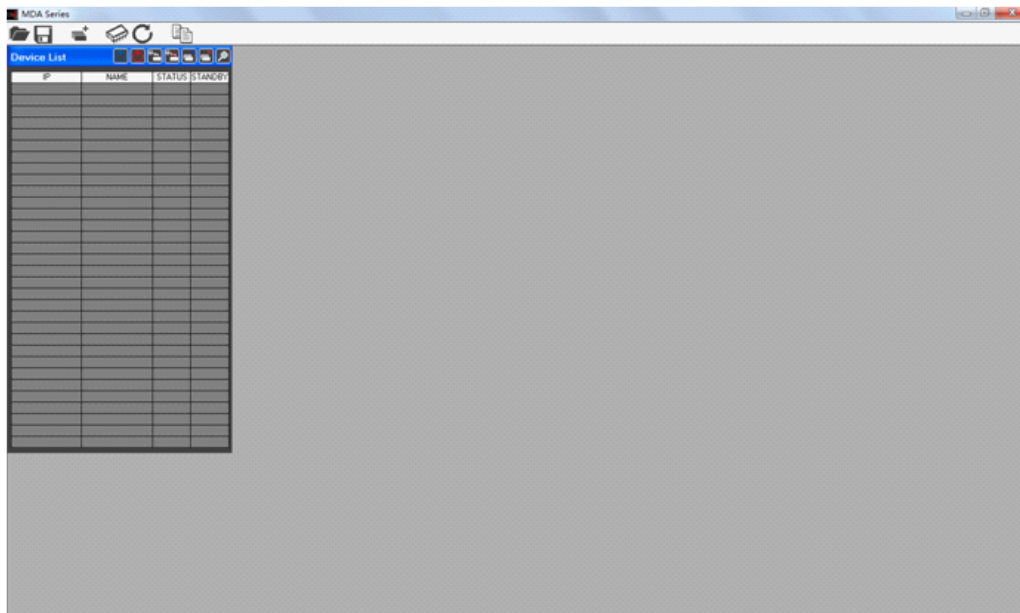# MDA4-1000M Quick User's Guide

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 "**MDA4-1000M**" then the system show the following window

and after few seconds the main window

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

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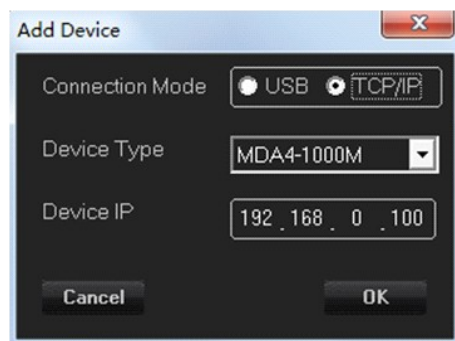

fig.1

fig.2

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.

If the **TCP/IP** is selected, please insert the IP address of the device that the User want to connect.

On the PC SW, user can also click the "**Search Device(s)**" button, so the MDA4-1000M can automatically detect if USB or Tcp/Ip Interface Is used, therefore no need to set anything at Amplifier level on the LCD interface.
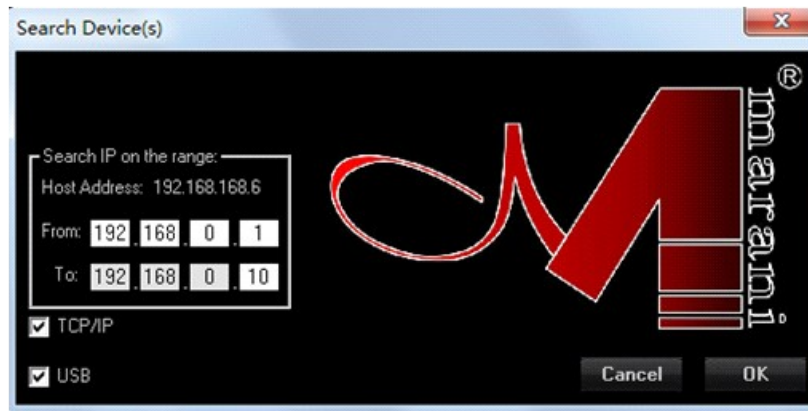
Once decided the Interfacing Connection and set the necessary parameters there where required, from the all USB and TCP/IP windows, press the button "OK" and the system will start to check the device(s).

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 **MDA4-1000M**.
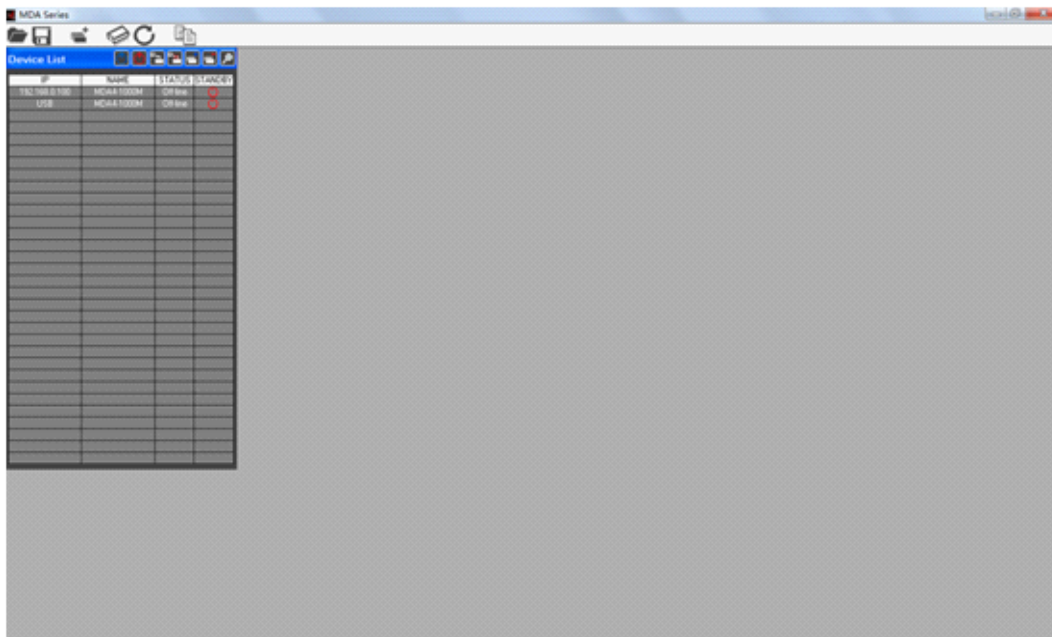
to edit the device, double click on the name of the device present on the "Device List".

The first Window will open is indicating the following, if the current Status of the Amplifier is the Stand By Mode.
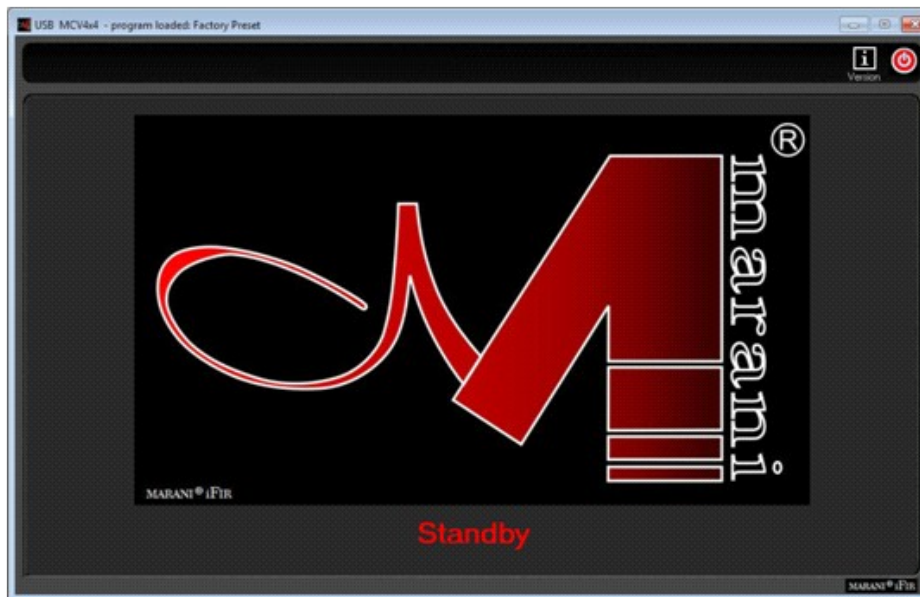
The MDA4-1000M in facts, can be set in Stand By Mode, when not operative so enter e low power consumption status without the necessity of turning it OFF.

When in Stand By, the Amplification stages aren't powered, but still is powered the digital and logic part of the unit which can therefore be remotely controlled and operated.

NOTE: USB and TCP/IP interface are "concurrent" which means that both connection can work together. This is allowing in example the user to connect through Tcp/Ip with more Pc on the same network.

If in Power Mode the MDA4-1000M will show on the remote control Sw the following screen, so as a similar one is displayed on the graphic LCD of the Unit.
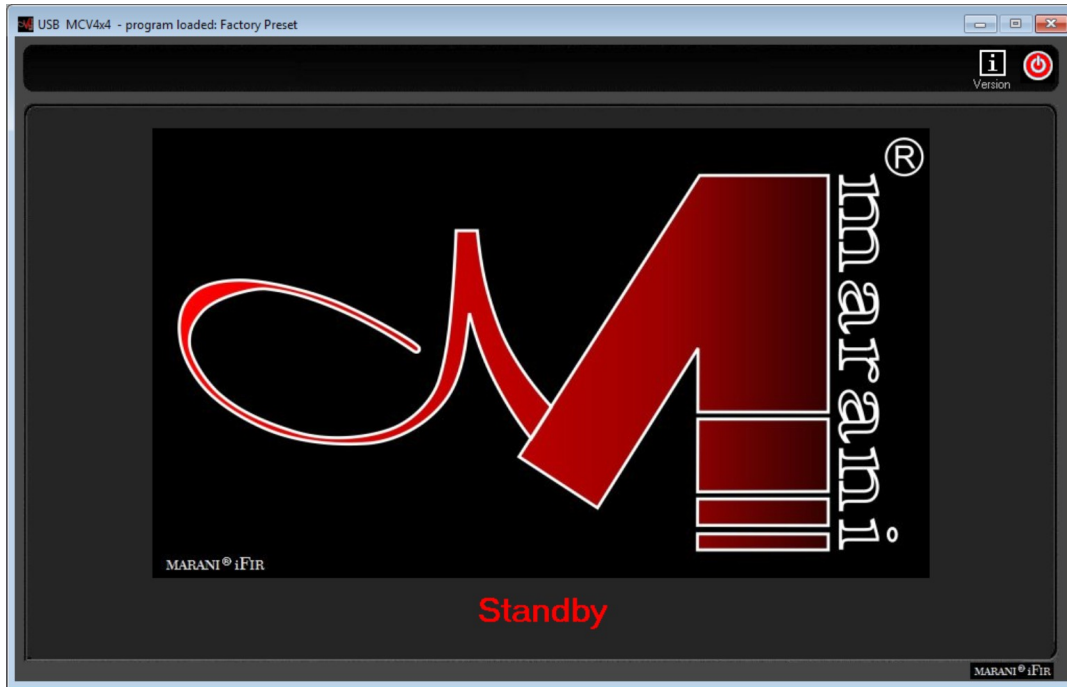
To Exit the eventual Stand By Mode, need to press the red On/Off button on the right of the top bar.

EDITING Windows

on the Edit window is possible edit all parameters of the Input and output Output channel, save and load configuration on the sw PC, 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 50 available locations within the **MDA4-1000M**. 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 50 available locations within the **MDA4-1000M**. The configuration loaded will be the one edited with its parameters set on the several editing windows.

Pwd: User can set a new password by clicking this button and input the current password as well as password the user prefers to use.

Lock: Click this button, and input the default password "000000", user can lock the front panel touchscreen and the editing functions on the PC SW. Once it's locked, user can only review the parameters. To unlock only needs user to input the passwork again.

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. (so, if linked two channels where one of them had the Eq, in example, in bypass, then modifying the parameters of a filter on the NOT bypassed EQ, channel, the parameters of the previously bypassed Eq. channels will

NOT be modified...)

