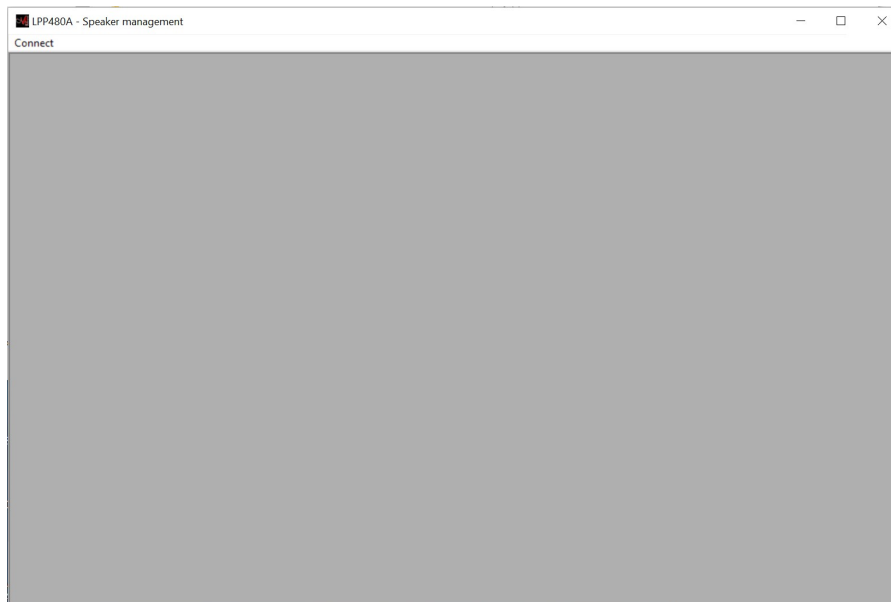**LPP480A Quick User's Guide**

Before to install the setup.exe, please make sure that the Net Framework 4.0 is already installed on the PC used.

After install the setup.exe and run the app "**LPP480A**" then the system show the following window

and after few seconds the main window

The user must click on the menu "**Connect**" in order to connect one or several devices.

The User has the possibility to connect the device via **USB** (fig.1) or **RS485**(fig.2) or **TCP/IP**(fig.3)
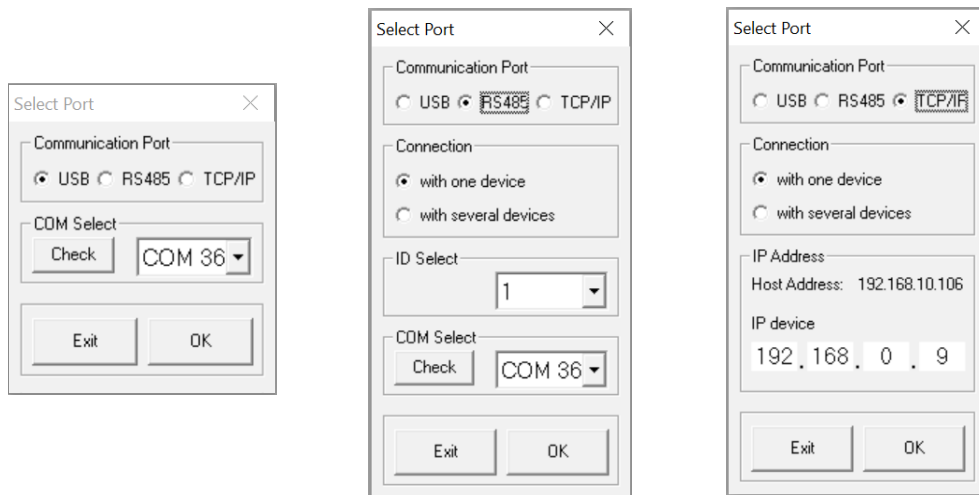

fig.1   fig.2   fig.3

* If the **USB** is selected, the User must set the number of the COM used to connect the device
By the way, using the button "Check" the Sw will scan the Pc ports looking for the potentially connected ones: set on the Com Select window the found Com ports until found the working one.
In order to use the USB connection for remotely controlling the LPP480A, need first set on the unit the communication interface as USB.
To set the USB interface on the LPP480A the following steps have to be done:
1. press the "PM3/UTILITY" button on the front panel, for entering the "UTILITY MENU"
2. use the "PM1/ENTER" encoder for selecting the "Interface Utility" field
3. press the "PM1/ENTER" button, for entering the "Interface Setup" field
4. use the "PM2/ESC" encoder, for selecting the USB interface
5. after operated the selection, press the "PM2/ESC" button the necessary times for moving back on the several fields up to the default screen, showing "LPP80A" and the current loaded preset

* If the **RS485** is selected, the User must set the number of the COM used to connect the device and the ID number set on the device. When the RS485 is used and the User want connect several devices then if important that all device have an unique ID otherwise some device can not working
Use the button "Check" to see all COM connected on the PC.
In order to use the RS485 connection for remotely controlling the LPP480A, need first set on the unit the communication interface as RS485 and assign an ID to the unit.
To set the RS485 interface on the LPP480A the following steps have to be done:
1. press the "PM3/UTILITY" button on the front panel, for entering the "UTILITY MENU"
2. use the "PM1/ENTER" encoder for selecting the "Interface Utility" field
3. press the "PM1/ENTER" button, for entering the "Interface Setup" field
4. use the "PM2/ESC" encoder, for selecting the RS485 interface
5. use the "PM3/UTILITY" encoder, for selecting the RS485 interface's ID number
6. after operated the selection, press the "PM2/ESC" button the necessary times for moving back on the several fields up to the default screen, showing "LPP80A" and the current loaded preset

* If the **TCP/IP** is selected, the User can select the option "with One device" or "with Several devices"
if "with one device" is selected then insert the IP address of the device that the User want to connect
if "with several devices" is selected then the user must select a range of the IP (the first 3 bytes are
the same so the max range is from xxx.zzz.yyy.1 to xxx.zzz.yyy.254)
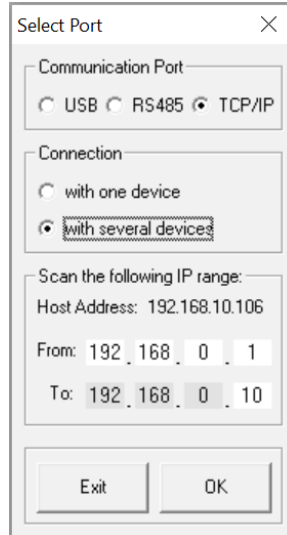
In order to use the TCP/IP connection for remotely controlling the LPP480A, need first set on the unit
the communication interface as TCP/IP and assign an IP address to the unit, if not used DHCP mode. t
To set the TCP/IP interface on the LPP480A the following steps have to be done:
1. press the "PM3/UTILITY" button on the front panel, for entering the "UTILITY MENU"
2. use the "PM1/ENTER" encoder for selecting the "Interface Utility" field
3. press the "PM1/ENTER" button, for entering the "Interface Setup" field
4. use the "PM2/ESC" encoder, for selecting the TCP/IP interface
5. use the "PM3/UTILITY" encoder, for selecting the DHCP mode On/Off
6. if set the DHCP mode OFF, press the "PM1/ENTER" button fo entering the field for the IP address assignment
7. after operated the selection, press the "PM2/ESC" button the necessary times for moving back on the several fields up to the default screen, showing "LPP80A" and the current loaded preset

Once decided the Interfacing Connection and set the necessary parameters there where required, from the all USB. RS485 and TCP/IP windows, press the button "OK" and the system will start to check the device(s).
When found the connected device(s) the Sw will show a list of the devices found (if no device are found then is possible to continue in demo mode "Off-line") on the window "List ID".

If no devices found, the Sw will ask if the user want to continue in demo mode for evaluating the available process of the **LPP480A**.
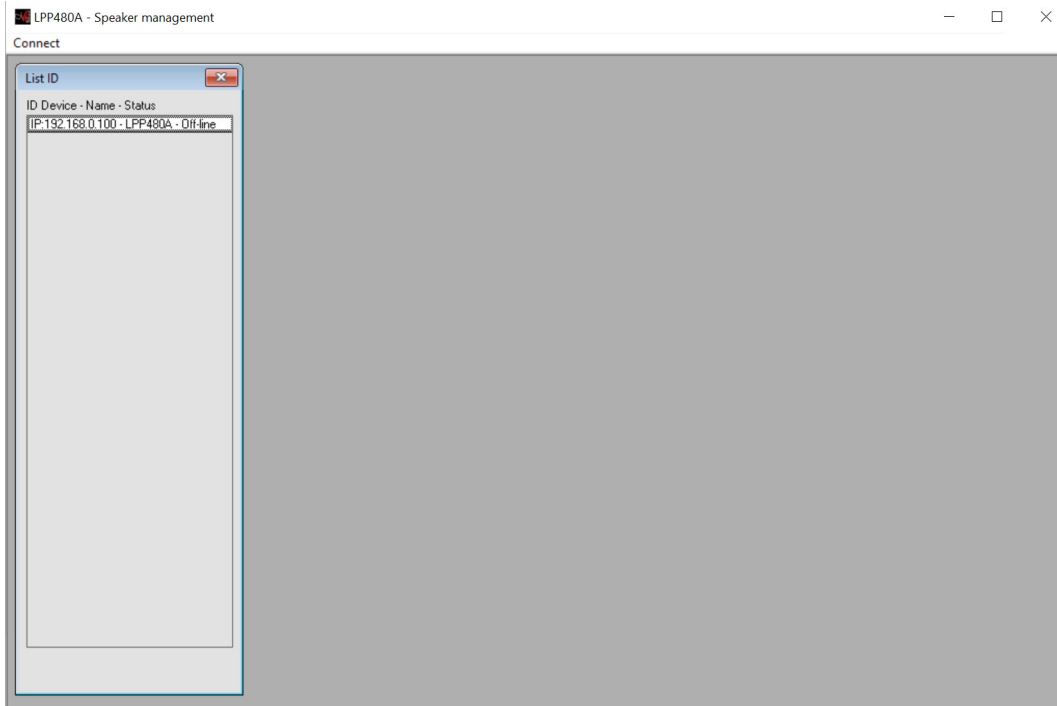
to edit the device, double click on the name of the device present on the "List ID"

on the Edit window is possible edit all parameters of the Input and output Output channel, save and load configuration on the sw PC, copy the input channel to another input channel, insert and change a User password in order to lock/unlock the interface, link the channel and see the current version of the firmware and software.

