



RDN Net 4.0 MANUAL

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1. INFORMATION

IMPORTANT NOTE

Before using this product, please read this instruction manual carefully and keep it on hand for future reference. This manual is to be considered an integral part of this product and must accompany it when it changes ownership as a reference for correct installation and use as well as for the safety precautions.

RCF S.p.A. will not assume any responsibility for the incorrect installation and / or use of this product.

1.1 GENERIC INFORMATION

RDNet software allows professional speakers for sound reinforcement to be designed, measured and (remotely) controlled and managed. This release also includes the new business music support as well as the new RCF Nirvana 14K amplifier support.

It is available also a cloud where users can save and load RDNet files.

RDNet 4.0 is based on many years of research and development of new technologies, making the management of complex systems simple and intuitive. Entirely designed and developed by RCF R&D., it includes several new functions (when compared to the previous version), as well as hundreds of minor improvements and changes.

RDNet 4.0 includes control software, all supported devices (with suitable firmware) and CONTROL 2 and CONTROL 8 devices. RDNet software is available (free download after registering) for RCF system users on the website: <http://www.rcf.it>

1.2 SYSTEM REQUIREMENTS

Minimum system requirements:

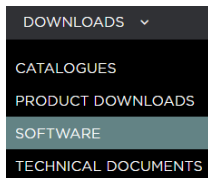
- 32-bit / 64-bit PC (Windows compatible)
- Windows 7 (32-bit / 64-bit), Windows 8, Windows 10 operating system
- 2 GHz CPU
- 4 GB RAM
- 100 MB of free space on hard disk
- DirectX compatible video board
- 1024 x 768 min. display resolution
- An available USB ports
- RDNet CONTROL 2 or CONTROL 8 controllers

2. GETTING STARTED

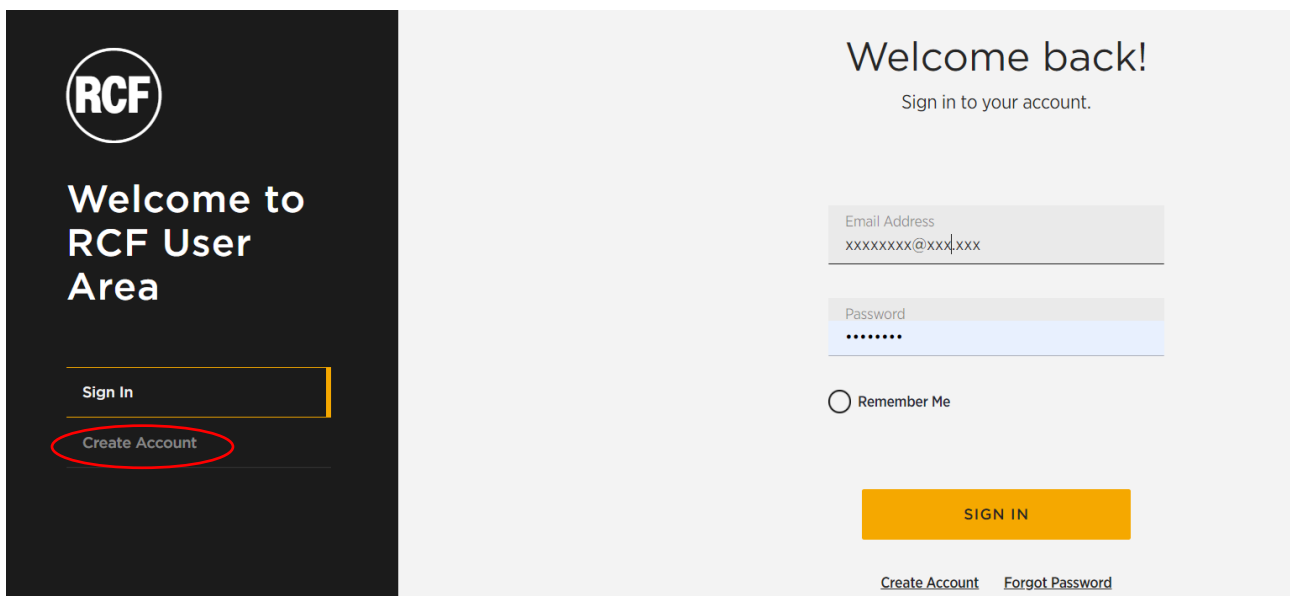
This chapter describes the preliminary activities to be carried out before using RDNet 4.0.

2.1 SOFTWARE DOWNLOAD

RDNet software is available as free download from the RCF website.











Go in the download section and select <software>.



If you have not registered yet, do it now creating your new RCF free account to get your credentials that will be requested when the software will be launched for the first time. That is why an internet connection is required at the first start of RDNet.

Download Software

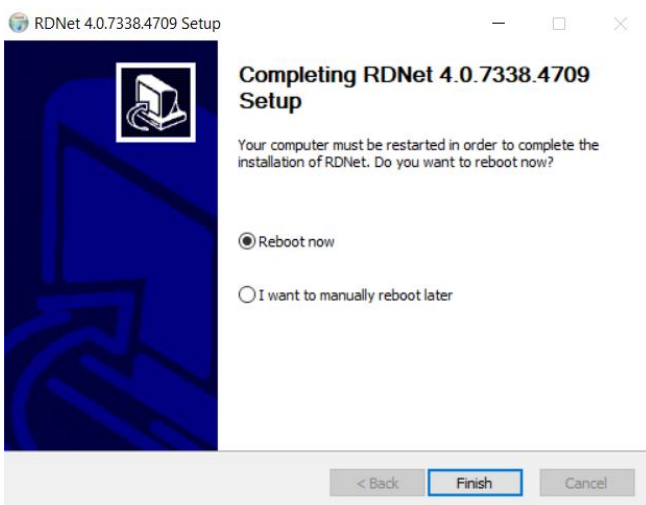
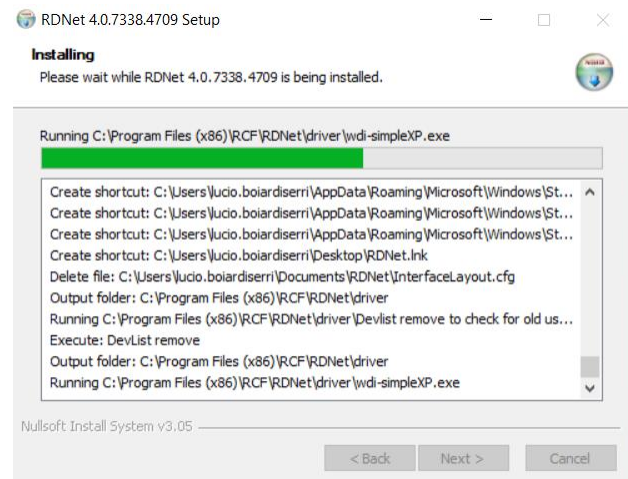
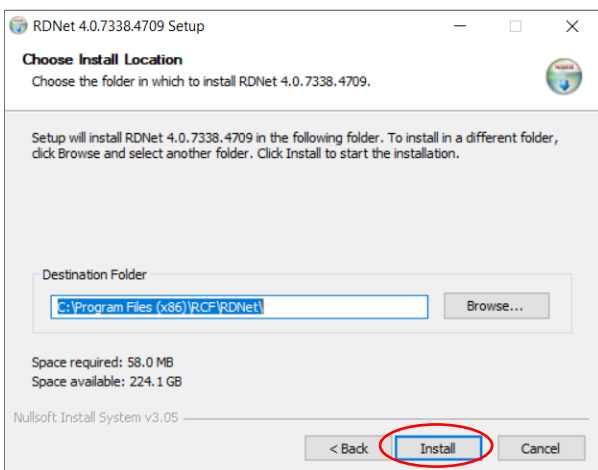
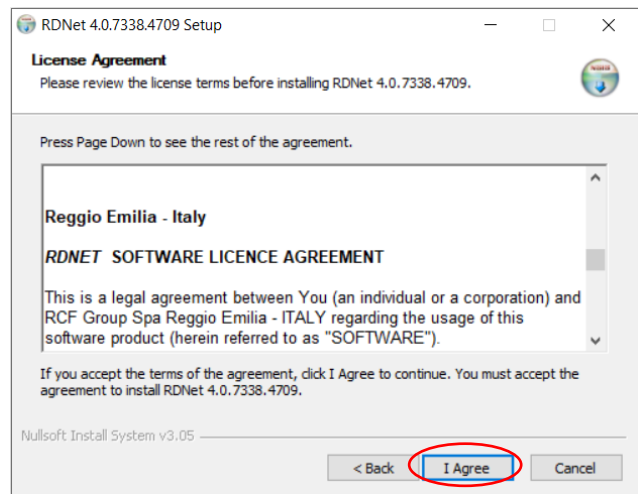
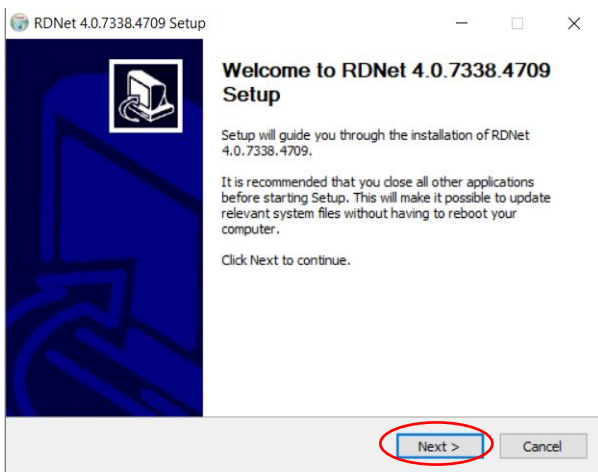
SOFTWARE	SOFTWARE RELEASE	VERSION	ARCHITECTURE	SIZE		
DXT 3000 Planner	DXT 3000 Planner	1.3.4.0	64 bit	21.1 MB		
EASY SHAPE DESIGNER	EASY SHAPE DESIGNER	1.17.0.0	64 bit	2.8 MB		
RDNet	RDNet 4.0	4.0.xxxx.xxxx		30.4 MB		
RDNet	RDNet 4.0	4.0.xxxx.xxxx		30.4 MB		

Click on RDNet 4.0 to download the software.

The package includes the last release, all firmware of supported devices.

2.2 SOFTWARE INSTALLATION

After downloading the proper package from the RCF website, double-click the setup file. Follow all instructions as shown in the next figures:



If it is the first RDNet installation, the computer must be restarted.

NOTE: RDNet software needs **.NET Framework 4.8**. Refer to the documentation about your operating system for installation.

3. RDNet LOG & CLOUD

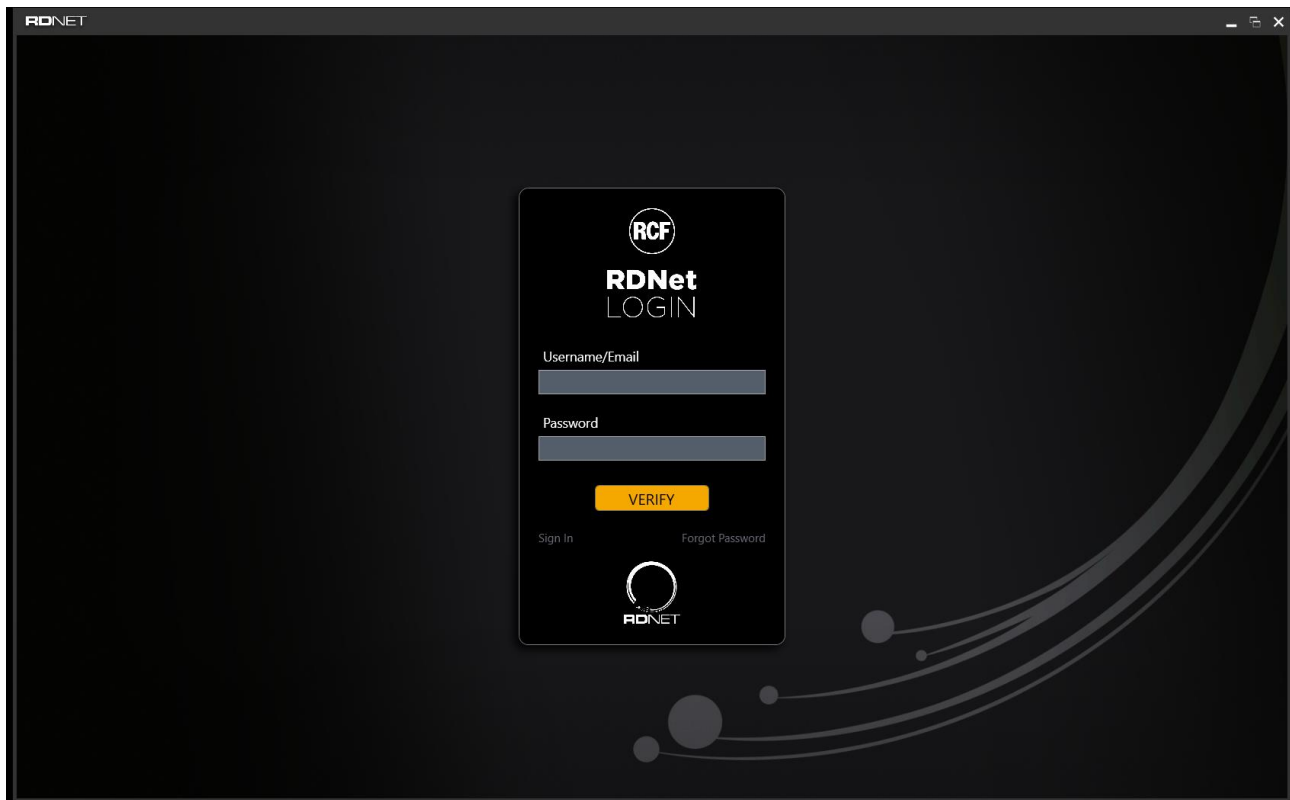
3.1 SOFTWARE REGISTRATION

As soon as RDNet will start the first time, it is mandatory to insert Username and Password.

To get this credential it necessary to have a free RCF account. Go to the RCF website and register a new account with Username and Password.



These credentials will serve to log-in RDNet the first time. Once the log is done, the software can be used also off-line until log-out of the current user.