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: buttons allowing to access the OUTPUT CHANNELS Editing Pages
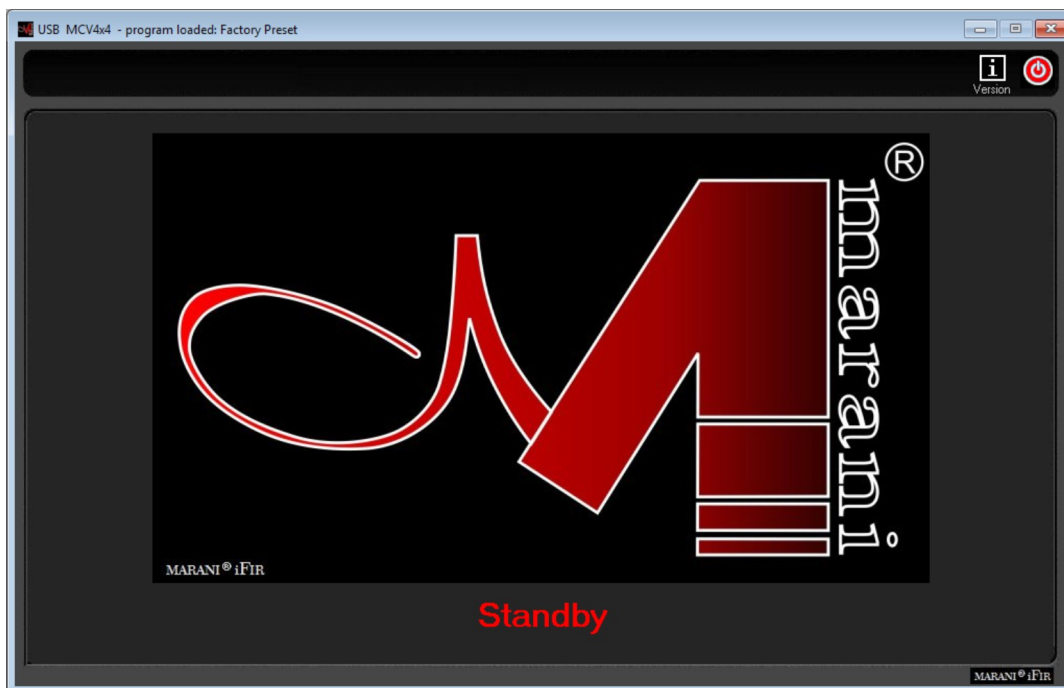
i: info button, giving information about the Firmware and Pc Sw version.
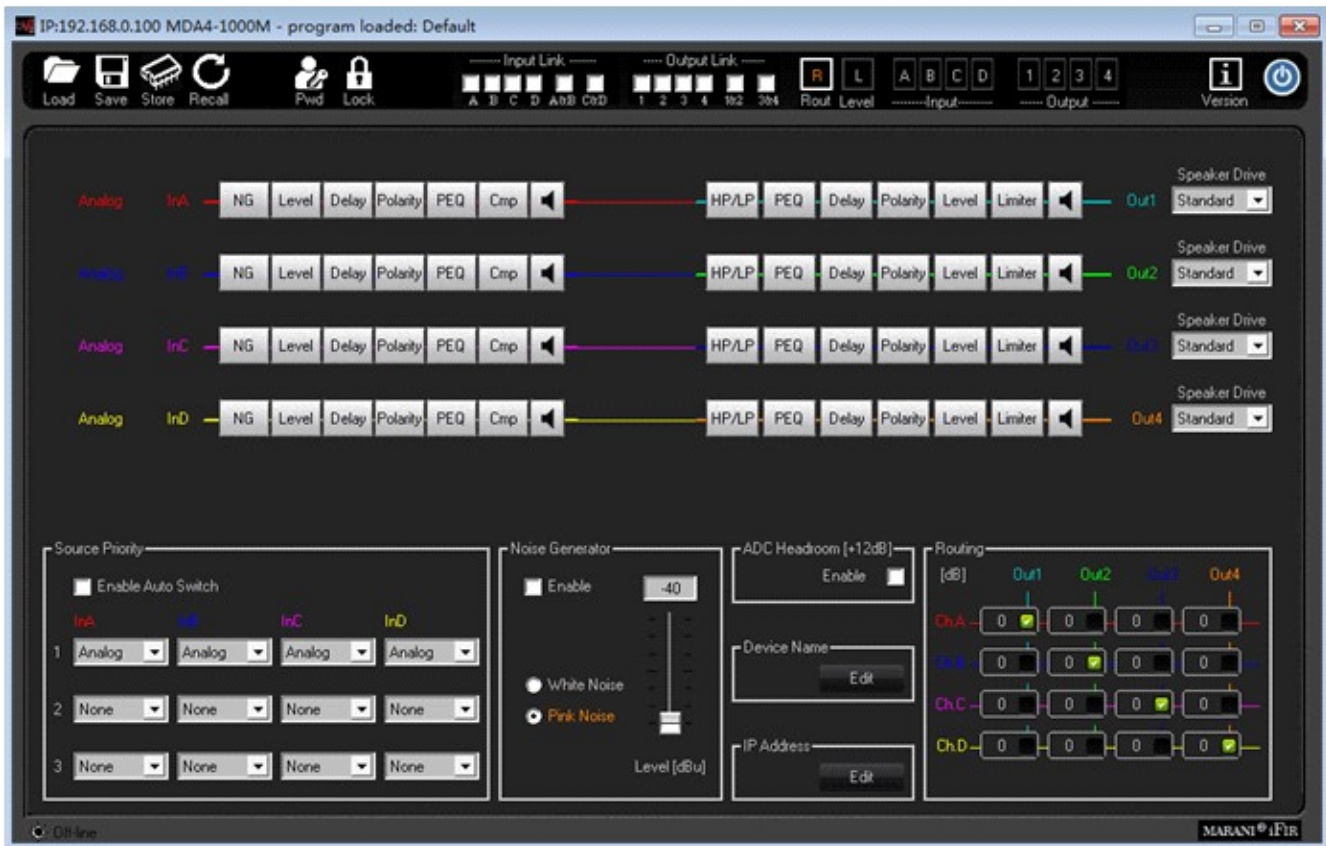
The Icon ....

when clicked Is allowing to set in Stand By Mode the MDA4-1000M.
In that case, the Sw will display the Stand By Mode window. So as the Unit's LCD.

ROUTING WINDOW

This Window is guesting a synoptic image of the several processes available on the Input and Output paths of the **MDA4-1000M**, so as the Menus for the selection of Input sources and Signal Routings.

Input Source selection: The Signal Sources to the **MDA4-1000M** inputs can be selected in between several options, in alternative to each others. A scroll bar Menu for the selection is available at the beginning of the Channels synoptic images
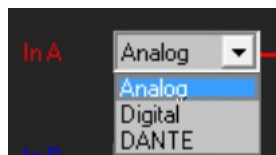
the available input sources are:

- **Analog Input** is selecting as Inputs for the **MDA4-1000M** input channel, the ANALOG INPUT coming from the XLR Balanced connectors on the unit's back panel. The Max Input Level is +20dBu.

- **Digital Input** is selecting as Inputs for the **MDA4-1000M** output channel, the DIGITAL INPUT coming from the AES XLR Inputs on the unit's back panel.

- **DANTE input** is selecting the DANTE input coming from the DANTE Interface embedded within the Amplifier

- **Noise Generator** is selecting as Inputs for the **MDA4-1000M**, the White or Pink Noise generated internally by the Unit and controlled in Level by the related Slider ranging from -40dBu up to 0dBu.

Each Input Channel can have a different Input Source, with the exception of the Noise: when Noise is selected, the all Input channels have it as Source.

Source Priority frame: By assigining priority among different channels, and click the "Enable Auto Switch" button, once the priority 1 source is lost, the unit will switch to the priority 2 source automatically. If the priority 2 input source is lost, then it will switch to priority 3 source automatically.
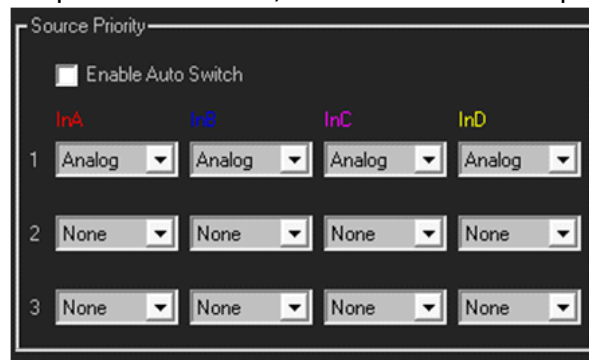
Note: Before to set the source priority, please confirm the current input source.

ADC Headroom [12dB] frame: checking the ADC Headroom box, an internal process is made active, which is allowing to have onto the MDA4-1000M A/D converters a +12dB headroom. This means that the MAX output level of the Amplifier is reached yet when the input signal is at -12dBu from the Max accepted level accepted by the A/D converters. Each increase of the Input level in front of the A/D from the -12dBu, is contained by an internal Clip Limiting process. This feature is allowing to get then the Max power delivered by the Amp when still 12dB of Headroom are available on the Inputs, so allowing to have already the Max Power performances and avoid Clips there where the input signal is Exceeding the -12Dbb from the max acceptance.

IP Address frame: here is possible, clicking on "setting", to enter the following window
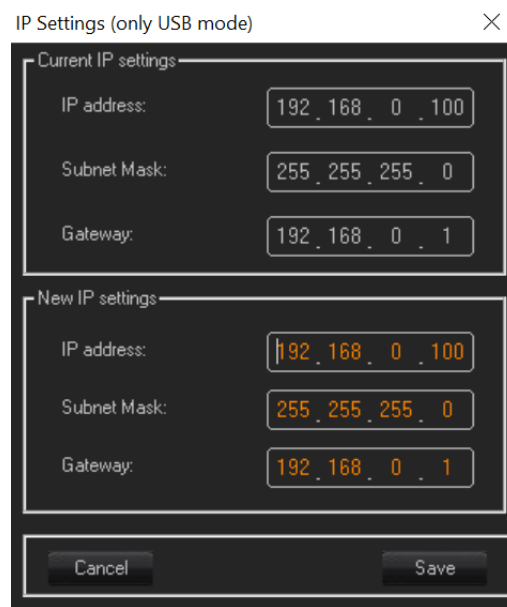
Within this window, the user can assign to the MDA4-1000M a specific IP address.

This is useful when more MDA4-1000M are in a network and need to access them from remote controls: once more MDA4-1000M with different IP addresses are in the same network, the Pc sw, scanning the network, can find all of them, to list all of them on the ID side bar of the Main Window when launched the Pc Sw and to edit each one of them independently from the same "shell".

**Device Name** frame: this is used to edit the name of the device.
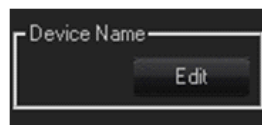
Clicking the "edit" button, we will see a conversation window as below. Input the preferred name, click "OK" to save. To discard only need clicking "Cancel" button.


Routing 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 **MDA4-1000M** 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.

Speaker Drive selection: at the end of each output channel in the synoptic image, there is a scroll bar menu, allowing to select the way of driving the Speakers connected to the output itself.
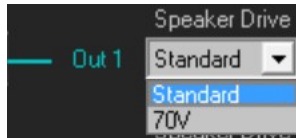
The MDA4-1000 give the possibility on each channel independently, to drive Standard loads or Constant Voltage lines. Particularly, the selection "Standard" is used fo driving standard loads and "70V" for Direct Driving 70v Constant Voltage lines.

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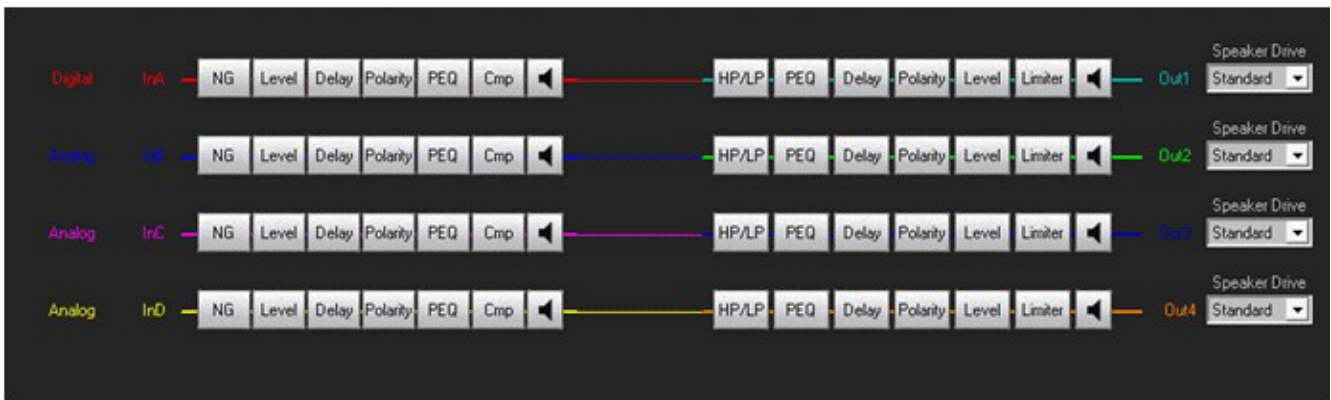
GAIN WINDOW
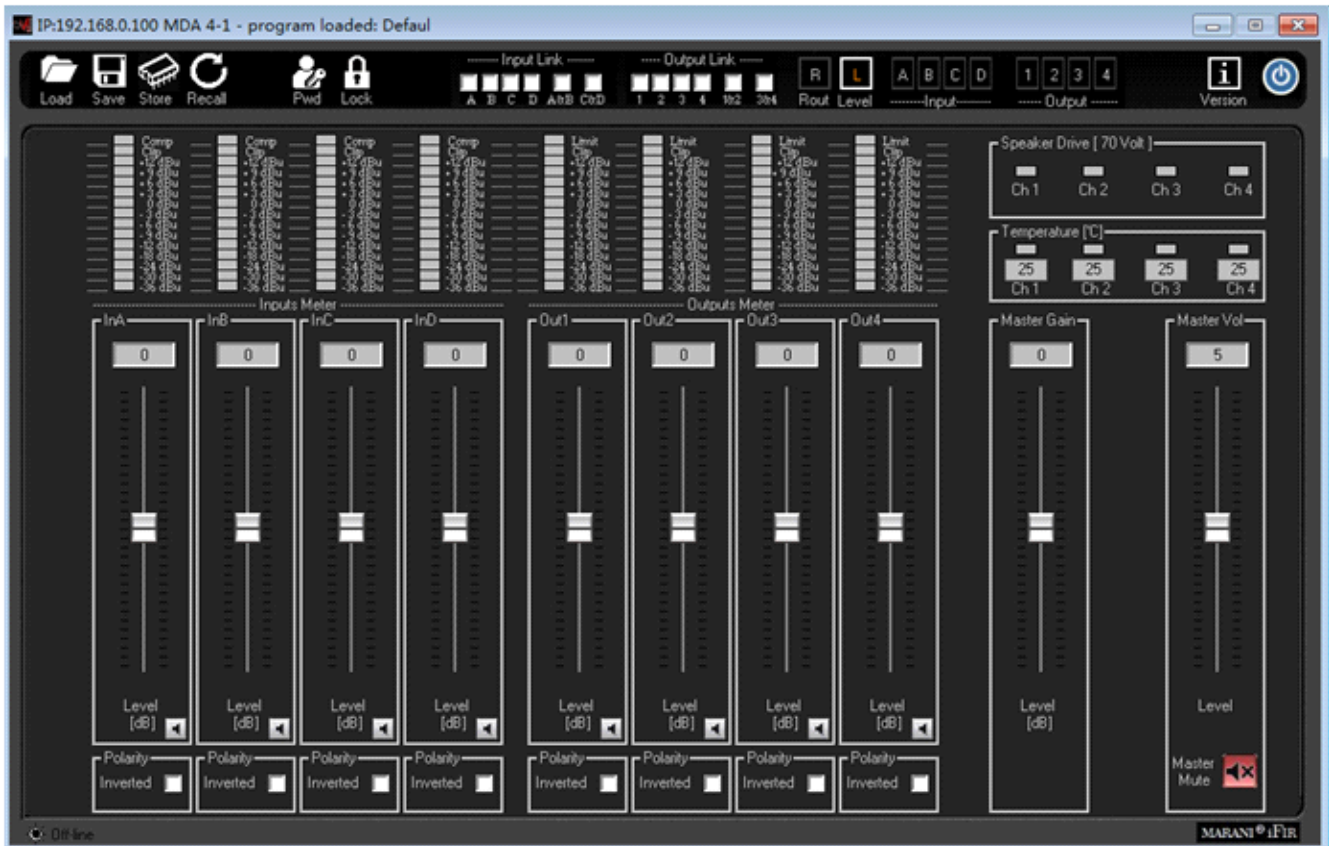
This "simple" window is allowing a quick control of the Input and Output Gains, so as the Input and Output Mutes. More, a complete "one shot" view of the ALL Input and Outputs Meters is given here.