On the ALL Editing Windows, the Top Bar is fixed and shows ever the several available "tools'' useful for the User to manage the Editing Job so as to save it on Pc or within the unit.

TOOL BAR
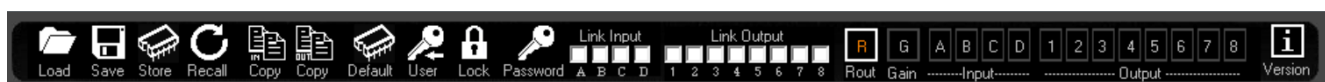
Load: Load a previously saved Full Configuration from a defined Pc directory. The configuration loaded will be the one edited with its parameters set on the several editing windows. The configuration loaded is containing the ALL parameters set in the several Editing Windows
Save: Save the current Full Configuration (the all parameters set within the all Editing Windows) into a defined Pc directory. The saved configuration is containing the ALL parameters set in the several Editing Windows

Store: Save the current Full Configuration (the all parameters set within the all Editing Windows) into one of 16 available locations within the **LPP480A**. The saved configuration is containing the ALL parameters set in the several Editing Windows and can be recalled also from the unit's front panel.
Recall: Load a previously saved Full Configuration from one of 16 available locations within the **LPP480A**. The configuration loaded will be the one edited with its parameters set on the several editing windows.

Copy (located after Recall): tool for copying the all parameters of one input channel to an other one. The Phase Correction FIR, available on each Input Path, are not included in this copy tool.
Copy (located before Default): tool for copying the all parameters of one output channel to an other one. The Xover FIR, available on each output Path, are included in this copy tool. The Routing available on each couple of outputs (1/2, 3/4, 5/6/7/8) is not included in the copy tool.
Default: tool which can be used to bring back the **LPP480A** to the default setup, which is matching the one got by the Hw reset. All parameters are flatted and the all outputs are in MUTE

User (password selection): by default (when released by the factory) the password for locking permanently the **LPP480A** is set as "**000000**". Using the USER tool, the user can define is own password of six characters. Just providing at the very beginning the password "000000". a windows is entered allowing the user to assign a new password and confirm it.

Lock: momentary lock of the units' controls. When set, the all parameters cannot be accessed by the user, but no password is required for setting/resetting the lock itself. Used for avoiding to accidentally modify a setting during a live performance or if the user need to leave the editing session momentarily.

Password: this tool is allowing to LOCK the **LPP480A** by Password. When the unit is locked providing a Password, no control is accessible and to exit this status it is necessary to provide again the password allowing so to UNLOCK the unit.

Link Input: this powerful tool is giving to the user the possibility, checking the related boxes, to LINK together 2 or more input channels. When two or more input channels, with their own particular setting of parameters, are linked, from the link moment ahead the all parameters set to one of the linked channel will be set in the same way also on the other linked channels. The link function is not affecting the status of the parameters of the linked channels, preceding the Link action.

Link Output: as for the inputs, this tool is giving to the user the possibility, checking the related boxes, to LINK together 2 or more output channels. When two or more output channels, with their own particular setting of parameters, are linked, from the link moment ahead the all parameters set to one of the linked channel will be set in the same way also on the other linked channels. The link function is not affecting the status of the parameters of the linked channels, preceding the Link action.

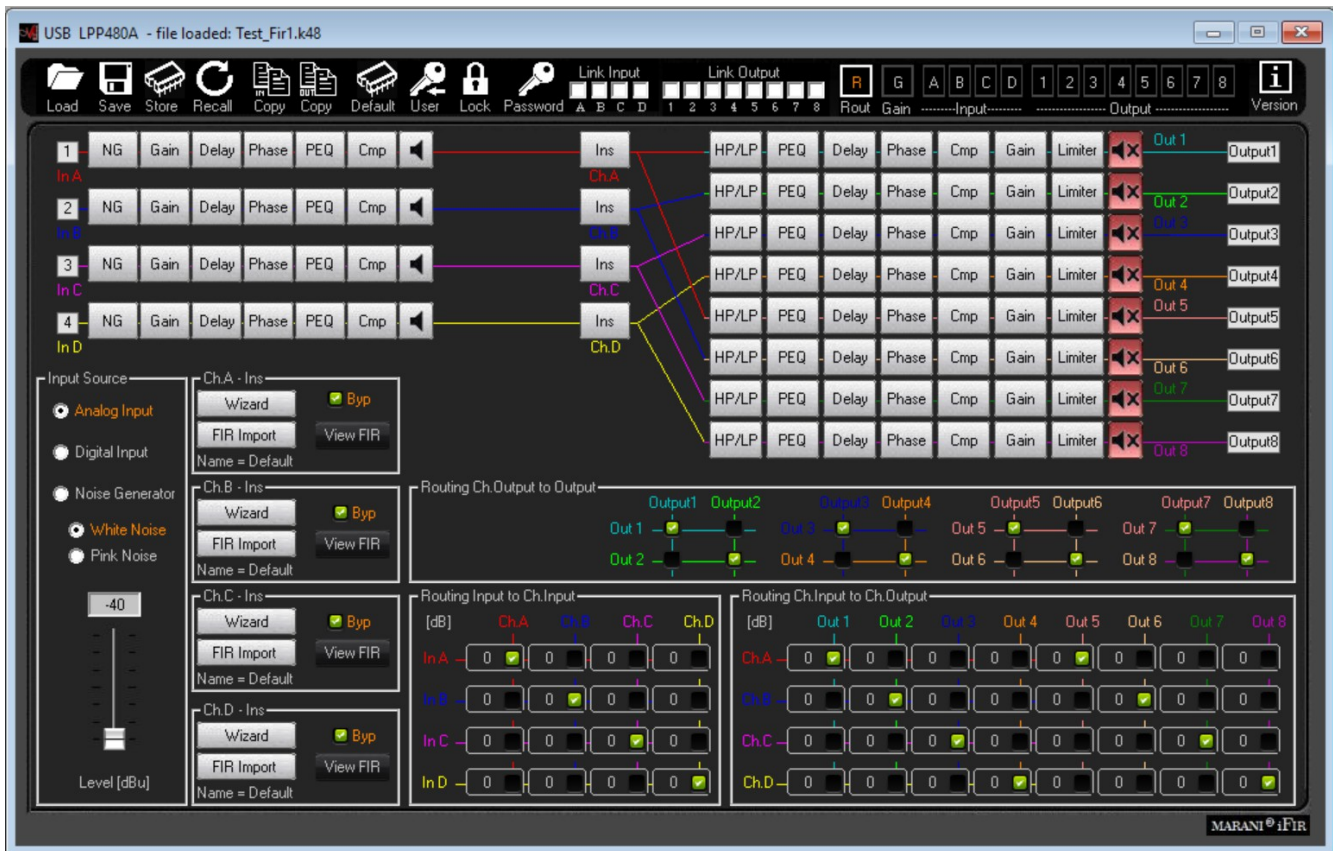**R**: button allowing to access the ROUTING Main Editing Page

G: button allowing to access the GAINS Main Editing Page

A/B/C/D: buttons allowing to access the INPUT CHANNELS Editing Pages

1/2/3/4/5/6/7/8: buttons allowing to access the OUTPUT CHANNELS Editing Pages

i: info button, giving information about the Firmware and Pc Sw version.

ROUTING WINDOW

This Window is guesting a synoptic image of the several processes available on the Input and Output paths of the **LPP480A**, so as a series of "frames" for the selection of Input sources and Signal Routings.

Input Source frame: The Signal Sources to the **LPP480A** inputs can be selected in between several options, in alternative to each others.

- **Analog Input** is selecting as Inputs for the **LPP480A**, the ANLOG INPUT coming from the XLR Balanced connectors on the unit's back panel. The max accepted input level for the Analog Inputs is +20dBu.

- **Digital Input** is selecting as Inputs for the **LPP480A**, the DIGITAL INPUT coming from the XLR connectors CHA and CHB on the unit's back panel. In order to select the Digital Inputs, need the inner button located in between the ChC Input and CH1 Output to be pressed.

- **Noise Generator** is selecting as Inputs for the **LPP480A**, the White or Pink Noise generated internally by the Unit and controlled in Level by the related Slider ranging from -40dBu up to 0dBu.

ChA/B/C/D - Ins frames: here are available the controls for the use of a 1024 Taps FIR located on the Input path, which has been added mainly for being use for **PHASE CORRECTION** purposes, there where used together with the "Wizard" process embedded in the **LPP480A** Sw (see NOTE A), able to control a measurement process bringing to the calculation of the necessary coefficients for the phase linearization of a 2 way system, which in the case of the **LPP480A** can be identified as being a system processed by any of the 4 Inputs and 2 of the 8 available outputs.

Nevertheless, the FIR on the input paths can also work with coefficients loaded by external files and generated by Third Party Sw able to generate FIR coefficients. In this case, the FIR turn to be a 1024 Taps standard FIR, which can be loaded with any sort of coefficients for getting any sort of result (PEQ, Min Phase, Lin Phase, etc.). For the use of the external coefficients, need to generate them as text files and import them. See the details on the NOTE B.