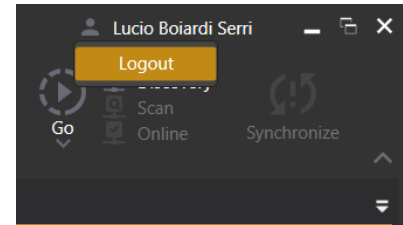
In this case PC must be connected to network, otherwise login procedure will fail.

Once the user has logged in, RDNet stores the identity of the authenticated user.

At subsequent starts of the application, 2 cases can occur:

1. PC ONLINE: RDNet automatically checks the user identity. If something goes wrong, the user must reintroduce his own credentials.
2. PC OFFLINE: RDNet does not check the user identity but all the application functionalities can be used. Those functionalities that require a network connection are disabled (for example the connection to the cloud storage)

The user can explicitly log out clicking on the RDNET menu item from the top bar and choosing the *Logout* item.

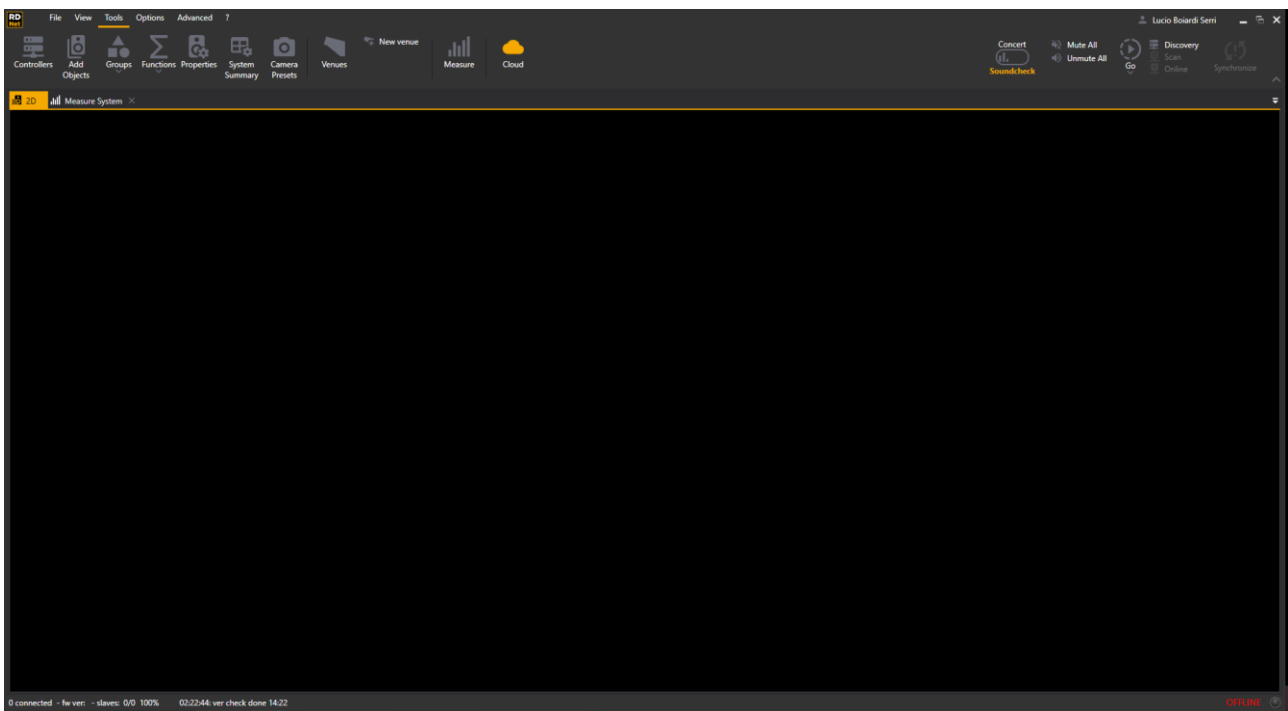


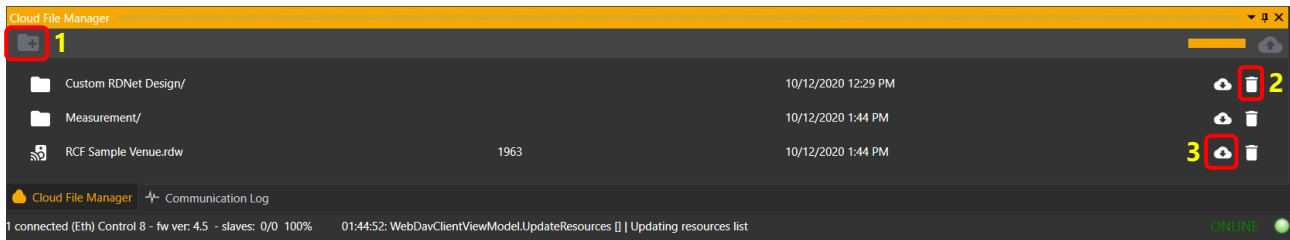
3.2 CLOUD STORAGE

RDNet allows authenticated users to use some cloud storage space for saving and loading synoptic and measurement files. In this way is easily for a user to switch between devices and access at own files simply inserting his own credentials.

Also, the RCF Engineering Support Team could anytime refer to the user cloud files for assistance and advice on particular projects.

The Cloud File Manager View can be open by selecting **<Tools> → <Cloud>**.



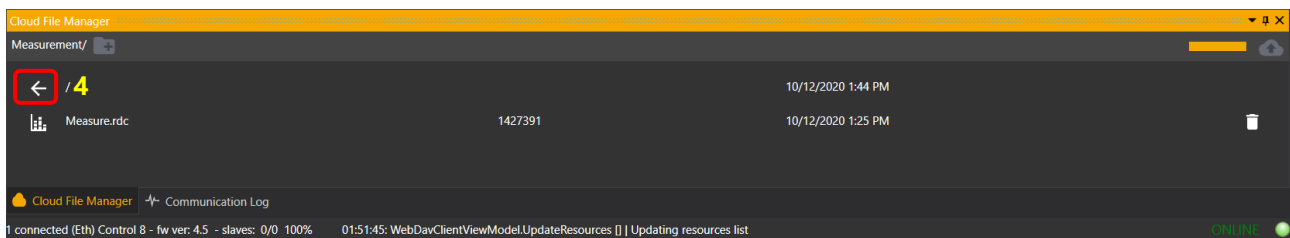


Folder Management

The storage space has 2 preloaded default folders: Documents and Photos. To create a new folder, the user has to click on the New Folder (1) button on top left in Cloud File Manager view.

To view the contents of an existing folder, the user must just click 2 times on the row corresponding to the desired folder.

Clicking on the Delete Folder button (2) located on the right of each folder rows, it is possible to delete the selected folder/item and their all contents.



The user can go back to the parent folder by clicking the Back button (4) located on the first row of each child folders.

File Upload

To upload a synoptic file in a specific folder, first of all the user has to navigate inside the desired storage folder. Once done, clicking on the *Upload* button located on top right (**Errore. L'origine riferimento non è stata trovata.**) and inserting the file name upload procedure will start. When the upload procedure finishes the new file is shown in the file list inside the Cloud File Manager view

Open Files from Cloud

1. By clicking 2 times on the desired file: in this way, the synoptic file is downloaded in the user local folder “\Users\Current user\Documents\RDNet\Cloud” and automatically loaded inside RDNet.
2. By clicking on the Download button (3) located at right in each file rows: in this way the synoptic file is downloaded in the user local folder “\Users\Current user\Documents\RDNet\Cloud” and after the user is asked if he wants to open the synoptic inside RDNet. So the user can only download the file without open it.

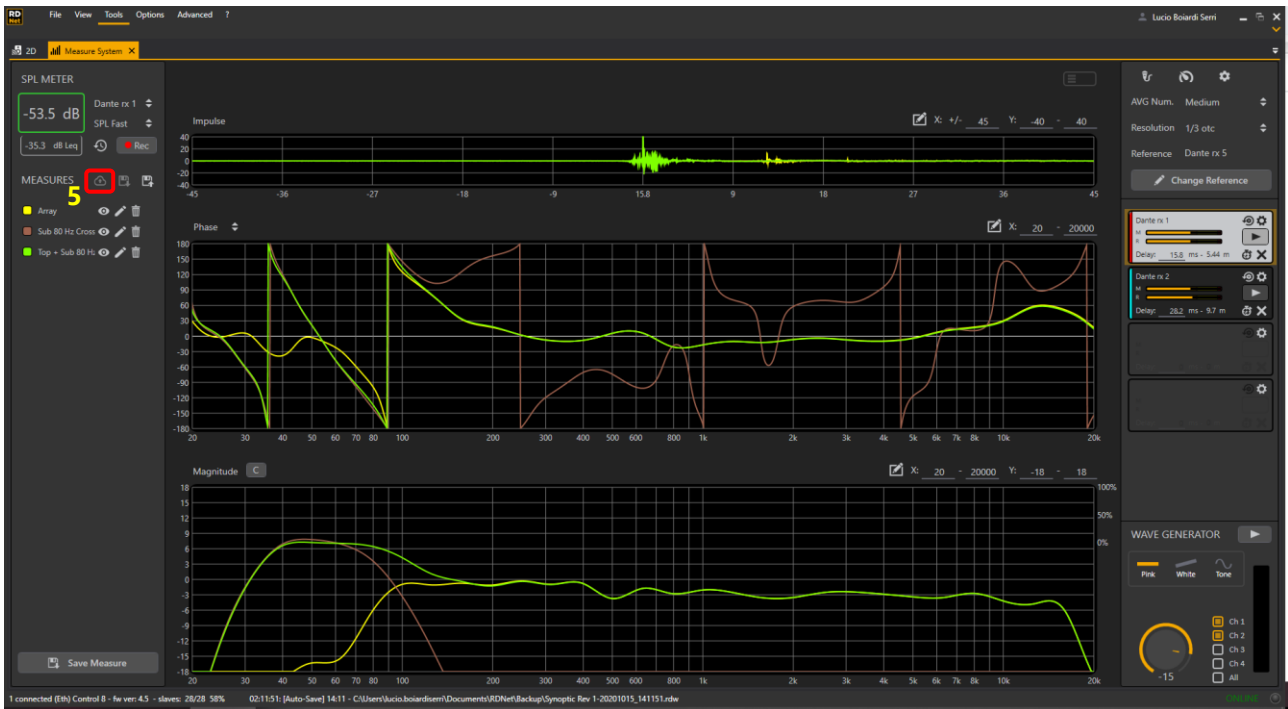
Once a file is downloaded and loaded inside RDNet, it will be seen as a local file by the application. To save changes on the cloud the user can proceed in 2 ways:

1. By making a new upload as described at the specific paragraph. In this case the user is asked to overwrite the existing file on the cloud.

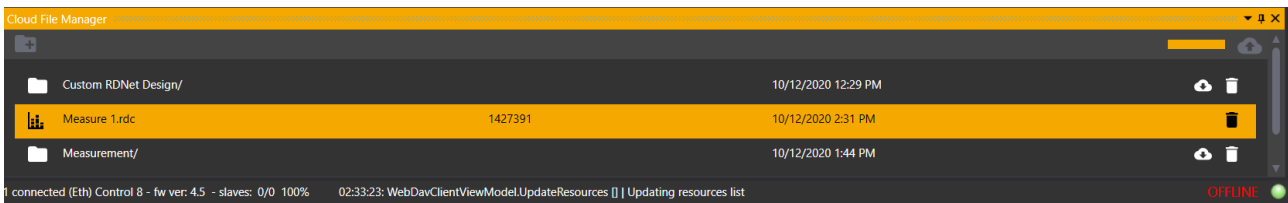
By selecting the subitem *Save In Cloud* in the *File* menu on the top bar. This item is enabled only if RDNet recognizes the synoptic as a file loaded from the cloud.

Measurement Upload and Download

Once a measure has been captured and saved, it is possible to save (upload) it in the cloud.



To upload click the upload button (5). After having appropriately named the measure, it will appear in the main root of the cloud.



To load a saved measure from the cloud just double click on the related row or name and the measure will appear in the RDNet measure workspace.

For more details on using RDNet measure refer to chapter 9.

4. CONTROLLERS

RDNet controllers allow the RDNet software to be linked to the speaker systems (to be controlled). These allow USB / Ethernet data to be converted to RCF proprietary communication protocol to control different types of speakers and devices.

It is important to point out that it only concerns the control, as all software changes affect DSP of connected speakers.

If (for any reason) the computer loses communication with devices (due to unstable wiring, computer crashes, etc.), the system will keep operating without any problem.

Two different controllers are available:

RDNet Control 2

RDNet CONTROL 2 is a two-port self-powered USB interface. It is possible to link up to 32 devices to each port (max. 64 speakers controlled simultaneously).

It is directly powered from the computer (through USB), so it does not need any external adapter. Only a single CONTROL 2 can be linked to a computer.



RDNet Contro8

RDNet CONTROL 8 is a USB/Ethernet interface (for 19" cabinets, 1 unit) having 8 ports. It is possible to link up to 32 devices to each port (max. 256 speakers controlled simultaneously). When using the USB port, the computer can be linked to only one CONTROL 8.

When using Ethernet (through a dedicated switch), it is possible to link up to 20 CONTROL 8 per computer. A single computer cannot be linked to both CONTROL 8 and CONTROL 2 at the same time.



On its front panel, there are the USB port to link a computer and the slot for an SD card (to save projects). On its rear panel, there are the RJ45 port (for CAT5 cable) to link a computer (to be used as alternative to USB) and the 8 ports to connect all devices; each of them has both ETHERCON and XLR socket.

Note: RDNet just needs 3 wires (out of the 8 available on CAT5 cables), so this makes it possible to use standard balanced audio cables instead.