IMPORTANT NOTE: the **MDA4-1000M** 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 **MDA4-1000M** 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. [*Note that this algorithm is different from the one used for the 12dB Headroom on the A/D converters, being the one here described "containing" digital potential overflows coming from the internal DSP processes*]. When overflow over 12dB occurring on the internal processes, 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 -36dBu up to +12dBu. 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.
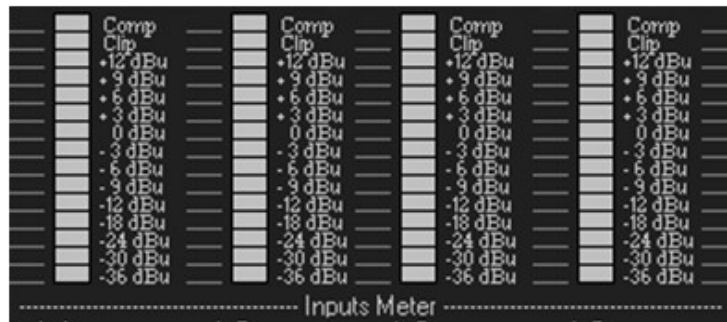
Output Meters: the output meters show the output levels from -36dBu up to +12dBu. The Limit Led is indicating if the RMS Compressors or the Peak Limiter. The Clip Led is indicating if the Clip limiter Algorithm described here above is active on the Output path.
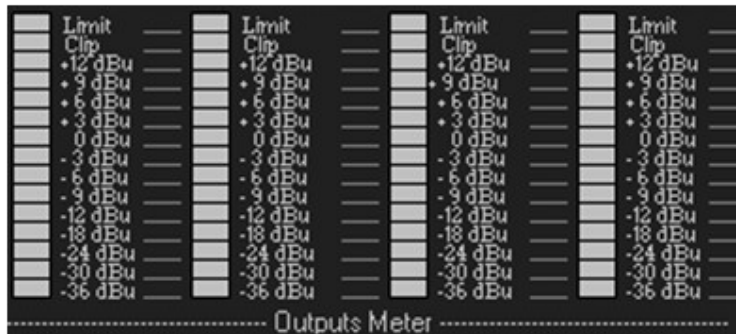
Sliders: the sliders control the Input/Output levels ranging from -12dBu up to +12dBu. By double click the slider, can be back to the "0" position directly.

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

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

Master Gain: the Master Gain control is allowing to add an "extra" Gain to the ALL Inputs at the same time. This added Gain is ranging from -12dB up to +12dB

Master Vol: the Master Vol control is allowing to add an "extra" Level to the ALL Outputs at the same time. This added Level is ranging from 0dB up to +10dB

Temperature frame: within this frame, the current temperature of the Power Stages on each Output channel, is indicated. Particularly

- Ch1/2/3/4 : temperature of each channel in °C
- Red Led (THERMAL): when it is ON (light red) the channel enters in mute/protected mode
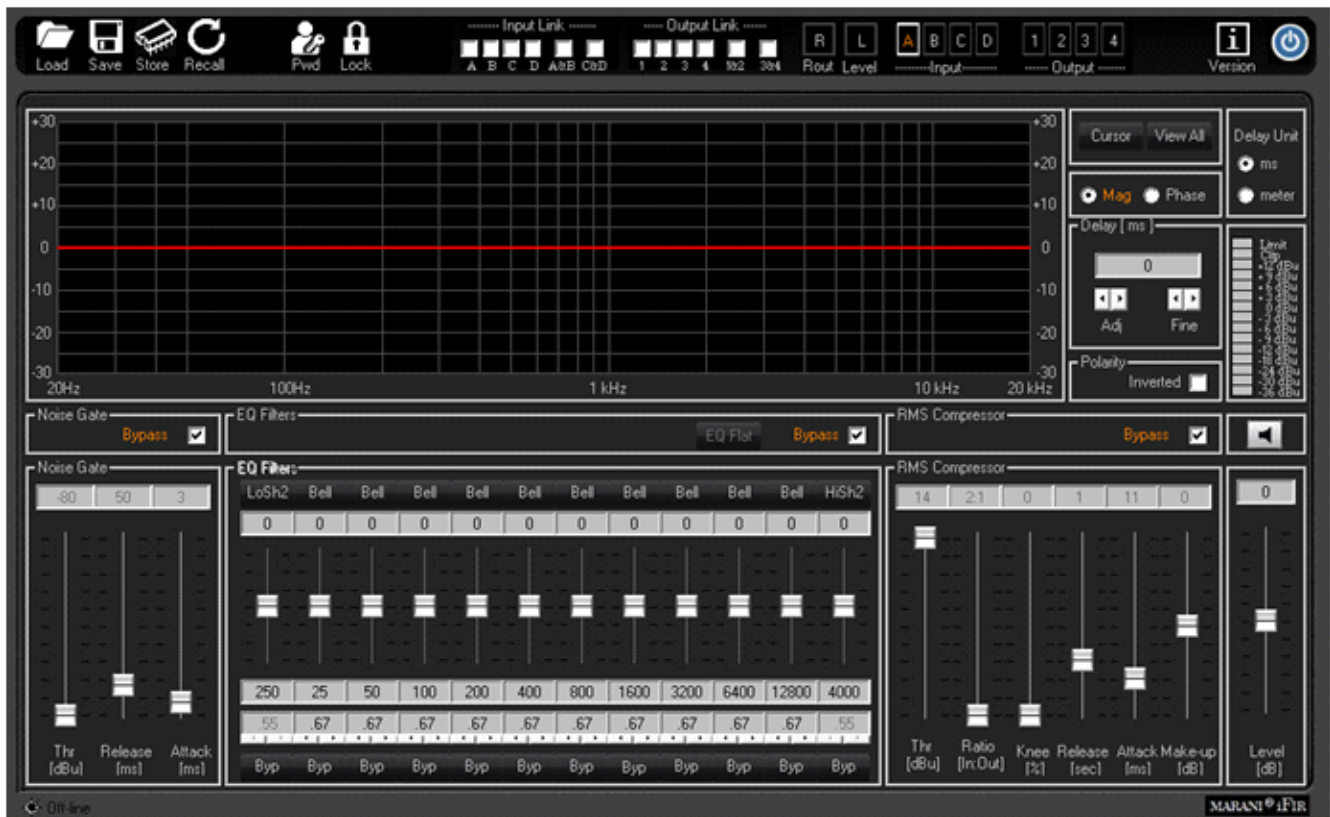
The MDA4-1000M is setting in Protection Mode the Power Stages when the temperature is T > 85°C
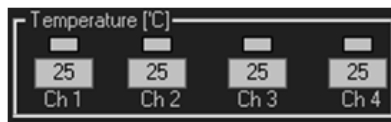
Speaker Drive frame: here is displayed, as reminder, what's the setting of each output channel in term of Speaker Drive Mode:

- 70V orange led: when it is ON (light orange) the constant voltage limiter is enabled.

INPUT WINDOW

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

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
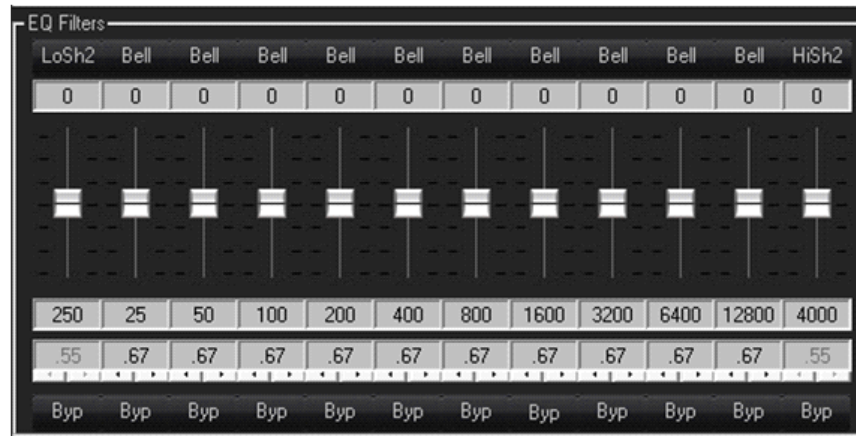- **Attack**-time: from 1ms to 1sec step variable
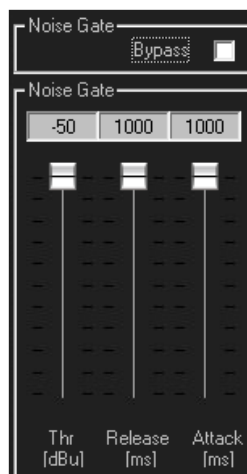
Eq Flat and Bypass Controls: the EQ Flat control is allowing to flat in one shot the 12 bands Parametric Eq. The Bypass control, instead, is allowing to temporarily Bypass the Eq, without resetting the current setting.

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 $1^{st}/2^{nd}/Q$** (classic first and second order and symmetrical ones with variable Q), **Lp/Hp $1^{st}/2^{nd}/Q$** (classic 6dB/Oct first order, 12dB/Oct second order and variable Q), **Band Pass**, **Notch**, **All Pass $1^{st}/2^{nd}$ Ord**.
- **Gain**: the filter types which can gain, have the gain controlled by a slider ranging from -15dBu up to +15dBu.
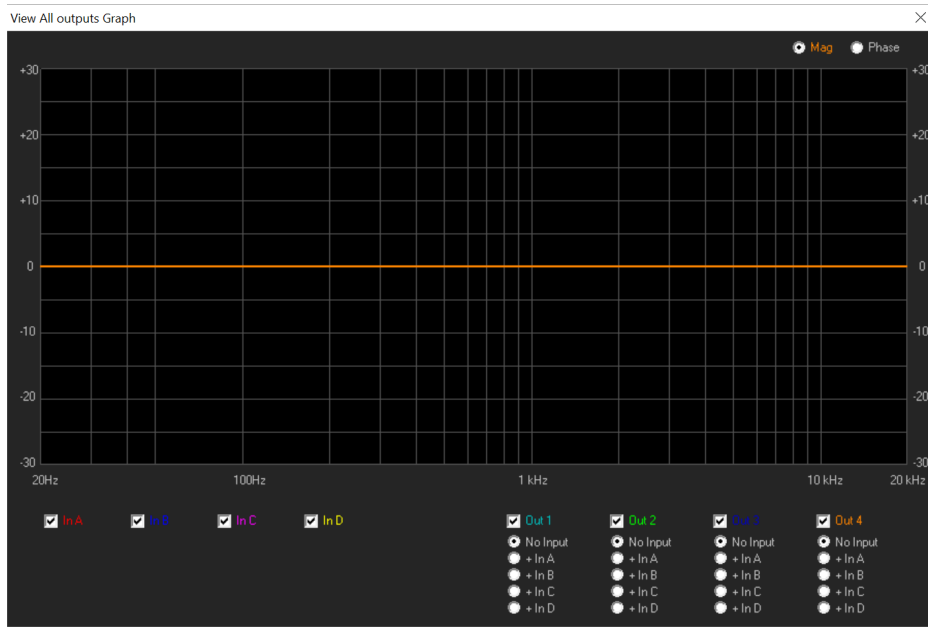- **Freq**: here can be inserted the Center, Cutting Frequency of the selected filter, ranging from 20Hz up to 20kHz.
- **Q**: there where usable, the Q can be set with a range depending from the selected filter.
- **Byp:** any filter of the 12 of the Parametric Eq, can be singularly bypassed, so to 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 = 500.998ms =170.340meter)

RMS Compressor: the **MDA4-1000M** 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.
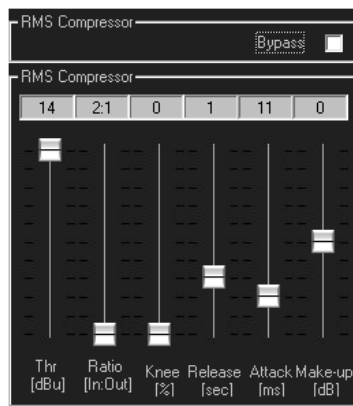
- **Bypass**: Compressor Active or not (Note that the all parameters here below are not accessible when the Compressor is set in Bypass)
- **Threshold:** from -16dBu to +14dBu step 0.2dBu
- **Ratio**: [input:Output] from 2:1 to 32:1 step 1
- **Knee**: from 0% to 100% (0% hard knee, 100% soft knee