- **Wizard**: this control is launching the "Wizard" Sw for the related FIR (see NOTE A for the Wizard Sw)

- **FIR Import**: here external coefficients can be imported into the FIR. Pressing the "FIR Import" button, the following window open and from the clicking on the LOAD icon, a .txt file (see NOTE B) with the Third Party calculated coefficients can be imported.
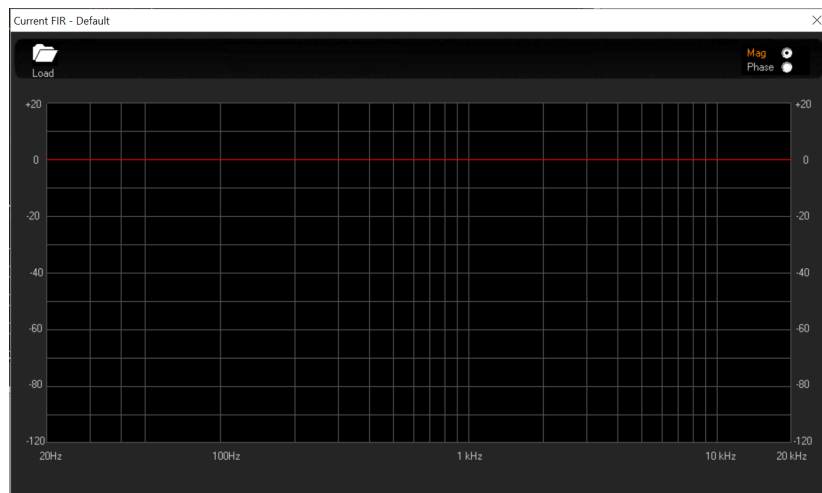
The Amplitude and Phase responses can be seen on the graphic which will show the characteristics of the imported filter.

- **View FIR**: once imported, or even internally generated, the FIR coefficients, the response of the FIR can be seen recalling it on graphic just pressing the 'View FIR" button.

- **Byp**: this check box is useful for making the loaded Fir Active or not. When not active, checked box, the fIR is simply transparent on the related input path. The Byp can therefore be used as powerful tool for A/B comparison between the system responses using or not the FIR.

Routing Ch Output to Output frame: Due to the availability on each input channel of the **LPP480A** of a 1024Tap FIR for phase correction purposes (see later), the Unit has been conceived as a possible unit able to provide 4 times of   Mono Input processes with FIR for phase correction and two outputs for driving a 2 ways Loudspeaker System. From this point of view, each pair of output channels (1/2, 3/4, 5/6, 7/8) can be seen as pair of outputs for driving a 2 ways system which input has its own processes and its own phase correction FIR. In this perspective, has been chosen to give the user the possibility of routing the pair of outputs to the physical outputs of the unit. This touting can be performed within the "Routing Ch Output to Output" frame.

Routing Input to Ch Input frame: The "Routing Input to Ch Input" frame is allowing the user to send one input to more than one FIR filter on the input path, so to have the possibility to control more two or more way systems with different FIR for phase correction, still providing them the same input source if required. The way of routing the signal is here in MIXER MODE, giving the **LPP480A** the possibility to not only assign one input to the desired FIR for phase correction, but also to control on any FIR the level of the assigned input.

Routing Ch Output to Ch Output frame: this routing is the "classic" routing allowing to assign each Input to each output of the **LPP480A**. Particularly, being here the routing AFTER the FIR for phase correction, it is here possible to extend the principle of making a flexible controller with FIR on Input for phase correction and processes for 2ways outputs only, having here the possibility to assign one input and its own FIR for phase correction to more than two outputs, so extending the possibility to control system with more than two ways. The way of routing the signal is here in MIXER MODE, giving the LPP480A the possibility to not only assign one input to the desired output, but also to control on any output the level of the assigned input.

Synoptic Image: The Synoptic Image is showing in clear way the defined routings , so as gives the possibility to directly MUTE/UNMUTE any input and nay output, just clicking on the related loudspeaker icons. Clicking on any block of the Input path or Output path, the user is immediately brought to the editing window of the related Input or Output channel. A click on the 'INS" blocks of the Input paths, is opening the "wizard" process for the related FIR phase correction coefficients calculation (see NOTE A)

GAIN WINDOW
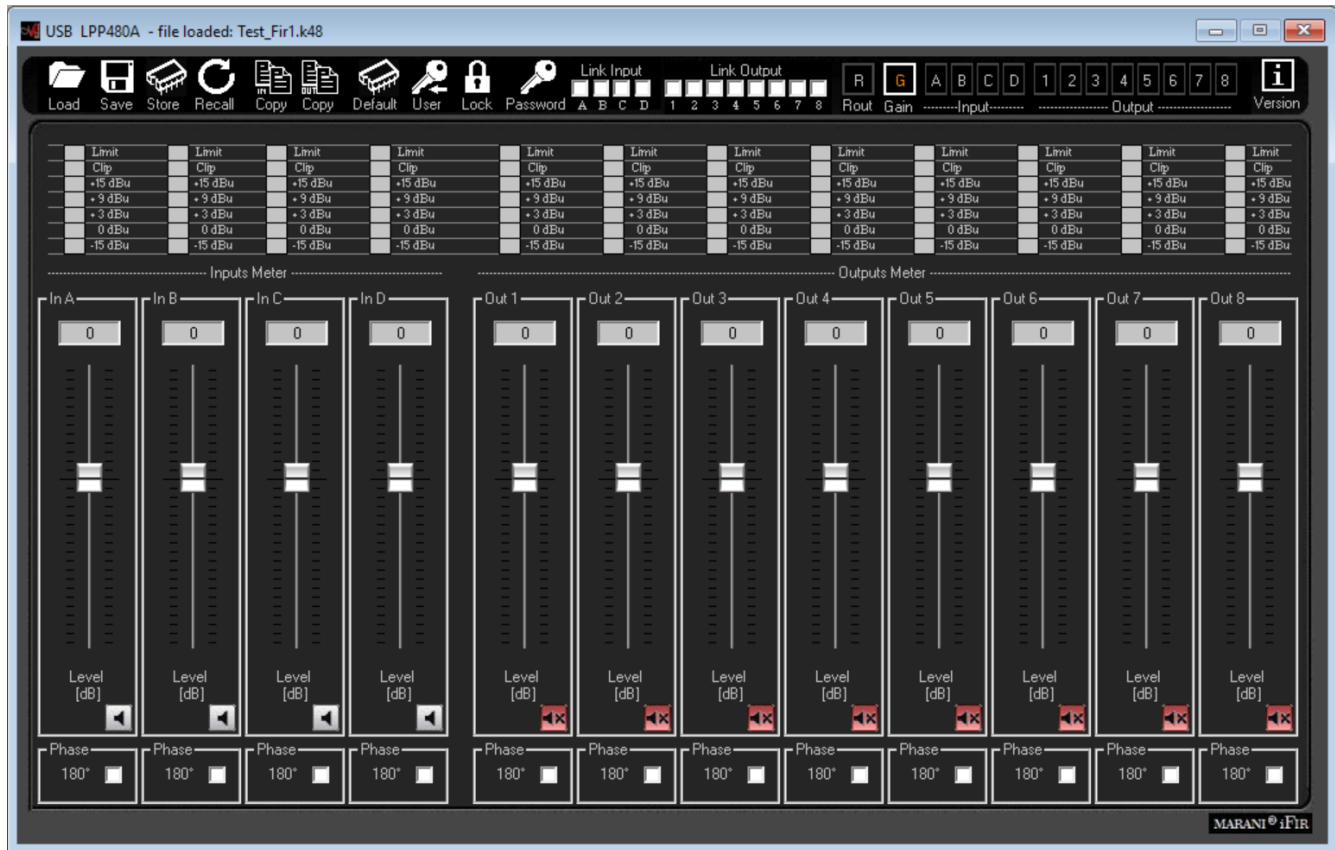
This "simple" window is allowing a quick control of the Input and Output Gains, so as the Input and Output Mutes. More, a complete "one shot" view of the ALL Input and Outputs Meters is given here.

IMPORTANT NOTE: the **LPP480A** has in internal Algorithm controlling the level coming from the Processes including gain variations as, Filtering Gains or Simply Level Gains, there where the Gain coming from the processes themselves can be a positive one. In this case, it is possible, given an input level close the the max available, to have internal processes overflow. The **LPP480A** inner Clip limiting Algorithm is detecting the potential or already occurring overflows and is containing them up to a 12dB Headroom, with a process "distortion free" based on level reduction tabled coefficients. When overflow over 12dB occurring, the Algorithm is containing them with a no distortion free process, which progressively is increasing the distortion level as more as the overflow containment is exceeding the +12dBu. The result of this "transparent to the user process", is a NOT CLIPPED output signal even with large excess of gaining internal processes and Input levels close to the max accepted by the unit. The process is active ONLY in case of Overflow occurring; when the signal is not exceeding with the sum of the Input level and the processes gain, the unit's dynamic, then the process is not active.

Input Meters: the input meters show the Input levels from -15dBu up to +15dBu. The Limit Led is indicating if Active the RMS Compressors. The Clip Led is indicating if the Clip limiter Algorithm described here above is active on the Input path.

Output Meters: the output meters show the output levels from -15dBu up to +15dBu. The Limit Led is indicating if the RMS Compressors or the Peak Limiter. The Clip Led is indicating if the Clip limiter Algorithm described here above is active on the Output path.

Sliders: the sliders control the Input/Output levels ranging from -18dBu up to +12dBu.

Mute Controls: useful for MUTING/UNMUTING the related Input/Output

Phase (Polarity): control for inverting the signal polarity (180Deg.)