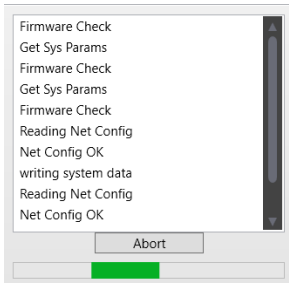
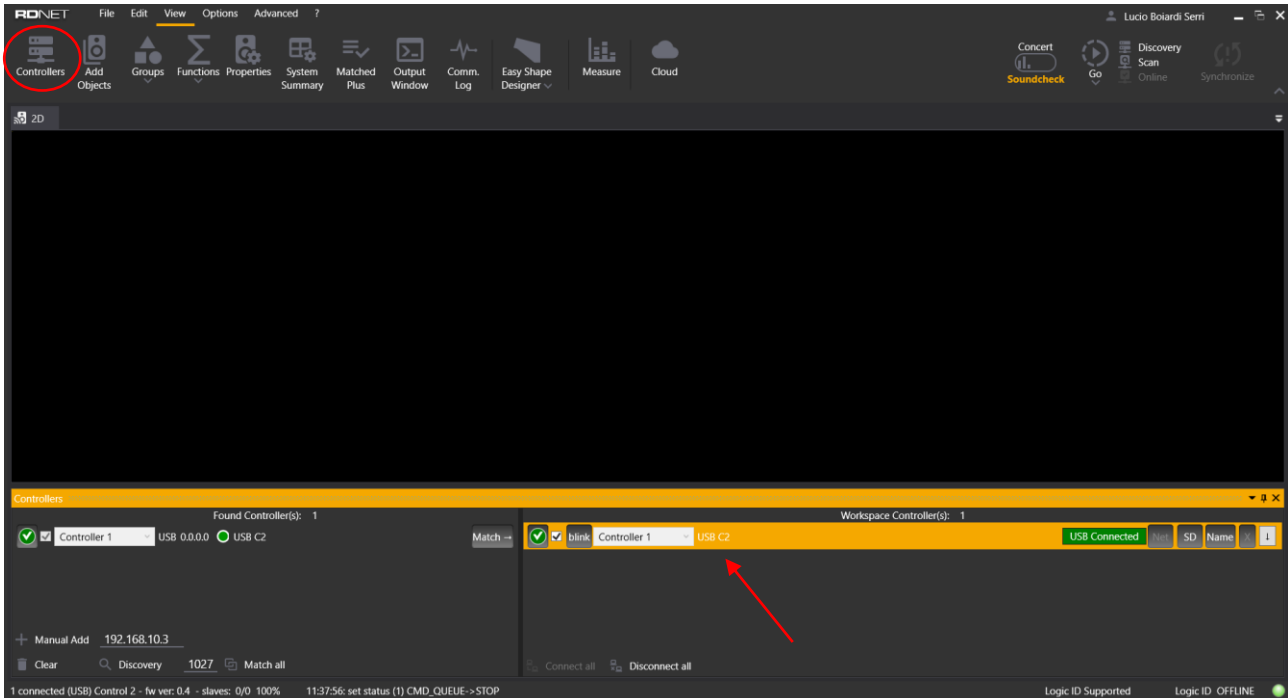
For instance, a channel of available balanced audio lines (XLR connectors), from the F.O.H. mixer to the stage) could be used as RDNet signal (in order to avoid laying another cable). In this case, an ETHERCON to XLR/MALE adapter is necessary to connect speakers.



Cod. 12399020 - ETHERCON TO XLR M ADAPTER

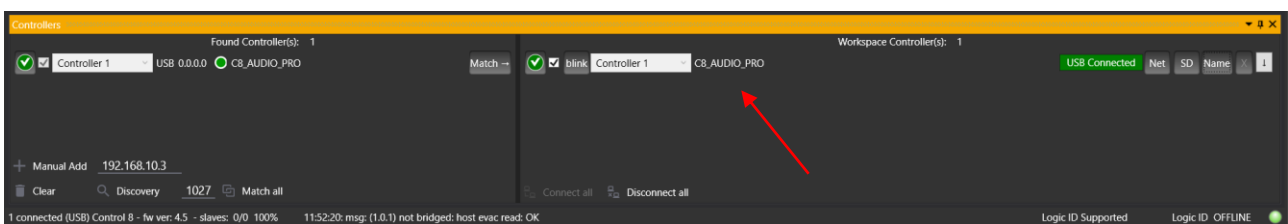
4.1 CONTROL 2 / CONTROL 8 SETUP

Link a CONTROL 2 to a computer via USB single controller and it is automatically detected by the software (without any type of configuration).



Link a CONTROL 8 to a computer via USB single controller and it is automatically detected by the software (without any type of configuration).

As soon as a controller is connected, RDNet will automatically check for the firmware status. If the firmware is not up to date, the software will indicate the need to update it.

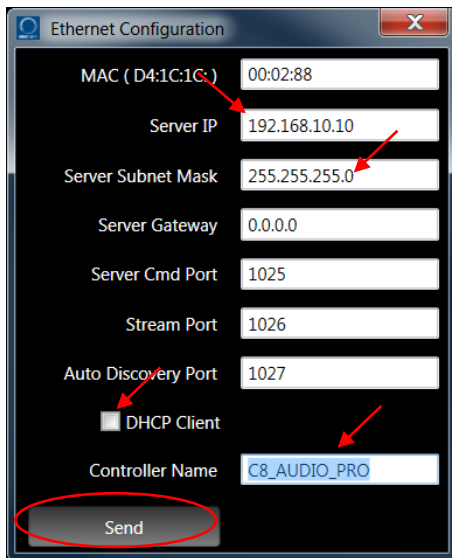


CONTROL 8 also has an Ethernet port that can be used to connect a computer (TCP/IP protocol). In this case, up to 20 CONTROL 8 can be linked to a single computer through dedicated Ethernet switches.

To use CONTROL 8 via Ethernet, proceed as follows: Link the CONTROL 8 unit to the computer via USB. Restart RDNet and click <Controller> button.

It is now possible to see the label that shows Control 8 connected via USB and its Name <Controller 1>.

Click on <Net> button or select <Options>→<Network Config> on the toolbar menu.

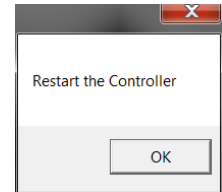
The image shows the 'Ethernet Configuration' dialog box. It contains several input fields: 'MAC (D4:1C:1C:)' with value '00:02:88', 'Server IP' with value '192.168.10.10', 'Server Subnet Mask' with value '255.255.255.0', 'Server Gateway' with value '0.0.0.0', 'Server Cmd Port' with value '1025', 'Stream Port' with value '1026', and 'Auto Discovery Port' with value '1027'. There is a checkbox for 'DHCP Client' which is currently unchecked. The 'Controller Name' field contains 'C8_AUDIO_PRO'. At the bottom left, there is a 'Send' button which is circled in red. Red arrows point to the MAC field, the IP Address field, the Subnet Mask field, the DHCP Client checkbox, and the Controller Name field.

All network parameters can be edited.

1. IP Address
2. Subnet Mask
3. DHCP mode on/off
4. Controller Name

The other parameters can be left in their default values.

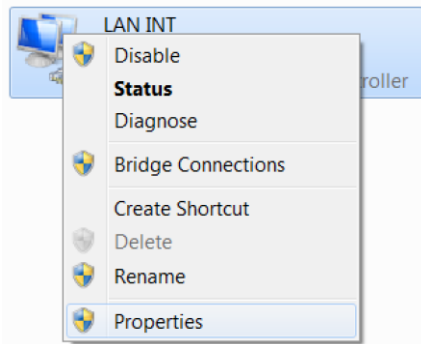
Click <Send> button to confirm and to send current settings to the CONTROL 8.



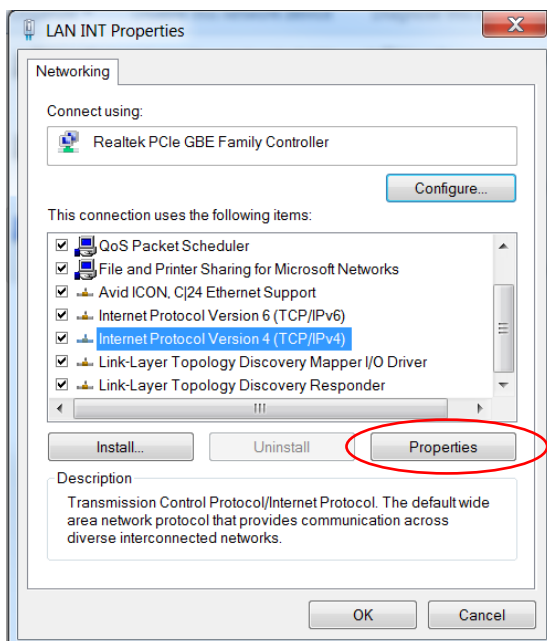
It is not necessary to restart it if the Control 8 firmware is ≥ 4.5 (the program alert you if restarting is necessary).

Connecting the Control 8 with a fixed IP Address:

1 - Set the computer network IP address (in the same subnet). Proceed as follows. (This example refers to Windows 7 Professional, other releases may have windows with different looks):



Open the network settings, right-click the network board icon and select <Properties> to display its respective menu.



2 - Select <Internet Protocol Version 4 (TCP / IPv4)> and then click <Properties>.

In some particular cases, it may be necessary to select the <Internet Protocol Version 6 (TCP / IPv6). Please refer to your network specifications.

In most cases, the configuration of the protocol version 4 is sufficient.

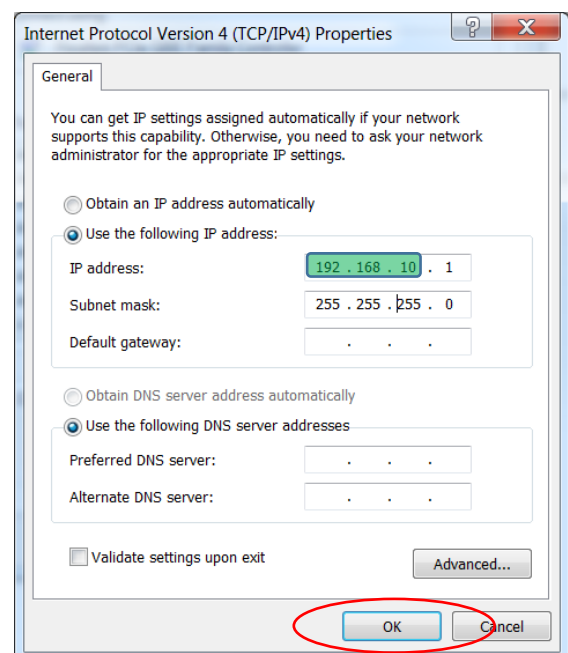
3 - Select <Use the following IP address> and then, in the IP address, only type the first three numbers of the IP address (highlighted in green in the figure).

Now type the fourth and last number of the IP address, which needs to be different for every device connected to the network.

The IP address fourth number can be in the range 1 to 254 (in this example it is 100), except the value 5 (that cannot be used), as it is the one assigned to the CONTROL 8.

Set the same Subnet mask value of the CONTROL 8.

Click OK

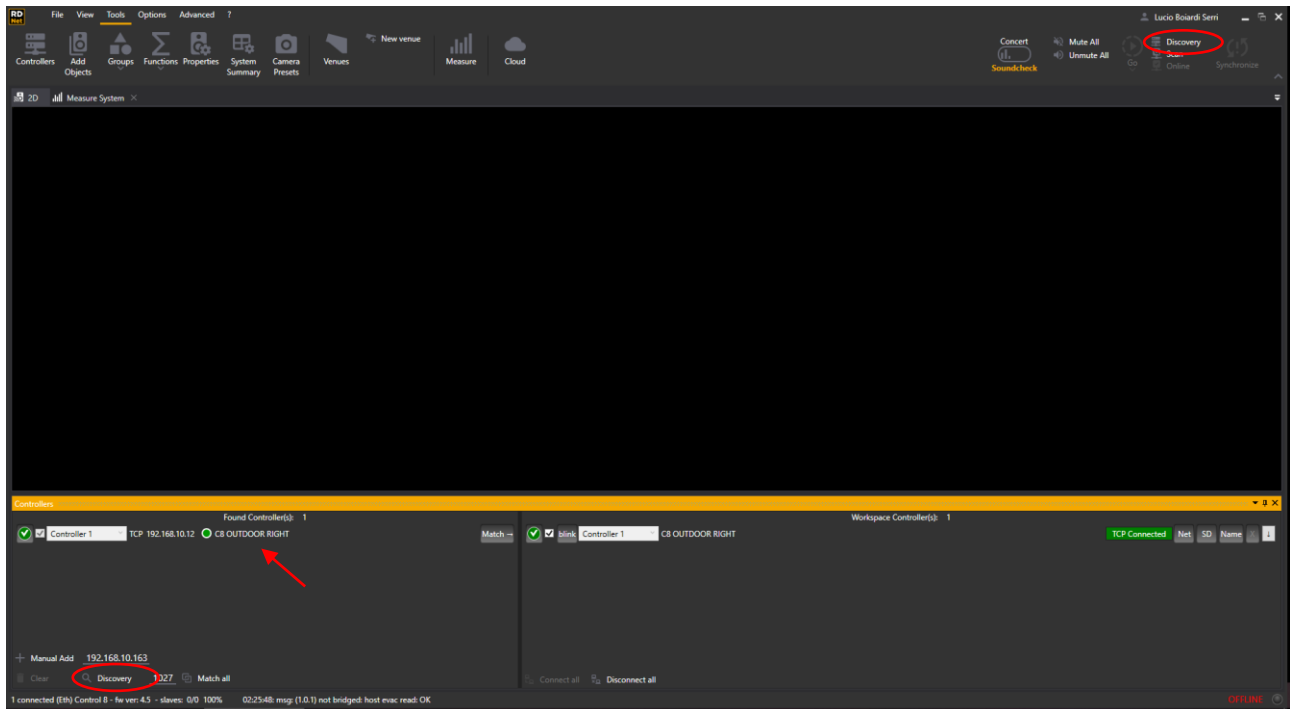


4 - Now disconnect the USB cable and link the CONTROL 8 to the computer via Ethernet (directly or through an Ethernet Switch).

5 - Run the RDNet software and proceed as follows:

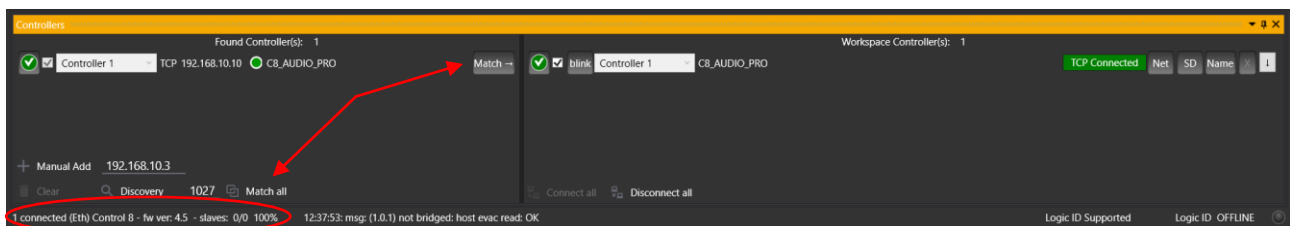
In the toolbar click <Discovery> and the Controllers window will open and show all the connected controllers found in the network with their own addresses.

