processor.



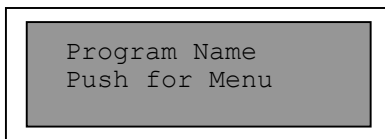
Pushing the **Enter** key, allows choosing the memory which is going to be sent to another processor.



Here we receive the order to prepare the processor which is going to receive the information, pressing the Enter key the process will start. For this, first the **LMS 221 / LMS 266** which is going to receive the memory needs to be waiting in the submenu **3.4 Receive Memory**.



A next screen informs us of the process of cloning, showing the percentage of information which is being sent.

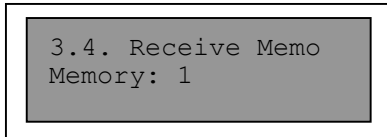


When the process has terminated a window with the program's name appears.

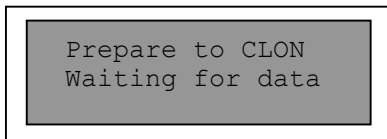
**NOTE:** In the case of data transmission's problems or when the processors are not correctly connected a screen with the words: **Communic. Error** will appear.

### Submenu 3.4. Receive Memo

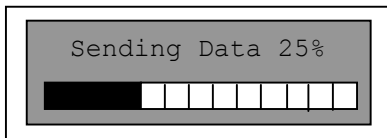
Going up from the submenu **Send Memory**, the submenu **RECEIVE MEMO** appears, which allows to receive a particular memory from a unit of **LMS 221 / LMS 266**, using our processor as a slave, meaning that it will receive the information from the other processor.



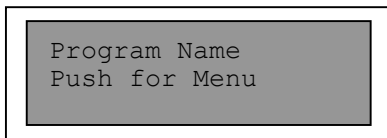
With the menu keys we select the memory in which the received information will be saved. Pressing the **Enter** key we move to the next screen.



Here we are informed that the processor is waiting to receive the data from the other unit of **LMS 221 / LMS 266**. Pressing any key you exit from this option, returning to the main screen.



As soon as the process begins, the following screen informs us of the cloning process, showing the percentage of information which is being received.



When the process has terminated a window with the program's name appears.

## 5.- TECHNICAL SPECIFICATIONS

<b>Analogical input</b>	Input impedance: 32 KOHM, BALANCED Connector: Balanced XLR (pin 2+), Balanced Converter AD: 24 bit-96 KHz, 256x Oversampling Dynamic Range: 105 db Max. Input level: +15dBu, Balanced RF (radiofrequency) filter to avoid interferences
<b>Output</b>	Output impedance: 50 OHM Connector: XLR Balanced (pin 2+) Converter DA: 24 bit-48 KHz, 256x Oversampling Dynamic Range: 112 db Max. Output Level: +18dBu, Balanced RF (radiofrequency) filter to avoid interferences
<b>THD(%)</b>	<0.002%
<b>Frequency Response</b>	10Hz - 24000Hz
<b>Processing</b>	2 Floating Point DSP (1 DSP for LMS 221) Internal resolution of 48 bits with double precision
<b>Data memory</b>	Flash type memory to store 60 Presets. Total Memory: 128 Kbytes
<b>Power Supply</b>	Self regulated Switching Power Supply Universal 85V – 265V, 50Hz - 60-Hz. Fuse holder included in the mains IEC connector with spare fuse (1A)
<b>Consumption</b>	12W
<b>Communication Interface</b>	USB and RS-232C
<b>Finish</b>	Chassis: black iron panel, 1.5mm thick Front Panel: anodized aluminium, 4mm thick
<b>Environment</b>	Work temperature: 0° to 50°C (32° to 122°F) Storage temperature: -30° to 70°C (-22° to 167°F) Maximum humidity: 90%
<b>Dimensions (WxDxH)</b>	482 x 226 x 45 mm
<b>Weight</b>	3Kg
<b>Guaranty</b>	1 year

## 6.- PROBLEMS SOLUTION

This section is dedicated to give possible solutions for problems in the working order, which are easy to solve.

### 1 – The LMS 221 / LMS 266 is not active.

Check the main cable. If it is correctly connected and the blue power LED does not light, check the fuse located in the mains input.

### 2 – The LMS 221 / LMS 266 turns on but there is no sound.

Check that the signal is being sent to the processor correct input, 1 or 2. If there is sufficient signal, the green signal LED will be lighting; if not, check the cabling from the mixing desk to the processor.

### 3 – The obtained sound is strange.

Check the correct connection between the outputs and their corresponding power amplifiers. Some ways could be changed. Always increase the amplifiers' volume bit by bit and way by way to ensure a correct wiring and avoid that the transducers is being damaged.

### 4 – One power amplifier (with the same signal as the rest) sounds less.

Check if the cable, which connects the processor and the amplifier, is balanced. If not, the output signal will decrease 6dB.

### 5 – The audio sounds distorted and not good.

Check that the input is not saturated (exceeding 15 dbu or 4.4 volts of input) In this case the red clip LEDs will be lighting. You will only have to reduce the signal to processor's input until the clip LEDs turn off. If the problem cannot be solved this way, check that the signal does not come out distorted from the previous appliance, for example the mixer, which could have a high gain in this way and saturate the sound mixer's input.

## **7.- GUARANTEE**

The RAM Audio products are guaranteed against any kind of manufacture defect for the period of one year beginning from the day of purchase.

During this period, RAM Audio guarantees the repair and the supply of the necessary spare parts free of charge. If the product cannot be returned to the factory for inspection and repair, RAM Audio will supply all necessary spare parts.

During the guarantee's validity, RAM Audio does not assume the responsibility for any damages or defects caused by transportation, bad use or inappropriate manipulation of persons who do not belong to RAM Audio staff or to its authorized services.

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