MRC
A U D I O

EQ*Limit*®

USER'S MANUAL

Version 1.13   July 2014

www.mrcaudio.com

⚠ The sign inside a triangle indicates the existence of high voltage that may affect safety.

- Category **I** device.
- All sockets are isolated from mains
- Always use the earth lead in mains cord
- Keep these instructions. Heed all warnings. Follow all instructions.
- Do not expose this device to rain or moisture. Do not use this apparatus near water - for example, swimming pool, fountain. Do not place any objects containing liquids, such as bottles or glasses, on the top of the unit. Do not splash liquids on the unit.
- Clean only with a dry cloth. Do not use any solvent based cleaners.
- Do not install near any heat sources such as radiators, heat fans, stoves, or other apparatus that produce heat.
- Unplug this apparatus during lightning storms, earthquakes or when unused for long periods of time.
- No user serviceable parts inside. Refer all servicing to qualified service personnel. 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.

- TO REDUCE THE RISK OF FIRE REPLACE THE MAINS FUSE ONLY WITH A FUSE THAT CONFORMS TO IEC127-2. 250 VOLTS WORKING, TIME DELAY TYPE AND BODY SIZE OF 20mm x 5mm. THE MAINS INPUT FUSE MUST BE RATED AT 230V=T 3,15A L and 115V=T 6,3AL.

Thank you for using the Limiter-Controller **MRC AUDIO EQ***Limit*, the most complete system for controlling the sound emission in public leisure establishments. This equipment adjusts the sound emission in a musical system, acting softly on the audio signal what warranties that the sound level inside the house does not exceed the maximum, avoiding in this way infringing the corresponding local rules, and ensures a perfect coexistence with possibly affected neighbours.

Specific and calibrated microphones are used in this equipment to detect the sound pressure level. The generated signal is weighted as for "C", "A" or "BASS" curves and is registered periodically with programmable frequency and registering all sound parameters: Leq5s, LeqT prog, L10, L90. These parameters can be measured also through a second sensing microphone. The in&out audio signals is also registered for a combined evaluation.

This signal is compared to the levels and timetables adjusted during the programming of the unit. As the maximum sound level is exceeded the equipment starts limiting. Beyond this point and even if the input signal grows or the power amplifiers boost up, the sound level in the house won't grow over the level fixed as the limit. The limiter's action is shown by a group of LEDs marked with 5, 10, 15, 20, 30 and 40dB of attenuation. Although the limiter does not show further, it will still carry on limiting up to over 60dB. The input overload is signalled by the AUDIO LED on the front and on the remote display. It is also possible to use the audio signal as the limiting source instead of the signal measured by the microphone. In both cases it is possible to adapt the limiting spectral curve to the house's isolation spectral curve by means of a spectral meter with 12 1/3 octave filters.

The limiting circuitry is one of the important advantages of this equipment, because it calculates in a predictive manner, the possible boost of sound level and thanks to its elaborated design avoids the unpleasant pumping effect and/or breathing sound other limiters have, offering high quality sound even at high attenuation levels.

Also, it reminds the last attenuation level when the input audio signal is interrupted, avoiding, in this manner, high level sound peaks when the signal is back on.

The control circuit is based on a powerful microprocessor that permits measuring both microphones, input line, output line and the 12 1/3 octave filters in real time. It also registers, and shows on screen all the events, including alarms, that might arise, together with their date, time, and sound levels in dB, per each.

- It regulates all the work time with three different working maximum levels per each day of the week. In this way it is possible to have different maximum permitted sound levels depending on the hour of the day or depending on the day of the week; or alternatively it is possible to have the same maximum permitted level all the time.

- It changes automatically from winter to summer time.

- It has the possibility to program up to ten special periods between any two year days, in which levels and/or timetables may be altered, intended for special occasions.

- It registers the date of the programming changes, as it also registers the user's license of the technician that makes those changes.

- Sound levels are registered periodically during the working sessions.

- As prevention against manipulation of the system, the limiter has a circuitry that detects different actions on the microphone like changing the original microphone, covering it with sound isolating material, changing its location, etc. It registers the date and time of the moment of the manipulation and mute the sound if desired.

All these events are kept in a **non-volatile memory**, with capacity for over 3 months of activity (registering sound levels every 5 minutes).

To avoid improper manipulation of the system, all the configuration and programming of the unit is only possible through proprietary software installed in a PC. It is necessary to register this software prior its first use, and introduce a user's license that is provided for each authorized user, license that identifies him in each access to the unit.

Optionally, the limiter can be provided with an internal ETHERNET adapter and/or an external GPRS modem, with which real time control is possible through Internet, in a web page restricted to authorized users.

It also has physical protections with sealing screws at the connections back plane and for the microphone's cover.

As a complement for its installation and configuration, the limiter has an internal pink noise generator.

All these elements are shown in the block diagram in **fig.1**

FIG 1

LINE INPUT LEFT

LINE INPUT RIGHT

VCA

VCA

SUM

SUM

FILTER
"C" "A"

RELAYS

LINE OUTPUT LEFT

LINE OUTPUT RIGHT

MIC 1

MIC 2

FILTER
"C" "A" "BASS"

FILTER

BAND
FILTERS

uC

DISPLAY

COMMS
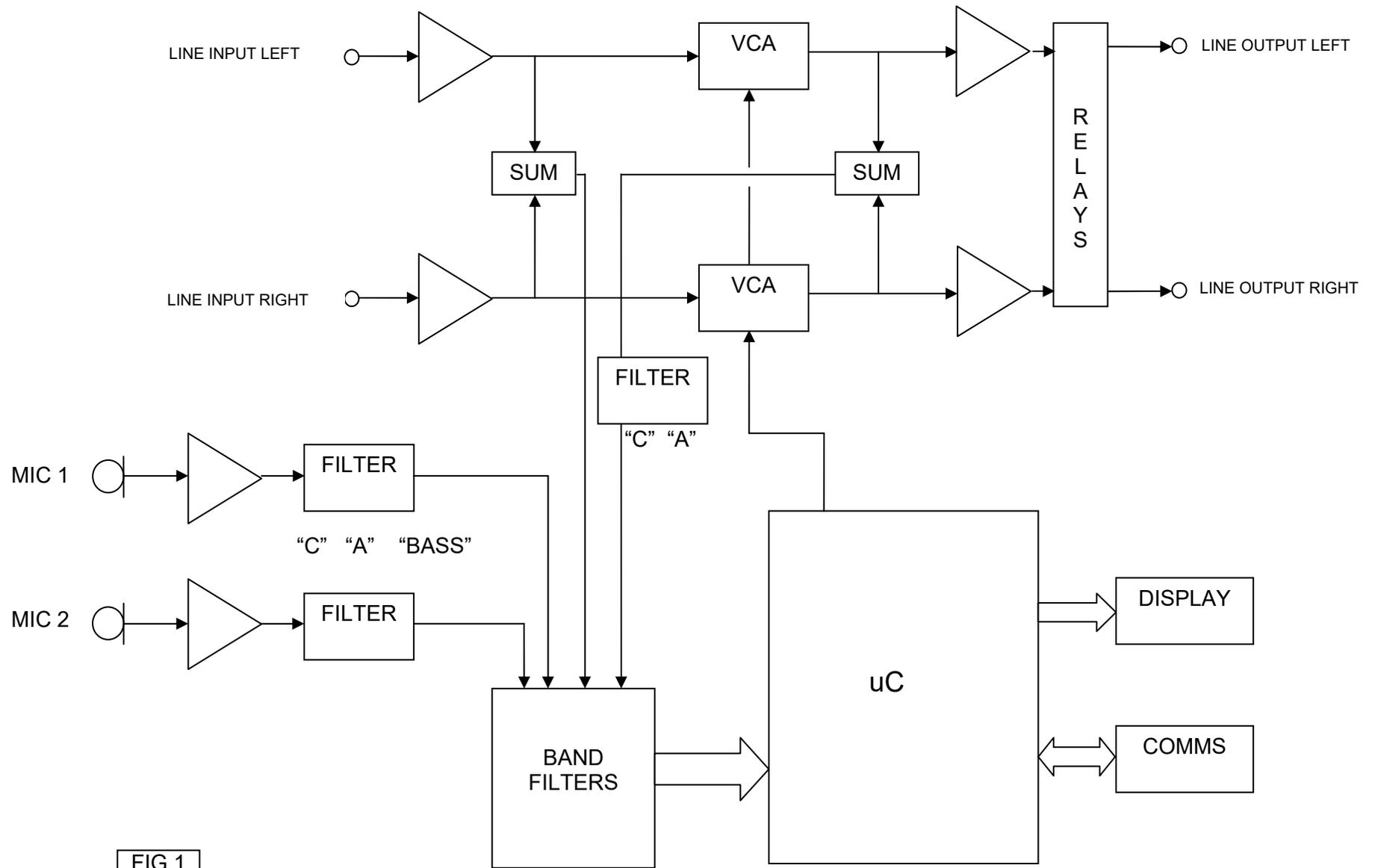
The next text refers to **fig.2** that shows the indicators and necessary connexions for a proper use of **EQlimit 1**

1. **NOISE** – The limiter has an internal pink noise generator that leads to a more comfortable adjusting of the installation. When clicking on the buttons NOISE or CAL, the signal of this generator is mixed with the audio inputs. Also this yellow LED starts to blink.

2. **AUDIO LEVEL** – Three LEDs show the state of the sound level: <u>Green</u> shows presence of normal signal, <u>Yellow</u> shows the audio level is above the permitted maximum, and <u>Red</u> shows the limiter has shut off sound.

3. **LIMITING LEDs** – LEDs that show the amount of dynamic attenuation applied o the input signal and input peak.

4. **STATUS LEDs** – LEDs that show the states of alarm, off time and special period active.

5. **USB** – USB connector for a direct connexion to a PC.

6. **MAINS INPUT** – Normalized IEC power input connector with Earth connection and input fuse. The protecting fuse must always be substituted by one of the same type **T 3.15A/250V.** Universal power supply 90 to 250VAC.

7. **DISPLAY** – Connector for the remote display.

8. **AUX** – Auxiliary connections to drive an optional relay box to control external equipment and fire alarm input to activate the priority of an external fire evacuation message or level reduction.

9. **MODEM** – RS232 connector for the external optional GPRS modem.

10. **LAN** – Optional Ethernet connector for an ADSL router.

11. **MODEM POWER FEED** – Jack connector to feed the optional external GPRS modem, with selectable 5 or 15Vdc, by means of internal jumper, with LED indication of the selected voltage.

12. **XLR OUT** – Output balanced connectors for channels left and right.

13. **AUX** – Level control for the external fire evacuation message.

14. **XLR IN** – Input balanced connectors for channels left and right.

15. **MIC1 - 2** – Input balanced connectors for main microphone **1** and optional registering microphone **2**.

Front panel labels:

NOISE | OK | PRE | MUTE | -5 -10 -15 -20 GAIN REDUCTION | PEAK | ALARM | OFF TIME | SPECIAL | USB

MRC AUDIO

EQ*Limit*
Sound Level Controller

1   2   3   4   5

10   13

Rear panel labels:

FUSE | DISPLAY | AUX | MODEM | 15V 5V | LAN | L R OUT | AUX | L R IN | MIC2 | MIC1

6   7   8   9   11   12   14   15

Fig.2

DISPLAY

MIXER

MICROPHONE

POWER AMPLIFIER
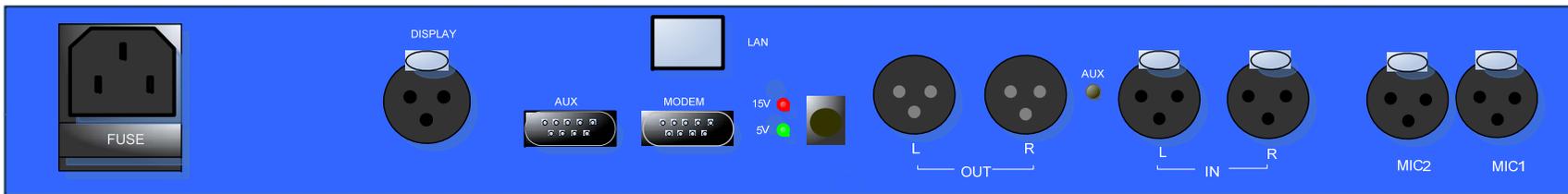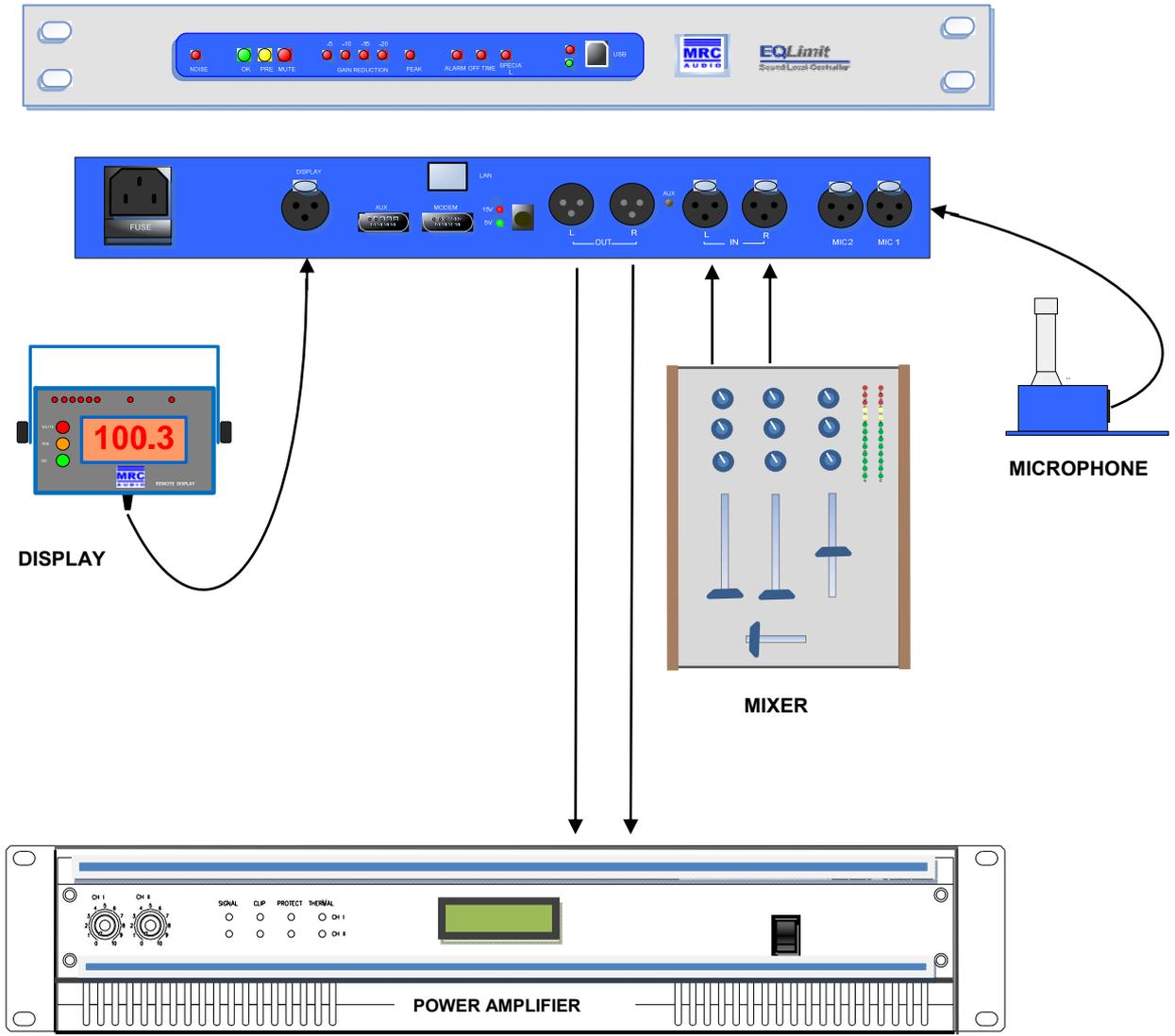
FIG. 3

This unit has been carefully packed at the factory inside a specially designed case. Nevertheless we recommend you supervise the state of the box and its contents.