Otherwise click <Tools> → <Controllers> on the toolbar and the controllers page will open empty. Select <Discovery> here to scan for the connected controllers. This way is suitable in case of venue with more than one controller, where different part of the system could be connected in different moment.



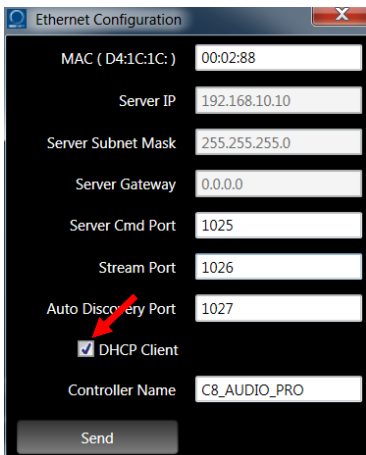
Click <Match> or <Match All> button (if more than one controller is present).

Now the controller(s) is (are) connected and ready to scan for the connected speakers.



Check if the RDNet software status bar indicates that the CONTROL 8 is connected and ready, as shown in the figure.

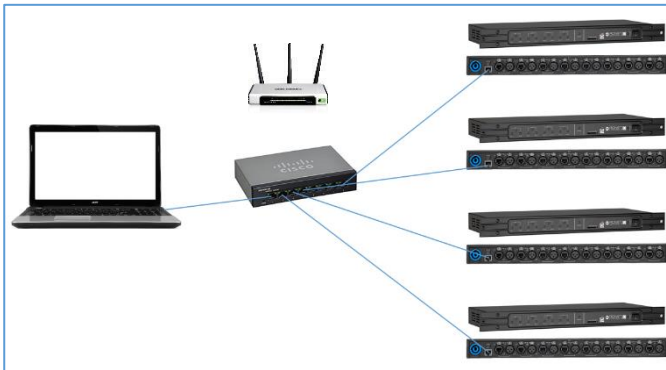
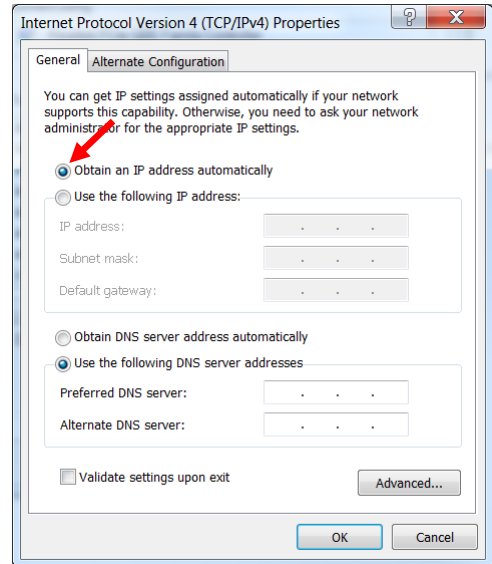
Connecting the Control 8 in DHCP mode:



Select DHCP client in the network settings of the Control 8. In this case a proper switch is required with the DHCP server function enabled. The controllers and the computer connected will automatically receive the IP address assigned to them from the switch.

Be sure also to set "Obtain an IP address automatically" in the network settings of the internal LAN card of the computer.

At this point follow the steps from the fifth at page 10 to continue working.



RDNet software supports up to 20 CONTROL 8, all simultaneously linked to a computer via TCP/IP, to get up to 160 RDNet ports.

When using the USB link, only a single CONTROL 8 (or CONTROL 2) is supported by a computer. The mixed use of both CONTROL 8 and CONTROL 2 is not allowed.

The CONTROL 8 TCP/IP setting only differs (from the one previously described) in the 'Server IP'

section, which shall be different for each CONTROL 8 and included in the address range set in the network configuration. Other TCP/IP settings are possible and depend on specific user needs.

The figure above shows a network configuration that includes 4 Control 8.

The wireless connection is supported (within the WLAN covered range) to set the system.

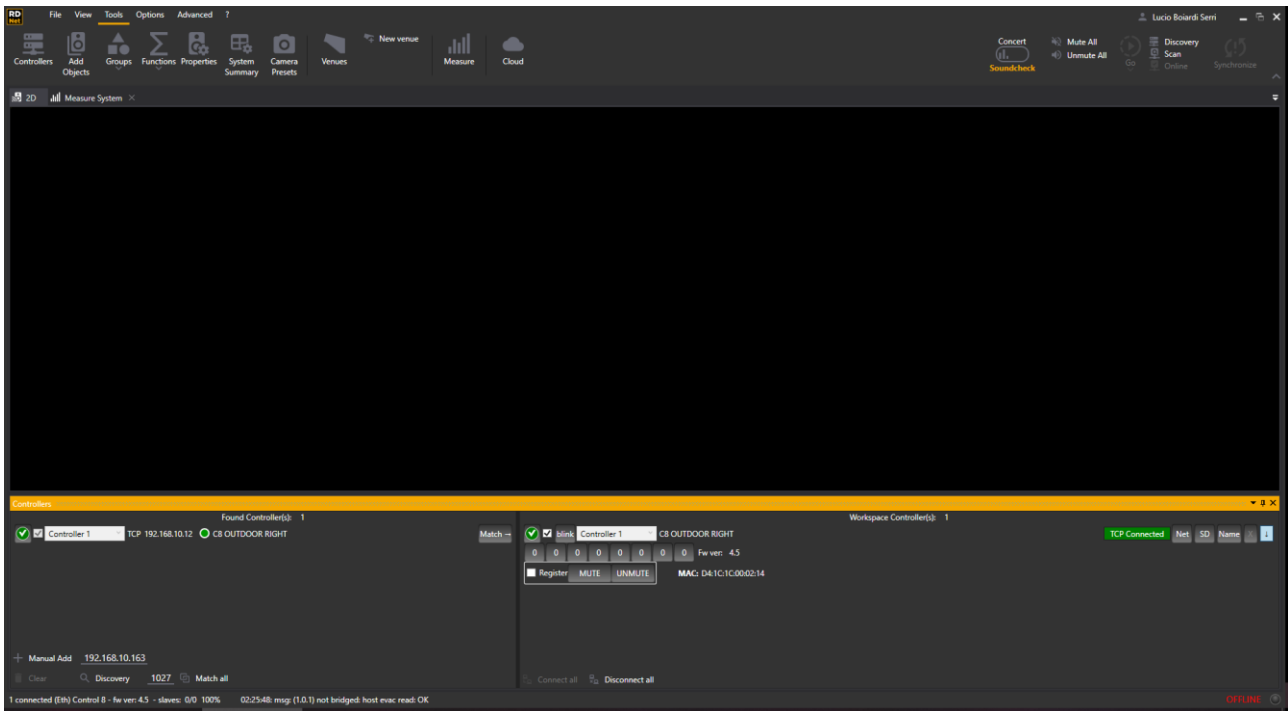
It is also possible to connect a CONTROL 8 through Internet for assistance and remote configurations.

4.2 CONTROLLERS WINDOW

The Controllers window shows a summary of all controllers linked to RDNet.

The right side of this view ("Found Controllers") contains all the controllers and different devices (COM), physically connected to the system via Ethernet or USB. In order to find Ethernet connected ones, you need to click <Discovery> button. The others get individuated automatically.

The first USB controller found, will directly be connected to the system (this behavior could be disabled on the "Settings" panel). It also appears on the right side ("Workspace Controller"). The green tick means "Matched".



The right side of the window ("Workspace Controller") contains the controllers connected to the devices shown on the screen in the case of an offline project.

If there are many controllers on the right list you can select which one you want to match with another one on the left list ("Found Controllers") by clicking <Match> button or by dragging one on the left list and dropping it to another one on the right list. The <Discovery> button orders the controllers by IP address.

By building the project in the right way, you can avoid manually doing the matching for each controller. This can be easily done by clicking on the <Discovery> button and afterwards, the <Match All> button.

If you save a scene after controllers' matching at loading the matchings will kept.

The allowed functions in this list are:

– **“Blink”** button: after clicking it, the front panel LEDs start blinking for a few seconds. This function can be useful to identify all controllers linked to the computer.

– **“MUTE” and “UNMUTE”** buttons: these commands immediately take effect on all devices physically connected and addressed by the selected controller, even if not present on the workspace.

The **“Register”** checkbox forces the automatic address reallocation of all devices before sending the mute / unmute command.

- **“SD Card”** button: RDNet projects can be directly saved to an SD card (inserted into the dedicated slot of the CONTROL 8 front panel).

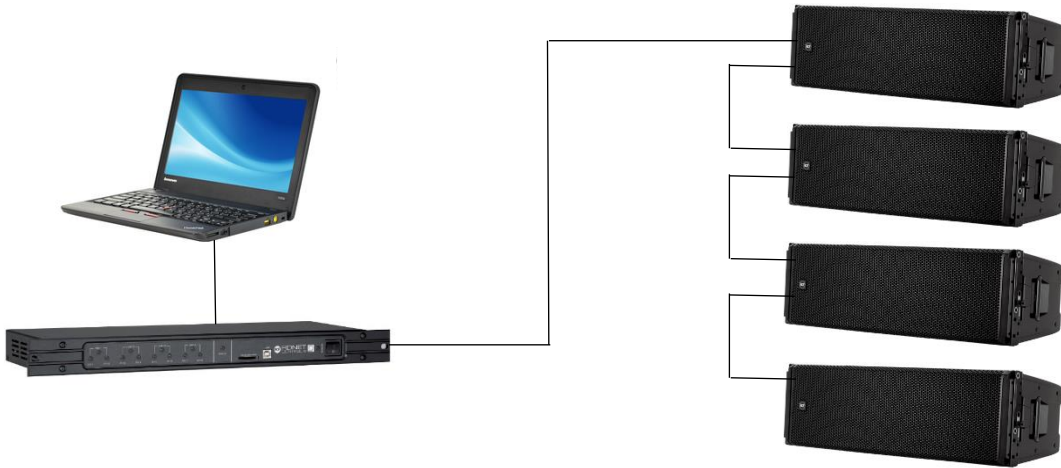
- **“NAME”** button: Lets you change the name of the controller.

- The arrow directed to the bottom shows you the controller’s view.

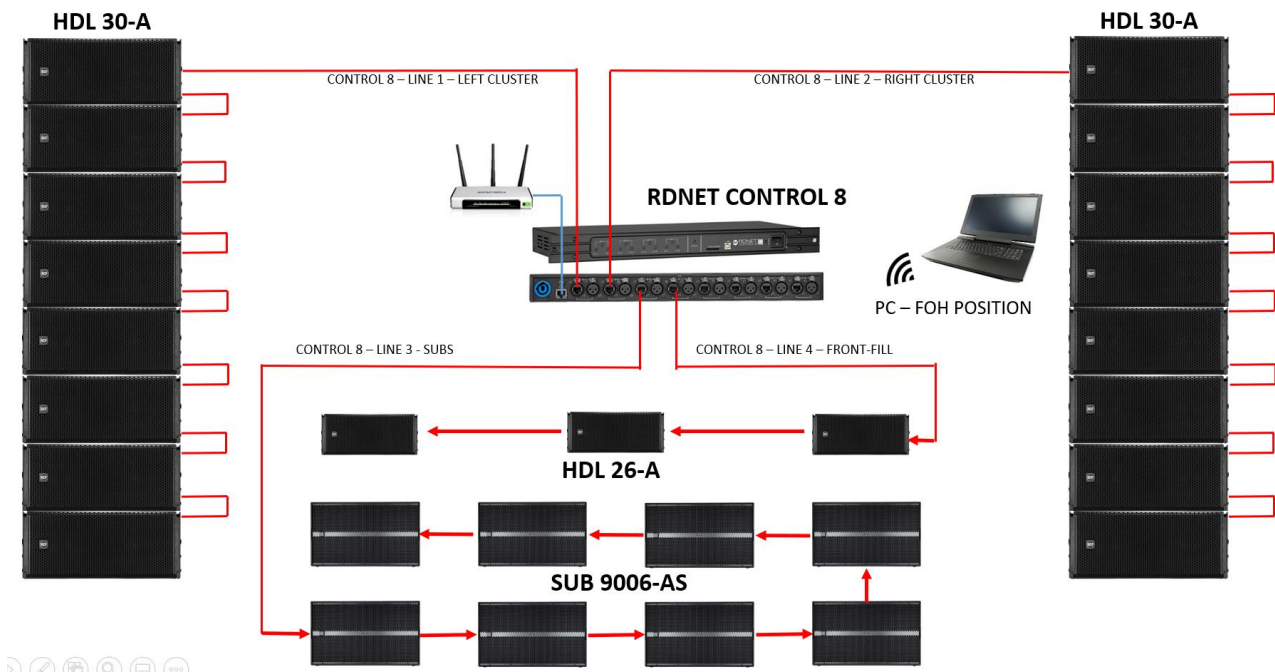
4.3 SYSTEM WIRING

RDNet is a 'daisy chain' network. An RDNet CONTROL 2 / CONTROL 8 port is linked to the 'Data Input' of the first device, from which its 'Data Link' output is linked to the second device input and so on, up to max. 32 devices per channel.

The next figure is an indicative example of a typical RDNet network connection:



RDNet software can detect the occupied position by every network device and assign a unique identifier to each of them. All this takes place in fully automatic mode and, at the end of the Scan, all devices are shown exactly as they are linked to one another.