- **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

Gain slider: this slider is allowing to set the Input Channel Gain and it is the same control available also in the Gain Window: they in facts are linked and reporting the same setting.
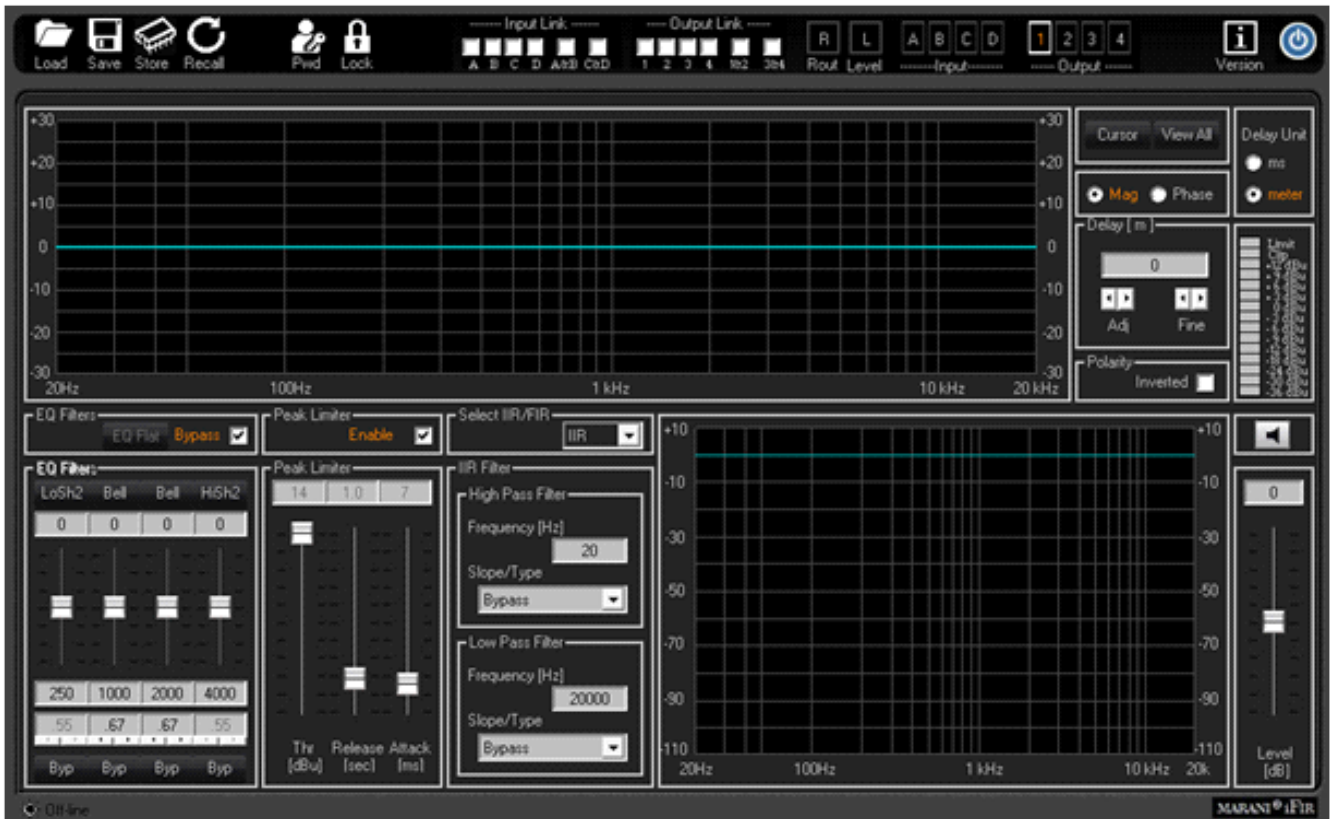

VuMeter: so as the Gain slider, the VuMeter is reporting the same information of the one available on the Gain window, and particularly is showing the input channel's Signal level, Dynamic process Active/Not Active and eventual engagement of the internal Overflow Clip Limiting process.

A button of MUTE channel is also available within this window.
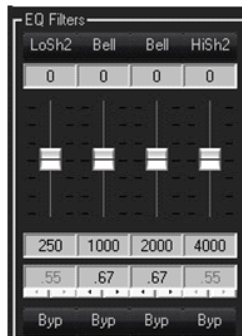
OUTPUT WINDOW

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 4 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 4 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 4 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 = 340.998ms =115.940meter)

Peak Limiter: a Peak Limiter for Loudspeaker protection is available
- **Bypass**: Peak limiter Active or not
- **Threshold:** from -14dBu to +16dBu step 0.2dBu
- **Release**-time: from 0.1sec to 5sec step variable

Gain slider: this slider is allowing to set the Output Channel Level and it is the same control available also in the Gain Window: they in facts are linked and reporting the same setting.

VuMeter: so as the Gain slider, the VuMeter is reporting the same information of the one available on the Gain window, and particularly is showing the output channel's Signal level, Dynamic process Active/Not Active and eventual engagement of the internal Overflow Clip Limiting process.

A button of MUTE channel is also available within this window.

Xover Section

The Xover Section of the MDA4-1000M 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 MDA4-1000M 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
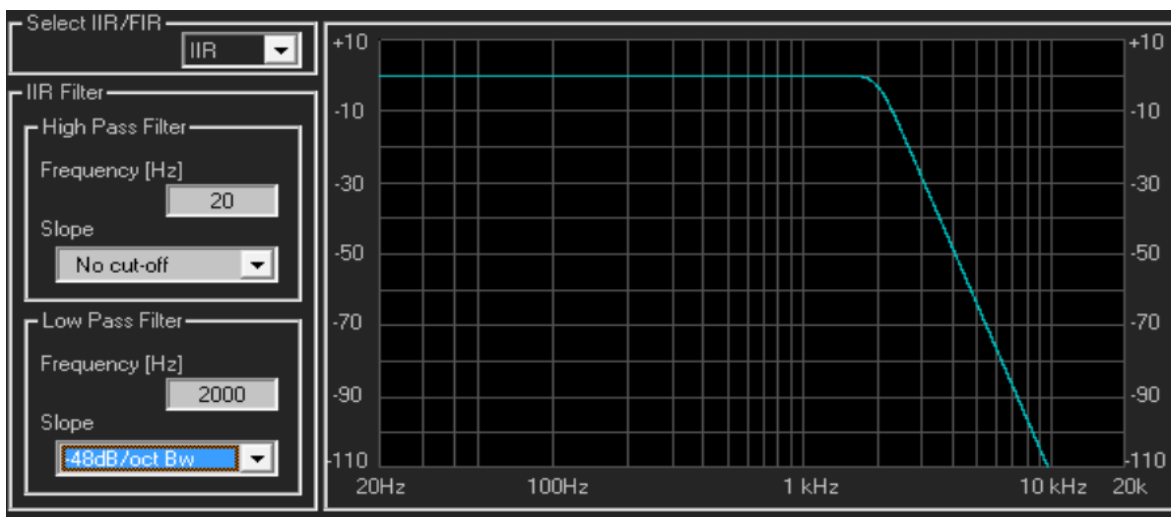

To edit the Hp or LP filter cutting frequency, input the value on the text box and press enter (Frequency from 20Hz to 20kHz step 1Hz)

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 IIR Hp/Lp, and the interface for the IIR filters setting is the following
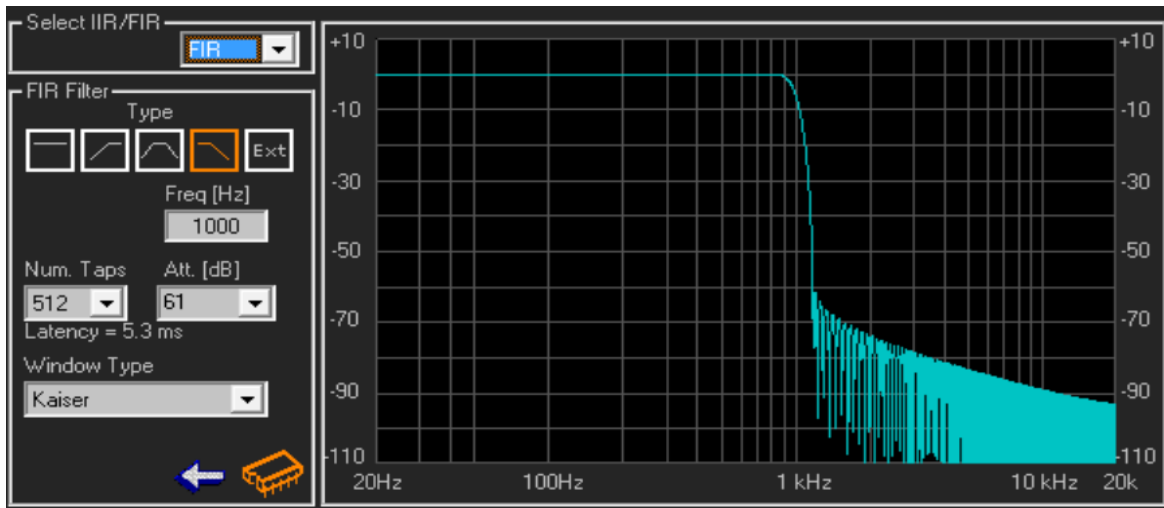
Here is possible to select the FIR type, and the all parameters for its configuration.
Particularly,

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:

$$FIR\ Latency = Ntaps/2\ x\ Ts = Ntaps\ x\ Ts/2 = Ntaps\ x\ 10.4us$$

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 **MDA4-1000M** 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 **MDA4-1000M**, 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.
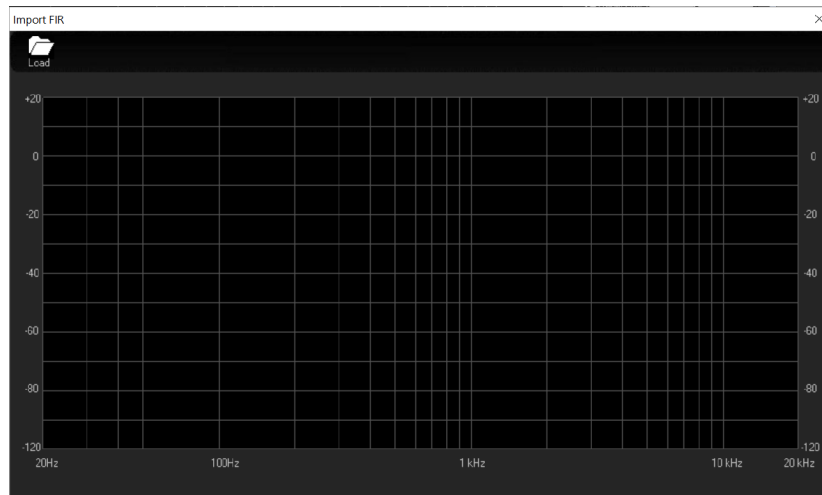
The Amplitude and Phase responses can be seen on the graphic which will show the characteristics of the imported filter.
- **View** : once imported, or even internally generated, the FIR coefficients, the response of the FIR can be seen recalling it on graphic just pressing the 'View " button.

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 could say that we have three possible way of using the FILTERS of the output channels.

1. 4 bands parametric Eq + IIR Xover (no FIR used): the Xover cutting frequencies can be set everywhere by the user, without limitation

2. 4 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 the 4 Filters of the PEQ..

Anyway, in this way, the user can have the IIR Hp or Lp and an available FIR 512Taps which can be used as the user desires if uploading the coefficients from an external source, using the FIR itself also for eventual Peq setting together with other features.
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
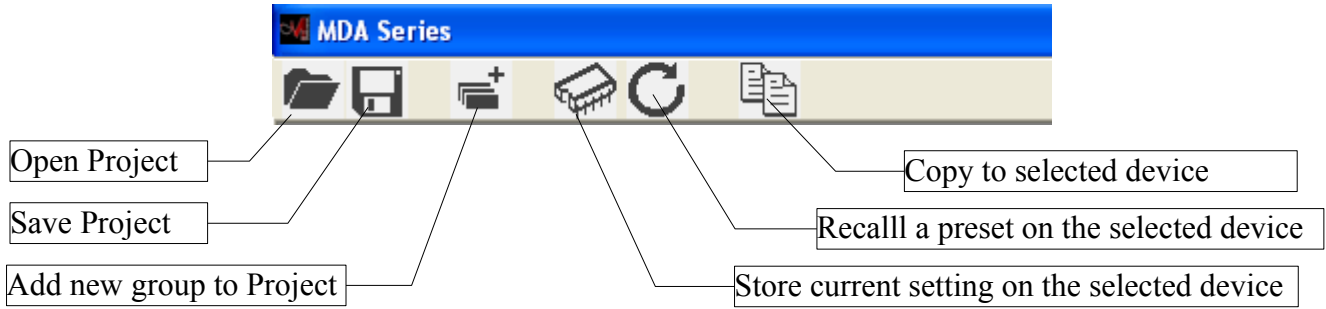

Linkwitz-Riley

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
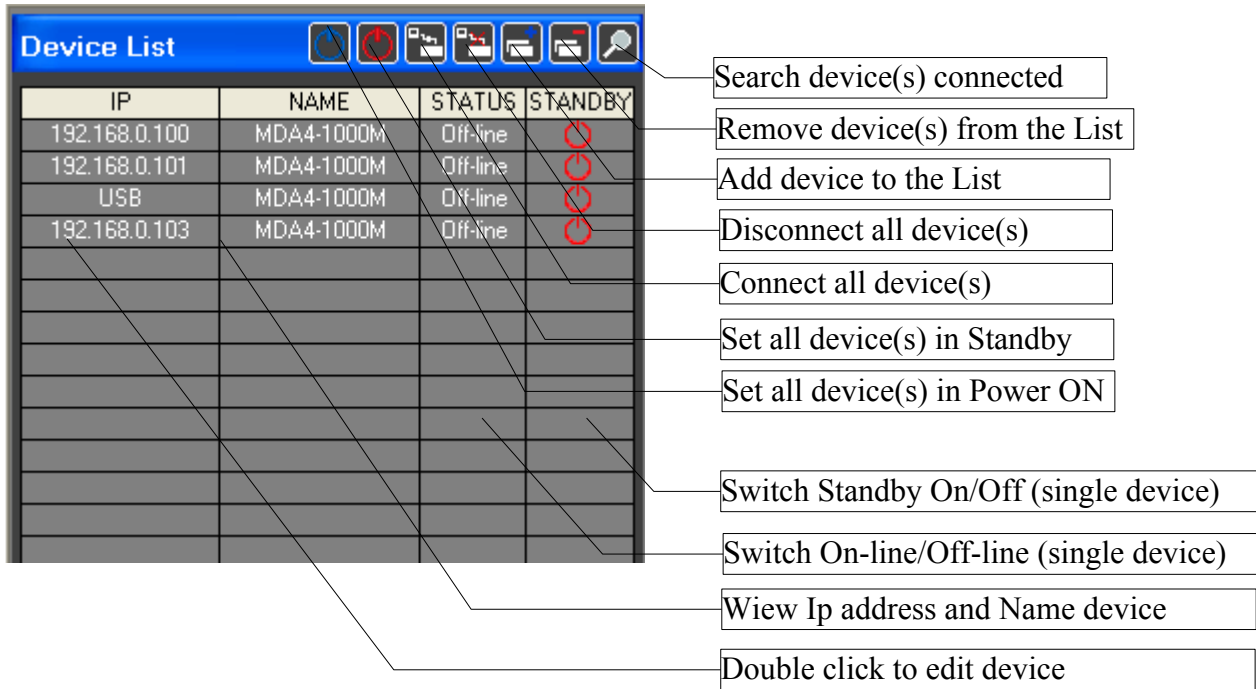48dB/Oct -----> Four Cells   / Q1=0.55, Q2=1.30, Q3=0.55, Q4=1.30