Please do keep all the packaging items in case the unit should go back to MRC Audio.

The content of the box is:

- EQlimit
- MS1 Microphone
- Remote display DD1 (optional)
- USB cable
- Power feed cable
- Backplane cover TP2
- Microphone cable CM10

5.1.- Connections

- Input and output connexions are made by means of XLR-3 connectors. The connection pin out follows the international standard: Pin 1 is signal ground, Pin 2 (+) is non-inverted and pin 3 (-) is inverted.

- Connect input and output audio signals (**12** and **14**) in such a way that the limiter is connected just before the crossover or power amplifiers if there is no crossover.

- Either balanced or unbalanced lines are used, be sure to follow the same pin out at both channels to avoid phase cancellations.

- Connect the microphone(s) to the **MIC1** and **MIC2** (optional) (**15**). Position the microphone in a more or less centred position with respect to the speakers in order to measure both audio channels. Try to position the microphone as near as possible to where the authorities would control the sound level from music, not the audience.

- Optionally connect the remote display by means of its cable to the connector **DISPLAY (7)**. The remote display cable is 5 meters long.

- Finally connect the mains cable supplied with the unit to the mains input and the unit will switch on. Do always connect the earth connection for your personal security.

- Test for correct sound. If the remote display is installed verify that the metering more or less varies according to the sound level in the house.

5.2.- SCL Software installation

Download from www.mrcaudio.es the executable: **EQ*Limit* SCL v1.00**. Run this executable in your PC and follow instructions on screen. Once installed the icon ![icon] appears on your desktop. Double clicking this icon runs the software for **EQ*limit*** setup and control.

Before attempting to adjust the limiter, you must request an installer's license and register this license in the USER DATA window. This license identifies the installer every time he makes a configuration change in the limiter. If you do not have a valid license the limiter works in Demo mode, where no changes to the limiter's configuration are possible.

5.3.- Limiter's password

Besides needing a user's license for the SCL software, every time you attempt to change any configuration parameter in the limiter, the limiter will request a password to permit changes. For this purpose an emerging window will appear to input the password:
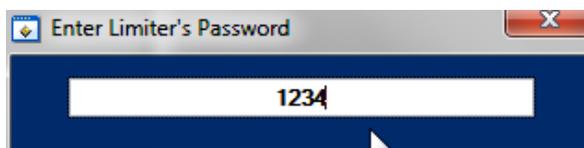
Enter the limiter's password. The default password for all limiters is **1234**. This password can be changed by the user as described further on.

Once the password has been entered once, it will not be requested for further changes unless a period of at least 5 minutes exists between two successive changes, or if the software is restarted.

If a valid password is entered, the emerging window disappears and the changes are made in temporary volatile memory. If the limiter is switched off, these changes are lost. This is why a "Save Changes" button appears at the bottom left corner each time changes are made:
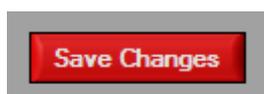
Clicking on this button makes the changes permanent and stored into non-volatile memory and the button disappears until new changes are made.

Also, if the screen is exited and changes have not been saved, an emerging window appears inviting to save changes:
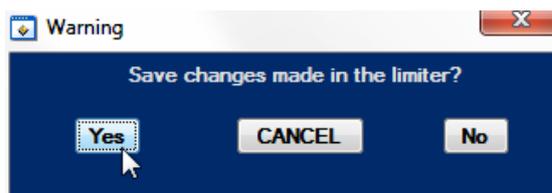
On this emerging window YES saves changes, NO continues exiting the window without saving changes and CANCEL cancels exiting and redirects back to the actual screen.

The save changes process is repeated each time any configuration changes are made into the limiter, but also, it is possible to save changes only once after making all the changes wanted.

5.4 Master Password

If the user forgets the password to configure the limiter, MRC Audio can provide a master password valid for only that limiter, as a function of its serial number, and valid only once.

Introducing a master password is registered in the limiter's non-volatile memory as an event, together with the date and time as all other events, and together with the authorised user that has entered the master password.

NOTICE: Each MRC Audio EQlimit has up to ten master passwords. Each time one is used it will not work ever again. If all ten master passwords are used and still the user keeps on forgetting the password, the limiter will have to be serviced at MRC Audio to restore ten new master passwords.

Clicking on the ▦ icon, created on the desktop at software installation time, the initial window appears where you can choose the user´s language through its corresponding flag.
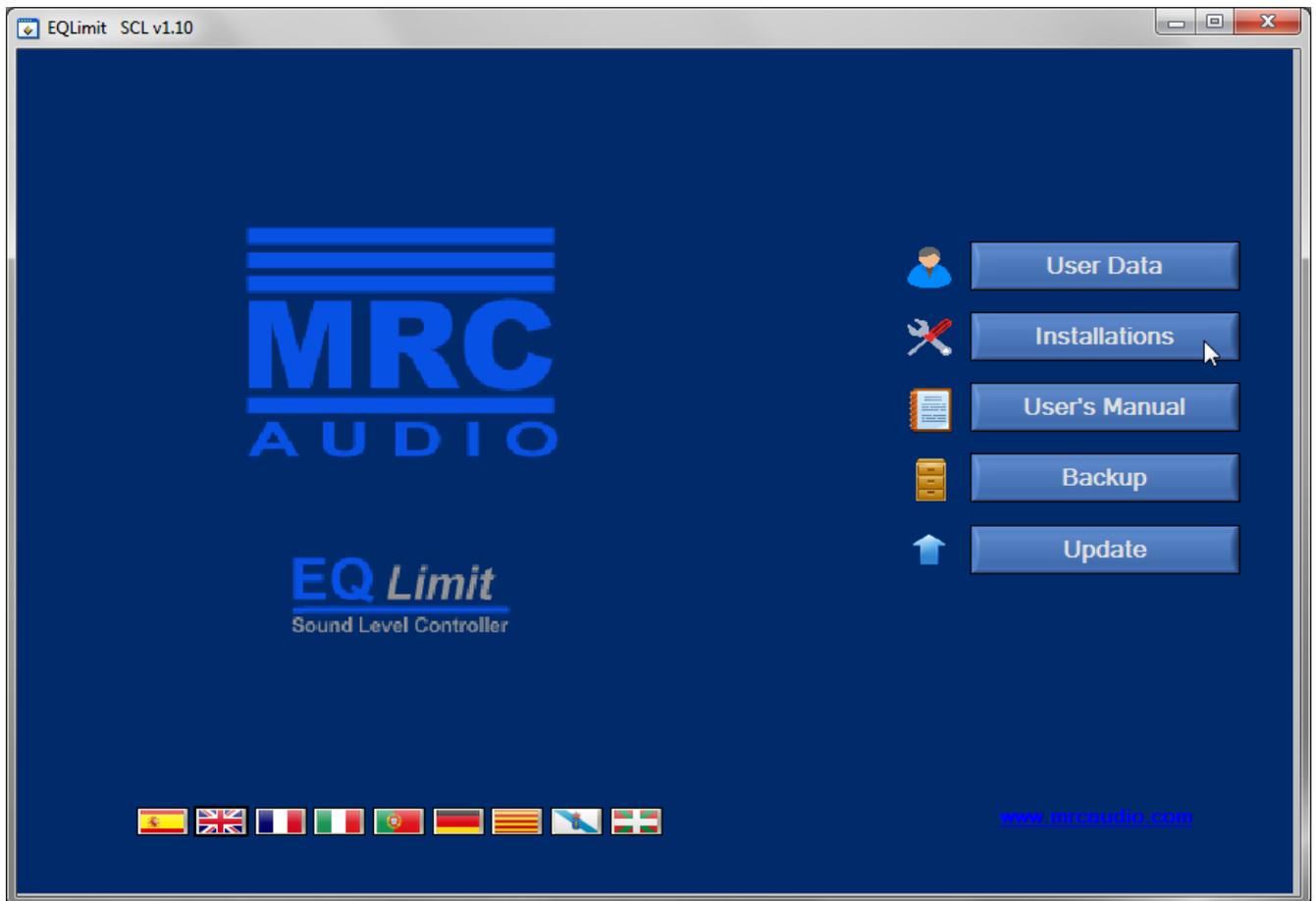
Once clicked on the language flag, the rest of buttons change to the language chosen.

USER'S DATA – This button takes us to the next screen, where it is possible to fill in the software's user data and the license provided by the manufacturer.

In the **User** field, fill in exactly the user name provided by the manufacturer. This name will identify you when accessing any EQlimit.

In the **License** field type in the license number provided by MRC Audio; this field is case sensitive.

Please fill in all fields, including the logo of your company, as this data will appear at the headings of the reports.

Click on the **Save Data** button and then on the **Activate** button and the software will be ready to use.

If the **Remember me in this PC** box is checked, the application remembers your license number not needing to type it in each time the application is launched. But remember that anybody using this PC will also not need to type in any license number at launching and therefore anybody can make changes to limiters in your name.

EXIT goes back to the initial window.

Again at the initial window the rest of the buttons are:

INSTALLATIONS – Opens the window with the list of installations kept in the data base and with the required buttons to connect to an EQlimit.

Any data base installation can be opened in read only mode clicking on the corresponding numbered button in the left column.
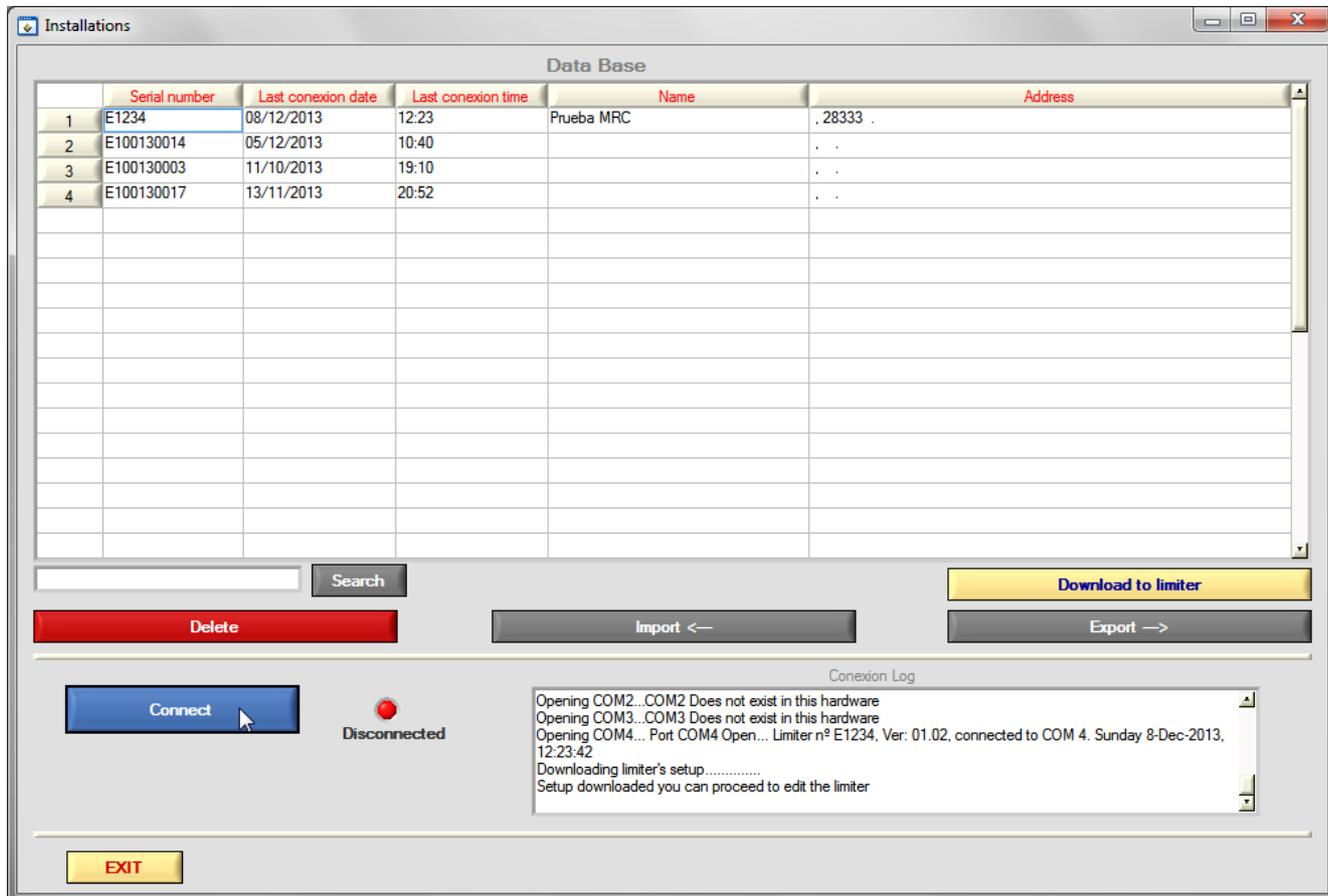
Search: Finding installations is possible by typing the name or part of the name or any identifying word into the **Search** box and clicking on the **Search** button.

Delete: Installations can be erased by clicking on the **Delete** Button; the button changes to **Select Installations. Cancel/Continue** and colour blue. Once the delete button changes, click on one or more installations by means of their left hand numbered buttons. Each time a button is clicked it changes to blue colour. Once all installations wanted to erase have their left hand numbered button coloured blue, click on the **Click here to delete** button, now colour yellow, to erase them permanently. This action is not reversible, therefore be sure you have chosen the wanted installations before deleting.

If you do not want to delete any or all installations, unselect them by clicking again on its blue button that will change back to its normal grey colour. If all installations are deselected, the **Click here to delete** button changes again into **Select Installations. Cancel/Continue** and colour blue. Click on the button to go back to the initial state without deleting anything.

NOTE: on top of the numbered left-hand buttons there is a button with an asterisk; clicking on this button alternatively selects/deselects all installations.

Download to limiter: It is possible to download the entire configuration from a database limiter into the actually connected limiter. Obviously it is mandatory to be connected to an EQlimit before proceeding with this action.

Click on the yellow **Download to limiter** button. This action will change the installations' left-hand numbered button into yellow colour. Click on the chosen database installation's left-hand numbered yellow button and the entire configuration of that database limiter will start downloading into the connected limiter.
Be patient, this action may take some seconds. Wait for the download to complete; the USB red LED, on the connected limiter, blinks as data is transferred while downloading, and stops blinking when the action is finished.

Export ---> It is also possible to export the entire configuration of one or more database limiters to a file within the PC with the extension **.mef** in order to share database installations with other PCs, or simply as a back-up method.

Like with the delete button, click on the **Export --->** button that changes to blue, choose the wanted installations, again the asterisk button alternatively selects/deselects all installations, and click again on the now **Click here to export** and colour green, to export the installations. This will open an OS window that permits choosing the name and location of the export file.

Import <--- This button imports into the SCL database any exported **.mef** files. Clicking on this button changes it into **Importing…** and colour red and opens an OS window to look inside the PC for the **.mef** file that is to be imported. Once chosen the file to be imported with the OS window, the application adds the contents of the **.mef** file to the SCL database, the OS window disappears and the import button goes back to its initial state.

The connect button and log window are explained further on.

The **EXIT** button goes back to the initial window.

Back at the Initial window:

USER'S MANUAL – This button opens a **.pdf** file with this user's manual in the language chosen for the application.