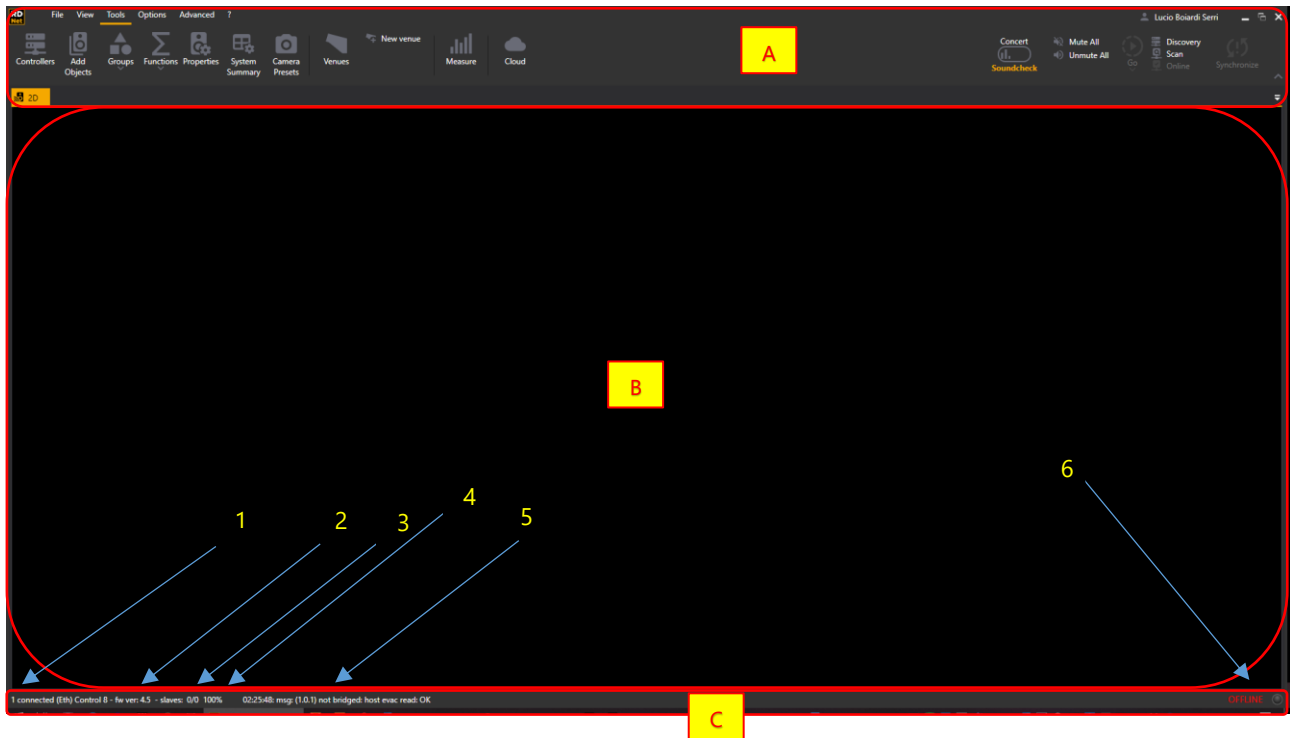


Note: the system in the picture is the same we used in the RDNet video tutorials which are available on our website.

Watching these tutorials you will get a quick overview of the software capability and you will see how our product specialists work, to set up a system for a live event.

5. RDNET SOFTWARE OVERVIEW

The RDNet software main window is divided into four areas, each with its role:



- A) **Menu bar and Toolbar.** The menu bar includes five options which opens five different toolbar scenarios. You can access frequently used commands directly, without having to open drop-down menus.
- B) **Workspace.** All devices linked to RDNet network are shown here as icons (objects). Each device (e.g. a speaker) is uniquely matched to an icon (object) that can be freely moved and placed inside the workspace.
- C) **Status bar.** This shows messages and information about the system.
 - 1. Number and type of linked controllers (CONTROL 8 or CONTROL 2)
 - 2. Controller firmware release
 - 3. Number of linked devices
 - 4. Zoom display percentage
 - 5. Time and type of the last event
 - 6. Current software connection status (offline or online)

5.1 RDNET OBJECTS

As soon as a controller is connected and matched with the workspace, it will be possible to use the **<Scan>** command to start the automatic system scan.

RDNet software automatically detects every device in the network which are shown in the workspace as icons. Each object, (icon), is matched to the respective physical device by means of an **identification number (ID)** and the **model name**.



Every ID consists of three numbers (from left to right):

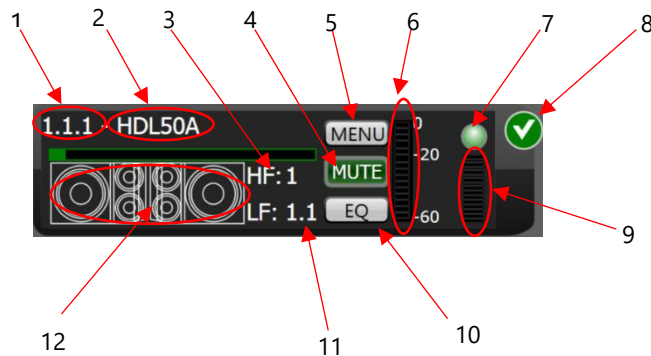
- 1st: controller number.
- 2nd: controller channel number.
- 3rd: channel device number.

Starting from an object ID, it is possible to find its physical location in the RDNet network. When knowing how a device is wired, it is also possible to find its object in the workspace. The model name helps identify the device type.

All objects have a set of primary attributes, a set of extended attributes and a DSP control section.

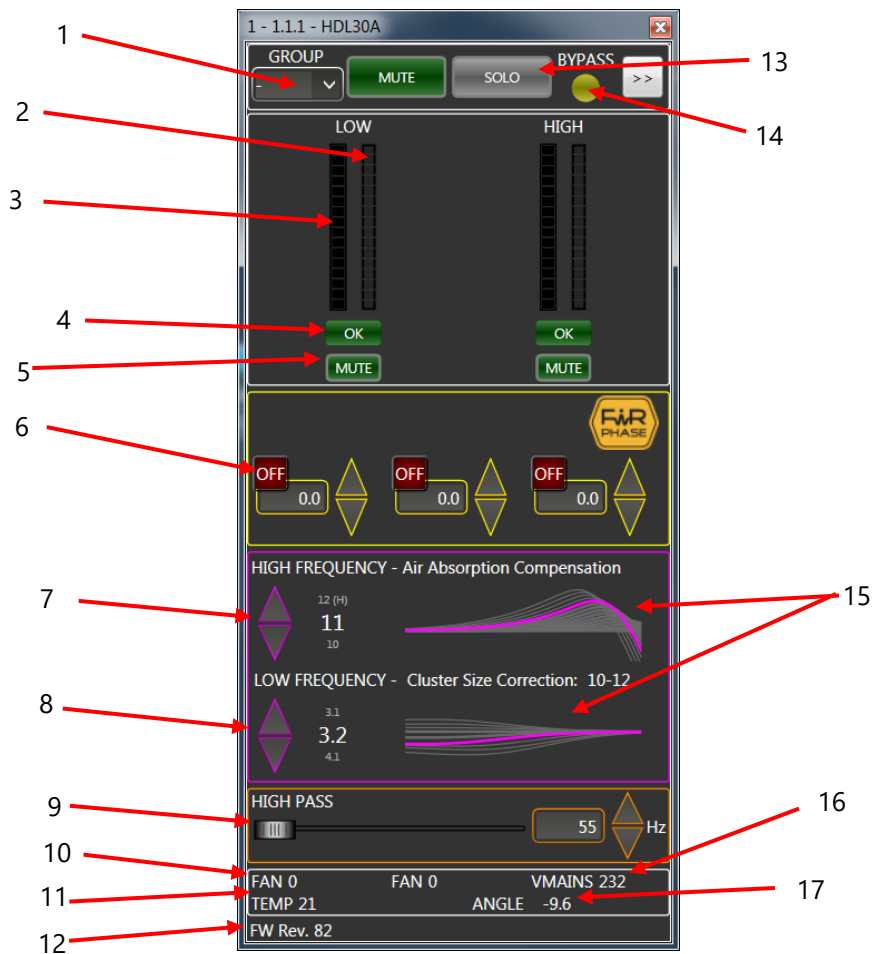
NOTE: All object attributes are not related to the functionality of the software (which is only a remote control), but only depend on device type and firmware. Therefore, attributes of different objects are not all the same and may have different appearance and parameters.

Primary attributes, (HDL 50A), are immediately visible on objects:



1. Device logical ID (address)
2. Device model
3. High frequency current preset (high frequency adjustment due to the air absorption due to humidity and temperature)
4. MUTE button
5. MENU button to access the extended attributes (also accessible by right clicking the object)
6. Input signal level (VU meter)
7. Input signal level CLIP indication
8. Indication of connected device
9. Limiter intervention level
10. EQ button to access DSP parameters (equalization, gain, delay, etc.)
11. Low frequency current present (system cluster size)
12. Device status of each way: blinking green when the output level is normal, yellow or red mean respectively soft / hard limiter intervention.

Extended attributes, (HDL 30A), are specific for each device. For instance, a 'line-array' speaker has extended attributes different from the ones of a 'point-source' speaker. Double-click the object to open the extended-attribute window:



1. GROUP button to enter group/array functions (refer to the manual chapter 5.2.)
2. Limiter intervention level of each single way
3. Output level (VU meter) of each single way
4. Amplifier status of each single way (green: OK, red: fault)
5. MUTE button of each single way
6. FIRPhase Filter
7. High frequency current preset (high frequency adjustment due to the air absorption due to humidity and temperature)
8. Low frequency current present (system cluster size)
9. High Pass Filter (Butterworth 24 dB/oct)
10. Cooling fan speed
11. Amplifier temperature
12. Device firmware version
13. Device solo button
14. Local/Bypass status indication
15. Graphical representation of equalization corrections (due to a preset)
16. Amplifier mains voltage
17. Device angle indication, useful when rigging the system, particularly when using two engines and it is necessary to tilt line array clusters manually



The DSP control section (click '>>' in the extended-attribute window) includes all DSP controls (shown in the next figure) that are common for all speakers:

The graphic user interface allows presets (equalization, gain and delay settings) to be loaded or saved from / to the internal PC drives.

This is the new detail interface for the new array devices.

It has been organized by sections using precise colors.

■ = Fir Section

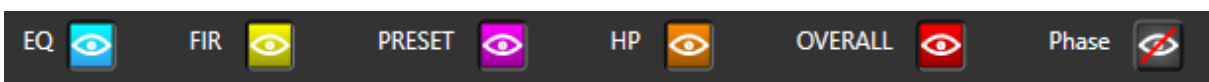
■ = Preset Section (Air Absorption & Cluster Size Corrections)

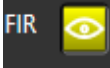

■ = High Pass Section

■ = User Equalizer Section

Each equalization component is drawn in the graph using the associated color.

By clicking the following toggle buttons is possible to show/hide the relative curve in the graph.

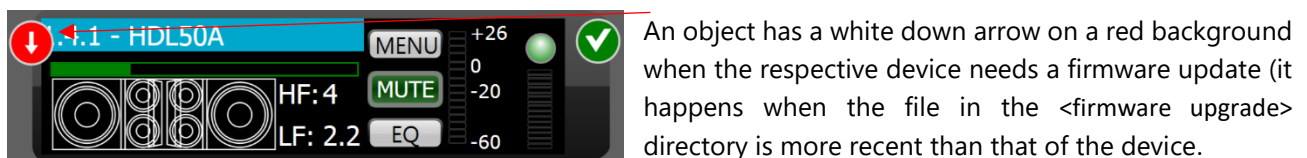
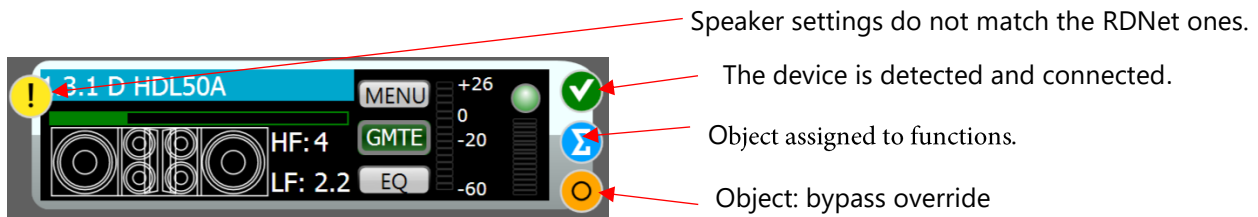


If the button is highlighted () then it means that the curve is plotted otherwise () it is not.

“Overall” is the summation curve of all graph components.

In chapter 6 we will examine the functionalities of each individual function applied to a line array system.

Next figures show several software indications under certain conditions which are common to all the RDNet devices:



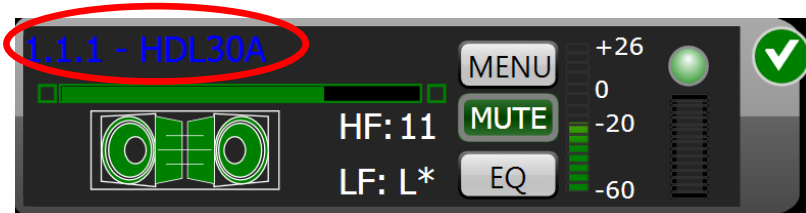
To get updated a device firmware, please refer to the last RDNet software release. Periodically check for new updates.

6. RDNET USE

6.1 BYPASS FUNCTION

All RDNet devices have a 'Bypass / Local Set up' button on their rear panels. This option concerns the device on-board DSP, about which configuration will be loaded when rebooting. If that button is released, the DSP will load the local manual settings. If that button is pressed, the DSP will load the last valid settings received and will be able to be remote controlled by RDNet.

In an RDNet system, it is crucial all devices have their 'Bypass / Local Set up' buttons pressed. It is thereby assured that even after a possible power interruption and restoration, the system will keep operating properly according to the last received configuration.



RDNet software indicates the 'Bypass / Local Set up' button status by changing the respective object ID colour on the workspace and in the extended-attribute window as well.

Note: If (for any reason) the computer loses communication with a device, that device will keep operating according to the last settings received from the software, therefore possible issues (due to unstable wiring, computer crashes, no mains, etc.) do not affect its proper operation.