Bessel

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

Group Function Introduction
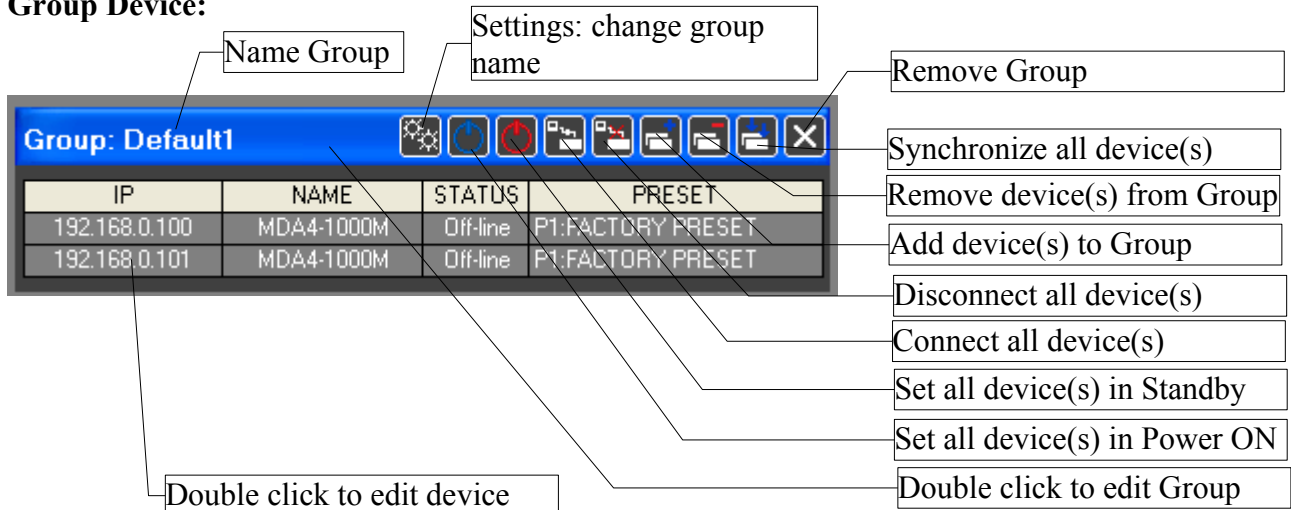
Main window:

| MDA Series |

Open Project

Save Project

Add new group to Project

Copy to selected device

Recalll a preset on the selected device

Store current setting on the selected device

Device List window:

| Device List |
IP	NAME	STATUS	STANDBY
192.168.0.100	MDA4-1000M	Off-line	
192.168.0.101	MDA4-1000M	Off-line	
USB	MDA4-1000M	Off-line	
192.168.0.103	MDA4-1000M	Off-line	

Search device(s) connected

Remove device(s) from the List

Add device to the List

Disconnect all device(s)

Connect all device(s)

Set all device(s) in Standby

Set all device(s) in Power ON

Switch Standby On/Off (single device)

Switch On-line/Off-line (single device)

Wiew Ip address and Name device

Double click to edit device

Group Device:

Name Group

Settings: change group name

Remove Group

| Group: Default1 |
IP	NAME	STATUS	PRESET
192.168.0.100	MDA4-1000M	Off-line	P1:FACTORY PRESET
192.168.0.101	MDA4-1000M	Off-line	P1:FACTORY PRESET

Synchronize all device(s)

Remove device(s) from Group

Add device(s) to Group

Disconnect all device(s)

Connect all device(s)

Set all device(s) in Standby

Set all device(s) in Power ON
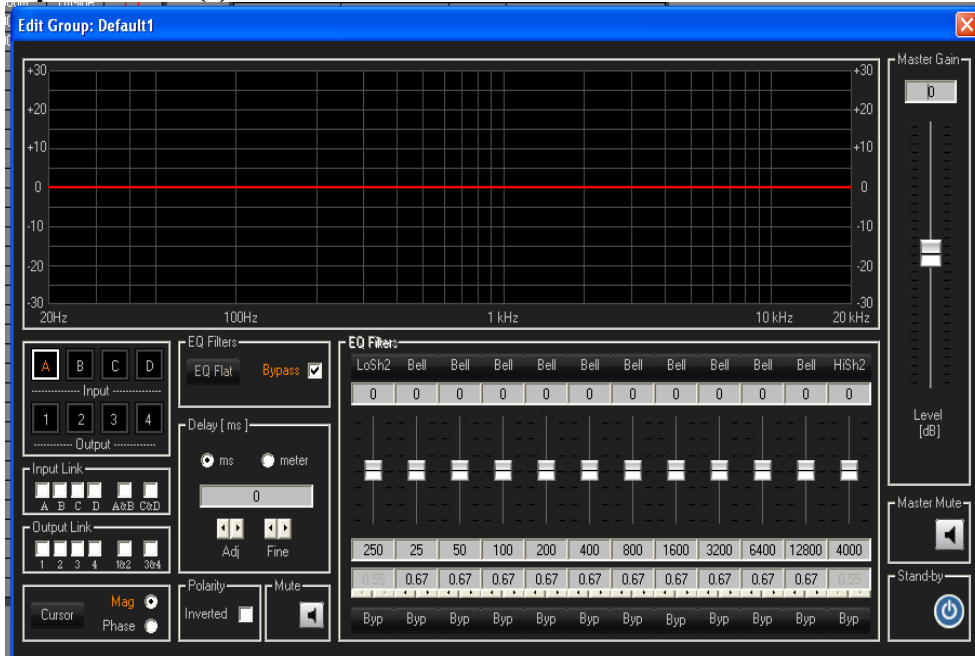
Double click to edit Group

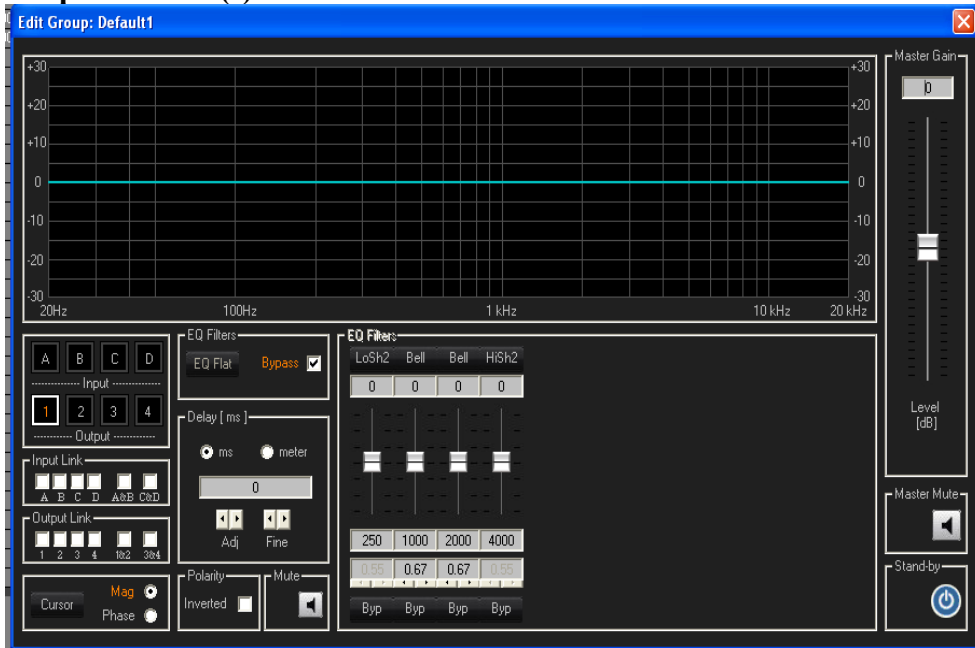Double click to edit device

Note: On the Group is not possible to insert device working in USB mode
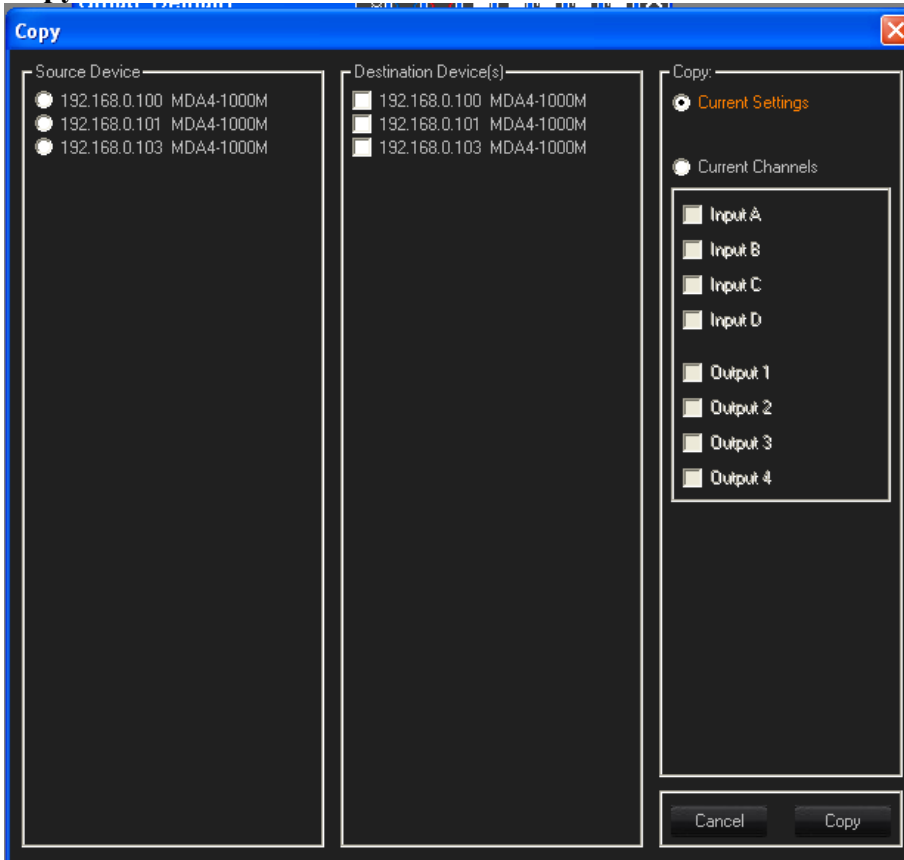
Group Edit window:

Input channel(s)

Output channel(s)

Each parameters changed on the interface will be update on the devices present in the group
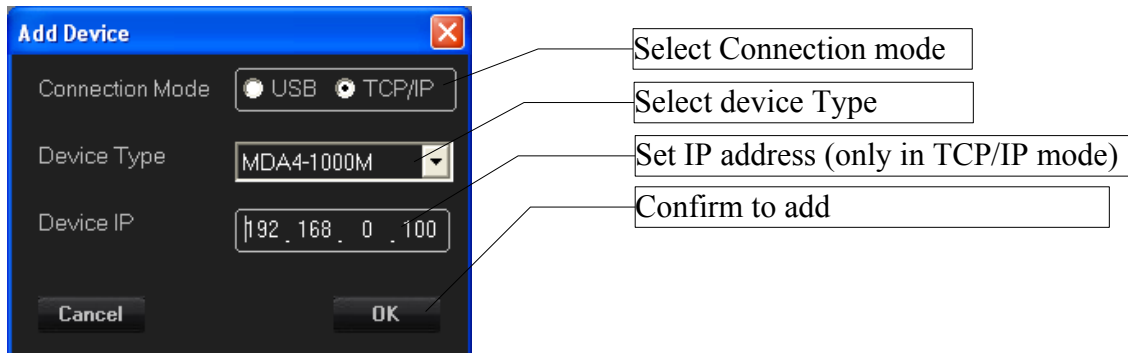(if the device is not locked, see later the locked parameters).

Copy window:

The User can:
1. select only one source device (if connected)
2. select severals destination devices (if connected)
3. Choise the copy:
   - Current setting
   - one o more channels
– the number of the channel shown dipending from the sorce device (4x4, 2x3, 2x2)

Add Device to "Device List":

Select Connection mode

Select device Type

Set IP address (only in TCP/IP mode)

Confirm to add

– The user can add on the list only one device with "Connection Mode = USB".
– When the system try to connect the device via USB, then the system check the COM from 1 to 64
– Device Type: MDA4-1000M (4x4), MDA4-2000PS (4x4),MDA3-1000M (2x3), MDA2-2500P (2x2)

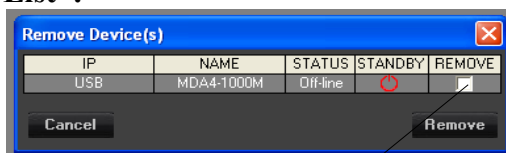**Store and Recall window:**
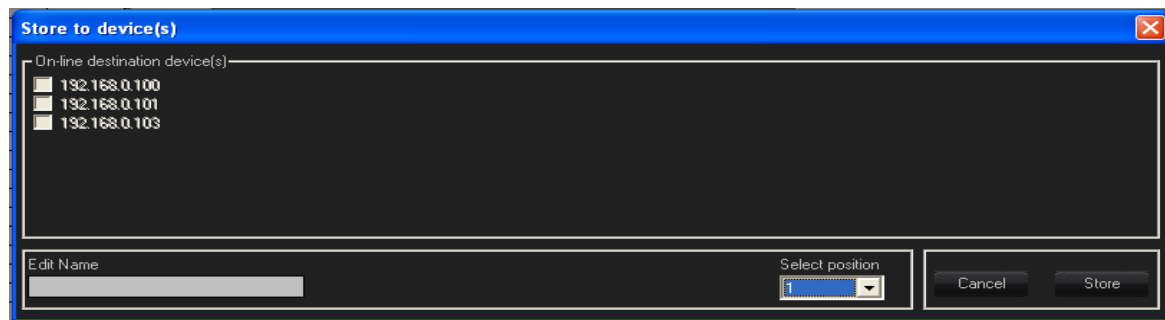
The system "store" the current configuration of the device selected (if connected) to the location memory selected and insert the name edit from the user
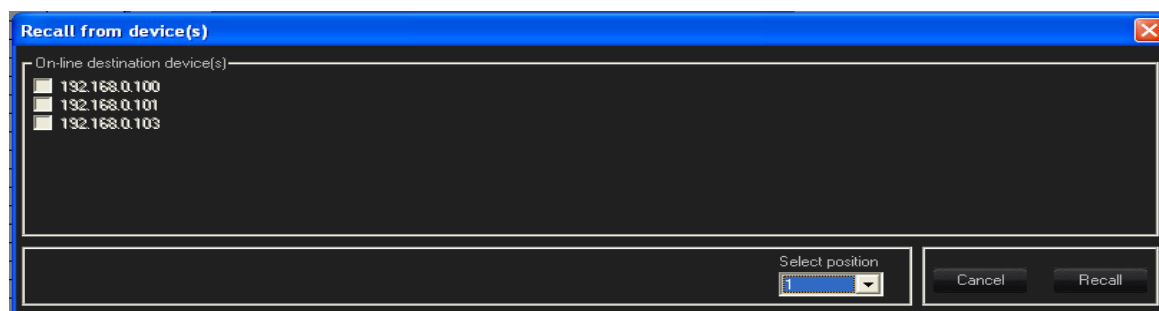
The system "Recall" a preset on the device (if connected) selected from the memory location selected

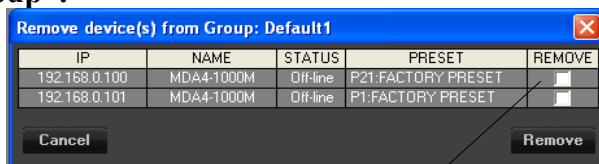**Remove Device from "Device List":**

Select the check-box to remove the device

On the "Remove Device(s) List" are present only the device that the user can remove.
A device can't remove when:
1. Device is added to the group
2. Edit window of the device is open
3. Device is On-line

Remove Device from "Group":

Select the check-box to remove the device

is possible to remove a device from the group if the relative edit group window is closed.