INPUT WINDOW
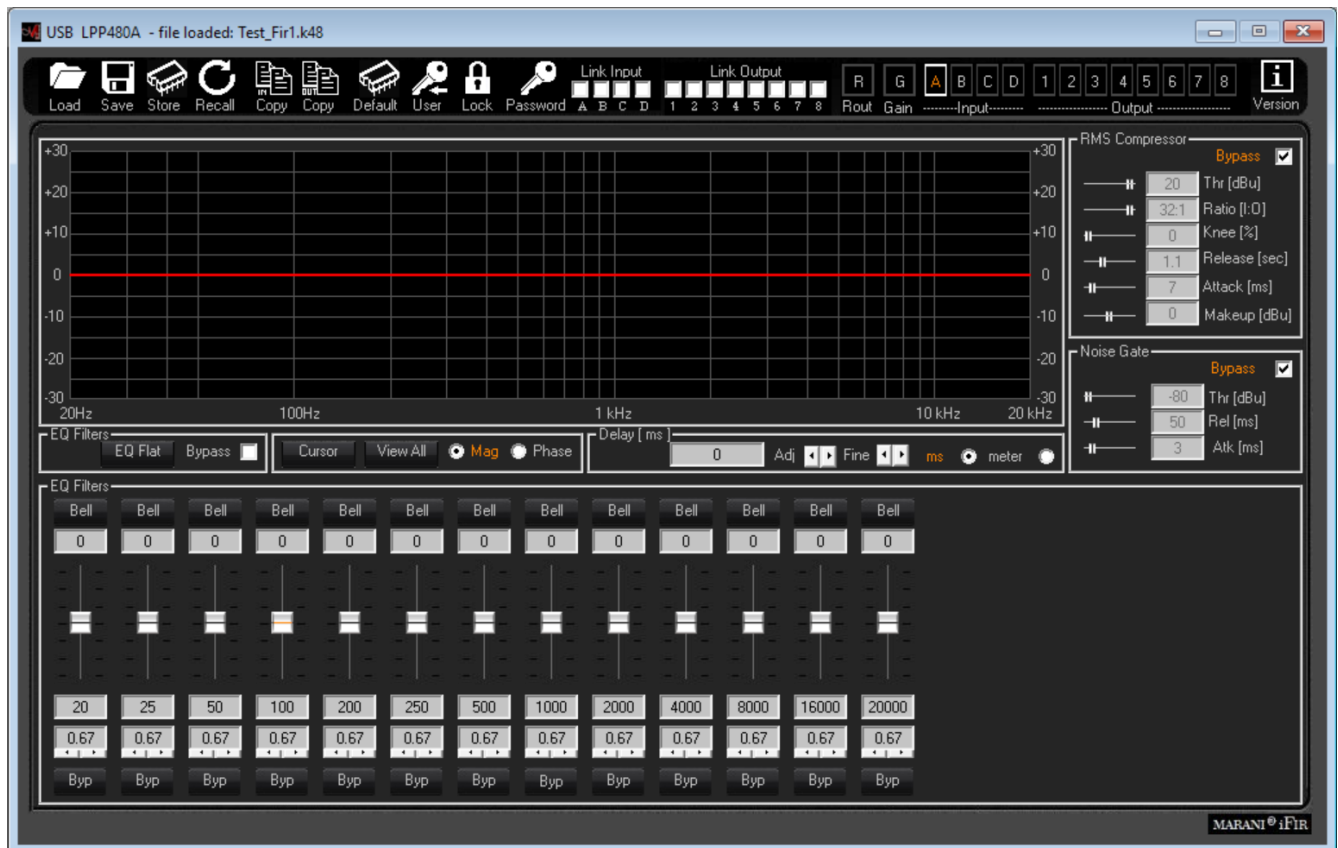
All the processes available on the Input Paths can be edited within the Input Windows.

Eq Flat and Bypass Controls: the EQ Flat control is allowing to flat in one shot the 12 bands Parametric Eq. The Bypass control, instead, is allowing to temporarily Bypass the Eq, without resetting the current setting.

EQ Filters: within this frame, the all 12 filters of the PEQ can be defined in terms of type, gain, Freq, Q
- **Fitlers type**: on top of the Slider and the box showing the gain level, there is a button that once pressed is opening a wide list of filters type which can be selected, for each filter of the parametric Eq. The available filters are **Bell** (constant Q), **Hi/Low Shelving 1st/2nd/Q** (classic first and second order and symmetrical ones with variable Q), **Lp/Hp 1st/2nd/Q** (classic 6dB/Oct first order, 12dB/Oct second order and variable Q), **Band Pass**, **Notch**, **All Pass 1st/2nd Ord**.
- **Gain**: the filter types which can gain, have the gain controlled by a slider ranging from -15dBu up to +15dBu.
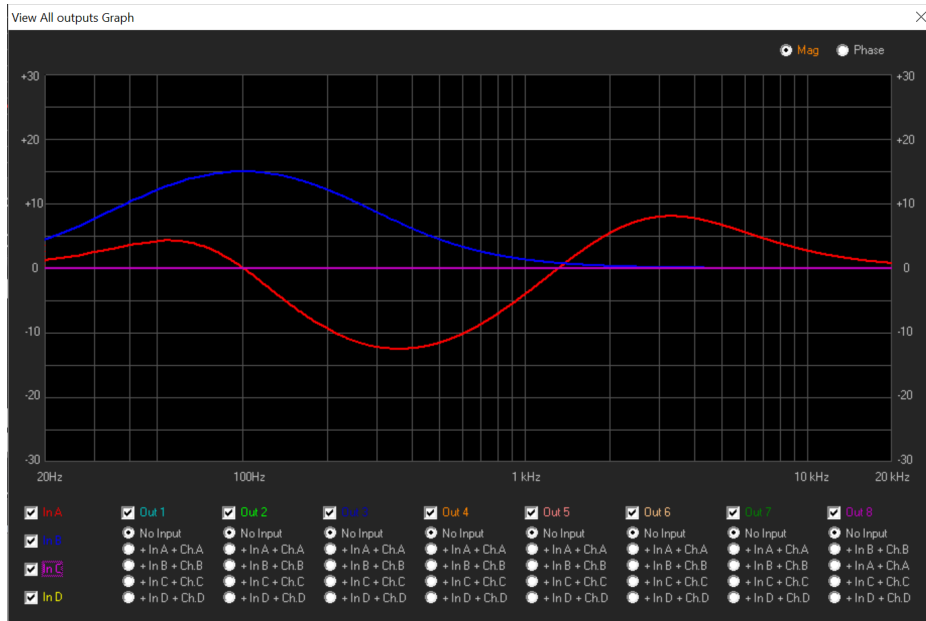- **Freq**: here can be inserted the Center, Cutting Frequency of the selected filter, ranging from 20Hz up to 20kHz.
- **Q**: there where usable, the Q can be set with a range depending from the selected filter.
- **Byp:** any filter of the 12 of the Parametric Eq, can be singularly bypassed, so to have the possibility to a quick A/B comparison between the signal when active or not the filter currently in editing phase.

Cursor: clicking on this control, cursors will appear on the graphic showing the amplitude response of the parametric Eq, for the setting of the filters' gain by mouse action.

View All: this control is opening a window showing the full Eq setting on each Input or Output or combination of them.

Mag and Phase: it is possible to decide if showing on the Window's graphic the Magnitude response of the Parametric Eq setting (Mag selected) or the Phase response (Phase selected).

Delay: the Input delay can be set here. The delay (in ms or meter) can be set using the button up/down "Adj" with step 1ms or "Fine" with step 10.4us (max input delay = 480ms =163.5meter)

RMS Compressor: the **LPP480A** is implementing a powerful RMS compressor on Inputs and Outputs, which compression coefficient is calculated on the base of tabled values giving a compression step of 0.1dB.
- **Bypass**: Compressor Active or not (Note that the all parameters here below are not accessible when the Compressor is set in Bypass)
- **Threshold:** from -10dBu to +20dBu step 0.2dBu
- **Ratio**: [input:Output] from 2:1 to 32:1 step 1
- **Knee**: from 0% to 100% (0% hard knee, 100% soft knee)
- **Release**-time: from 0.1sec to 3sec step 0.1 sec
- **Attack**-time: from 5ms to 200ms step variable
- **Make-Up**: from -12dB to +12dB step 0.1dB
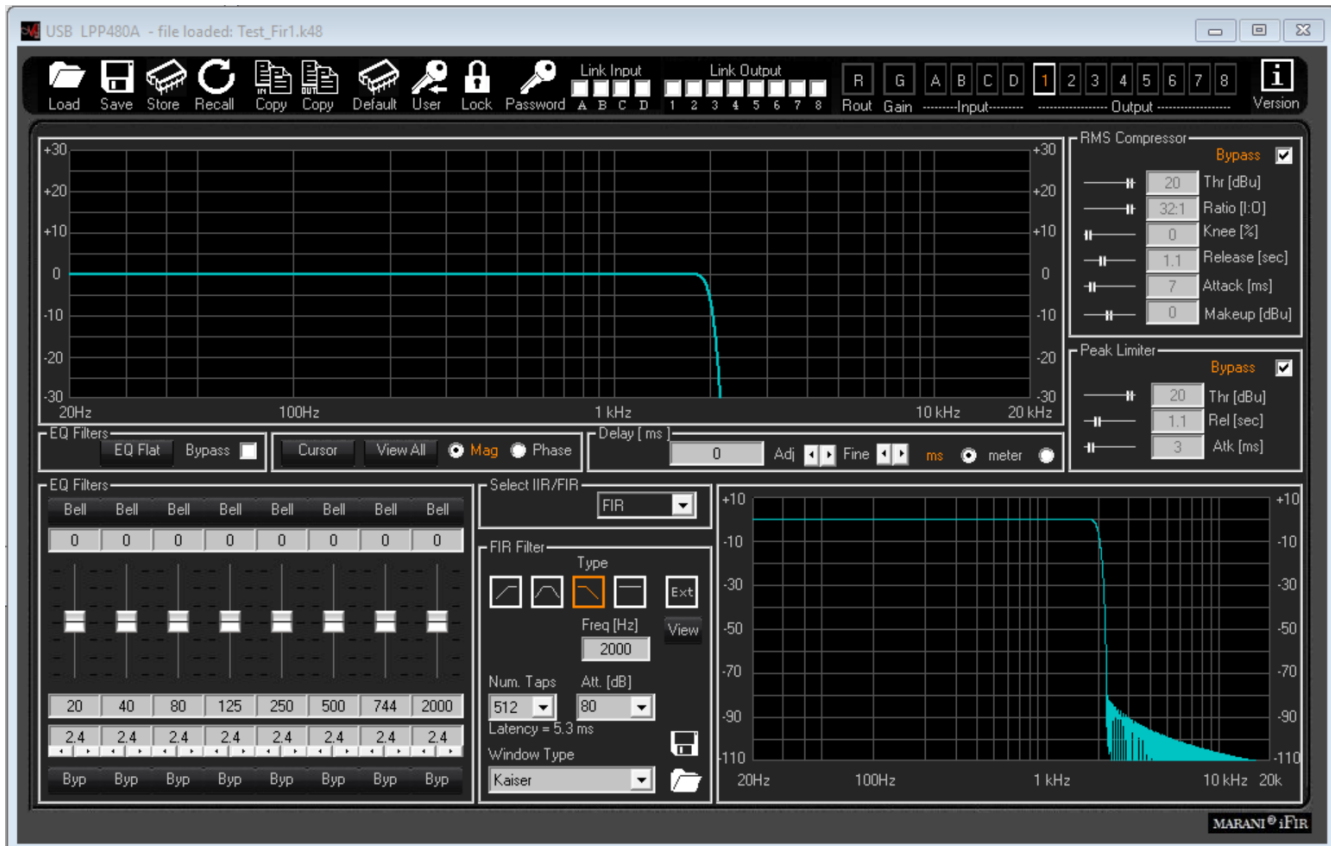
Noise Gate: a noise gate is available
- **Bypass**: Noise Gate Active or not
- **Threshold:** from --80dBu to -50dBu step 5dBu
- **Release**-time: from 10ms to 1sec step variable
- **Attack**-time: from 1ms to 1sec step variable