BACKUP – Creates a backup file (***.mrb**) with the entire current database to reinstall in a different PC or for after a total formatting of the disk.
Clicking on this button an emerging window appears inviting to create or to restore a database:

Click on any of both, an OS window appears to select the name and location of the file to create or to find the file to restore.

UPDATE – This button is used to update a connected limiter's firmware to the latest provided by MRC Audio.
It is mandatory to connect to a limiter in the installations window using the connect button. Once connected as shown by an emerging window and the log window, EXIT the connect window

going back to the initial window. Click on the **Update** button to show the emerging window to proceed or to cancel the action. Click on the button **YES** to open an OS window to look for the update **.bin** file inside the PC:
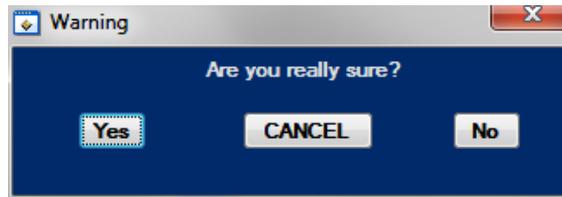
NOTICE: the update action is of your entire responsibility. It takes a time to transfer the update file to the limiter, in this time the limiter must not be disconnected from the PC. If the action fails for any reason, the limiter will have to go back to the manufacturer in order to burn the entire firmware into the limiter's microprocessor.

PROGRAMMING   7

After connecting the corresponding USB cable between the PC and the limiter, in the Installations window, click on the **Connect** button and wait while the SCL finds the limiter.

The log window shows the connecting process:
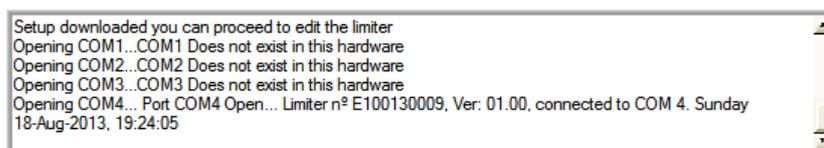
Once the limiter is found and connected, an emerging window notifies this condition and shows some data for the connected EQlimit:

	Serial number	Last conexion date	Last conexion time	Name	Address
1	E1234	08/12/2013	12:22	Prueba MRC	, 28333 .
2	E100130014	05/12/2013	10:40		. .
3	E100130003	11/10/2013	19:10		. .
4	E100130017	13/11/2013	20:52		. .
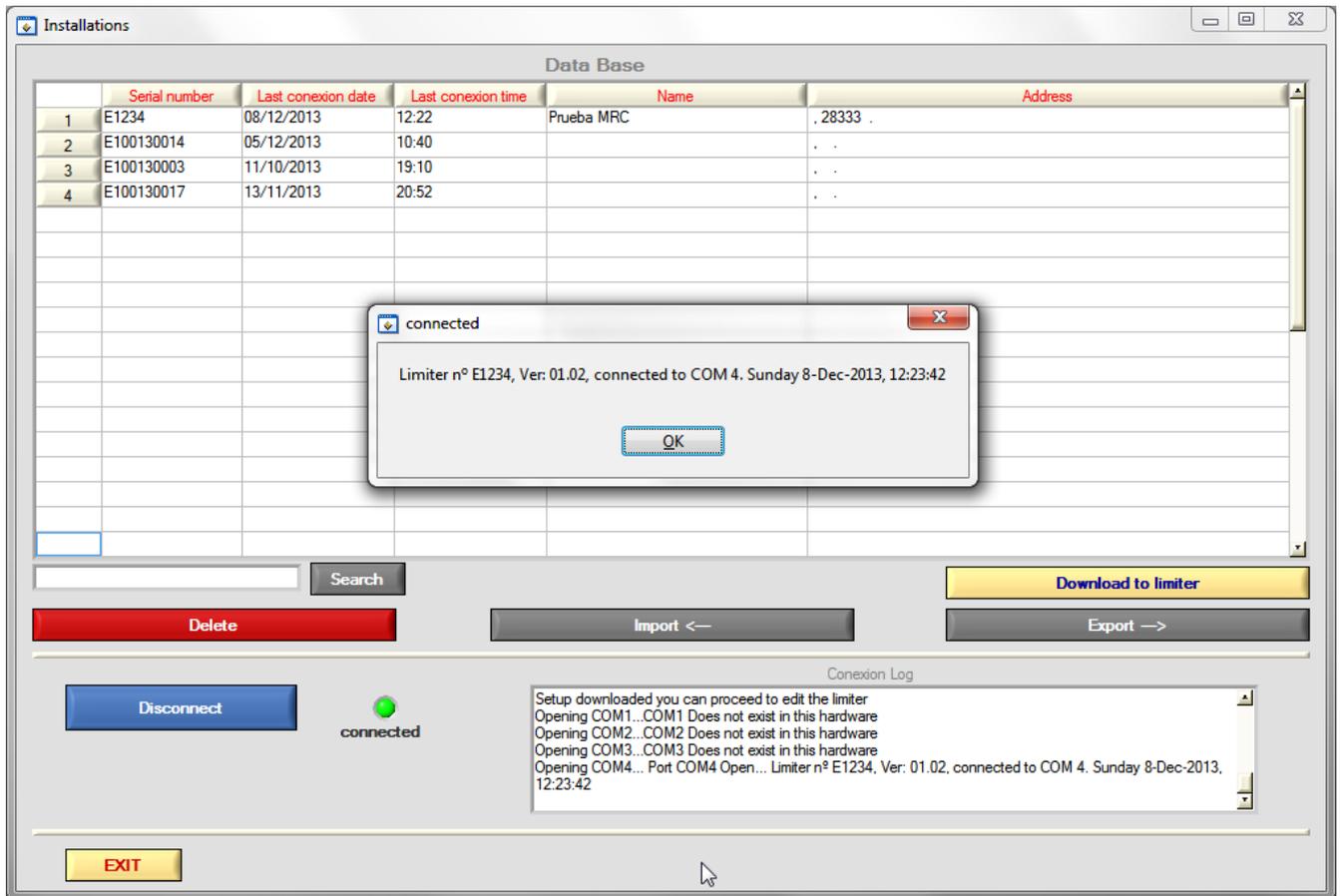
To finalize the connecting process, click on the **OK** button on the emerging window.

The **Disconnected** red LED changes to **Connected** and colour green and he **Connect** button changes to **Disconnect** as clicking on this button again disconnects the limiter from the SCL application.

A button **Edit Limiter** appears under the **Disconnect** button. This button is initially dimmed while the limiter's configuration data is downloaded to the PC. Also the log window notifies that the configuration is being downloaded:
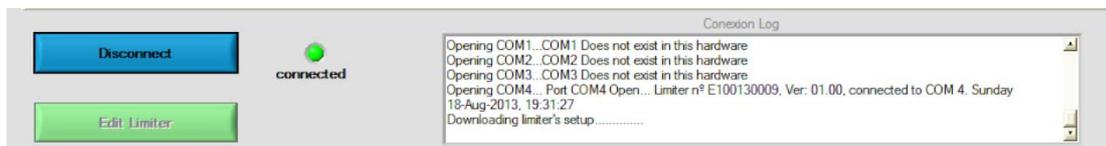
Once uploaded the **Edit Limiter** button un-dims and the log window notifies:
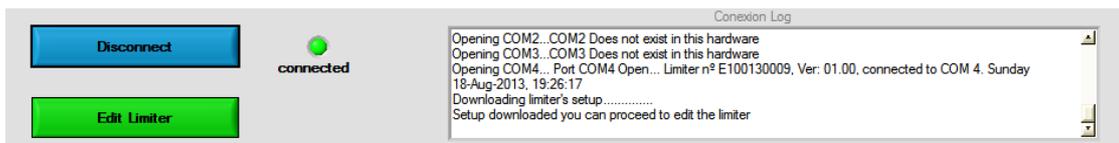
Now the limiter's configuration parameters can be edited, as described further on.

EDIT LIMITER CONFIGURATION TABS

Clicking on the **Edit Limiter** button the configuration window appears. It is a group of sub windows each headed by a tab.

7.1   INSTALLATION'S FILE

This tab opens the Windows that shows all the information about the installation. Name, contact data, address, installer's data, installed equipment, observations and attached files to ease the consulting of files related to the installation.

Once filled in all the data a configuration report can be generated clicking on the **Generate Configuration Report** button. This will open an emerging window to choose among the possible report formats: Word, PDF or direct to the local printer:
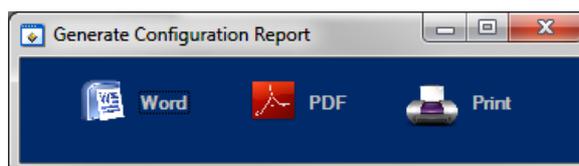
NOTICE: In order to be able to generate the report in Word format, it is necessary to have installed Microsoft Word® and Adobe Reader for PDF.

7.2 LIMITER ADJUST

The MRC Audio EQlimit limiter is factory adjusted for its immediate use, with the microphone 1 signal as the controlling signal for limitation and with its standard parameters. Only the maximum sound level needs to be adjusted.

If we need to change any of the default parameters we can do so in the Limiter Adjust window:
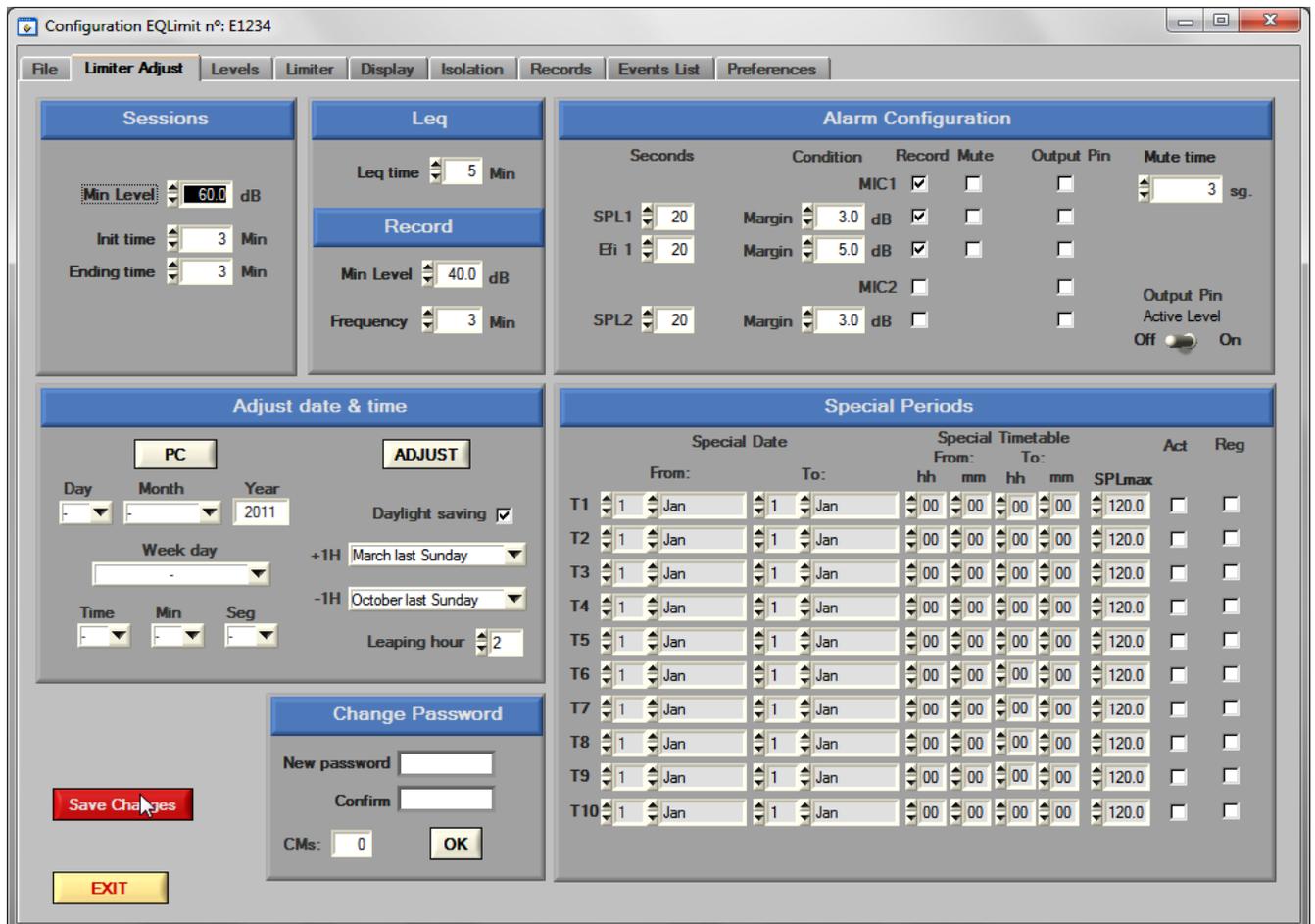
Sessions – Adjusts the minimum sound level and the time that level needs to be surpassed to consider the beginning or ending of a working session. The beginning and ending of the working sessions are registered in the events memory together with their date and time as all events.

Leq – Adjusts the integration time for the Leq parameter.

Record – Adjusts the minimum level to record in the events memory and the time interval between two successive level events to be recorded.

Alarm Configuration – Determines the alarm level (condition) and time persistence for the alarm condition for each type of alarm; it is also possible to choose if the alarms will be recorded in the events memory, if the alarm should cause a mute and if the alarm should activate the limiter's auxiliary output pin. Only the Microphone alarm has no level or persistence time adjust as the microphone alarm arises immediately when the microphone is disconnected from the limiter.

The mute time can also be adjusted and the auxiliary output pin active level too.

The EQlimit limiter has capacity to register three types of alarms of the proper sound system, plus an external alarm described in the **Preferences** tab description.

- **Microphone Alarm**. Arises when the sensing microphone is disconnected from its corresponding input connector.
- **SPL Alarm**. Arises when the sound level sensed by any of the two microphones surpasses the limiting level plus a margin, during a persistence time.
- **Efficiency Alarm**. Or manipulation alarm, arises when the microphone level is under the Line Out level in a quantity greater than the margin condition, during the persistence time. This alarm is useful only if a calibration of the installation is performed; because the calibration of the sound system is performed only with microphone 1, it is possible to configure this alarm only for microphone 1.

If Microphone 2 is configured not to be active in the **Preference** tab, its corresponding configuration windows and boxes do not appear:

The adjustable parameters for each type of alarm are:

- Seconds: the persistence time in seconds to consider an alarm condition.
- Margin: the sound level margin with respect to the limiting level in the SPL alarm or with respect to the Line Out level in the Efi alarm, which must be surpassed in the SPL alarm or under passed in the Efi alarm to start counting the persistence time.
- Record: if checked the alarm is recorded in the events memory.
- Mute: if checked the corresponding alarm causes a mute in the sound system during the time typed into the **Mute time** box.
- Output Pin: if checked the EQlimit limiter activates a pin in the AUX connector located at the back panel of the limiter. This pin is a two state output: 5 volts or 0 volts. And the active level either 5 volts or 0 volts can be chosen with the **Output pin Active level** switch. This is: if the switch is at its **Off** position, the output pin at the AUX connector will normally be at the 5 volts level; when the alarm occurs, the level at the AUX output pin changes to 0 volts. On the contrary, if the switch is at its **On** position, the AUX output pin is normally at the 0 volts level and changes to 5 volts when the alarm occurs.

Adjust date & time – Click on the **PC** button to read the date and time from the PC, and click on the **Adjust** button to transfer this date and time to the limiter. Alternatively the date and time can be adjusted manually before clicking on the **Adjust** button.
If daylight saving leap hour is desired, check the **Daylight saving** box and adjust the date and hour of the hour change, before clicking on the **Adjust** button.