Edit Device:

working Mode: USER Mode, ADMIN Mode
at the start-up of the sw PC, when the splash-screen is show, if the user push on the keyboard the button "S" or "s" then the sw Pc start as ADMIN otherwise the sw PC working as USER.

Presets:
User Preset = 1,..,20
Factory Preset = 21,..,50

In USER mode:
if a preset factory is loaded, some parameters on the interface are locked and the user can store a preset only from position 1 to 20.
the parameters locked are:
Input:
– Noise Gate
– RMS Compressor
– Polarity
– Channel Link

Output:
– Peak Limiter
– EQ
– Xover IIR/FIR
– Polarity
– Channel Link

In ADMIN mode
all parameters are every time unlocked and the Admin can store preset from 1 to 50

– The user can change the device name from the "Rout page" of the edit window.
– The Sw PC restart with the last configuration (Device List, Group, device(s) settings)
– Is possible to work in off-line mode and when the user try to connect the device(s) the sw PC ask if the user want upload the current setting to device or download the current setting from device.

LCD GUI Quick User Guide

The MDA4-1000M amplifier is equipped with an high resolution 480x272 pixel Touchscreen LCD, allowing to control the main settings of the system through a GUI.
In addition to the touch gestures, the GUI can be fully controlled by the encoder/button on the amplifier front panel.
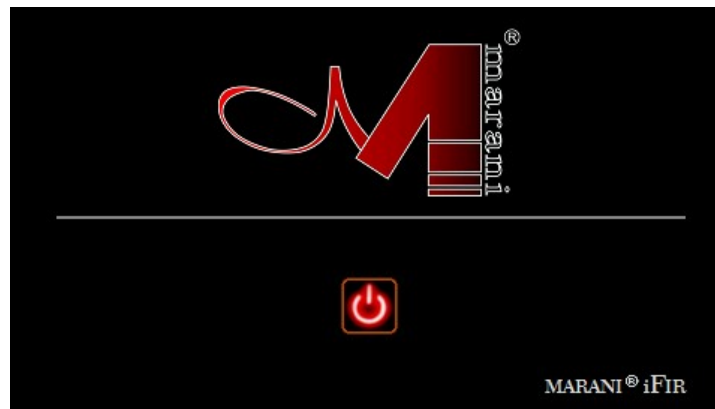
System Startup Page

The image below shows the LCD view during the amplifier startup, through which the whole system is initialized loading the last DSP settings; the screen shows the booting status in a green progress bar.
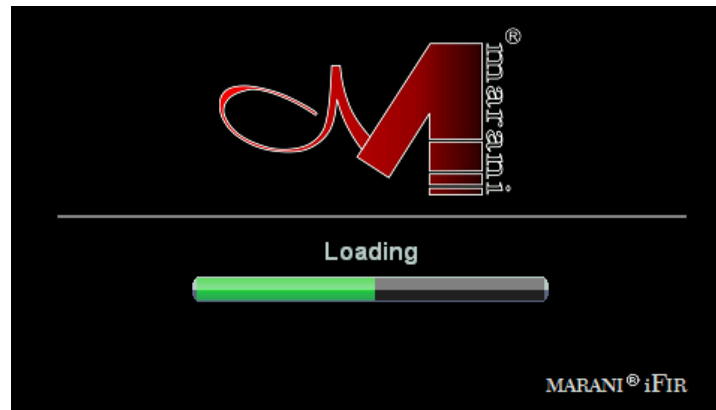
Standby Page

After the boot process completion, the "Standby" page is shown.


Pressing the "Power" button the amplifier enters in normal mode and the main view is shown in the screen.

Main Page

The image below shows the LCD main view, that allows monitoring the amplifier status (in/out levels, temperature, thermal protection, 70V constant voltage enable, etc) as well as controlling the input channels gain/mute, the output volume/mute and the amplifier standby.
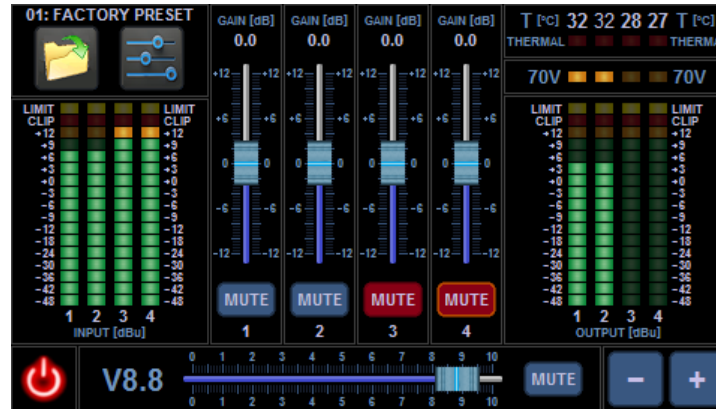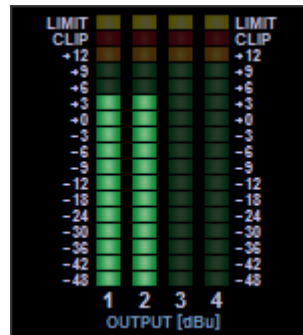

Input VuMeter Frame
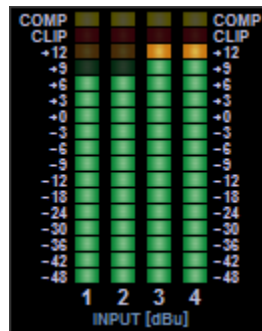
The input VuMeter frame shows the signal level of each channel before the input gain/mute (PFL) from -48dBu up to 14dBu, the overflow/clip limiter activity and the input compressor activity:

- *[-48 … +9] green led*: when it is ON (light green) the signal is in the range [X,X+2] dBu.
- *[+12] orange led*: when it is ON (light orange) the signal is in the range [+12,+14] dBu.
- *[CLIP] red led*: when it is ON (light red) the overflow/clip limiter is active.
- *[COMP] yellow led*: when it is ON (light yellow) the input compressor is active.

Output VuMeter Frame

The output VuMeter frame shows the signal level of each channel after the output volume/mute (AFL) from -48dBu up to 14dBu, the overflow/clip limiter activity and the output limter activity:

- *[-48 … +9] green led*: when it is ON (light green) the signal is in the range [X,X+2] dBu.
- *[+12] orange led*: when it is ON (light orange) the signal is in the range [+12,+14] dBu.
- *[CLIP] red led*: when it is ON (light red) the overflow/clip limiter is active.
- *[LIMIT] yellow led*: when it is ON (light yellow) the output peak limiter is active.

Status Frame

The status frame shows the power stage temperature of each amplifier channel, the thermal protection status and the 70V constant voltage limiter enable:
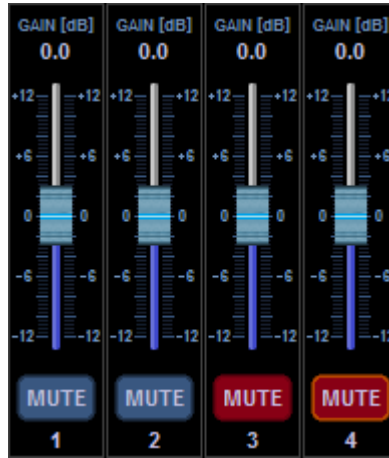
- *T [°C]*: temperature of each channel in °C
- *THERMAL red led*: when it is ON (light red) the channel enters in mute/protected mode (@T > 85°C)
- *70V orange led*: when it is ON (light orange) the constant voltage limiter is enabled.

Power Frame/Button

Pressing the Power button the amplifer enter in standby mode and the "Standby" page is shown in the screen.

Input Gain Frame

The input gain frame allows to control the gain and mute of each input channel:

- *MUTE button*: it controls the input channel mute (blu: unmuted; red: muted)
- *GAIN slider*: it allows changing the input gain from -12dB to +12dB with 0.1dB step.

The input gain sliders and mute buttons can be linked in mono or stereo mode as described in the "Channel Link" section. When two or more input channels is linked the control frames change s shown below (CH1-2 stereo link; CH3-4 mono link)
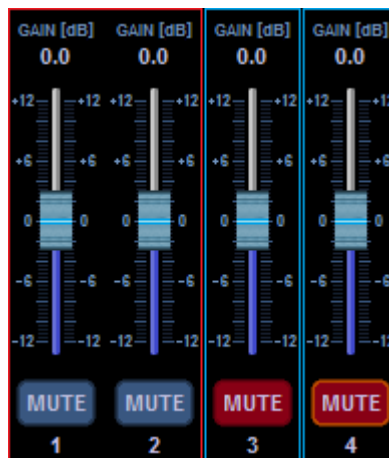
Output Volume Frame

The output volume frame allows to control the output volume and mute of all output channels.

- *MUTE button*: when the button is red all the amplifier channels are muted.
- *VOLUME slider*: it allows changing the output volume of the amplifer from -80dB (V0.0) to 0dB (V10) with a variable step:

    - V0.0 – V1.0: -80dB - -60dB step 2dB

    - V1.0 – V4.0: -60dB - -30dB step 1dB

   - V4.0 – V10: -30dB - 0dB step 0.5dB

NAV Frame
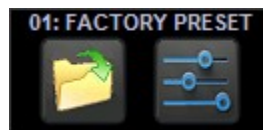
The NAV frame shows the on top the actual device preset and allows to open secondary control pages.

- *OPEN button*: pressing this button, the "Load Preset" view is shown.
- *SETTINGS button*: pressing this button, the "Channel Source" view is shown.

Load Preset Page

The image below shows the LCD Preset view, that allows to reload a device preset. The MDA4-1000M has up to 50 presets.
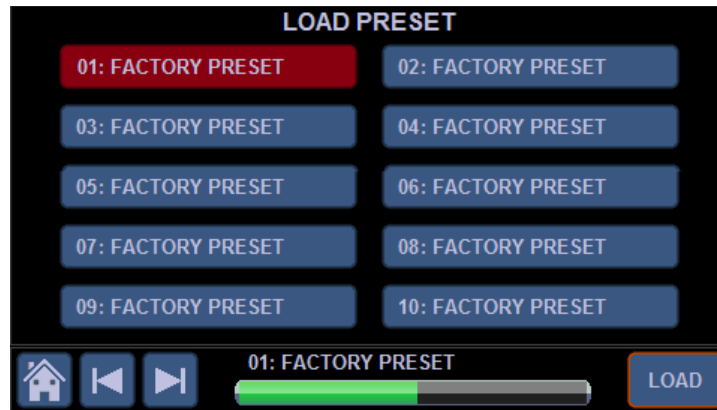
- *Preset buttons*: they allow to select the preset to be loaded
- *Load button*: when this button is pressed the selected preset is loaded. The green bar in the botton shows the loading progress.
- *Home button*: it allows to go back to the main view
- *Left/Right arrow buttons*: they allow to scroll the preset set (1-10, 11-20, 21-30, 31-40 and 41-50)

Channel Source Page

The image below shows the LCD Channel Source view, that allows selecting the source type of each channel and controlling the input gain of the amplifier.
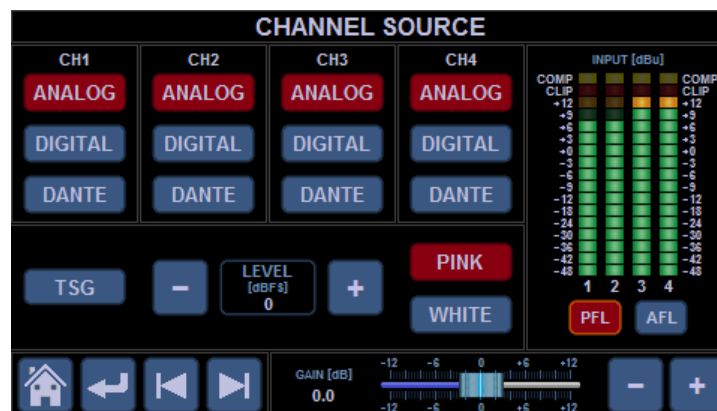
Channel Source Frame

The Channel Source frame allows to select the source type of each input channel (ANALOG, DIGITAL or DANTE), or to enable the internal test signal generator (TSG). The current source selection is shown with red buttons.

When the TSG is enabled all the input channels are fed with "Pink" or "White Noise" and the channel source buttons are disabled.

The TSG signal level can be changed through the LEVEL up/down from -40dBFS to 0dBFs with 1dB step.