OUTPUT WINDOW

All the processes available on the Output Paths can be edited within the Output Windows.

Eq Flat and Bypass Controls: the EQ Flat control is allowing to flat in one shot the 8 bands Parametric Eq. The Bypass control, instead, is allowing to temporarily Bypass the Eq, without resetting the current setting.

EQ Filters: within this frame, the all 8 filters of the PEQ can be defined in terms of type, gain, Freq, Q
- **Fitlers type**: on top of the Slider and the box showing the gain level, there is a button that once pressed is opening a wide list of filters type which can be selected, for each filter of the parametric Eq. The available filters are **Bell** (constant Q), **Hi/Low Shelving 1st/2nd/Q** (classic first and second order and symmetrical ones with variable Q), **Lp/Hp 1st/2nd/Q** (classic 6dB/Oct first order, 12dB/Oct second order and variable Q), **Band Pass**, **Notch**, **All Pass 1st/2nd Ord**.
- **Gain**: the filter types which can gain, have the gain controlled by a slider ranging from -15dBu up to +15dBu.
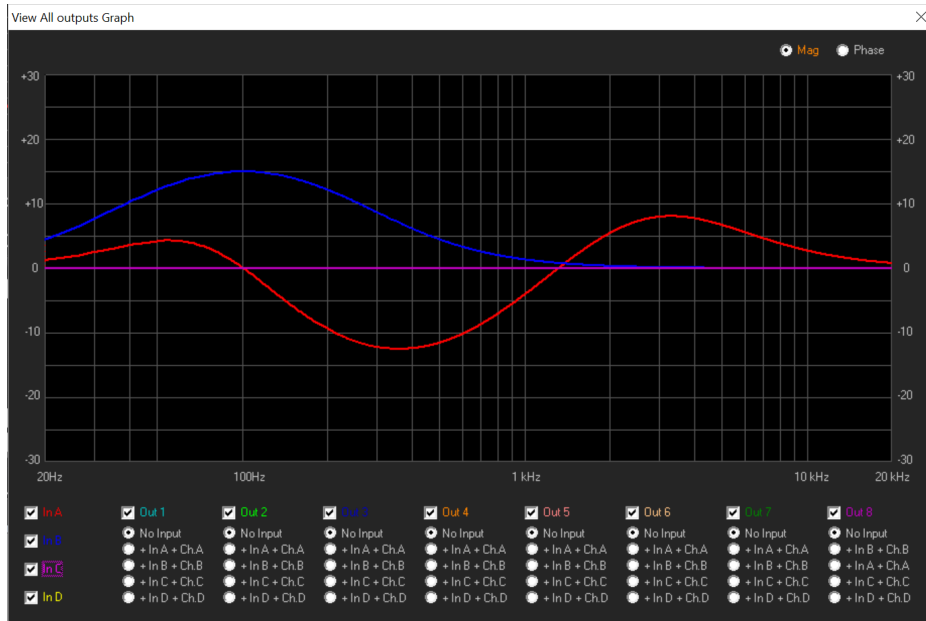- **Freq**: here can be inserted the Center, Cutting Frequency of the selected filter, ranging from 20Hz up to 20kHz.
- **Q**: there where usable, the Q can be set with a range depending from the selected filter.
- **Byp:** any filter of the 8 of the Parametric Eq, can be singularly bypassed, so to have the possibility to a quick A/B comparison between the signal when active or not the filter currently in editing phase.

Cursor: clicking on this control, cursors will appear on the graphic showing the amplitude response of the parametric Eq, for the setting of the filters' gain by mouse action.

View All: this control is opening a window showing the full Eq setting on each Input or Output or combination of them.

Mag and Phase: it is possible to decide if showing on the Window's graphic the Magnitude response of the Parametric Eq setting (Mag selected) or the Phase response (Phase selected).

Delay: the Input delay can be set here. The delay (in ms or meter) can be set using the button up/down "Adj" with step 1ms or "Fine" with step 20.8us (max input delay = 680ms =231meter)

RMS Compressor: the **LPP480A** is implementing a powerful RMS compressor on Inputs and Outputs, which compression coefficient is calculated on the base of tabled values giving a compression step of 0.1dB.
- **Bypass**: Compressor Active or not (Note that the all parameters here below are not accessible when the Compressor is set in Bypass)
- **Threshold:** from -10dBu to +20dBu step 0.2dBu
- **Ratio**: [input:Output] from 2:1 to 32:1 step 1
- **Knee**: from 0% to 100% (0% hard knee, 100% soft knee
- **Release**-time: from 0.1sec to 3sec step 0.1 sec
- **Attack**-time: from 5ms to 200ms step variable
- **M**ake-Up**: from -12dB to +12dB step 0.1dB

Peak Limiter: a Peak Limiter for Loudspeaker protection is available
- **Bypass**: Peak limiter Active or not
- **Threshold:** from --10dBu to 20dBu step 0.2dBu
- **Release**-time: from 100ms to 5sec step variable

Xover Section

The Xover Section of the LPP480A it is a particular and pretty powerful one, which can even become "tricky" if used in combination with the Parametric Eq.

Basically the PURE Xovering Section can be in standard operation, operated by IIR filters or FIR filters. The FIR filters used for the Xover Section are 512 Taps ones and therefore cannot be used for cutting frequencies lowest than 250Hz.

Actually has to be said that the LPP480A is working at a sample rate of 96kHz, but the FIR both on the Input path (the Phase Correction one) and the outputs, are processing with a decimation factor of 2, so running at 48kHz.

Back the the Xover, for cutting frequencies lower than 250Hz, of for any other reason coming from the user, IIR classic Lp/Hp filters can be used.

IIR Xover

If selecting IIR in the "Select IIR/FIR" frame, the Xover section is implementing IIR Hp/Lp, and the interface for the IIR filters setting is the following
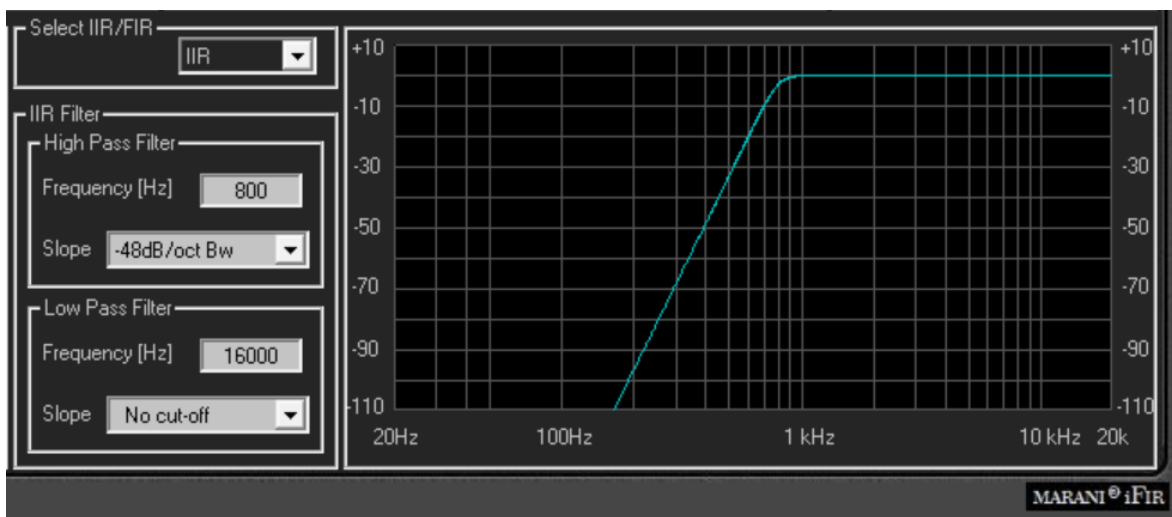

To edit the Hp or LP filter cutting frequency, input the value on the text box and press enter (Frequency from 20Hz to 20kHz step 1Hz)

To edit the Hp or LP filter type and slope, click on the relative Box and select the type (bypass, Butterworth, Linkwiz Riley, Bessel)