Change Password – An attempt to change any configuration parameters in the limiter will lead the SCL application to ask for the limiter password before changes are made. The default password is 1234. To avoid unauthorised access to the limiter we recommend changing the default password. The password can be alphanumeric of up to 10 characters. Type in the new password in the **New password** box and click the **OK** button. The limiter will ask for the old password before permitting a password change.
Once the correct password is given, the EQlimit limiter will not ask for it again unless a 5 minute elapse time occurs between two successive parameter changes.

Master Password – If you forget your password, MRC Audio can provide a master password, active only for that single unit, as a function of the limiter serial number, and is active only once. For MRC Audio to be able to provide a master password, you must provide MRC Audio the serial number of the unit and the number that appears in the **CMs** box.

Introducing a master password is registered in the limiter's non volatile memory as an event, together with the date and time as all other events, and together with the authorised user that has entered the master password.

NOTICE: Each MRC Audio EQlimit has up to ten master passwords. Each time one is used it will not work ever again. If all ten master passwords are used and still the user keeps on forgetting the password, the limiter will have to be serviced at MRC Audio to restore ten new master passwords.

Special Periods – The EQlimit limiter has the capacity to configure up to 10 special periods in which the maximum permitted level and timetable can be different to the normal settings.

In each of these ten rows T1 to T10, this is for each special period, a beginning date, ending date, beginning time, ending time and permitted sound level have to be configured.

To configure a special period, click on the **Special Date, From** column, day box; a list appears with the days 1 to 31. Click on the desired day. In the same way choose the beginning month in the **Special Date, From** column, month box. The ending date is configured in the same way using the **Special Date, To** day and month boxes. Because it is not possible to go back in time, when the **From** boxes are filled in, the **To** boxes change accordingly. Also not existing dates are forbidden, like February 29th if it is not a leap year or April 31st for example. If chosen, the boxes change automatically to the previous permitted day.
In the same way configure the beginning minutes and hours and ending minutes and hours in the **Special Timetable, From** and **To** columns.
Also configure the permitted maximum level during that special period in the **SPLmax** column.

The EQlimit limiter accepts time intervals starting one day and ending the next day, as this is the normal working intervals in clubs. Therefore if the **TO** time is earlier than the **FROM** time, the limiter assumes that the **TO** time is a time in the next day.

The **Act.** and **Reg.** boxes mean Active and Register respectively. The **Act.** box must be checked to make the special period active, and the **Reg.** box must be checked if you want to register sound levels and alarms in the events memory during the special period.

In the example picture above, a single special period has been configured: T1. In such way, from July 6th to July 14th the limiting level is 100dB from 10:00 in the morning to 6:00 in the morning of the next day. The period is active and sound levels and alarms will be registered in the events memory. By the way, this special period corresponds to the world famous Saint Fermín feasts in Pamplona, Spain.

7.3   LEVELS AND TIMETABLE

If the **Without weekly timetable** box is checked, only one limiting level will be configured for all the week days during 24 hours.
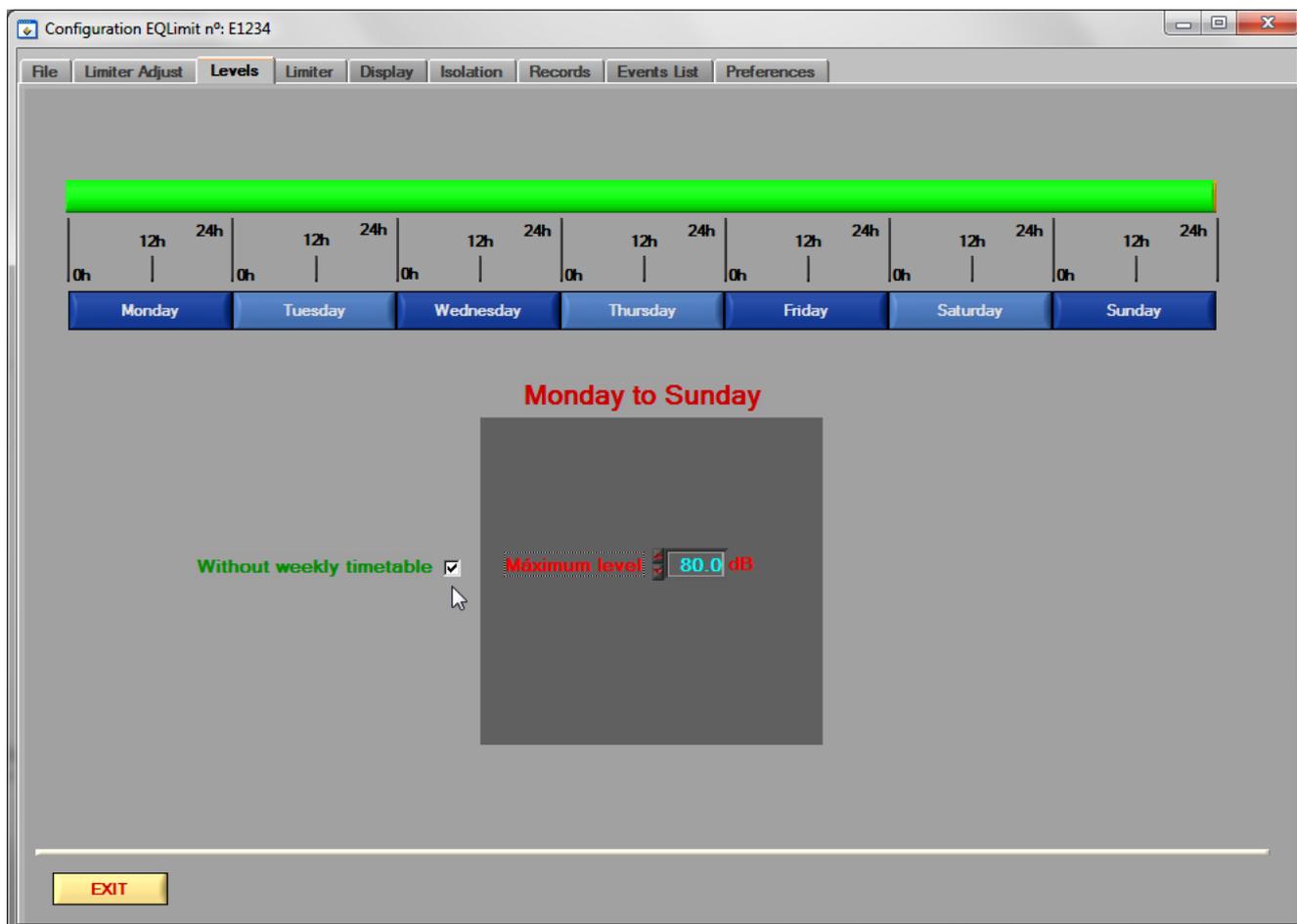
In the **Max. SPL** box type the required limiting level. Click in the box, delete the actual value and type in with the keyboard the new value in dB and with a maximum of one decimal. For example, 90.5 dB:

Alternatively the number in this box can be changed by means of the up and down arrows at the left of the box; each click on this arrows will make a change of 0.1 dB.

If the **Without weekly timetable** box is not checked, up to 3 different time periods can be configured for each day of the week, with their corresponding limiting level, plus the session ending time. The green horizontal bar at the top changes to a bar with different colours along its width. The bar together with the Monday to Sunday buttons make a linear graph that shows the distribution of the timetables along the week:
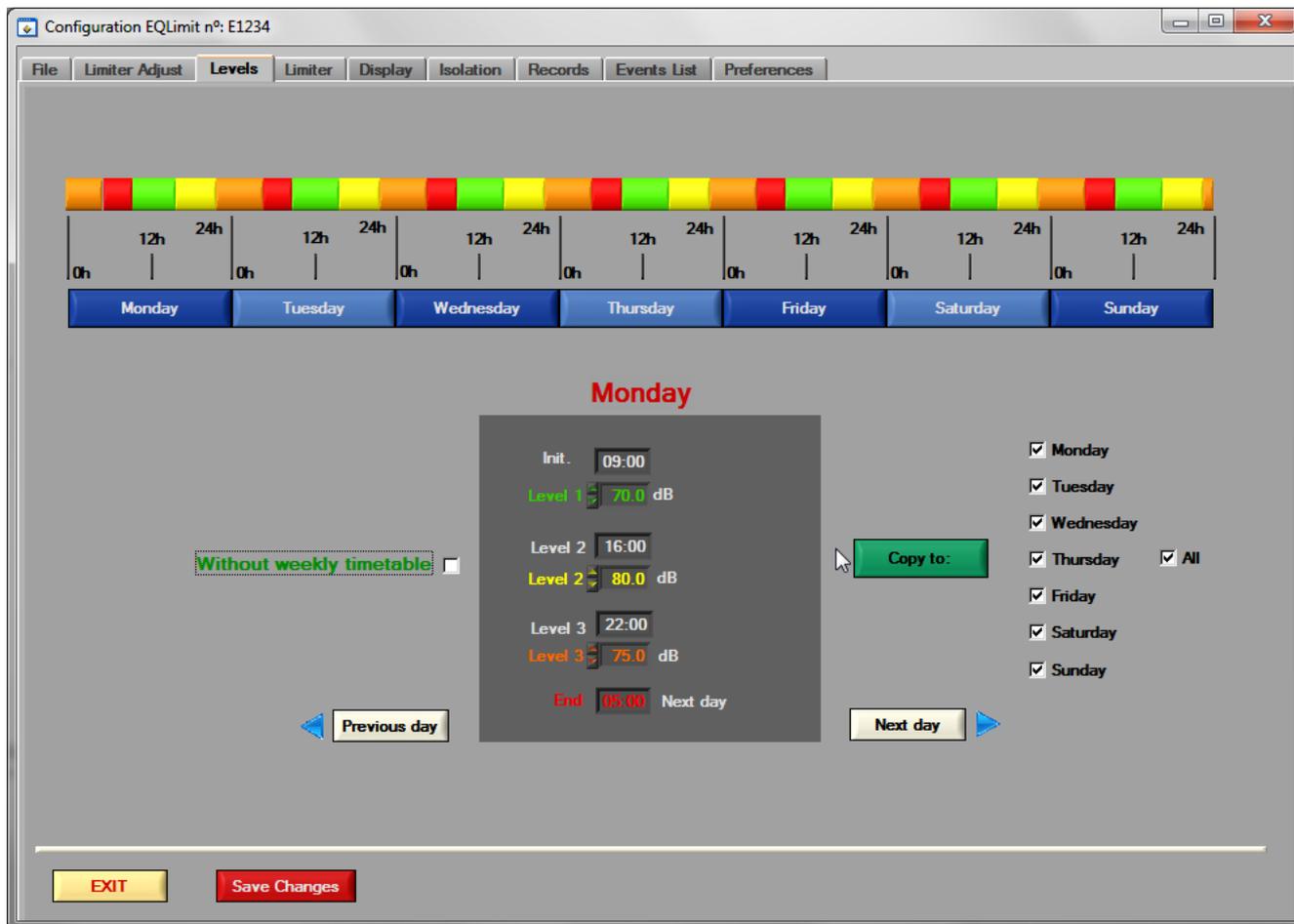
The different colours of the bar show the 3 possible day time periods. Green is the first period of the day, yellow is the second, orange is the third and red is the time between the ending of a working session and the beginning of the next working session, time in which the limiter mutes its outputs.

EQlimit permits to overlap days when configuring daily time tables as their sessions start one day and finishing it the next day.

To change the timetable of a day you can click on that day's button at the linear strip, or navigate from day to day with the **Previous day** and **Next day** buttons.

The examples figure above shows a time table for Monday as follows:

- From 9:00 in the morning to 4:00 in the afternoon the permitted level is 90.0 dB.
- From 4:00 in the afternoon to 22:00 in the night still the permitted level is 90.0 dB.
- From 22:00 in the night to 5:00 in the next day's morning the permitted level is 85.0 dB
- At 5:00 in the morning Tuesday, the limiter mutes its outputs.

It is possible to type in one single day and copy that input to the rest of the days of the week or to the days of the week you choose. This is done by means of the day tick boxes and the **Copy to:** button.
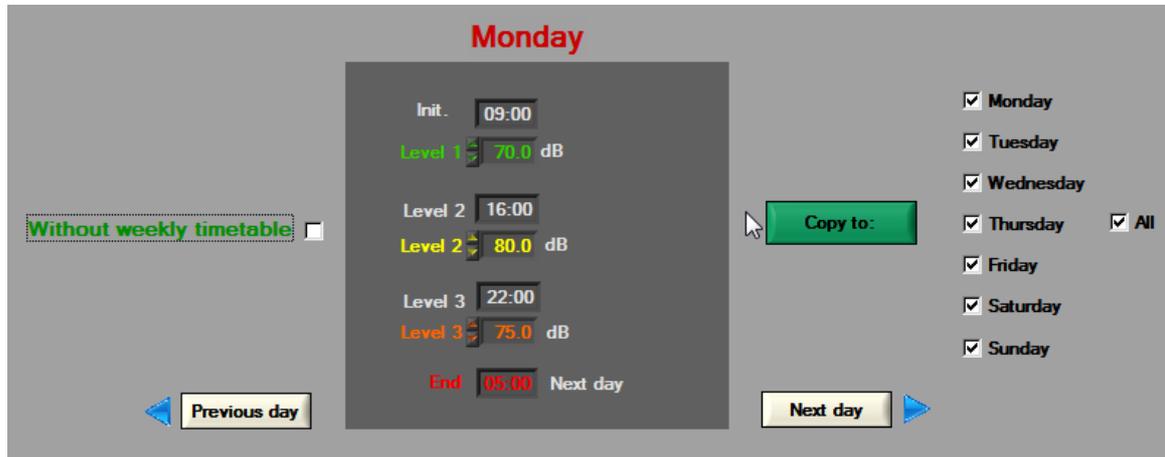
In this section tick the days you want to copy to and click on the **Copy to:** button. Ticking the All box will select/deselect all the days alternatively.