The channel source buttons can be linked in mono or stereo mode as described in the "Channel Link" section. When two or more input channels is linked the control frames change as shown below (CH1-2 stereo link; CH3-4 mono link)

Input VuMeter Frame
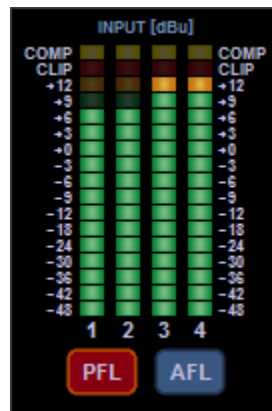
The input VuMeter frame shows the signal level of each channel before (PFL) or after (AFL) the input gain/mute from -48dBu up to 14dBu, the overflow/clip limiter activity and the input compressor activity:

- *[-48 … +9] green led*: when it is ON (light green) the signal is in the range [X,X+2] dBu.
- *[+12] orange led*: when it is ON (light orange) the signal is in the range [+12,+14] dBu.
- *[CLIP] red led*: when it is ON (light red) the overflow/clip limiter is active.
- *[COMP] yellow led*: when it is ON (light yellow) the input compressor is active.
- *PFL/AFL buttons*: they allow to select VuMeter PFL or AFL mode

Input Gain Frame

The input gain frame allow changing the gain of all input channels from -12dB up to +12dB with 0.1dB step.
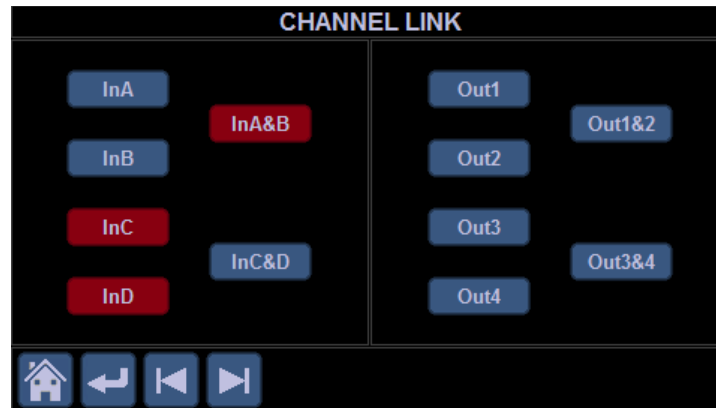
NAV Frame

- *Home button*: it allows to go back to the main view
- *Left/Right arrow buttons*: they allow to show the other settings views (by now, only the "Channel Link" view is available)
- Return *arrow button*: it allows to show the up layer page (by now, the main view)

Channel Link Page

The image below shows the LCD Channel Link view, that allows linking input or output channels in mono or stereo mode.

- InX *buttons*: enable/disable the mono link on input channel X
- InX1&X2 *buttons*: enable/disable the stereo link between X1 and X2 input channels
- OutY *buttons*: enable/disable the mono link on output channel Y
- InY1&Y2 *buttons*: enable/disable the stereo link between Y1 and Y2 output channels
- *Home button*: it allows to go back to the main view
- *Left/Right arrow buttons*: they allow to show the other settings views (by now, only the "Channel Source" view is available)
- Return *arrow button*: it allows to show the up layer page (by now, the main view)

GUI Button Control

Normal State

In "normal" state the button is enabled and the corresponding function is OFF (e.g. unmuted). The button can be controlled through the touch screen only. Moving the front panel encoder, the button state changes in "highlighted".

Highlighted State

In "highlighted" state the button can controlled through both the touch screen and the front panel button.

Selected State

In "selected" state the button is enabled and the corresponding function is ON (e.g. muted). The button can be controlled through the touch screen only. Moving the front panel encoder, the button state changes in "highlighted selected".

Highlighted Selected State

In "highlighted selected " state the button can controlled through both the touch screen and the front panel button. Moving the front panel encoder, the button state changes in "selected".

Disabled State

In "disabled state" the button function is not available.

GUI Slider Control

Normal State

In "normal" state the slider can be controlled through the touch screen only (the Plus/Minus buttons are disabled). Touching the slider track, the state changes in "highlighted". Touching the slider thumb, the state changes in "selected". Touching and dragging the thumb, the slider value changes.

Highlighted State

In "highlighted" state the slider can be controlled through both the touch screen and the encoder button. Touching the slider thumb or pressing the encoder button, the state changes in "selected". Touching and dragging the thumb. the slider value changes.
If no action is taken for 15 seconds the slider go back to normal state.

Selected State

In "selected" state the slider can be controlled through both the touch screen and the front panel encoder. Touching and dragging the thumb or moving the encoder or pressing the Plus/Minus buttons, the slider value changes. Pressing the encoder button, the slider go back to highlighted state.
If no action is taken for 10 seconds the slider go back to highlighted state to avoid unwanted value changes.

NOTE A

HOW TO CONNECT AND CONTROL DANTE ENABLED DEVICES

Dante is an Ethernet compliant audio networking solution developed by Audinate. It provides high performance digital media networking that meets the quality requirements of professional live sound, AV installations, broadcast and recording systems. Dante is built on standard Internet Protocols over Ethernet.
It distributes multiple streams of digital audio plus integrated control data and clock, with sub millisecond latency, sample-accurate playback synchronization and extreme reliability.

Seed Ultimo Board

The Seed Ultimo board is a ready-to-use Dante solution based on Audinate Dante Ultimo™ microcontroller. It support up 4 bidirectional audio channels at up to 96kHz sampling rate.
The board is available in two different configurations:

- *Single Ethernet*, for a cost effective Dante networking solution using a 100Mbps ethernet interface

- *Dual Ethernet*, using a fast 1Gbps ethernet switch with two ethernet ports, that allow daisy-chaining audio devices while preserving low latency requirements for live audio systems.

The board integrates a set of high-quality sample rate converters, that allow to connect audio systems running at different sampling rates. Moreover, an high-quality low-jitter clock generation circuit provides a sample accurate synchronization between networked devices.

The board can be easily connected to the DSP audio subsystem by a standard I2S interface.
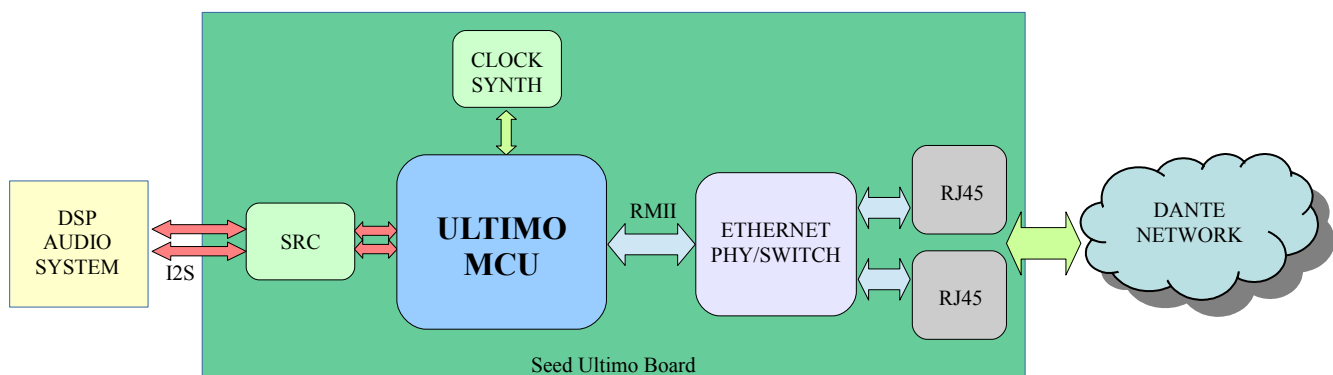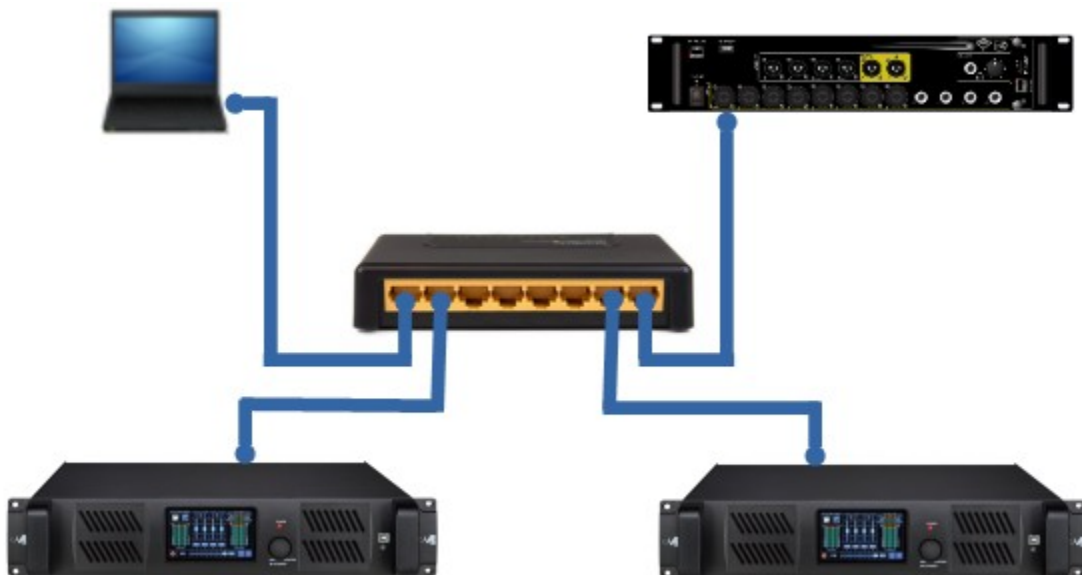
- ULT-01-002 and ULT-01-004 Dante MCU support

- Up to 2 in / 2 out @44.1kHz, 48kHz, 88.2kHz and 96kHz

- Up to 4 in / 4 out @44.1kHz and 48kHz

- Sample rate pullup/down (+/-4%)

- Async sample rate convertion from 8kHz to 192kHz with -130dB THD+N / 140dB DR

- 16, 24, 32-bit audio sample resolution

- I2S digital audio format

- Latency from 1ms

- Sample accurate time alignment between networked devices

- Standard 100Mbps or dual 1Gbps ethernet interface

- Unicast/Multicast streams support

- Network Master/Slave clock capabiity

- Hardware time-stamping

- UART control interface

- Firmware upgradable via ethernet interface

Dante Network

The image below shows a typical Dante network. Standard Ethernet cables and an ethernet switch is used to connect the Dante devices. A PC is used to configure the network, the Dante devices and the audio streams routing.

Dante devices use DHCP protocol to automatically obtain an IP address from the network.

If a DHCP server is not available, the devices automatically assign themselves an address in the range 169.254.xxx.xxx (Link Local autoip range).

A PC/MAC connected to the Dante network should be configured to "Obtain an IP address automatically" (i.e. the DHCP should be enabled). In this way, if a DHCP server is available, it acquires the IP address via DHCP. If the DHCP server isn't present, the PC/MAC will use Link Local IP addresses as the Dante devices.

Getting Started with Dante

Dante Software

Audinate provides two different software tools to manage Dante Networks. Both of them are available for Windows and Mac OSX:

1) The Dante Controller (www.audinate.com/products/software/dante-controller)
Dante Controller is a free software application used to route audio and configure devices on a Dante Network. It also provides automatic device discovering and network monitoring.
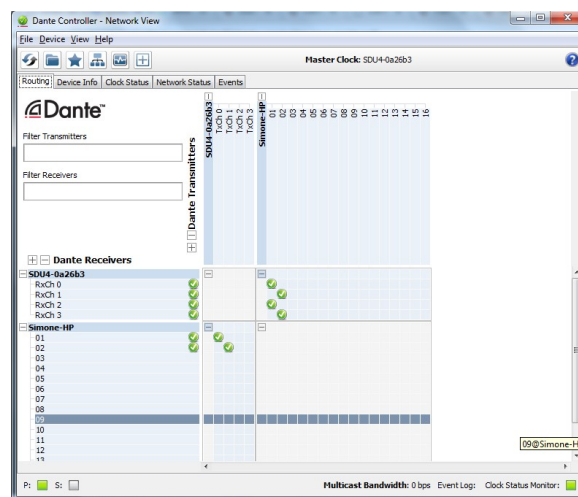
2) The Dante Virtual Soundcard (www.audinate.com/products/software/dante-virtual-soundcard*)*

Dante Virtual Soundcard (DVS) is a license charged tool, which turns the PC into a Dante-enabled device, allowing Dante audio to be transmitted and received using its standard Ethernet port, either directly or through an Ethernet switch.

The DVS supports ASIO and WDM Windows drivers and Mac OSX Core Audio API, allowing an easy integration with any audio application software.

Detailed information on downloading and activating the DVS software can be found on the Audinate website.
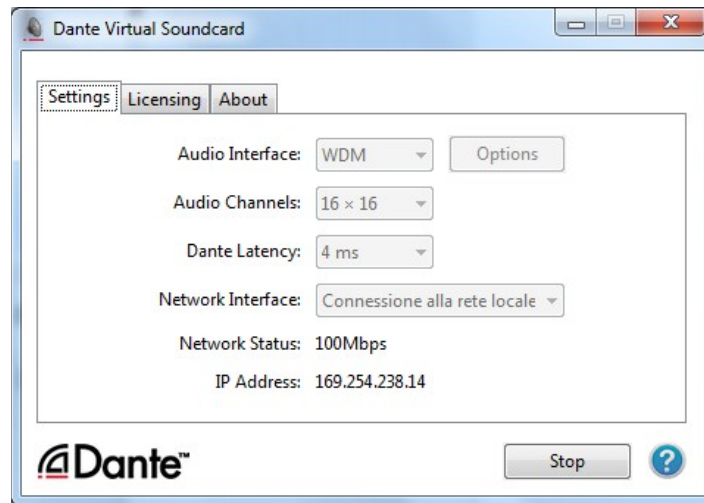
In the following, a quick tutorial on how to setup a Dante network is provided.

The image below shows the simplest Dante network, where a PC is directly connected to a Dante enabled device through an ethernet cable. In this scenario, no ethernet switch is required.


1) Let's start configuring the PC network settings to "Obtain an IP address automatically"
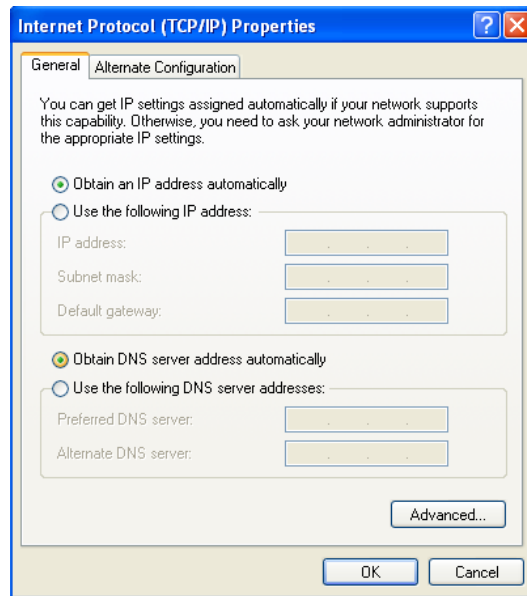

2) Connect the PC and the Dante device with an Ethernet cable.
Since a DHCP server is not available in the network, both the PC and the Dante device will use Link Local IP address in the range 169.254.xxx.xxx (see section "IP Addressing").