FIR Xover

If selecting FIR in the "Select IIR/FIR" frame, the Xover section is implementing FIR Hp/Lp, and the interface for the IIR filters setting is the following
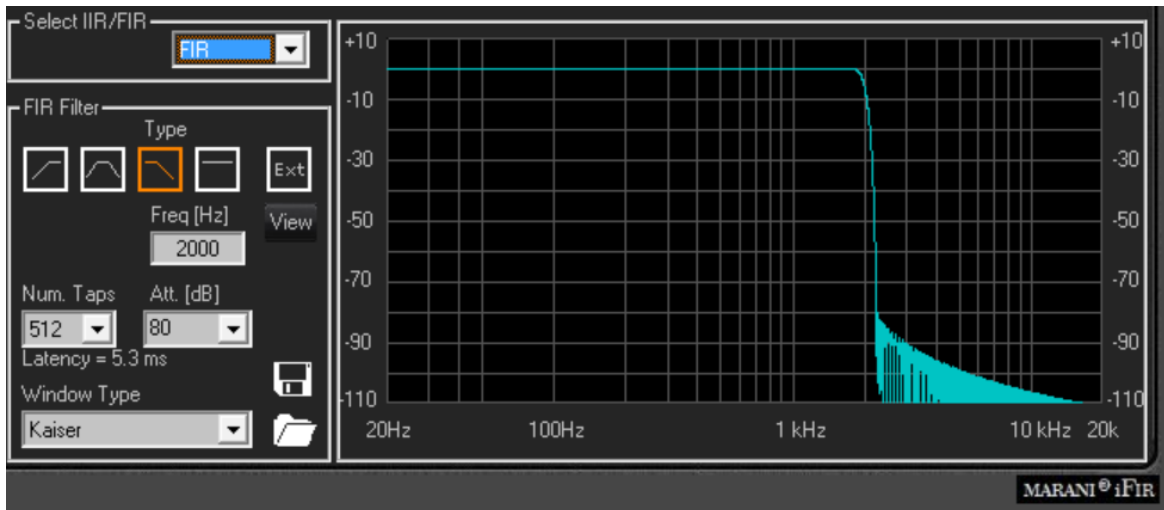
Here is possible to select the FIR type, and the all parameters for its configuration.
Particularly,

a. click on the icon to select the Filter **Type** (High Pass, Band Pass, Low Pass or Bypass)
b. insert the Cut-Off **Freq[Hz]**, input the value on the text box and press enter (Frequency from 250Hz to 20kHz step 1Hz)
c. select the number of the **Num. Taps** of the FIR (from 256 to 512). The FIR latency is dependent from the number of the taps and, being the FIR running at 48kHz, the latency can be calculated as follow:

$$\text{FIR Latency} = \text{Ntaps}/2 \times \text{Ts} = \text{Ntaps} \times \text{Ts}/2 = \text{Ntaps} \times 10.4\text{us}$$

d. select the max attenuation **Att.[dB]** for the out band signal
e. select the **Window Type** of the filter

Once the filter is set, it will be displayed in the window aside the parameters set. In order to make it active and performing on the Signal path, need to load it within the **LPP480A** clicking on the blinking icon

which is appearing as soon as a modification ton the currently loaded FIR is done.

Once the set FIR is uploaded into the **LPP480A**, the following Icons will become available

Allowing to save into a Pc directory the current edited filter for future use, or to upload from a Pc directory, previously saved FIR filters.

Also for the FIR used in the Output Xover Section, it is possible to upload coefficients imported from text files coming from Third Party Sw.

- **EXT** Icon: here external coefficients can be imported into the FIR. Clicking on the "EXT" Icon button, the following window open and from the clicking on the LOAD icon, a .txt file (see NOTE B) with the Third Party calculated coefficients can be imported.
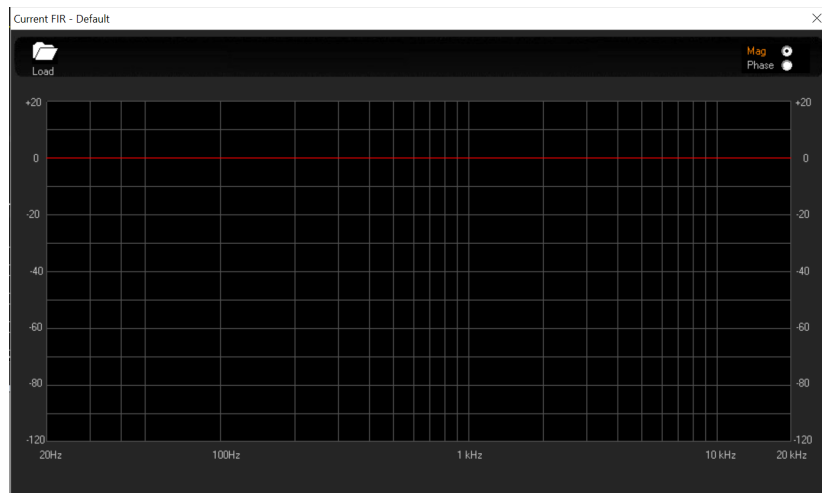
The Amplitude and Phase responses can be seen on the graphic which will show the characteristics of the imported filter.
- **View** : once imported, or even internally generated, the FIR coefficients, the response of the FIR can be seen recalling it on graphic just pressing the 'View " button.

FIR on Output not as Xover filter, using imported coefficients.

If the user would like to use an IIR filter as Xover, being necessary in example a cutting frequency below 250Hz, but still having available the FIR in the Xover section, a trick can be used for getting the result.
Particularly, we coujld say that we have three p[ossible way of using the FILTERS of the output channels.

1. 8 bands parametric Eq + IIR Xover (no FIR used): the Xover cutting frequencies can be set everywhere by the user, without limitation

2. 8 bands parametric Eq + FIR Xover (no IIR used): the Xover cutting frequencies can be set everywhere above 250Hz/300Hz by the user, no reasonable slopes can be achieved with the FIR for lower cutting frequencies.

3. If necessary to set a cutting Frequency for a Lp or Hp below 250Hz, but still we'd like to have the IFR available, eventually for working with imported coefficients, a trick for getting the result can be used.
If we'd like to combine the IIR filters for Hp/Lp for low frequencies and still have FIR filters available, let say for further filtering, as PEQ one or any sort of phase configuration, then the user can operate in the following way, "sacrificing" some of the filters of the PEQ: the user can create the Low Freq Hp or Lp, using the variable Q Hp/Lp filters available in the Peq. They are in cascade, therefore, for a Hp/Lp 48dB/Oct, you can use 4 of them leaving still 4 more filters available.

Would be necessary to consume all of them for a Bp with 48dB/Oct Hp/Lp...but is a very rare case. Anyway, in this way, the user can have the IIR Hp or Lp, plus 4 more filters for Peq correction still of Low Freq and an available FIR 512Taps which can be used as the user desires if uploading the coefficients from an external source.
The user can see each one of the PEQ Filters as a IIOrd Cell, which if set as Hp or Lp with variable Q, can give a 12dB/Oct filter.

In example, setting the Filter N1. of the PEQ, set as Lp-Q at 1kHz and with Q=0.7, then can be gotten a 12dB/Oct Butterwoth Lp Pass with 1kHz Cutting Frequency.

Selecting now the second filters also as Lp-Q, and also with 1kHz cutting Frequency, and setting the Q of the first filter to 0.55 and the Q of the second to 1.3, then a 4th order Butterworth can be set up.

Basically, to get Lp, filters from 12dB/Oct, up to 48dB/Oct, need you to set as follow the Q, given the same cutting freq. to all of them:

Butterworth

12dB/Oct -----> One Cell   / Q1=0.70
24dB/Oct -----> Two Cells   / Q1=0.55, Q2=1.30
36dB/Oct -----> Three Cells / Q1=1.95, Q2=0,70, Q3=0.50
48dB/Oct -----> Four Cells   / Q1=2.55, Q2=0.90, Q3=0.60,Q4=0.50

Linkwitz-Riley

12dB/Oct -----> One Cell   / Q1=0.70
24dB/Oct -----> Two Cells   / Q1=0.70, Q2=0.70
36dB/Oct -----> Three Cells / Q1=0.55, Q2=1,30, Q3=0.70
48dB/Oct -----> Four Cells   / Q1=0.55, Q2=1.30, Q3=0.55, Q4=1.30

Bessel

12dB/Oct -----> One Cell   / Q1=0.50
24dB/Oct -----> Two Cells   / Q1=0.55, Q2=0.80

Technical Data

Analog Input	4 x XLR electronically balanced
Analog Output	8 x XLR electronically balanced
Digital Input	2 x AES/EBU; Gain 0dBu
Minimum Load	150 ohm
THD+N	0.001% at 1kHz 0dBu
S/N	>110dBA
Ground Noise	-92dBu
Frequency Response	20Hz – 20kHz; -0.5dBu at 20Hz and 20kHz
AD & DA Converters	1 x AK5388 24bit, 4 x AK4396 24bit -96kHz
Device Presets	up to 32 User Presets
Front Panel	2 x 24 character LCD display with green LED back light 7-LED meter per input channel -15dBu to +15dBu, clip and limiter mode 7-LED meter per output channel -15dBu to +15dBu, clip and limiter mode Blue LED (Edit) per channel Red LED (Mute) per channel NAV/PM1 Rotary encoder push button switch PM2, PM3, ENTER, ESC, UTILITY push button switches EDIT/MUTE push button per channel USB type A connector
Rear Panel	(2+2) x XLR female connectors (4 x Analog Input or 2 x AES/EBU) 8 x XLR male connectors (Output) 1 x RJ45 connector for RS485 (Input) 1 x RJ45 connector for RS485 (Output) 1 x RJ45 connector for TCP-IP 1 x Ground-lift toggle switch 1 x Analog/Digital toggle switch IEC C13 16A connector; Power on/off switch
Main AC	90-240VAC (50/60Hz) – 40W
Dimensions	19"x 1.75"x 9" (483x44x229mm) 1RU
Weight, Net / Shipping	7.71 lbs (3.5 Kg) / 8.82 lb (4 Kg)