7.4 LIMITER
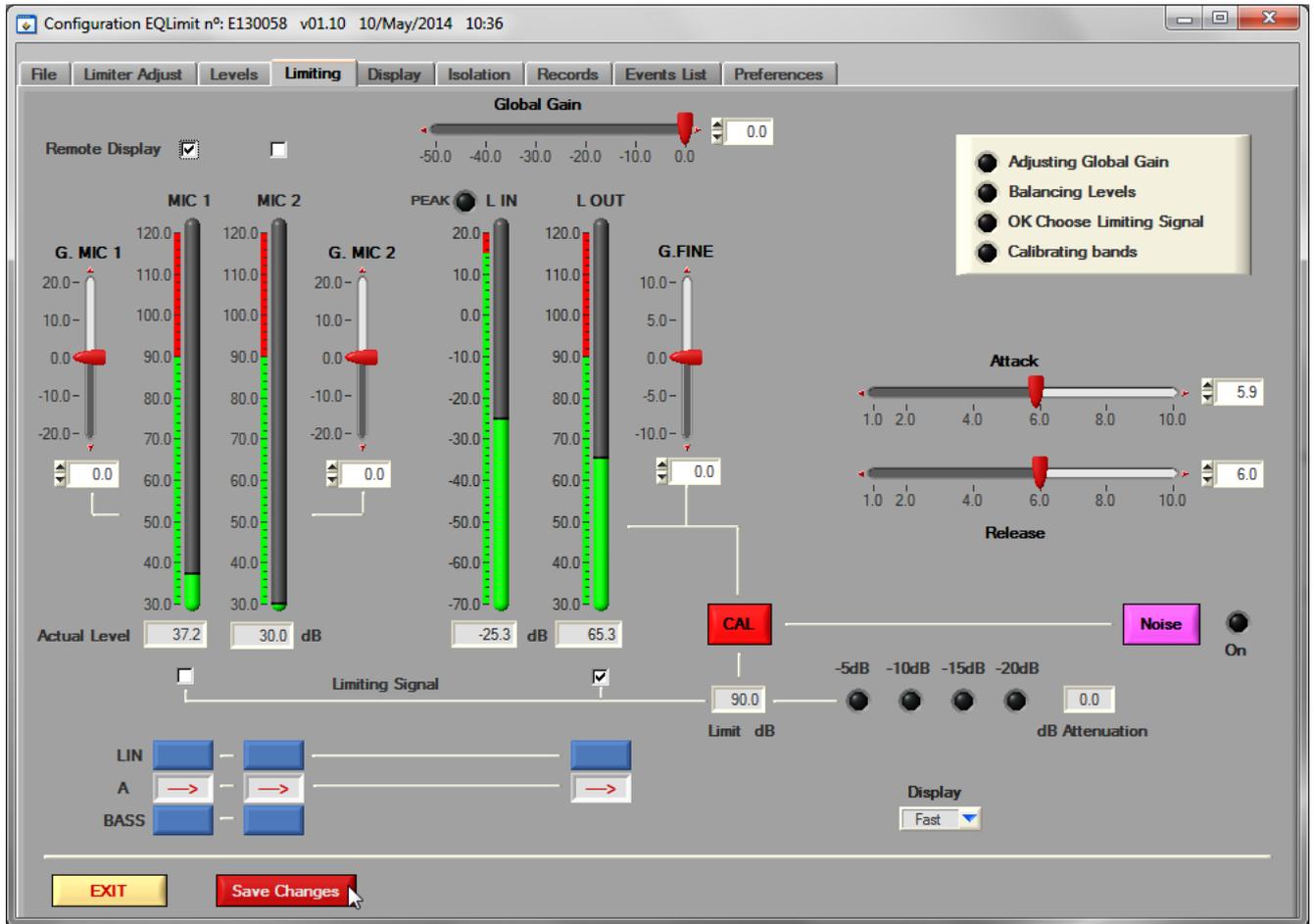
In this window we can adjust a global gain, a gain for microphone 1, a gain for microphone 2 and a fine gain for Line Out.

Also choose a filter for the measure of both microphones and Line Out (**A, C or BASS<300Hz**). Adjust the attack and release times for the dynamic control of the limiter.
Switch on the pink noise generator.
Calibrate automatically to equalise the Mic 1 and Line Out levels clicking on the **CAL** button. This process is guided by 4 LEDs and emerging advice windows.

The permitted maximum level is shown in the **Limit dB** box, and the applied attenuation is shown by the 4 level LEDs and the numeric box to the right.

The vertical level bars show the real time levels for the different channels and these can be seen with a fast or slow integration, chosen by the **Display** box.

7.4.1 Calibration process

Before executing the calibration process it is necessary to configure the global limiting level as described in previous chapters. It is also necessary that the sound system, the limiter and its sensing microphone (must be microphone 1 for calibration), are installed at their final locations.

The first step is to verify that the microphone level shown at the SCL application is the same as the level shown by a certified sound level meter, to compensate for the variations introduced by different factors like the distance to the speakers, the sensing microphone's proximity to the ceiling or walls, the effects of the sensing microphone's protecting box, etc.

To do so, first select the measuring filter and the measure mode to be equal at both limiter and sound meter; click on the **Noise** pink button to switch on the pink noise generator and have pink noise sound in the house, and adjust the microphone 1 gain, **G. MIC 1** slider, until both limiter and sound meter measure the same level. Once adjusted microphone 1's gain, click on the **Noise** button again to switch off the noise generator.

In the **G. MIC 1** slider control, the 0 point is adjusted at factory. This control can be adjusted my moving the red slider with the mouse, by clicking on the top and/or bottom small red arrows to obtain a 0.1dB increment per click, by typing a numeric value directly into the numeric box at the bottom or by clicking on the numeric box up and own arrows to also obtain 0.1dB increments. The same adjustment can be done with microphone 2 if present.

Once the limiter's sensing microphone measures the same as the sound level meter, you can proceed to calibrate the whole sound system. During this process, pink noise will be emitted through the sound system; avoid emitting any other sound in the house, be silent during this process. The process is automatic and is guided by the top left corner LEDs and different emerging windows; follow instructions:

- At the **Display** box select slow.
- Click on the **CAL** button. An emerging window appears inviting to fade out music and turning the amplifiers to maximum power.
- Click on the **OK** button. The limiter automatically turns its global gain to minimum, activates pink noise and switches to "A" filters.
- The **Adjusting Global Gain** LED starts to flash and the limiter automatically increases the noise level until the sensing microphone reaches the limiting level.
- Once reached, the **Adjusting Global Gain** LED stops flashing and the **Balancing Levels** LED starts to flash. At this time the limiter is automatically adjusting the Line out gain to match the microphone 1 level.
- Once matched, the **Balancing Levels** LED stops flashing and the **OK Choose Limiting Signal** LED starts flashing.
- At this time choose the limiting signal: microphone 1 or Line Out, by clicking on either the **Limiting Signal:** MIC1 box or L.OUT box, located just underneath the meter bars.
- Once chosen, the **OK Choose Limiting Signal** LED stops flashing and the **Calibrating Bands** LED starts flashing. The limiter registers the frequency band levels for later comparison, this takes around 30 seconds.
- Once the bands are registered, all LEDs stop flashing and the pink noise is switched off.

This automatic adjustment is an approximation due to spectral differences between both signals compared: microphone and line; therefore a manual fine adjustment of the Line Out gain may be needed. Do adjust the Line **G.FINE** slider control if necessary.

This calibration permits the limiter to limit through either microphone 1 signal or Line Out signal. It also permits to detect manipulation on the sensing microphone 1, and generate the corresponding **Efi alarm** if activated at the **Limiter Adjust** tab as described in previous chapters.

The difference between microphone 1's level and the Line Out level is due to either changing the sensing microphone's location, covering it with sound isolating material or because parallel sound systems, out of the control of the limiter, are installed in the house.

Also this calibration adjusts the limiter's global gain only 8 dB over the working limit, adjusting the total power of the installation to the real working level. This means that the limiter can work at lower attenuation levels, what results in a better sound quality.

Finally, during this calibration process, the limiter registers a spectral "stamp" measured by the microphone 1 that permits comparing by emitting pink noise again at any future time. This comparison permits to know if the house acoustical conditions have been modified.

This comparison can be done automatically, every time the limiter is switched on, if the **Automatic Band Calibration** button, at the **Preferences** tab, is in its **ON** position; see the **Preferences** tab description further on. If automatic, the band comparison is registered in the events memory each time the limiter is switched on and the comparison is automatically launched.

Or this comparison can be done manually whenever the installer or authorities require so. See **Isolation** tab description further on.

7.5 DISPLAY

This window reproduces the limiter's external remote display, in a bigger size to permit a better reading of the sound level at a distance.

Like the remote display, it shows the attenuation level by means of a bar of LEDs and signalises alarms and/or excessive input level by means of dedicate LEDs

By three big leds, show the activity of sound signal inside the unit:

Green - Input signal is present at connectors and its level is under the max authorised level.

Yellow - The unit is controlling the audio signal amplitude.

Red - The unit mutes de audio output.
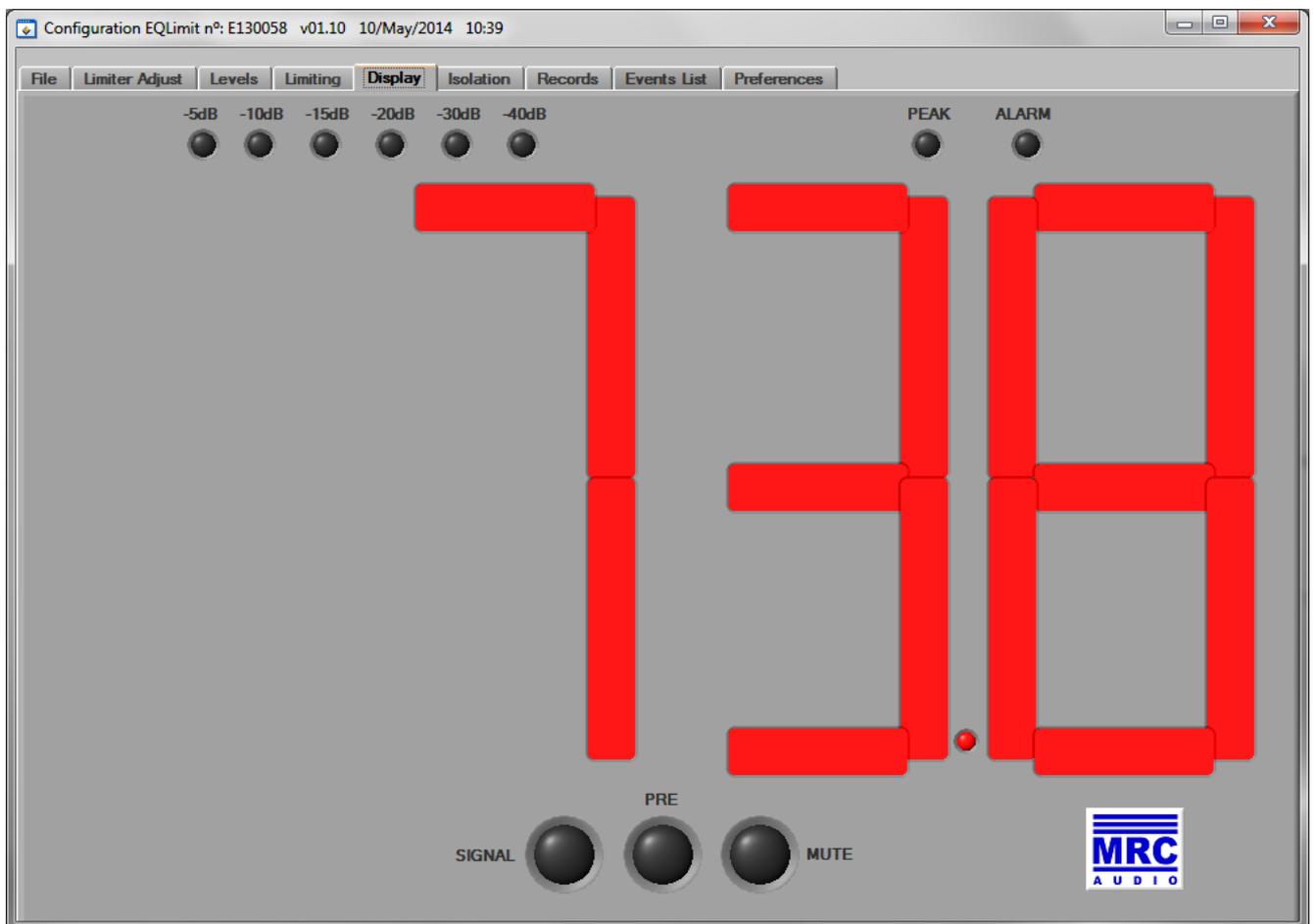
7.6 ISOLATION

The limiter is factory adjusted to work with global limiting through "A" filter. If you wish to use a control signal that responds to the acoustical isolation, adjust in this window the previously measured isolation and inmision levels, so that the limiter responds to a limiting level per frequency band.

At the real time measuring vertical bars, when a frequency band's level surpasses its limiting level, the bar changes from green to red colour; therefore we can perceive at a glance a real time spectral distribution of the sound

It is possible to choose between MIC1 or Line Out signals for limiting, and the spectral limiting becomes active when switching the **Band Limiting** ON/OFF button to ON.

The global MIC1 and Line Out real time levels are also show at the right of this window in order to have a more global view of the signals involved in limiting.

The working levels of each band can be determined manually or applying the normalised isolation **STC** and inmision **NC** curves, or applying global values that are distributed equally through all the bands.

Once the limiting values per band are adjusted, an equivalent limiting global value is calculated and shown; it is possible to transfer this value to the **Levels** tab in order to fill in the global value and the **timetable** values.
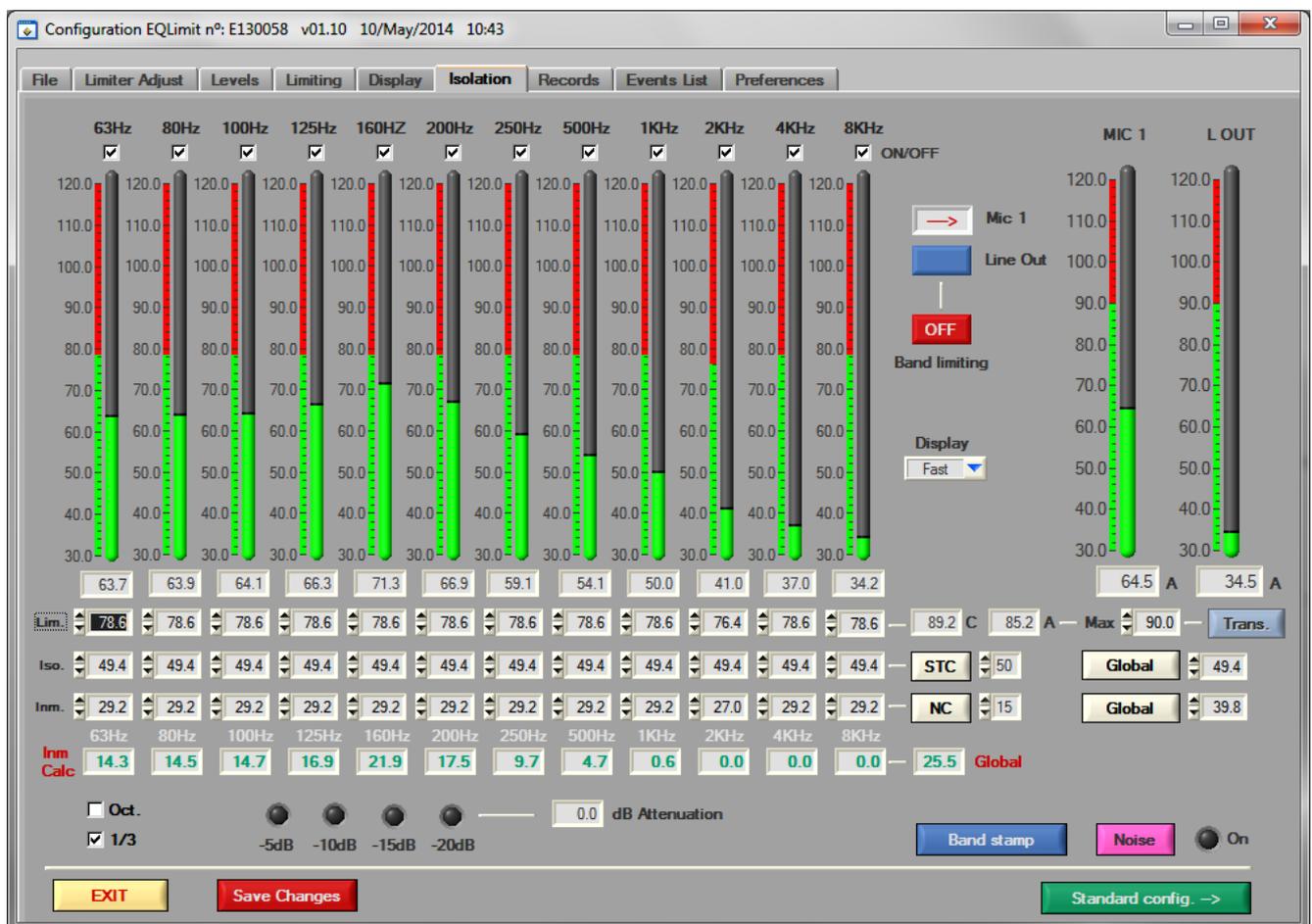
The band limitation is subordinate to the global limitation; EQlimit limits per the more restrictive of the two: if the maximum level is surpassed in any of the bands, the limiter will start limiting. But if no band reaches its limit but the global sum their level reaches the global limit, the limiter also starts to limit.