3) Open the Dante Virtual Sound Card software and select the Audio and the Network interfaces. Then click the "Start" button. The software will show the network status and the PC IP address..
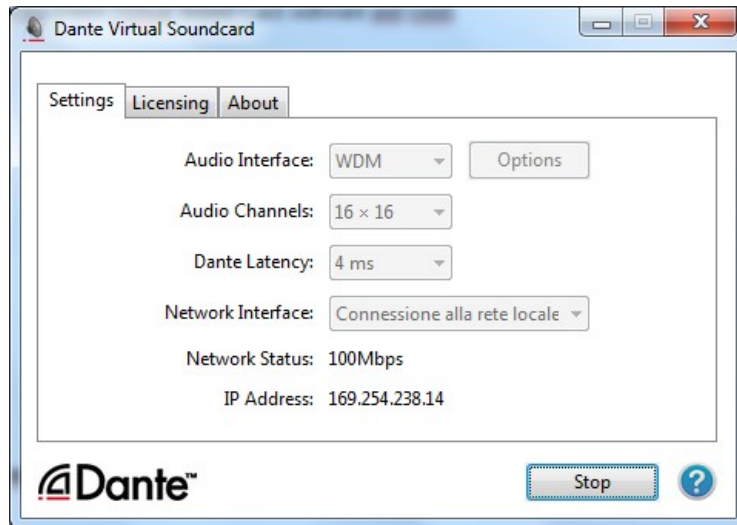

4) Open the Dante Controller software and wait for device discovering. Both the PC and the Dante device should appear in the device list.
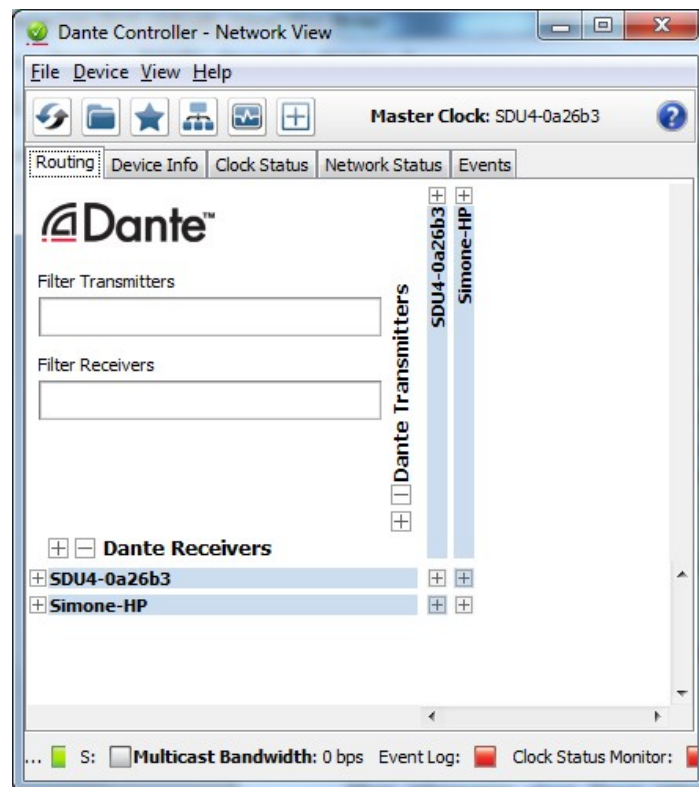
5) Configure the Dante interfaces audio settings of both the PC and the Dante device: double click a device in the device list and select "Device Config". Then choose:

- the sampling rate (e.g. 48k), that must be the same for the PC and the Dante device
- the bit encoding (e.g PCM24)
- the device latency: 5ms latency is a safe value for 100Mbps network.

Note: for the PC the audio latency is selected in the Virtual Sound Card software
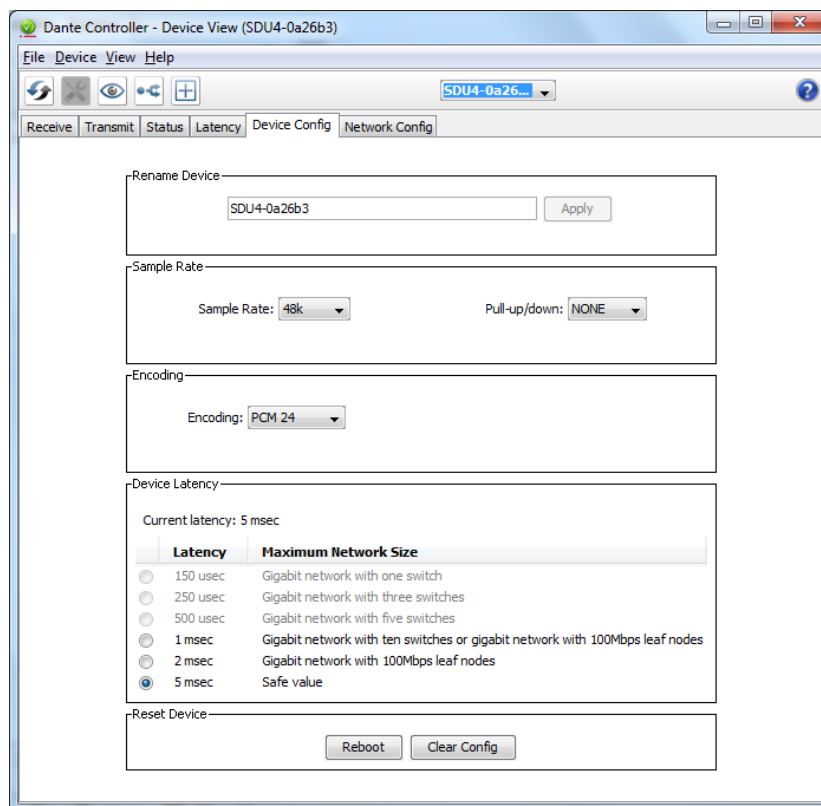
6) Configure the audio routing from the Dante Controller main form by clicking on the matrix crosspoint. For example, if we want to playback a stereo audio signal from the PC to the Dante device, we can route the PC Tx Ch1/Ch2 to the Dante Device Rx Ch1/Ch2 as shown in the following picture.
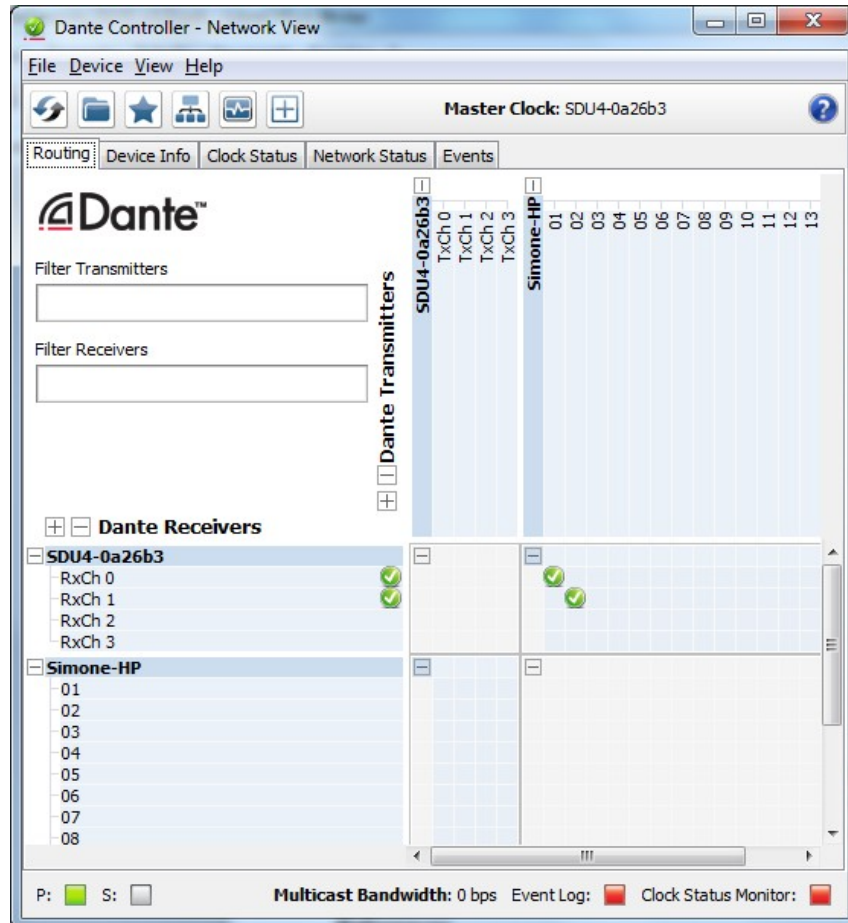
7) Open your favourite audio application and select the right Dante Virtual Soundcard channels in device preferences.
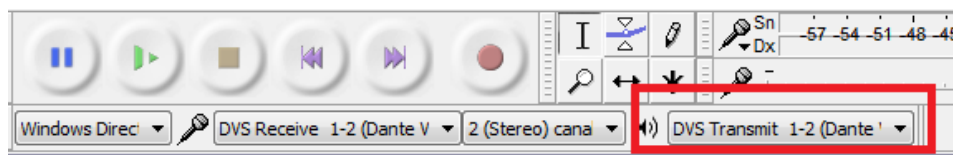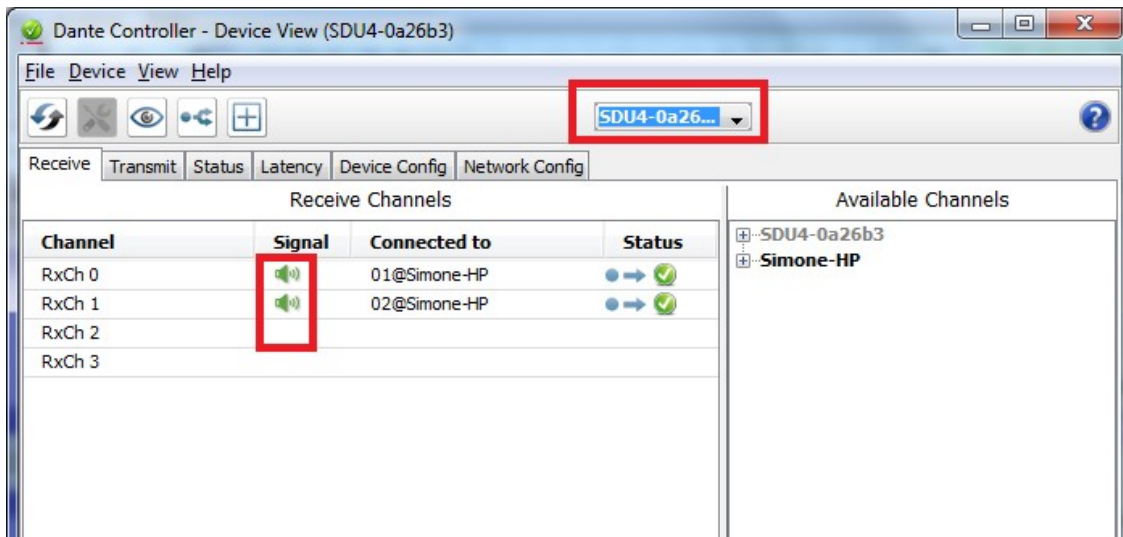
8) Then, open and playback an audio file.
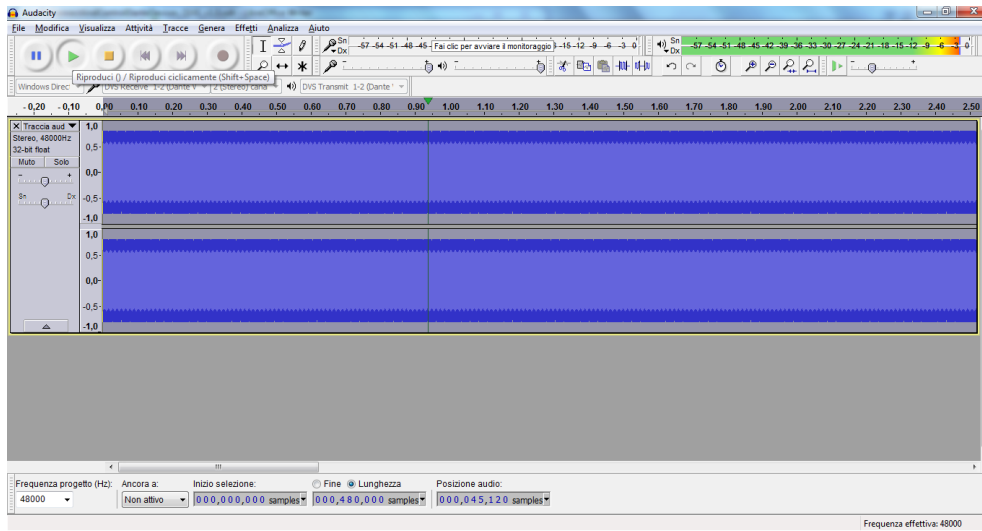
9) The Dante audio streaming is automatically started.

You can monitor the signal presence from the Dante Controller, by double clicking the Dante device and selecting the "Receive" tab, as shown below

References

More information about Dante networking can be found and downloaded from the Audinate   website (www.audinate.com)

- Dante Overview (www.audinate.com/solutions/dante-overview)

- Networks and Switches (www.audinate.com/resources/networks-switches)

- Dante Controller (www.audinate.com/products/software/dante-controller)

- Dante Virtual Sound Card (www.audinate.com/products/software/dante-virtual-soundcard)

- Dante training and video tutorial (www.audinate.com/training-and-tutorials)

- Dante FAQ (www.audinate.com/resources/faqs)

- Troubleshooting Dante IP Address Configuration (dev.audinate.com/GA/dante-controller/userguide/webhelp/#troubleshooting_dante_ip_address_configuration.htm)

For importing External FIR Calculated coefficients into the MARANI **MDA4-1000M**, 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 512 taps (shorter filters are allowed)

Just to be make sure, here below an example of "FIRFormat.txt" which can be imported by the **MDA4-1000M**:

FIRFormat.txt

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