NOTE A

WIZARD FIR

After click on the button "Ins" of the Ch.A/B/C/D the system show the FIR Wizard window following:
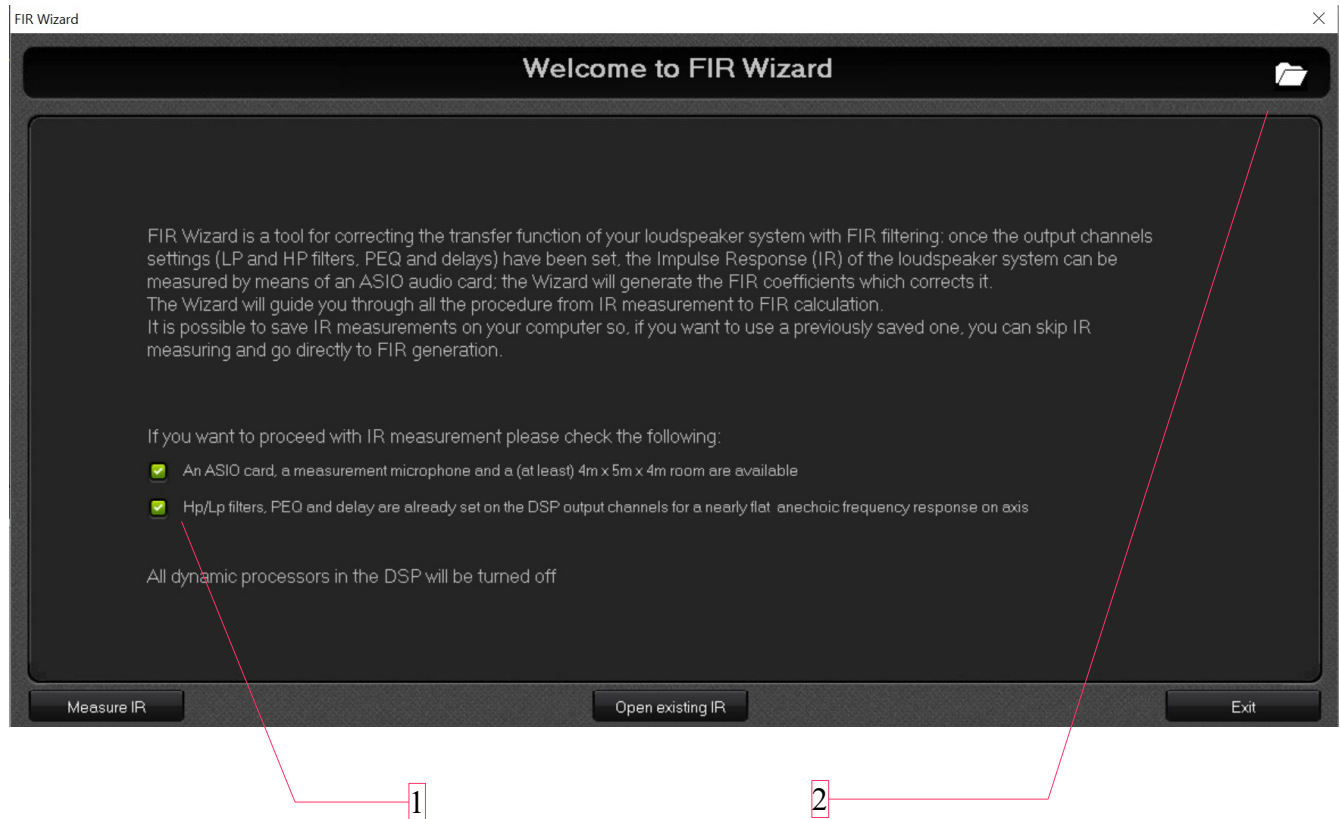
This wizard will guide the User through all the procedure from IR measurement to FIR calculation.
There are two possibility to calculate the FIR
1. Start from an existing IR
2. Measure IR

If the User have already saved one IR measurement done with this wizard and if the user not need to do a new IR measurement then the User can click on the button "Open existing IR" and load the IR saved

using the current parameter set on the wizard, or click on the icon Load (2) and load an IR saved with all parameter set on the preview measurement

If the User need a new IR measurement then user must set the check box (1) and click on the button "Measure IR"

the new window show to the User the geometry used to do a correct measurement
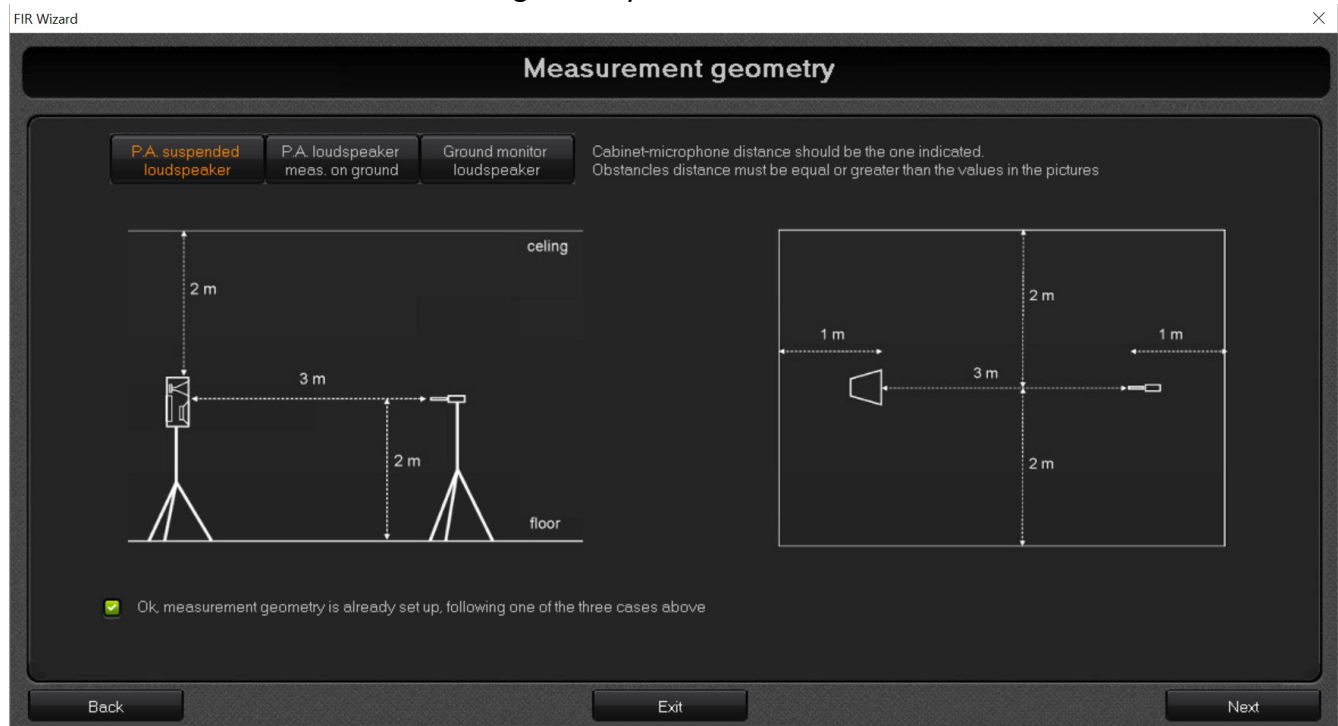

Set the check box and click on the button "Next". On the new page the User must select the Audio ASIO Card, input channel where the MIC is inserted and the output channel connected with the device

use the button "ASIO control panel" to adjust some parameter of the AUDIO Card
use the button "Test" to adjust the level of the speaker and click to "Next"
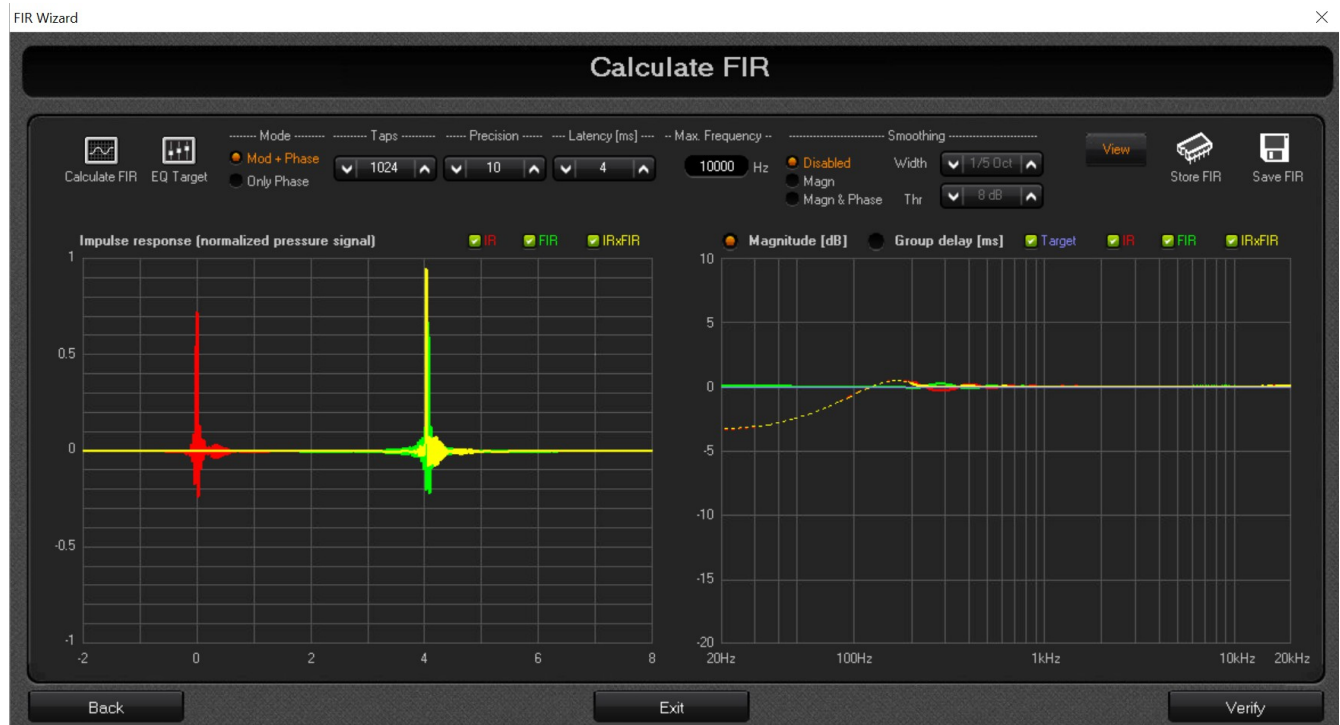
On this page, start the measurement of the IR. Click on the icon "Measure IR" and wait.