This window has vertical level measuring bars for the normalized bands centre frequency. The seven lower frequencies are centred in 1/3 octave bands and the five higher frequency bands in octave bands, having more precision at the lower frequencies because these are more problematic from the Isolation point of view.

In order to control the limitation, you can choose all 1/3 octave filters or only the eighth octave band filters with the selection boxes and we can also activate or not each band to be included in the measurement of the control signal.

To the left of each bar there is numbered scale and a two colour strip: green the lower part and red the upper part of the strip. The point where the strip changes colour is the limiting level for that band. Those bands that surpass the limit change from green to red as seen in the previous figure.

In the numeric box underneath the bars the real time level per band is shown with 0.1dB precision.

It is possible to see the real time frequency spectrum for **microphone 1** or **Line Out.** To the left of the bars there are two buttons that select which of the two to show on the bars. This also selects which of the two will be used as the limiting signal. The band limiting is activated by turning ON the **ON/OFF** button just underneath.
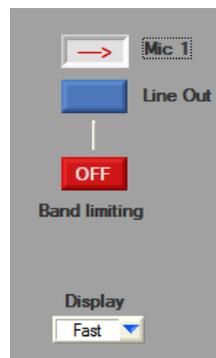
The real time measure can be seen with a fast or a slow integration time.

To the right of these 12 bars that correspond to the filters, there are two other bars that measure the global level for microphone 1 and Line Out:
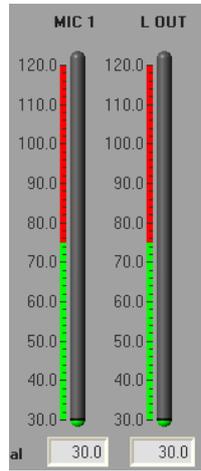
With both groups of bands we have both options in a single window and all the information, global and per bands, at a glance.

Below the band bars there is a matrix of 3 rows x 12 columns numerical boxes, for the adjustment of the band limits, per two different data groups:

	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz					
Lim.	78.6	78.6	78.6	78.6	78.6	78.6	78.6	78.6	78.6	76.4	78.6	78.6	— 89.2 C	85.2 A — Max	90.0	—	Trans.
Ais.	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	STC 50	Global	49.4		
Inm.	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	27.0	29.2	29.2	NC 15	Global	39.8		
Inm Calc	4.8	4.2	2.6	2.1	2.6	4.7	3.0	6.4	5.3	0.0	0.0	0.0	— 13.7 Global				
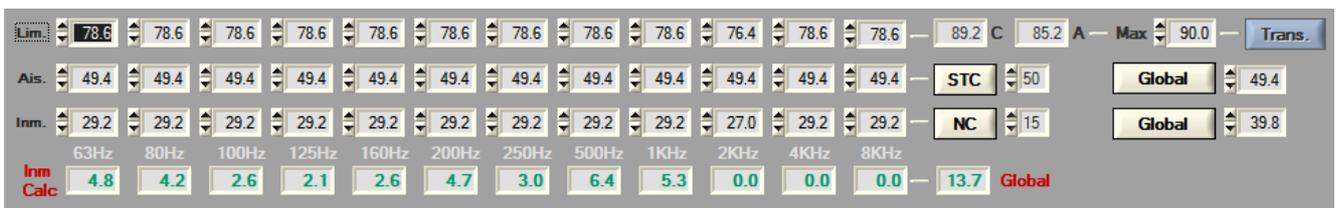
The lower row is the inmision group of data; the middle row is the isolation group of data. The upper row is the sum of the two, and is the resulting limiting value.

The immision is the maximum sound level that can be induced to the neighbour houses. This level is either global or per bands, depends on local regulations.

The Isolation is the amount of sound isolation existing between the house and the worst case neighbour.

The upper line is not editable because it is the resulting limiting level calculated by the sum of inmision and isolation.

To the right of the **Lim** row, the upper row, there is a numerical box where you can set the max allowed global limit.

To the right of the isolation and inmision rows, there is a group of boxes an buttons that aid in the fulfilment of the column boxes; either with a **"Global"** value, distributed equally throughout the bands or with a value resulting from the choice of a normalized **"STC"** or **"NC"** curve, for isolation and for immision respectively. Or even manually, you can edit he desired value.

The latest pulsed button, either Global or STC and either Global or NC, will change to blue colour, indicating if the levels in the matrix's boxes correspond to a global value or to a normalized value.

After adjusting of the limiting levels per bands we get a resulting global limiting level value that might not be the same as the value adjusted previously in the **Level** tab. If we want to transfer this new value to the timetable and global boxes in the **Level** tab, write the new max level in **Max** window and just click on the **Trans** button. Doing so, it means that the global limiting is subordinate to the spectral limiting.

If the resulting band global limiting value is not transferred to the timetable and global limiting boxes, the spectral limiting will remain subordinate to the global limiting; therefore after doing all adjustments and after 3 minutes without typing any data into the matrix, the limiting levels per band will be automatically adjusted to match the global limiting value typed in the **Level** tab, proportionally so that the spectral relations are not lost.

7.7   RECORDS

This window is a reminder of the changes made to the configuration of the limiter. All configuration changes are registered in non volatile memory inside the limiter and this record can be recovered from this utility.

This window also shows total counters for the alarms and sessions that have occurred in the past of the limiter.
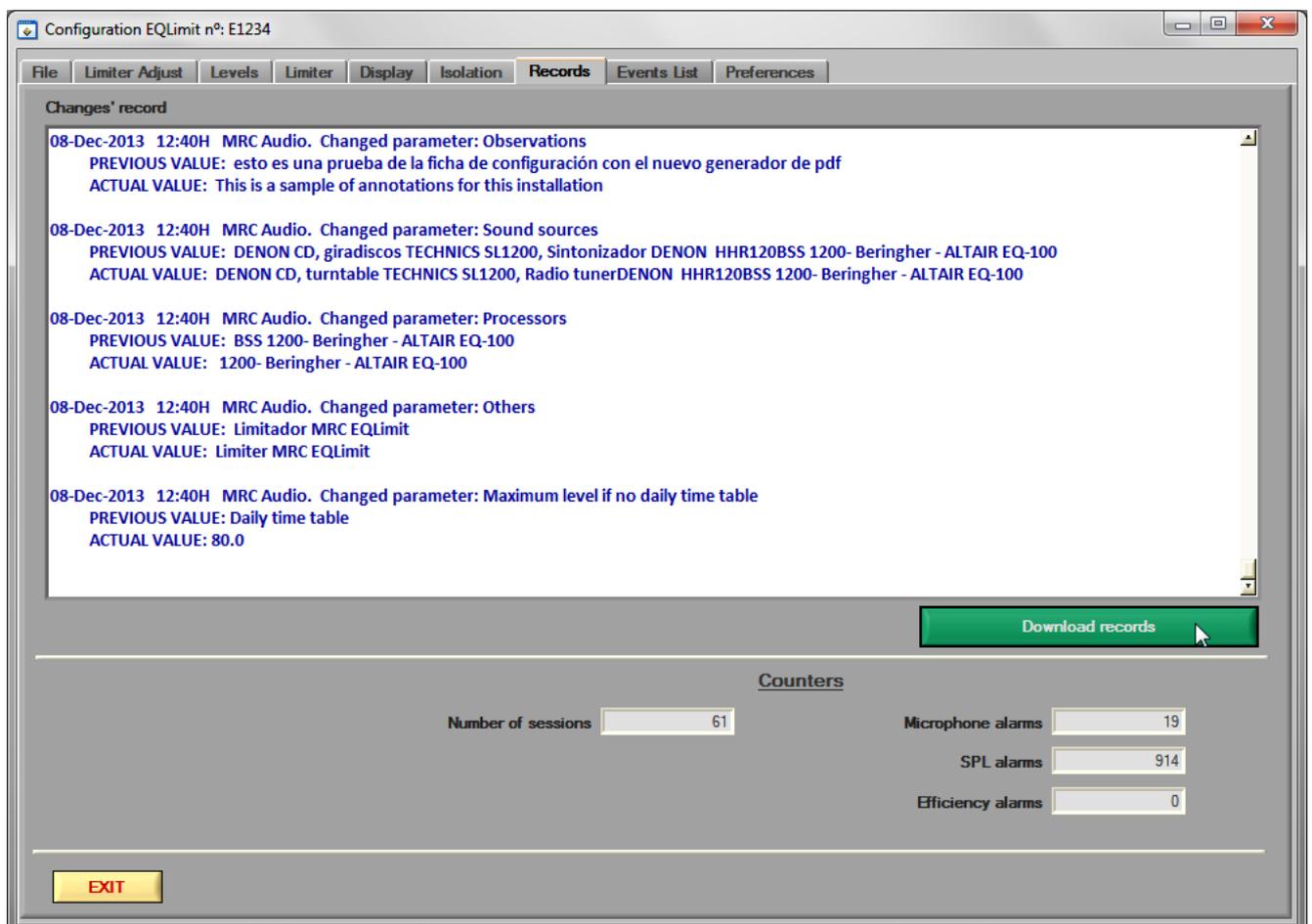
7.8 EVENTS

This window provides with a summary of the activity of the installation, summary that is stored in the non-volatile events memory of the limiter. Data can be downloaded from the limiter to the SCL application filtering by dates or time periods.

Once downloaded, the events are listed and the creation of graphics is then possible.

It is also possible to create reports in Excel, Word or PDF formats or can be directly printed through the local printer.

NOTICE: In order to be able to generate the report in these formats, it is necessary to have installed Microsoft Word®. Excel an Adobe Reader

The registered records are the next:

- Sound measurement data, this is the sound levels, with adjustable minimum level to register and register frequency.
- The beginning and ending of working sessions. The start and end of a working session conditions are adjustable.
- Microphone, level and efficiency alarms.
- External alarms if these are connected to the corresponding input pin in the auxiliary connector located at the back of the unit.
- The moment of switching off or on of the unit.

- The moment when a change in configuration is made; it registers the name of the authorized installer that makes the changes.
- Master password access is registered, together with the name of the authorized installer that has used it.
- The moment when a download of events is made.
- When is connected to Internet
- When disconnect from Internet
- When compare levels in each band and detect any misalignment

Sound Level Measurement Data:

EQlimit has the capacity to measure and register the next sound parameters:

- Instantaneous SPL of microphone 1 (Leq 5 seconds).
- Leq with adjustable integration time, for microphone 1.
- Percentile L90 for microphone 1.
- Percentile L10 for microphone 1.
- Instantaneous SPL of microphone 2 (Leq 5 seconds).
- Leq with adjustable integration time, for microphone 2.
- Percentile L90 for microphone 2.
- Percentile L10 for microphone 2.
- Instantaneous level for Line In (Leq 5 seconds).
- Instantaneous level for Line Out (Leq 5 seconds).
- Leq with adjustable integration time for Line Out.
- Maximum permitted level (limiting level) for that moment.
- Attenuation applied by the limiter in that moment.

The sound level measurements are stored in the non-volatile events memory in a periodic manner with a frequency configured by the user. The minimum level to register is also configurable. If the instantaneous level of microphone 1 is less than this minimum, none of the sound parameters will be stored into the events memory even if the period time has elapsed.

All this stored data can be downloaded directly from the limiter via the USB connection; after download this data is kept in a data base in the PC and can be analyzed in off line mode afterwards.

Reading data in CONNECTED mode

The top right corner of this screen is the section for downloading data from the limiter

In this section you can select the period of time to download. This period of time can be typed manually with the **From** and **To** lines, or alternatively you can choose one of the fixed periods of time with the Download box at the top; clicking on this box a list of fixed periods of time appear to choose one of them clicking on it.

Once the period of time is selected by any of both means, click on the **Download** button to start downloading. In the **Events in Flash** box the total amount of events recorded in the limiter's flash memory appears. In the **Downloaded Events** box an up growing number appears that counts the total amount of downloaded events while they are being downloaded, resulting at the end of the download in the total number of events that have been actually downloaded. If the All option in the Download time period selection box is chosen the numbers in these two boxes will be the same.

At the same time the events start to be listed in the events window at the bottom of this screen

ITEM	Event	Date	Time	MAX	Mic1	Leq1	L90-1	L10-1	Lin	Lout	Leq Lo	Attn.	Mic2	Leq2	L90-2	L10-2
1	Data Download	08/Dec/2013	12:54													
2	Levels	08/Dec/2013	12:53	70.0	65.0	67.3	55.1	71.1	75.5	26.9	26.9	0.0	23.7	23.7	23.2	24.1
3	Levels	08/Dec/2013	12:50	70.0	68.4	64.8	65.9	70.0	75.6	26.9	27.0	1.6	23.6	23.7	23.4	23.9
4	Session Start	08/Dec/2013	12:49													
5	Levels	08/Dec/2013	12:47	70.0	67.3	62.3	64.2	69.8	75.7	26.9	27.0	0.0	23.6	23.7	23.4	23.9
6	Session End	08/Dec/2013	12:46													
7	Levels	08/Dec/2013	12:44	70.0	59.9	62.2	51.6	62.7	75.7	27.2	26.9	0.0	23.8	23.7	23.3	24.1
8	Levels	08/Dec/2013	12:41	70.0	64.9	63.7	55.9	70.3	27.1	26.9	26.9	55.7	23.6	23.6	23.2	24.1
9	Setup	08/Dec/2013	12:40	User: MRC Audio												
10	Levels	08/Dec/2013	12:38	70.0	61.3	62.8	61.2	61.0	27.0	26.9	26.9	55.7	23.6	23.6	23.6	23.6
11	Session Start	08/Dec/2013	12:38													
12	Levels	08/Dec/2013	12:35	70.0	61.2	62.4	52.0	68.6	26.9	26.9	26.9	55.7	23.6	23.6	23.2	24.0
13	Levels	08/Dec/2013	12:32	70.0	60.8	60.8	55.6	70.1	27.0	26.9	26.9	55.7	23.5	23.6	23.2	24.0
14	Levels	08/Dec/2013	12:29	70.0	60.5	55.8	46.8	65.4	27.0	26.9	26.9	55.7	23.6	23.6	23.2	24.0
15	Levels	08/Dec/2013	12:26	70.0	61.7	51.0	37.5	57.2	27.0	26.9	26.9	55.7	23.6	24.1	23.2	24.0
16	Levels	08/Dec/2013	12:23	70.0	57.8	48.1	38.5	62.1	26.9	26.9	26.9	55.7	23.6	24.1	23.3	24.0
17	Levels	08/Dec/2013	12:20	70.0	43.4	44.1	36.9	47.2	27.1	26.9	26.9	55.7	23.6	24.1	23.2	24.1
18	Levels	08/Dec/2013	12:17	70.0	44.6	49.7	36.5	48.1	27.0	26.8	26.9	55.7	23.6	23.7	23.2	24.0
19	Levels	08/Dec/2013	12:14	70.0	46.2	52.9	36.3	59.5	27.1	26.9	26.9	55.7	23.6	23.7	23.2	24.1
20	Levels	08/Dec/2013	12:11	70.0	57.4	55.8	44.2	59.7	27.1	27.0	26.9	55.7	23.8	23.7	23.4	24.0
21	Session End	08/Dec/2013	12:10													
22	Levels	08/Dec/2013	12:08	70.0	51.8	59.8	42.4	67.4	27.1	26.9	26.9	55.7	23.7	23.6	23.2	24.1
23	Levels	08/Dec/2013	12:05	70.0	44.0	63.5	43.6	69.5	27.2	26.8	26.9	55.7	23.6	23.6	23.2	24.0
24	Levels	08/Dec/2013	12:02	70.0	62.2	63.5	43.0	71.9	27.2	26.9	26.9	55.7	23.6	23.6	23.1	24.0
25	Levels	08/Dec/2013	11:59	70.0	66.9	63.0	42.6	76.0	27.2	26.8	26.8	55.7	23.5	23.6	23.2	24.0

In the events window each line is a single event and the data shown per event is:

- ITEM: the number of the downloaded event, starting at 1.
- Event: the type of event.
- Date: the date in which the event was recorded.
- Time: the time in which the event was recorded.
- MAX: the limiting level or permitted maximum level, in dB, at the date and time of recording.
- Mic 1: the instantaneous, 5 seconds integration, microphone 1 level in dB.
- Leq1: microphone 1's Leq level.
- L90-1: microphone 1's 90% percentile level.
- L10-1: microphone 1's 10% percentile level.
- Lin: instantaneous, 5 seconds integration, line in level in dB.
- Louy: instantaneous, 5 seconds integration, line out level in dB.
- Leq Lo: Line Out's Leq level in dB.
- Attn: amount of attenuation in dB applied at the moment of recording.
- Mic 2, Leq2, L90-2 and L10-2. correspond to the optional microphone 2 and are the same as for microphone 1.