6.2 OFFLINE AND ONLINE MODES

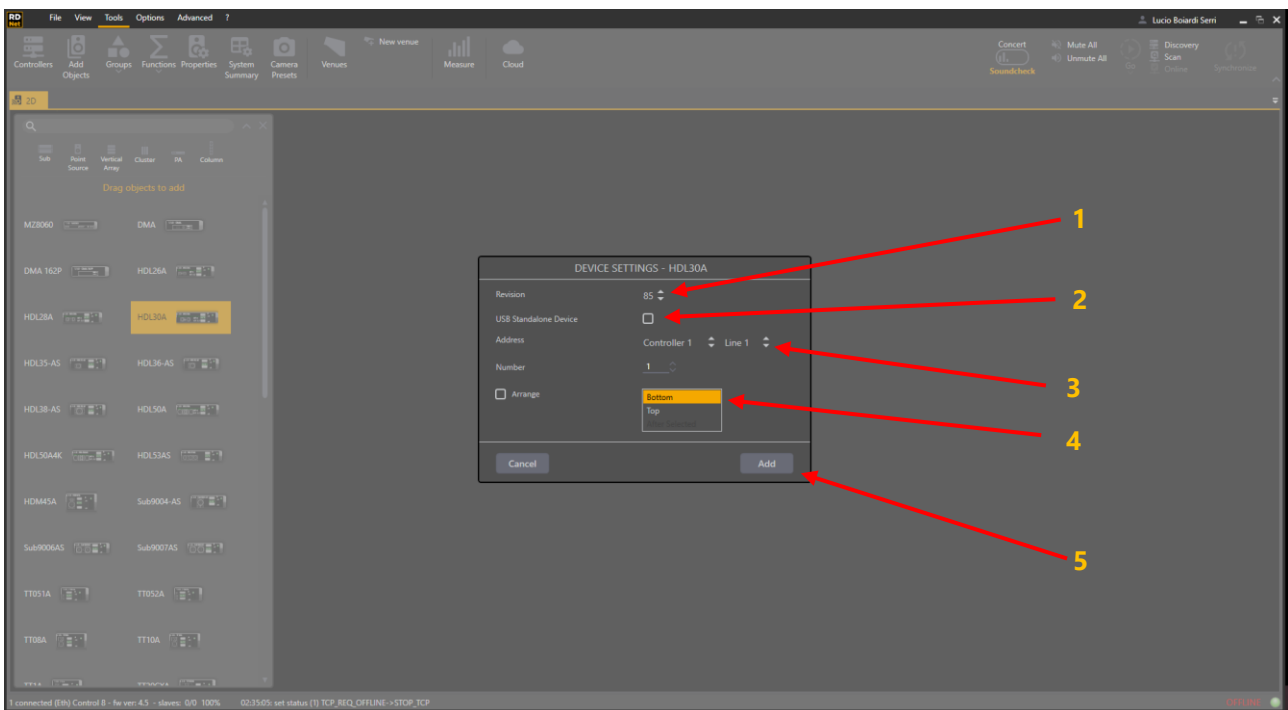
RDNet software has two operating modes (mutually exclusive):

- **Offline mode**
- **Online mode**

The **Offline mode** provides all necessary tools for the virtual design of a professional sound reinforcement system. It is possible to add, remove or drag objects in the workspace, deciding how they should be interconnected to one another and what controller port (channel) is to be linked.

Once clicked on the **<Tools> <Add Object>** button it will appear the proper window where all the RDNet devices available are divided in sub-categories: Sub, Speaker, Array and PA. Select the category and drag the device on the workspace.

Once dragged the device setting window will appear with some options:



1. Firmware Release: selectable if more than one firmware is available.
2. Option for USB devices as MZ 8060
3. Address of the devices which will be added to the workspace. Once in the venue, be sure that the system is wired as in the offline previously designed workspace. This is mandatory.
4. Direction that will be used to address the devices
 - <Bottom>** – the new device will be the last of the selected line and will get the respective address.
 - <Top>** – the new device will be the first of the selected line and will get the address x.x.1. The address of all subsequent devices will be incremented according to the number of inserted modules.
 - <After Selected>** – the device will be inserted after the selected one and will get the next address. The address of all subsequent devices will be incremented according to the number of inserted modules.
5. Click **<Add>** to add the devices to the workspace according with the selected parameters.

Once it is finished the off-line design with all the objects we need and once in the venue, with all the devices connected and on, it will be possible to match the system designed off line with the real system by pressing **<Scan>**.

It is now possible to go online by pressing the **<Online>** button to start working.

The **Online mode** provides all necessary tools to control and monitor the system designed in Offline mode in real time. It is possible to edit all parameters of each device.

The **Status bar**, bottom right, always indicates the current mode.



When putting in place a project designed offline, it is important to scrupulously respect the foreseen wiring, for instance: the device chain order, the controller used ports, the correct number/names of controllers. If this procedure is not followed properly, all devices assigned to a non-wired port will be reported as missing and a dialog box indicating the actually detected devices will appear. At this point, all offline work (graphics and setup) could be lost, because new devices could be added to the default condition.

6.3 NETWORK GO & SCAN

As soon as the system, or part of it, is connected we have two option to operate: **<Go>** or **<Scan>**.



If the whole system is connected and on, the most suitable command is **<Go>**. It will, in one click, discover for the connected controllers, scan for the connected devices, and go Online.

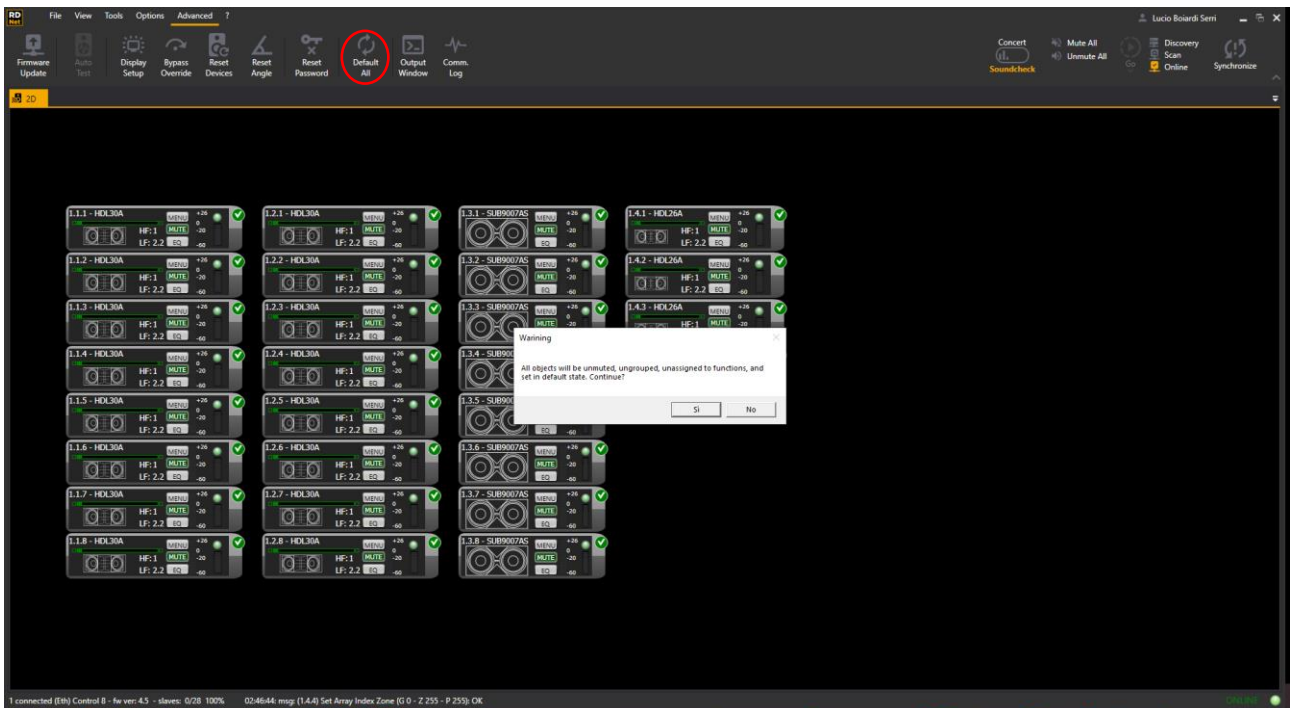
In this way, if all the devices are correctly detected, it will be able to start working in real time with all the function available.

If just part of the system is available, **<Scan>** is the command to work with. It starts the search of all devices linked to the network through CONTROL 2 / CONTROL 8 controllers, returning a found-device list.

<Scan> always ends in offline mode and returns different results depending on the system assembly procedure.

The devices found will be added to the workspace stacked vertically according to the number of the controller line they are connected to.

All initial primary and extended attributes and DSP settings are **read and imported from physical devices**. To reset the devices in order to start working from the factory default situation, press **<Advanced> → <Default All>**



This command will also delete all groups, array groups and functions.

The **<Scan>** command will produce different scenarios based on the synoptic design status related to what it has been found in the network:

<Scan> with an empty workspace:

In this mode, all found devices are automatically added to the current workspace.

If the scan result is different from what is expected (for example, a device is missing because it is switched off or not wired), it will be possible to scan again, after solving the problem.

Another option starting from an empty workspace is the command **<Go>** as wrote on the previous page.


<Scan> when the workspace is not empty:

this second mode is suitable when there are a lot of devices, so it is preferable to start from a workspace previously configured.


In this approach, the goal is that the system wiring is carried out according to the guidelines of the designer rather than the installer needs. Scan is such an important tool that helps the user find out all differences between the physical wiring and what has been previously foreseen.

After getting the list from the network, Scan compares (in the workspace) what is found to what is really present. This function (repeated for each object) can lead to four different results:


A) An object on the workspace corresponds to the one found in the network.

This is the desired result: the physical device corresponding to the workspace object has been found. This symbol  is added to the object in the top right-hand corner.

B) Workspace object has not been found in the network.

It is not possible to find a network device that corresponds to the workspace object (or the device is switched off). This symbol  is added to the object in the top right-hand corner.

C) Workspace object is different from the one found in the network.

In the network, there is a device with the proper ID, but it is a different model. For instance, if the workspace object with ID 1.2.2 is a subwoofer and in its place a line-array module has been found instead, this error is indicated by the symbol  added in the top right-hand corner of the object. Point the mouse on this symbol to see a text box with the name of the detected model.

D) A detected device in the network is not present in the workspace.

An expected device is linked to the network in a wrong position or a controller port that had to remain unused has been connected. If so, the new device is listed in the **'Matched Plus'** (which will be described in the following pages).

The next figure shows RDNet workspace of a simple system made of 8+8 HDL 30-A in combination with 8 SUB 9007-AS and 4 Front-Fill HDL 26A. This system will be used in this manual as well as in the on-line video tutorials as example to describe the software functions.

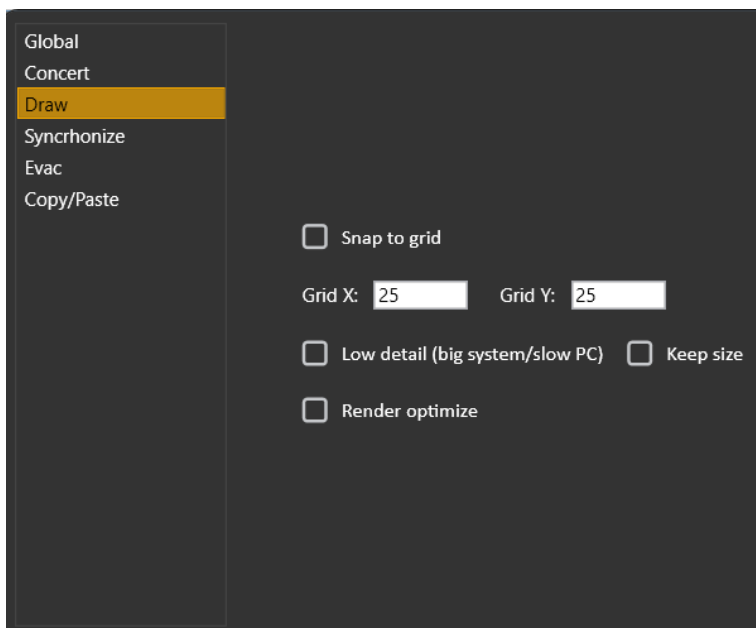
The Scan function (on the example setup, starting from an empty workspace) leads to the following result:



Each workspace object (/device) column corresponds to a controller line.

All objects can be moved in the workspace to best suit the current setup. Normally, all objects are placed in the workspace considering their real physical positioning.

Drag and drop workspace objects to delivered positions. RDNet has a hidden grid to position all objects. The grid size can be chosen in the toolbar Option > Settings as shown in the next figure:



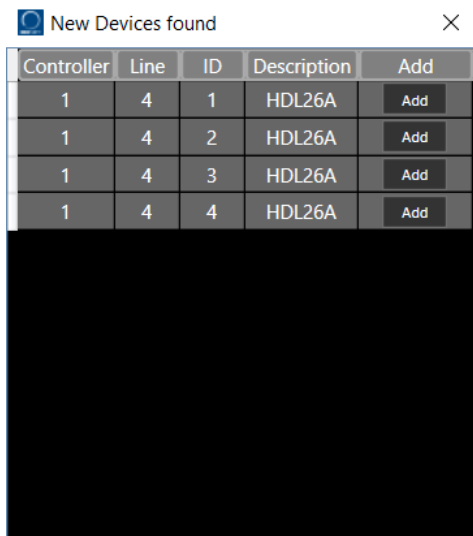
If the **<Snap to Grid>** box is checked, when dragging and dropping, objects are automatically snapped to the grid.

<Grid X> and **<Grid Y>** allow to set the grid size. (Default values: 25 - 25)

The **<Low Detail>** option removes some functions (VU meters and others) in the objects to optimise CPU resources in big systems.

The **<keep Size>** option keeps the object standard size (with less details) instead of reducing it (if not checked). It is useful to keep the same workspace aspect in both **Low / High Detail** modes.

For instance, four HDL 26-A modules need to be added to the system.



Link the devices to the network and use <Scan> to add it to the workspace.

After linking new devices to the network, click Scan to add them to the workspace. The '**Matched Plus**' window (the found device list) will appear (as shown in the figure).

In this example, RDNet detected four HDL 26-A

Click <Add> (on each item) to add the respective new object to the workspace.

To remove an object from the workspace: select it and click <Edit> → <Delete Selection> on the toolbar.

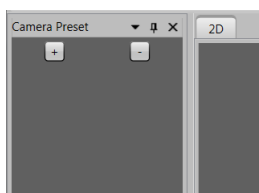
All tools to add / remove objects also allow the system designer to prepare workspaces for complex systems, reducing the time required for setup in the field.

Now it is possible to arrange the objects by using RDNet tools.

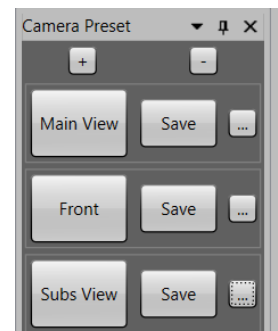
Hold down the right mouse button (<Pan> tool) to drag the entire workspace. Left-click a single object to drag into the toolbar left, there are 3 icons: <Zoom In> <Zoom Out> <Zoom 100%> and <Zoom Fit>, the latter allows optimization by scaling the workspace, in order to display all objects in their relative position.