When the measurement is finished then on the graphic the user can see the IR.
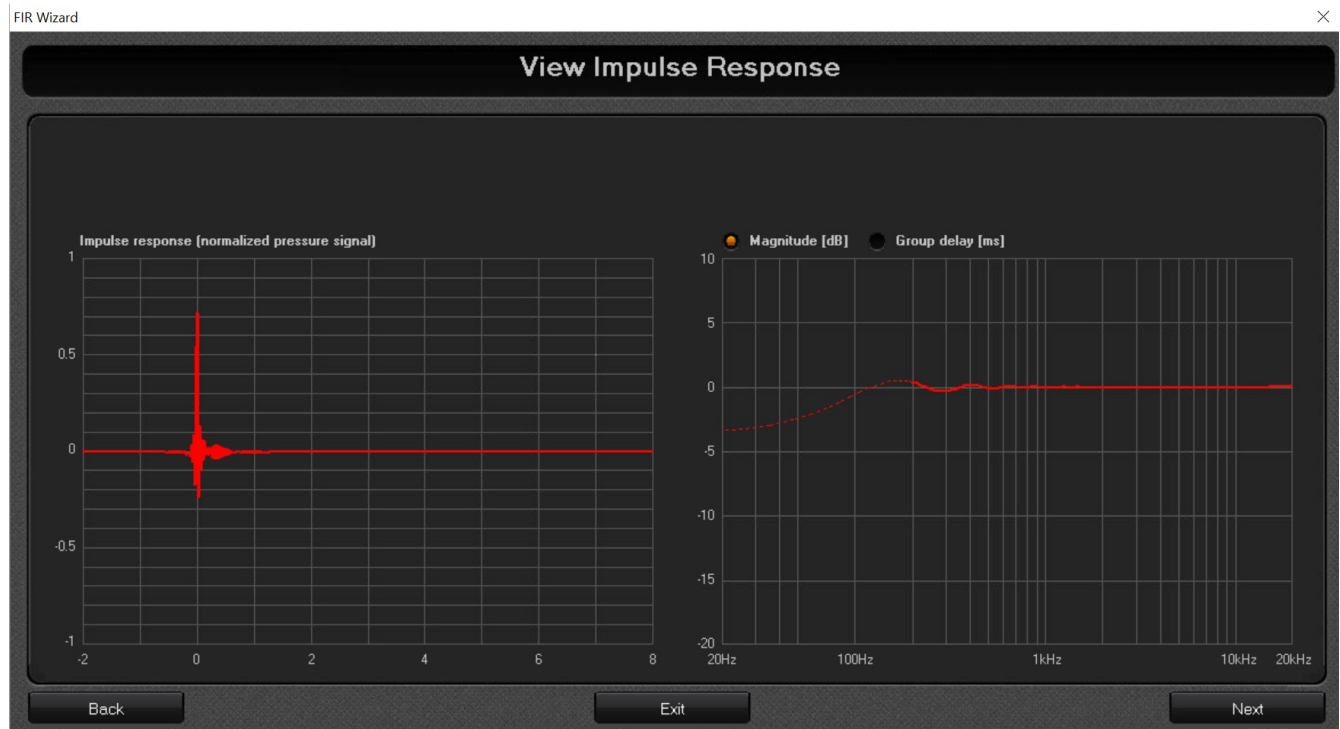
Click on the button "next" to see the calculate FIR (in green) the IRxFIR (in yellow) and the IR (in red)

Here Clicking on Eq Target, in addition to the Phase linearization, the User can request to add a target PEQ to the final response.

if the User changes some parameters (Latency, Precision, Smoothing and Max frequency) then the user must click on the Icon "Calculate FIR" to recalculate the new coefficient of the FIR.
If the FIR calculate is ok then the user must store the new filter to the device (Store FIR) and/or save the FIR to the PC (the System save to PC two file with the same name but with different extension ".Mfi" and "txt". On the txt file the FIR coefficient are in floating point with a range from -4 to +4)

After stored the FIR to device the user can verify the new FIR stored on the device after click the button "Verify"
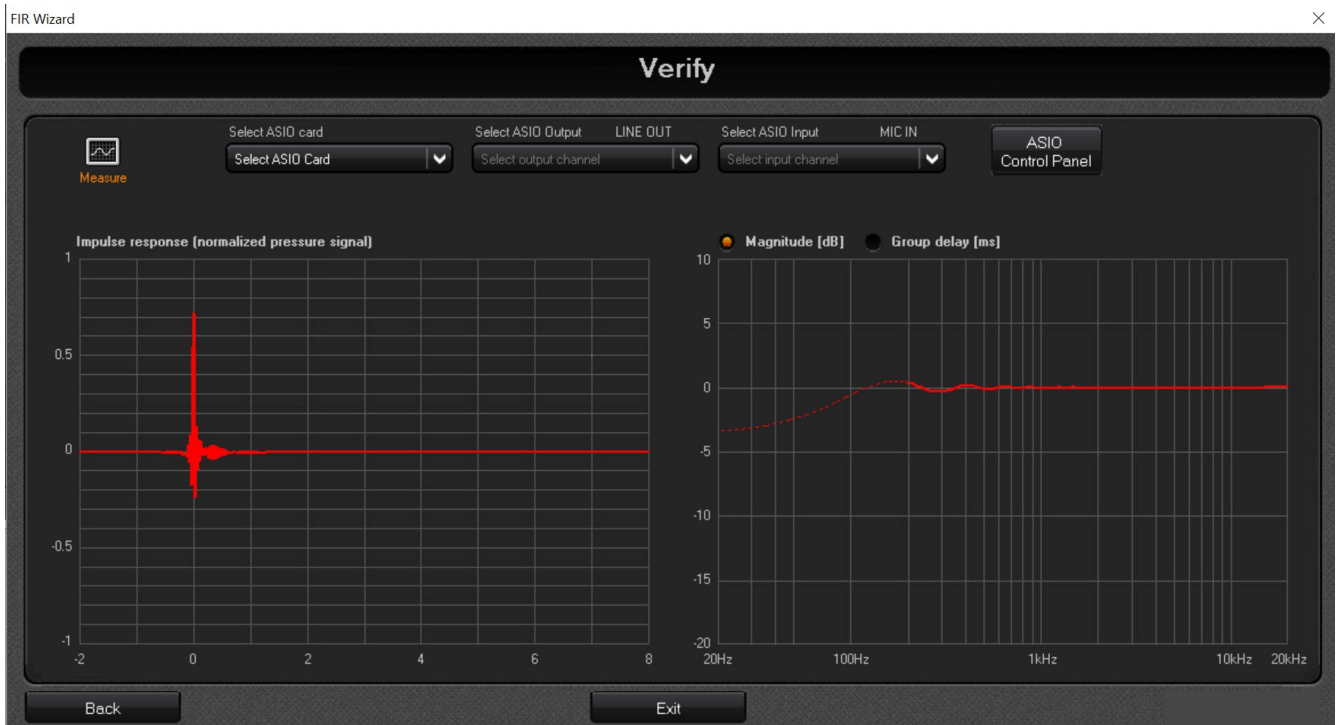
Click on the icon "measure" blinking and wait the measurement. When finish the sw show the measurement without FIR and with FIR.

Use the button "Back" to do new Calculate or use the button Exit to exit from the Wizard.
When the user use the button Exit the system ask if the USER want to save the configuration wizard on the PC in order to recall on the start page of the wizard

NOTE B

For importing External FIR Calculated coefficients into the MARANI **LPP480A**, the file format has to be the following:

FIR FILE FORMAT

- Standard floating point txt file
- One coefficient for each row
- Decimal separator: "."
- Max coefficient value: 4.0
- Max filter length (i.e. max file rows): Up to 1024 taps (shorter filters are allowed)

Just to be make sure, here below an example of "FIRFormat.txt" which can be imported by the **LPP480A**:

FIRFormat.txt

-2.65204521320808E-06
-2.1021137868951E-06
-1.21276289563775E-06
6.87446664056699E-20
1.48474417799171E-06
3.15405377541534E-06
4.88738331652021E-06
6.53749187280831E-06
7.94029938736576E-06
8.92767141156887E-06
9.34231057722965E-06
9.05364538873791E-06
7.97338946695563E-06
6.06932382028795E-06
3.37585149784821E-06
-3.4267786230259E-20
-3.87819635557018E-06
-8.01162412259308E-06
-1.20985410917215E-05
-1.5801217026279E-05
-1.87698608816692E-05
-2.06703793366999E-05
-2.12140299515895E-05
-2.01866684942683E-05
-1.74750861611266E-05
-1.30879209253108E-05

-7.16882698831868E-06
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-1.65346869744702E-04

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-3.76468640395981E-03
-3.55469356139325E-03
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-2.48730388211796E-03
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2.88087002923016E-03
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9.81608359852185E-04
9.25660752621687E-04
8.10146503352965E-04
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4.4556802921037E-04
2.25073626530612E-04
4.1575805884051E-18
-2.14262557070894E-04
-4.03789936747858E-04
-5.56998973976392E-04
-6.65321340897085E-04
-7.23640058215945E-04
-7.30470081065933E-04

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-4.78434250636747E-04
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-1.66290299031671E-04
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-1.69425708251993E-04
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-5.47033667035977E-19
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1.50099472016755E-04
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