The slide bar at the right permits to navigate this window up and down to see all the events downloaded.

Automatically when the events are downloaded from the limiter, an events file is created, or attached to a possible previous file, in the SCL database that makes reading this data in off line mode in future occasions.

Reading data in OFF LINE mode

This reading is of the events stored in the SCL's data base.

When at the installations window all limiters in the database are shown:

	Serial number	Last conexion date	Last conexion time	Name	Address
1	E1234	08/12/2013	12:23	Prueba MRC	. 28333 .
2	E100130014	05/12/2013	10:40		. .
3	E100130003	11/10/2013	19:10		. .
4	E100130017	13/11/2013	20:52		. .

In this window each line is a different installation, per each installation the next data is shown:

- Serial number: the limiter's serial number.
- Last connexion date: The date of the last time you connected to this limiter.
- Last connection time: the time of the last time you connected to this limiter.

- Name: the name of the installation; it is the one typed into the Installation box in the limiter's file. (see 7.1.-)
- Address: the installation's address; it is the one typed into the address box in the limiter's file. (see 7.1.-)

To the left of each line there is a numbered button. Clicking on any one of them gives access to the editing windows of the corresponding limiter. The editing windows are accessed in read only mode, except for the file screen that can actually be edited off line and changes are made in the data base in our PC but, obviously, not in the limiter itself as it is not connected.

At the top left of the events screen is the OFF LINE mode section. Again you can select a period of time to analyze in the same way as for the connected mode. But in this section you can also choose the type of events to see by means of the tick boxes at the top; tick the boxes of the types of events you want to see. Clicking on the All tick, all types are selected/deselected alternatively.
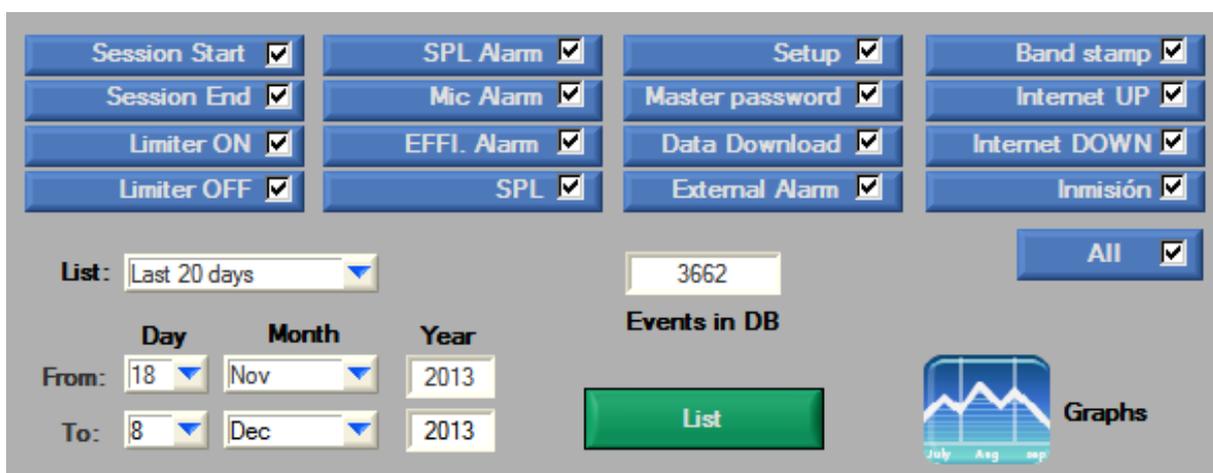
Once selected types and period of time, click on the **List** button to show your selection in the events window.

The EQlimit limiter has the capacity to generate an events report in either formats: PDF, Excel, Word or direct to the local printer, by means of the reports buttons:
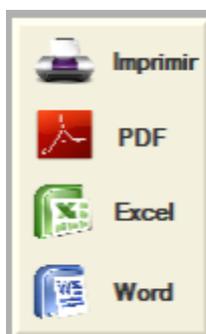
The reports are generated with a presentation layout except for the Excel format in which only an Excel table is generated, ready to make mathematical operations, in which the user can edit to make his own presentation layout and style.

The events report is generated with the events listed in the events window.

7.9   GRAPHS

Clicking on the **Graphs** button the graphs screen appears and automatically graphs the data listed in the events window:
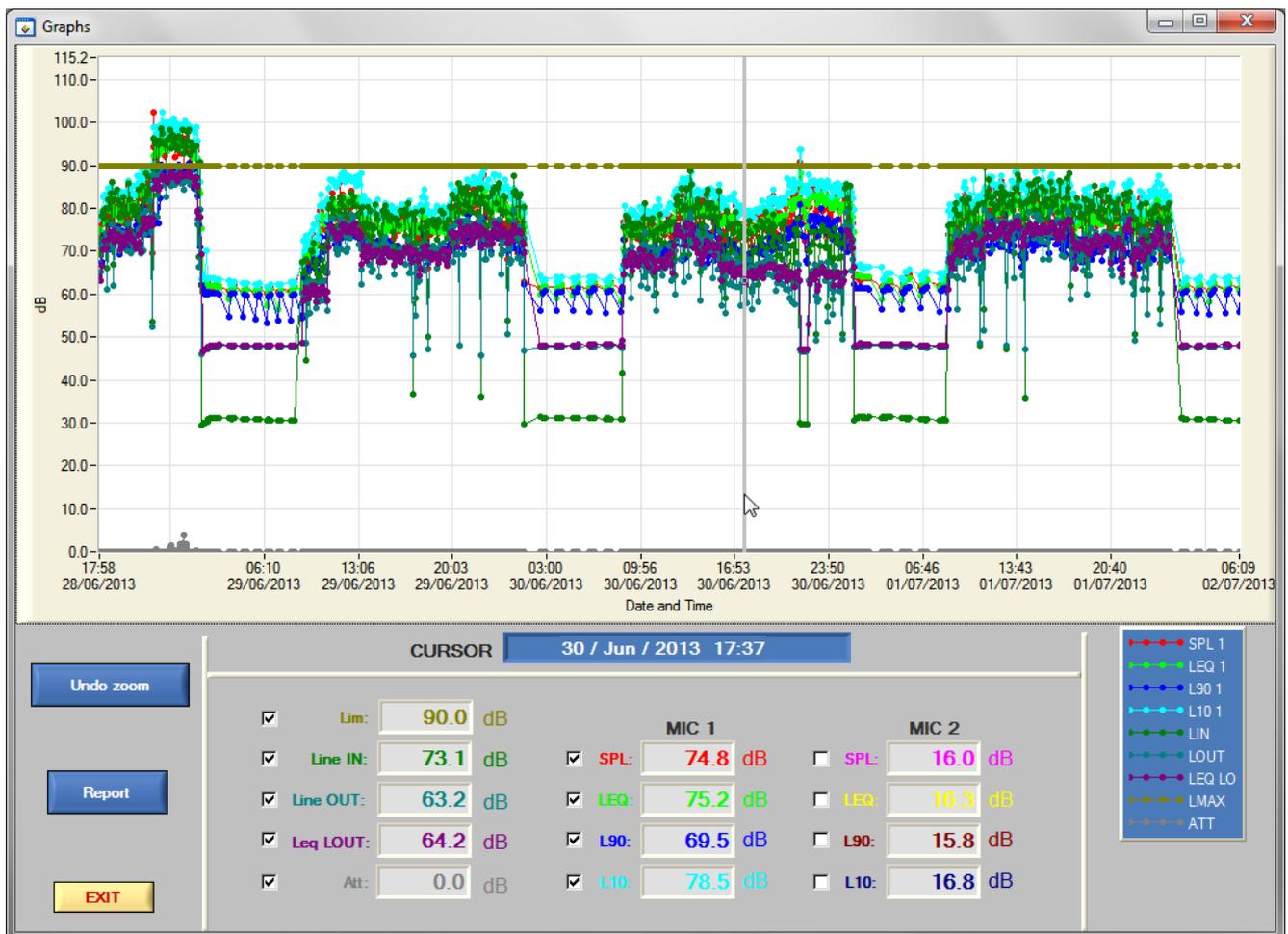
The graph shows the levels of the different signals that EQlimit measures, described in previous sections, as a function of time.

The graph has a cursor, the possibility to zoom in and out and the possibility to move around with the mouse.

To zoom in the graph select the area to zoom into dragging the mouse at the same time you hold the PC's **Ctrl** button and the left button on the mouse. To zoom out hold the **Ctrl** button on your PC and press on the mouse's right button repetitively. To go back to the original scale and zoom, click on the **Undo zoom** button just below the bottom left corner of the graph.

To move the graph inside the graph window click in the graph and drag in the desired moving direction at the same time you hold the left button of the mouse and the **Ctrl** and **Upper case** buttons on your PC.

The graph's cursor can be moved along the time axis by clicking directly on the point of the graph you want the cursor to go or, alternatively, with the left and right arrows of your keyboard, step by step. Underneath the graph there is a cursor section that shows the data relative to the cursors time position:

The top blue **CURSOR** box shows the date and time of the actual position of the cursor; underneath a box per signal shows a numeric value of the corresponding signal for that date and time. The different signals can be shown or not on the graph if the tick box to the left of each signal is ticked or not.

If microphone 2 is selected **ON** at the preferences window, its corresponding signals will appear in this section also; otherwise they will not appear.

The colours of the numerical boxes are the same as the colours of their corresponding graph lines. These colours can be configured in the preferences window. Underneath the graph's right corner there is a list of the signals shown at that moment with their line colours.

Clicking on the **Report** button an emerging window appears to choose the format of the Graphical report among Word, PDF or direct to the local printer.
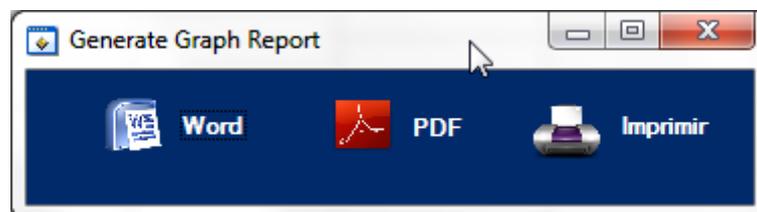
Click on any of the three to generate a graphical report with the actual selected data and zoom of the graph.

The button **Exit** exits back to the events window.

7.10 PREFERENCES
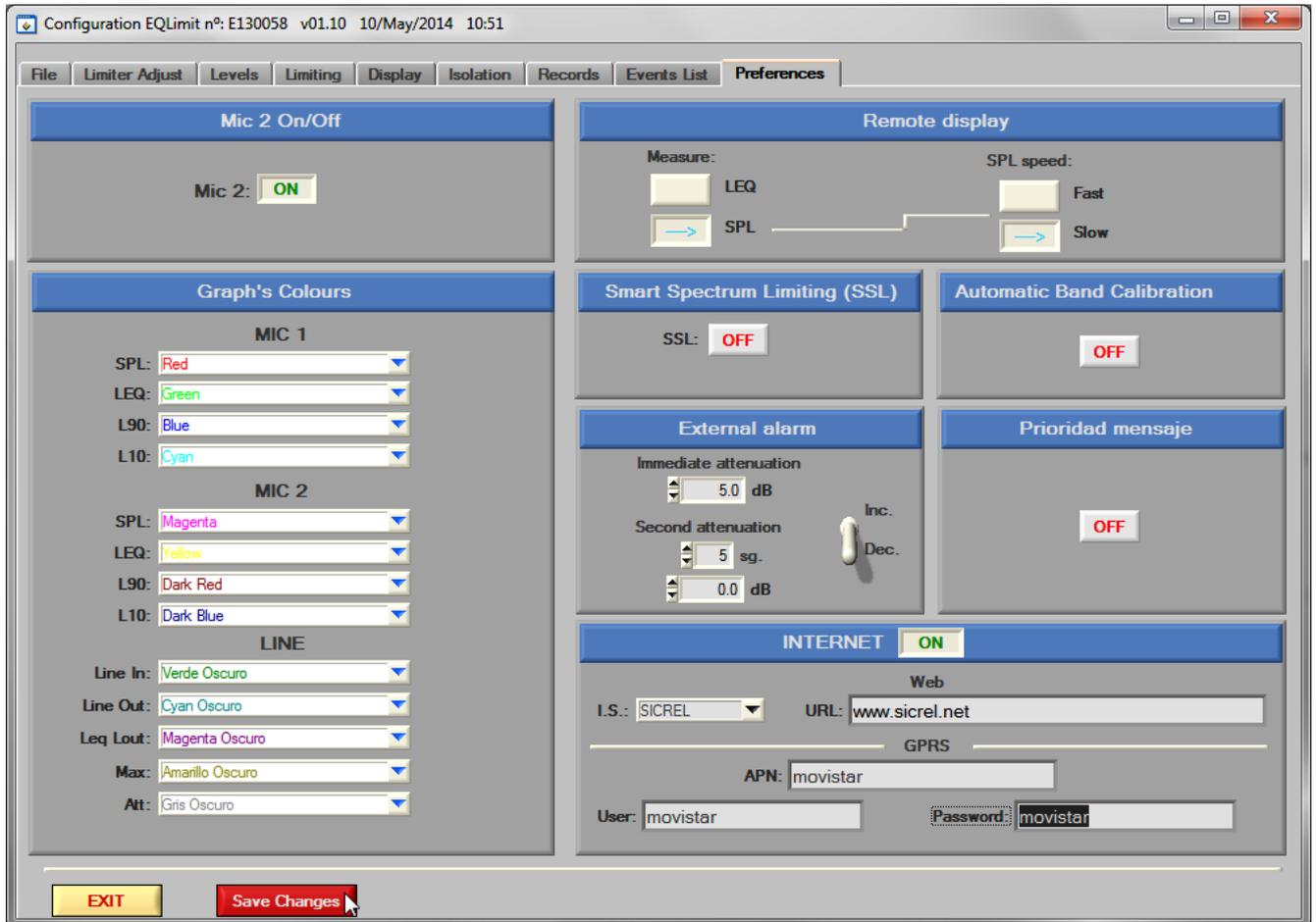
In this window you choose your preferences for the next items:

- Activate microphone 2 or not.
- Select instantaneous or Leq microphone signal to show at the remote display and if instantaneous choose between fast (0.12 seconds integration) or slow (1 second integration).
- **Smart Spectrum Limiting.** This button is intended for future versions, must be kept in the **OFF** position.
- **Bands calibration.** If activated, every time the unit is ON generates pink noise along 1 minute for level comparison with the one stored in memory from first calibration and checks the system´s efficiency.

External Alarm. With the combined action of several pins at the DB9 **AUX** connector, we can reduce or raise the sound level immediately in the quantity consigned in the **Immediate attenuation** box, plus a slow decay of the quantity consigned in the **Second attenuation** box with a ramp of 1dB/second.