<Device Arrange> will reposition all the devices by default in the workspace as the <Scan> command does from an empty workspace.

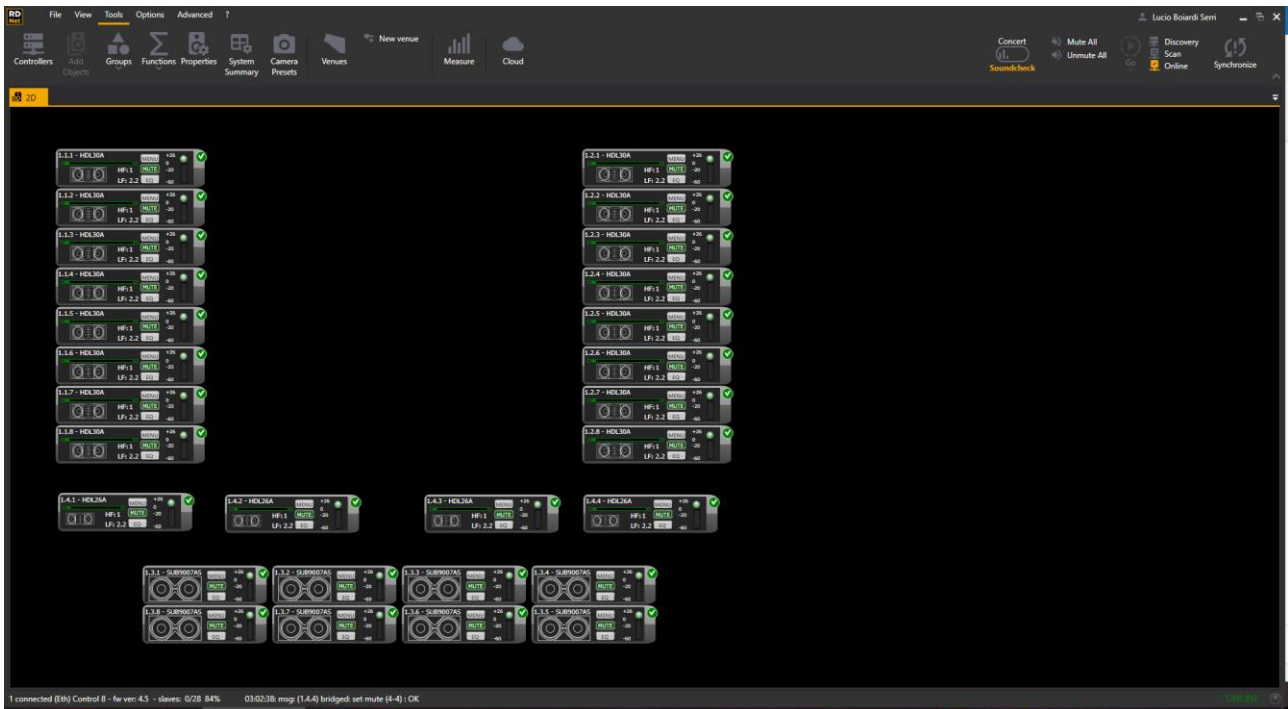
The <Presets> function allows several screenshots to be saved.



Click <+> to add and name a specific screenshot, which can be later recalled (any time) by clicking <Preset> and then the respective button.



Next figure shows the actual placement of all devices:



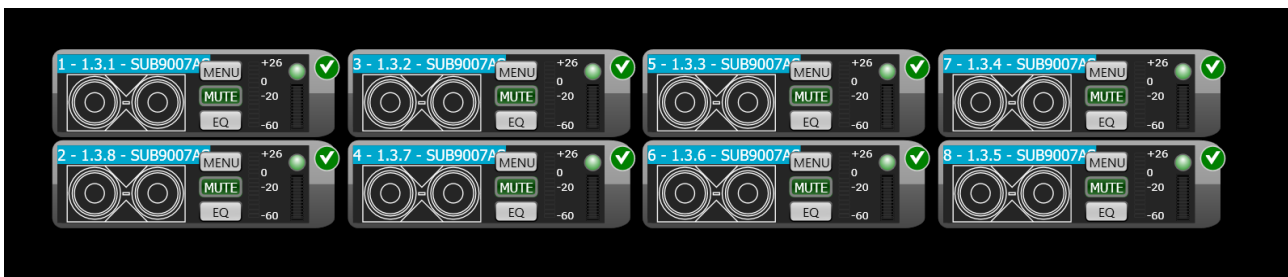
All objects have been arranged according to the actual appearance of the system, considering the physical location of each device. In this way, it becomes extremely simple and fast to locate a possible issue detected by the software.



For correct alignment of objects, it is possible to drag and overlap the icons, horizontally or vertically and the position of the icon will be perfectly aligned according with the shadow that appear while overlapping.

A proper alignment of the icons is crucial when using sub functions as they assign a number to the selected objects based on their alignment and position in the workspace.

This temporary number, (visible on the left of the speaker's address), tied exclusively to the objects selected in that moment, will depend the delay values for the End-Fire and Gradient functions.



After finishing the setup, further accidental movements of objects in the workspace can be prevented by clicking **<Edit>** → **<Lock>** on the toolbar.

6.4 SYSTEM MANAGEMENT MODE (ONLINE)

The **Online mode** starts data transmission between workspace objects and their respective physical devices. All object parameters (i.e. equalizers, mute, presets, etc.) are sent to the network devices with immediate effect. All network devices are cyclically scanned, in order to get a complete system status.

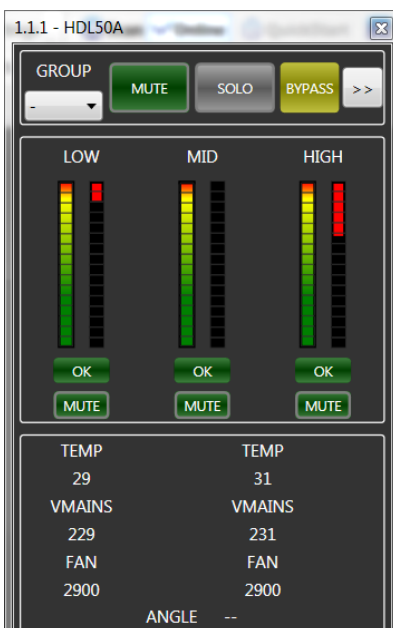
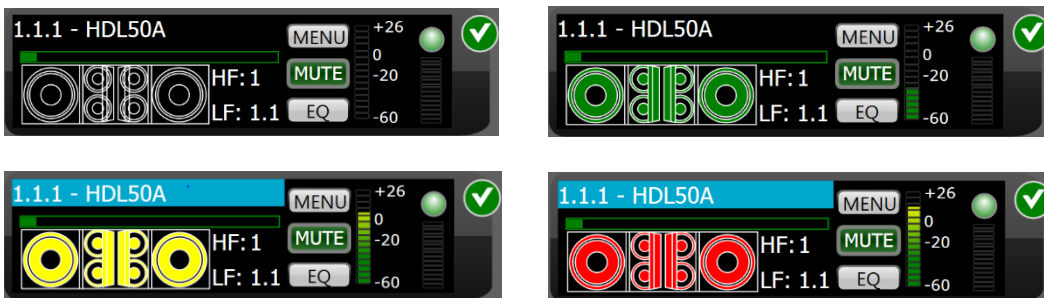
In Online mode, it is still possible to drag objects on the workspace, but it is not allowed to add or remove them.

6.5 METERING AND DIAGNOSTICS

The signal monitoring, common at all the RDNet devices, follows this color code:

- Black: no signal
- Green: signal presence
- Yellow: soft-limiter intervention (soft power compression)
- Red: hard-limiter intervention

Next figures show the monitoring of each way of an HDL50A speaker:



For instance, the left figure shows the extended attributes of an HDL50-A speaker (including all available diagnostic data). This figure is only relevant to this object, as each RDNet compatible device has its own extended attributes.

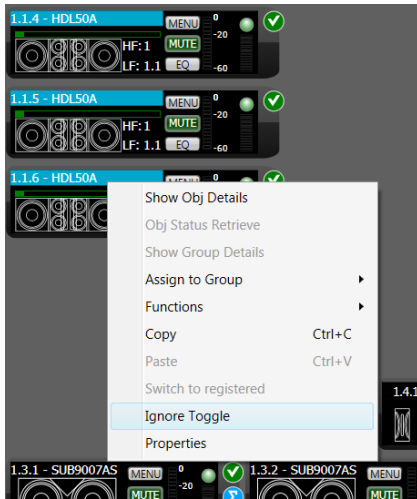
As you can see in the figure, if there is a situation of high input levels, then the DSP hard limiters are operating to protect the speaker components. A meter in red indicates the limiter intervention (gain reduction).

OK (in green) indicates that the respective amplifier is operating properly. Each MUTE button allows a single way to be muted for a truly complete system monitoring.

Other data: amplifier temperature, mains voltage, cooling fan speed and physical inclination. (available only without input signal).

6.6 ONLINE MODE WITH A SYSTEM PART

The RDNet software allows a complete project to be prepared in advance, then to make it effective in the field after completing the wiring. During installation of big systems, especially when it may take a long time, it can be useful to toggle to online mode only with a part of the designed system, without dragging or removing disconnected objects from the workspace. The **<Ignore Toggle>** option (in the object menu, right-click with the mouse) disables the switch to the **Online mode** in all devices that are not available or have not been properly wired yet.



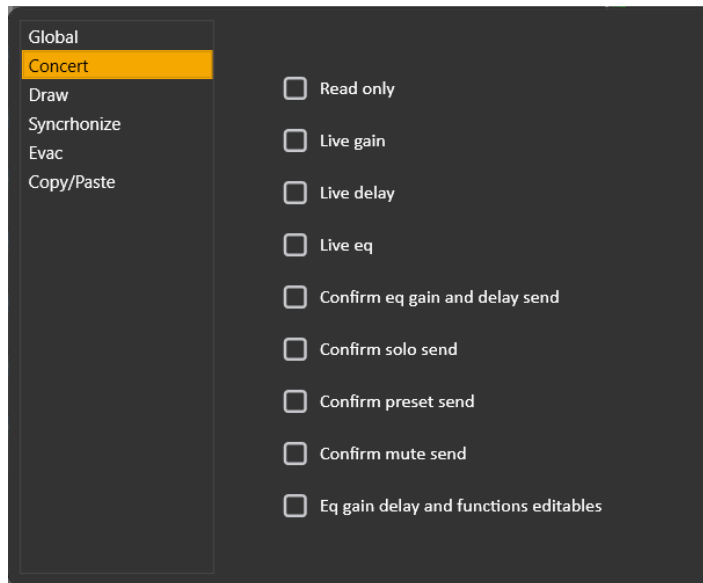
As shown in the figures, after selecting the 'Ignore Toggle' option, the object is marked with the symbol . Then, the object will be ignored and excluded from data communication until clicking **<Ignore Toggle>** again. It is possible to automate this function by selecting **<Auto Ignore>** in the software **<Settings>** menu. In this way, when switching to the online mode, all workspace objects not marked with the symbol are included in 'Ignore Toggle' and then back to their original state when switching to the offline mode.

6.7 SOUNDCHECK AND CONCERT OPTIONS

The <**Sound Check**> option (as default, when running the software for the first time) allows the user to edit the system configuration.

The <**Concert**> option significantly limits the executable commands for a safer system control during the show. For example, if <**Concert**> is selected, the <**Scan**> command will be disabled to prevent switching to the '**Workspace Design Mode**' when the show is in progress.

In addition to this protection, the <**Concert**> option can also limit some functions as configured in the <**Option**> → <**Settings**> menu:



Read Only: this is the most restrictive option and prevents any accidental system change during the show. If selected, RDNet software is just a system monitor and cannot be used to control all devices. Enabling this mode excludes all other options.

Live Gain, Live Delay and Live Eq: if enabled, all parameter changes will be immediately sent. If disabled, all changes will be accepted, but sent to devices only after clicking <**Send**> in the DSP control window.

Confirm Eq Gain and Delay Send, Confirm Solo Send, Confirm Preset Send and Confirm

Mute Send: if enabled, a confirmation request will appear before sending new parameter values to devices. If disabled, all changes are immediately sent to devices.

Eq Gain Delay and Functions Editable: if enabled, it will be allowed to edit EQ, Gain, Delay and Functions of workspace objects. If disabled, any change will be locked.

6.8 SEND, SYNCHRONIZE AND OBJ STATUS RETRIEVE COMMANDS

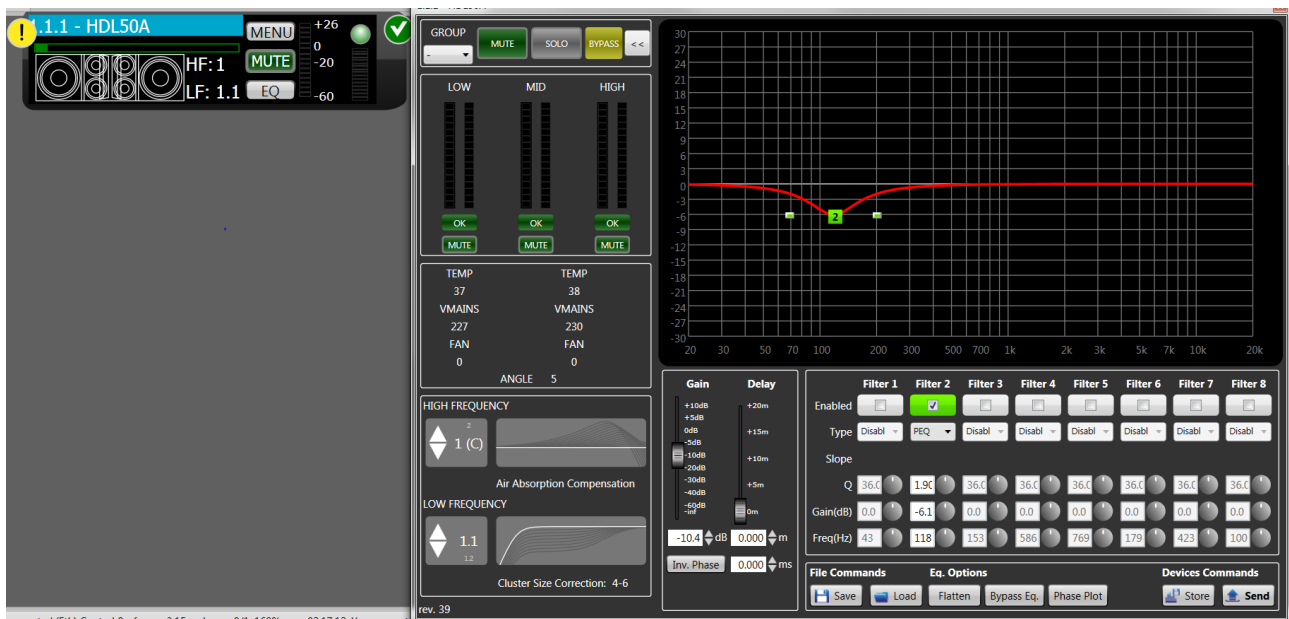
When in **Online** plus **Sound Check** mode, all object changes take immediate effect, providing complete synchronicity between RDNet software and the monitored system. When in **Online** plus **Concert**, some restrictions may be present: parameters can be edited by the user but defer sending changes to the corresponding physical device. For this reason, it is possible that synchronization between RDNet objects and physical devices is lost, until all commands are sent. **<Send>** and **<Synchronize>** are useful to bring the system into a state of complete consistency (matching data). **<Send>** acts on the selected object, **<Synchronize>** acts on all workspace objects.