Message priority is the external alarm referred to in previous chapters. Called "Fire Alarm" as its main function is to connect the local fire alarm system to EQlimit in order to activate a gentle fire alarm message through the main PA system in case of fire. To activate this function turn the **Message Priority** button **ON**.

- Please read the next schematic if you want to use the **AUX** connector possibilities. The elements enclosed in rectangles are inside the limiter.
- Pins are numbered looking at the connector from its front, and are marked in the proper connector.
- In order to use a N.C. (normally closed) circuit, you must short circuit permanently the N.O. (normally open) pins
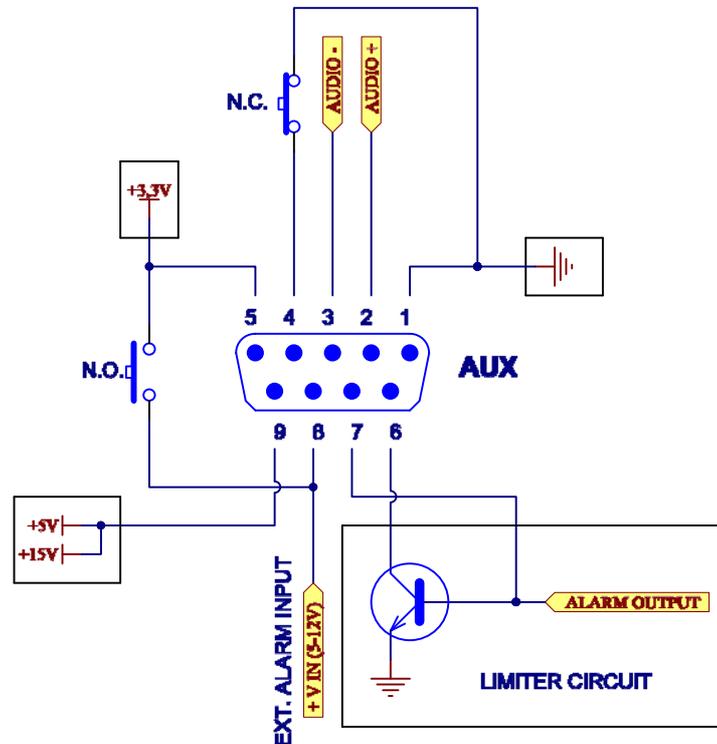
- **Internet**: The EQlimit limiter can access Internet via two ways: the first is to use local Ethernet TCP/IP net with access to Internet (ADSL) and the second is through a GPRS modem with its corresponding digital data available SIM card.

  There is an optional RJ-45 connector located at the backplane of EQlimit, for connection to the local area net, and a DB-9 connector to connect to a GPRS modem. EQlimit connects to Internet automatically, the user must only activate this communication by turning the **INTERNET button** to its **ON** position. Before that configure the site to communicate with typing in its URL in the **URL:** box; alternatively choose a preconfigured site from the **I.S.:** drop list box.

If a GPRS modem is to be used, type in the APN, user and password provided by the mobile phone company, in the corresponding boxes in the GPRS section. The GPRS modem must be the one provided by MRC Audio.

The Internet site must be an authorized site prepared to receive the limiter's data. The user must sign in to any of them by contacting MRC Audio. This connection has an annual fee. At the time of this writing there are two authorized Internet sites for EQlimit:

www.sicrel.net
www.netaudiocontrol.com

Both sites collect the configuration data and the events data.

The GPRS connection also has an annual cost derived from the mobile phone company.

NOTICE: Some ADSL routers cannot properly solve the IP address from the URL name using the DNS servers. In these cases the IP address of the site must be typed in the **URL:** box, instead of the site name configured automatically by choosing a site from the **I.S.:** drop list box.

- Balanced audio inputs 20 KΩ impedance. Max. level + **20** dBV

- ⊙utSmarts® audio outputs 100 Ω impedance. Max level + **20** dBV

- THD+Noise @ 1kHz and 0 dBV **:< 0,006%** (CCIR 468 - 22Hz a 22khz)

- IMD : **< 0,010 %**

- Frequency response: **30 Hz** to **30 kHz**.   - 1 dB

- Signal/noise ratio : **107 dBq**   (CCIR 468 - 22Hz a 22khz) @ +20 dBV

- Output residual noise :   **< 45 µVq**   (CCIR 468 - 22Hz a 22KHz)

- Crosstalk : **> 100 dB** @ 1 Khz and **> 95 dB** @ 10 KHz

- Global gain : From 0 to **- 50 dB**

- Peak level indicator: **+ 15** dBV

- Measurement range: **30 dBA** to **120 dBA**

  Accurate +/- 1,5 dB: From 60 to 115 dBA

- Limiting:

    Adjustable: From **30** to **120 dB**
    Range: > 60 dB

- Dimensions: 1U (43 mm) high, 19'' (483 mm) wide y 10'' (260 mm) total depth with rear cover.

- Weight: 3Kg

- Power supply: Universal switched 90-250 VAC /40 - 60 Hz. < 30 watts

- Environment: From 10º to 50º C. Humidity Max 90%

MRC AUDIO reserves the right to modify these equipment´s specifications without prior notice

MRC Audio Limitadores, S.L., warrants the **EQ***Limit* SPL Controller-Limiter to conform substantially to the specifications of this manual for a period of **TWO YEARS** from the original date of purchase when used in accordance with the specifications detailed in this manual.

The warranty covers all defects in workmanship and materials except for:
- Damage or deterioration resulting from installation and/or removal of the unit
- Damage from accident, misuse, abuse or unauthorized product modification
- Damage resulting from repair or attempted repair by anyone not authorized by MRC Audio.
- Damaged occurring from shipping (claims must be presented to the carrier).

In the case of a valid warranty claim, MRC AUDIO repair or replace the parts without charge. This warranty is not transferable. It applies only to the original purchaser of the product.
For warranty service please call your local MRC AUDIO dealer. Then, ship the defective product, with transportation and insurance charges pre-paid, to below address. Enclose your name, address, email, copy of the original sales invoice and a detailed description of the problem.
MRC AUDIO will not accept responsibility for loss or damage during transit.

DISCLAIMER
MRC Audio limiters, S.L. is not responsible for the economic sanctions or any other measures that could fall on the activity for improper use of its products or when the installation or/and configuration does not conform to the procedure described by the manufacturer in the corresponding user manual.

COSTUMER
SERIAL Nº
DATE OF PURCHASE
SOLD BY

Technical Service	**MRC AUDIO** Cavanilles, 50　28007 MADRID - Tfno +34-915 529 138 Fax +34-915 018 399　info@mrcaudio.com

Please, contact our Technical Service prior to sending the equipment for repair.

The remote display is provided optionally. EQlimit can works without it. It has four high efficiency red 20mm high digits, for a comfortable reading of the sound level.
A row of eight LEDs at the top, show the dynamic attenuation applied by the limiter, peaks at the input signal and the presence of alarms.

The three 10mm LEDs to the left of the four digits show the state of the limiting system:

GREEN when a signal is present at the input and the output is below the limiting threshold.

YELLOW when the output signal reaches or is over the limiting threshold and therefore the limiter is applying attenuation correspondingly.

RED when the limiter is turning on, or when the output signal is cut off because of any alarm or due to the time of the day being beyond the working time configured in the levels window.
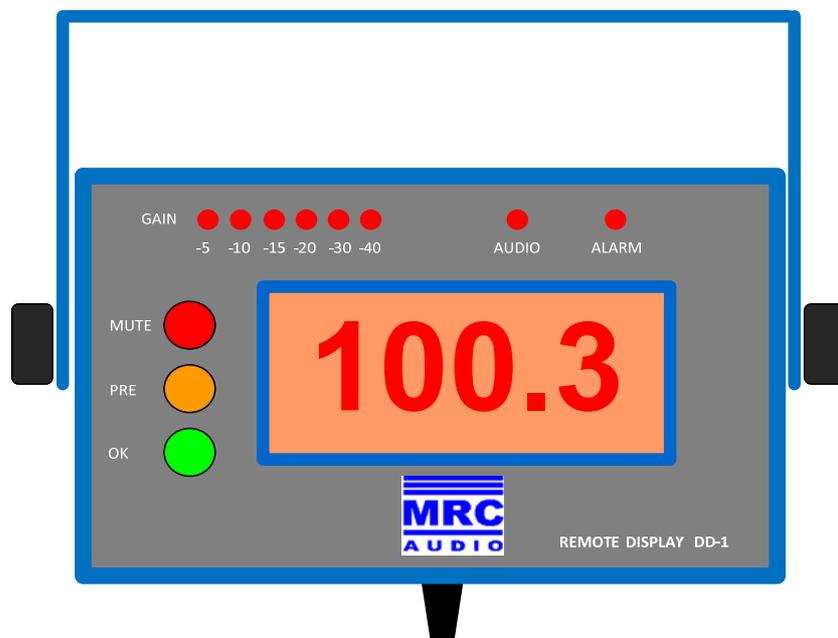
At switch on, the remote display reproduces a verifying sequence showing a count down from 9 to 0 at the four digits and lighting up all the LEDs. At the end of the countdown it starts displaying the sound level and the LEDs show the state of the limiter.
Other messages displayed are:

- If at a time of the day outside the working time configured in the Levels window, the remote display shows the actual time of the day and the message **StOP** alternatively.
- If the actual date and time are inside a special period, the remote display shows the message **SPEC** and the sound level alternatively.
- If there is a situation of alarm the remote display shows the message **ALAr** and the sound level alternatively.
- If the sound level measured by the microphone is under the configured minimum level for registering level events, as described in previous chapters, the remote display shows the message **Und**.

11

CERTIFICATION

AT4 WIRELESS

CERTIFICADO DE ENSAYO
TEST CERTIFICATE
Nº: 39031CSE.001

Producto / Product	:	Limitador-Controlador acústico espectral con transmisión telemática
	:	Spectral sound Limiter-Controller with remote data transmission
Marca comercial / Trade Mark	:	MRC Audio
Modelo .Tipo Ref. / Model / Type Ref.	:	EQLimit
Fabricante / Manufacturer	:	MRC AUDIO LIMITADORES, S.L.
Peticionario / Tested on request of	:	MRC AUDIO LIMITADORES, S.L.
Otros datos de identificación - n/s / Full identification of the product - s/n	:	Mide, muestra y controla el nivel de presión sonora de forma espectral, evitando sobrepasar un nivel prefijado. Almacena registros y gráficos de los niveles sonoros, para su evaluación e impresión. Al mismo tiempo puede enviarlos a un servidor de Internet. N/S: E100130015
	:	Measures, displays and controls the sound pressure level spectrally, avoid exceeding the preset level. Store events, sound levels and graphics, for further assessment and printing. At the same time, it can send all data to a server on the Internet. S/N: E100130015
Norma(s) de referencia / Standard(s)	:	Artículo 48 e IT.6 apartado 1 subapartados a, b, c, d y e del DECRETO 6/2012, de 17 de enero (BOJA núm. 24 de 6 de febrero 2012)
Certificado basado en el informe / Test certificate based on the test report	:	Nº. 39031ISE.001 de fecha / dated: 2013-12-10
Resultado / Summary	:	CONFORME / COMPLIANT

AT4 wireless es un laboratorio de ensayo competente para la realización de los ensayos objeto del presente informe.
AT4 wireless is a testing laboratory competent to carry out the tests described in the report.

Nota: Este certificado de ensayo sólo es aplicable a los objetos sometidos a ensayo cuya identificación se recoge en el informe en que se basa, ensayados en el modo y fecha(s) declaradas del mismo informe. Por tanto, no implica una certificación de la producción.
Note: This test certificate is only applicable to the unit(s) of the product submitted, shown in the reference report, tested and used in the mode and date shown in the mentioned test report does not imply a certification of the production.

Málaga, a

Consultor SE
SE Consultant

AT4 wireless, S.A.
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www.at4wireless.com · C.I.F. A29 507 456

AT4 WIRELESS

ilac-MRA ENAC
ENSAYOS
Nº 51/LE147

Informe de ensayo nº:
Test report No:

NIE: 39031ISE.002

Informe de ensayo
Aparatos de audio, video y aparatos electrónicos análogos

Identificación del objeto ensayado.......................: Identification of item tested	Limitador-controlador acústico espectral.
Marca ....: Trade	MRC Audio
Modelo y/o referencia tipo ....: Model and /or type reference	EQLímit
Other identification of the product ....:	Mide, muestra y controla el nivel de presión sonora de forma espectral, evitando sobrepasar un nivel prefijado. Almacena registros y gráficos de los niveles sonoros, para su evaluación e impresión. Equipo con envolvente metálica y clase I de protección contra los choques eléctricos.
Características ....: Features	100-250 V~, 50/60 Hz, 40W. Clase I
Peticionario ....: Applicant	MRC Audio limitadores, s.l. CIF: B85637403 C/ Cavanilles Nº 50 C.P: 28007 Madrid (España) Contacto:Edurne Gastañaga Email: info@mrcaudio.com Tlfno:915 529 138
Método de ensayo solicitado, norma....................: Test method requested, standard	-IEC 60065:2001 + Corr:2002 + A1:2005 + A2:2010 -EN 60065:2002 + A1:2006 + Corr:2006 + Corr:2007 + A11:2008 + +A2:2010 + A12:2011 -UNE EN 60065:2003 + A1:2006 + Corr:2006 + Corr:2008 + A11:2010 + A2:2011 + A12:2011
Procedimiento de ensayo....................................: Test procedure	POSE000 (Procedimiento general del laboratorio de Seguridad)
Resultado...: Summary	CONFORME
Aprobado por (nombre / cargo y firma) ....: Approved by (name / position & signature)	Rafael González Consultor SE
Fecha de realización ....: Date of issue	2014-04-07
Formato de informe No. ....: Report template No	FSE70_07

DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY

Directiva(s) del Consejo con la(s) que se declara conformidad:
Council Directive(s) to which conformity is declared:
CD 73/23/EEC + CD 89/336/EEC + CD 93/68/EEC

Aplicación de las Normas:
Application of the Standards:
UNE EN 60065 (2003) + EN 61010-1 (2001) + 61000-6-3 (2001) + EN 55022 (1994) + A1 (1995) + A2 (1997) + EN 61000-6-1 (2001) + EN 61000-3-2 (1995) + EN 61000-3-3 (1995) + EN 61000-4-2 (1995) + EN 61000-4-3 (1995) + A1 (1998) + A2 (2001) + EN 61000-4-4 (1995) + A1 (2001) + A2 (2001) + EN 61000-4-5 (1995) + A1 (2001) + EN 61000-4-6 (1996) + A1 (2001) + EN 61000-4-8 (1993) + A1 (2001) + EN 61000-4-11 (1994) + A1 (2001).

Representante/ *Representative*: **EDURNE GASTAÑAGA AURRECOECHEA**
CIF: 50824484G

Dirección / *Manufacturer´s address*: **CAVANILLES, 50 - 5º A**

C.P. 28007 MADRID - ESPAÑA

Tipo de equipo / *Type of equipment*: **CONTROLADOR DE PRESIÓN SONORA EN BANDAS DE 1/3 OCTAVA**
1/3 Octave Bands filtered SPL Controller

Marca / Trade: **MRC AUDIO**

Modelo / Model: **EQ*Limit***

Nosotros, los abajo firmantes, declaramos que el equipo antes especificado cumple con las Directivas y Normas mencionadas
We, the undersigned, hereby declare that equipment specified above conforms to the Directives and Standards mentioned

Lugar / *Place*: **España**
Fecha / *Date*: **5 de Noviembre de 2013**

_____
(Firma / Signature)

Edurne GASTAÑAGA AURRECOECHEA
(Nombre / Full name)

GENERAL MANAGER
(Cargo / Position)