The exclamation mark '!' indicates no synchronization between an object and its respective device.

In the **<Options>** → **<Setting>** menu, it is possible to automate the synchronization between workspace object and devices by checking the '**Auto Synchronize Gain, Eq and Delay on Startup**' option.

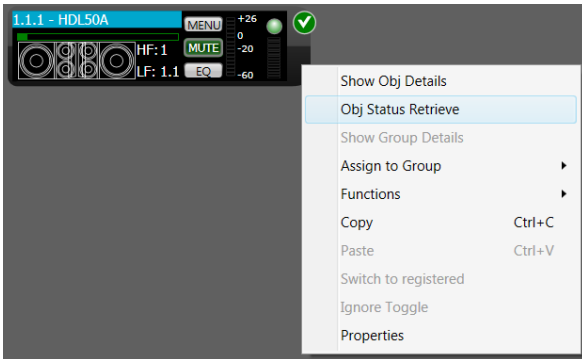
For instance, assume the **Online-Concert** mode (with default settings, as described in the previous chapter). Only one device is edited and its PEQ filter needs to be inserted. Since the '**Live EQ**' (Settings) is disabled, the software accepts the change, but this is not sent to the device.



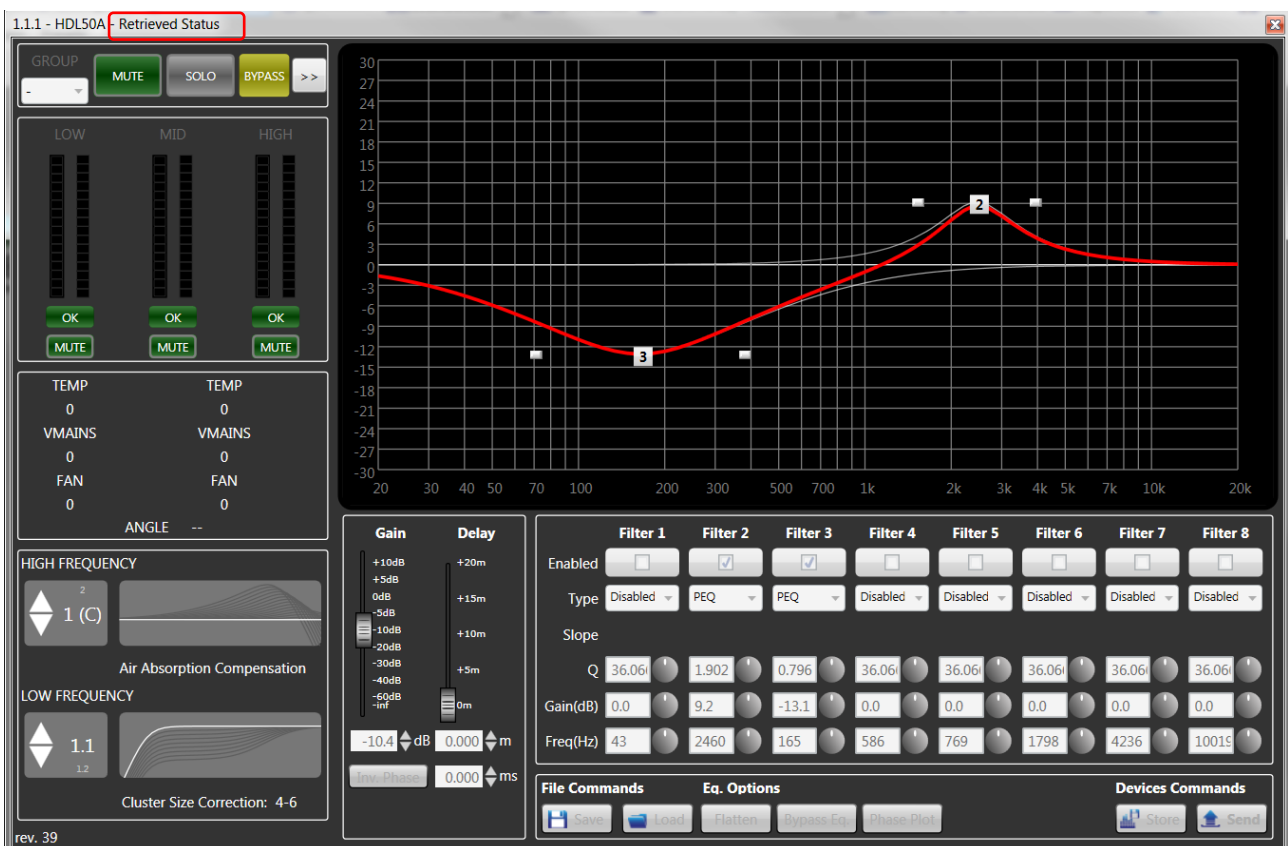
After enabling one filter, the exclamation mark will appear on the object, because the change has been accepted, but the command has not been sent. Click **<Send>** to send all changes to the device for a complete synchronization.

<Synchronize> works in the same way but applies to all workspace objects.

When the exclamation mark '!' is present on the object, the controlled device is operating with different parameter values (compared to its respective RDNet object). <**Obj Status Retrieve**> (right-click the object to open the menu) queries the device about its current parameter values.



All data is displayed on a window similar to the previous, allowing the user to see what the differences in details are. The Object '**Retrieved Status**' window only shows the device parameters (EQ, Gain, Delay). After saving the current project, select <**Go**> or <**Scan**> in an empty workspace to also save all device data on a file. In this case, the RDNet software imports parameters of all found devices, so it is now possible, if necessary, to save settings to single files and recall them later.



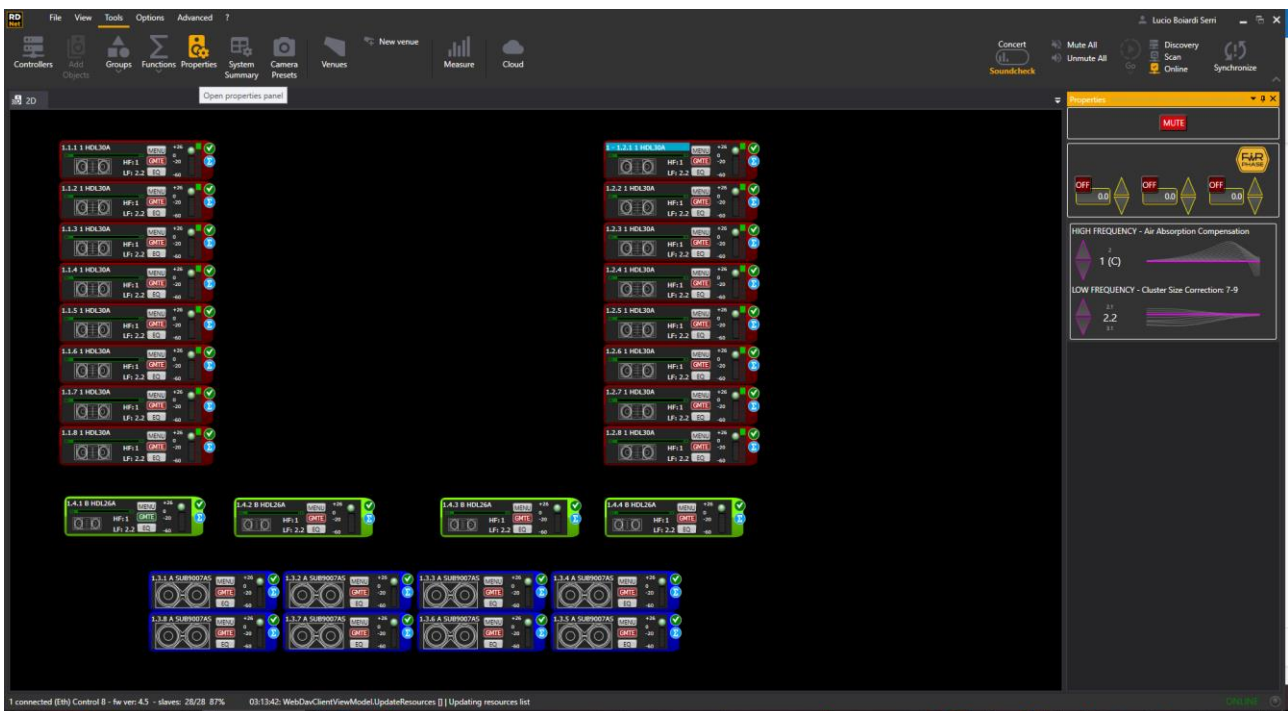
As shown in the figure above, in the object 'Retrieved Status' window, all commands are disabled (it serves to display parameters only).

7. ARRAY SETTING

This chapter is about all advanced functions that are useful to control a lot of devices in a simple and intuitive way. For a complete understanding of this manual section, it is necessary to know the basic functionality (previously described in chapters 3 and 4).

7.1 PROPERTIES WINDOW

The Properties window (select either **<Tools>** → **<Properties>** in the toolbar) allows all object presets to be selected in a simple way. For instance, to set both cluster size and HF correction of an entire speaker array, it is possible to open the **<Properties>** window after selecting all objects:



The **<Properties>** window is not the same for all devices. For instance, the HDL30-A has a first section about the FIRPhase settings. The second section regards the high frequency correction, showing presets of both top and bottom speakers (HDL30A has 15 available presets for HF correction). A second section allows the 'Cluster Size' to be set (the same for all speakers).

In the specific case of the line arrays, when selecting all cluster objects, all changes are progressive in order to maintain the presets scalability (among objects) but still keeping the possibility to edit (globally) to get customized corrections according to the needs of the sound engineer.

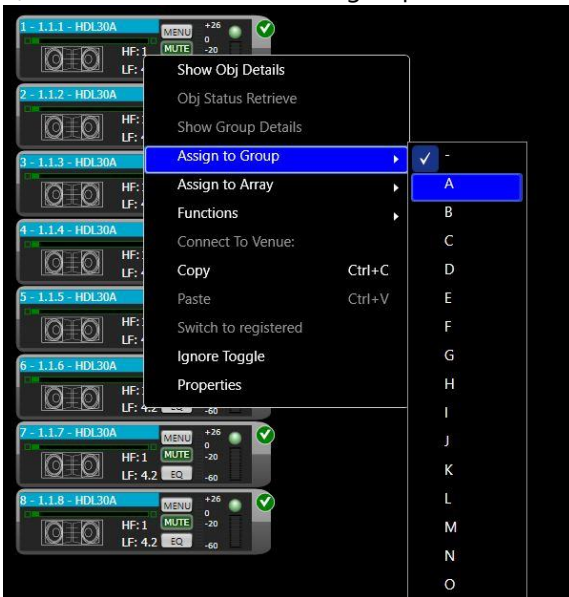
NOTE: the simultaneous selection of different objects restricts the available controls only to those common (among all selected devices).

7.2 GROUPS

The **<Group>** function puts together all **DSP controls** of an object selection. All devices belonging to a group share the same values (i.e. Gain, Polarity, Delay and Eq.). All changes are simultaneously sent to DSP of all selected devices. Each single object can belong to a group only, which can be identified by a different edge color.

To group more objects:

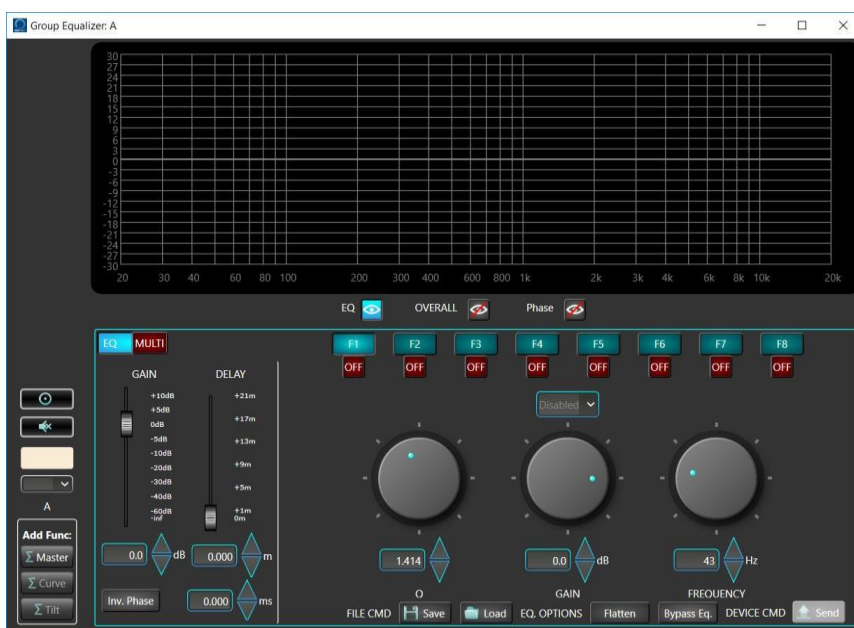
- 1) Select with the mouse (click and hold to make an area) all objects to be grouped.
- 2) Right-click on an object and select **<Assign to Group>** in the menu.
- 3) Choose to which available group all selected objects will be assigned.



When an object is assigned to a group, it is not possible to edit its **DSP** parameters directly, but only through the **group DSP** settings (**Group Equalizer** window).

To open the **Group Equalizer** window:

- 1) Right-click the object belonging to the selected group.
- 2) Select **<Show Group Details>**.



All equalizer changes affect all objects of the group.

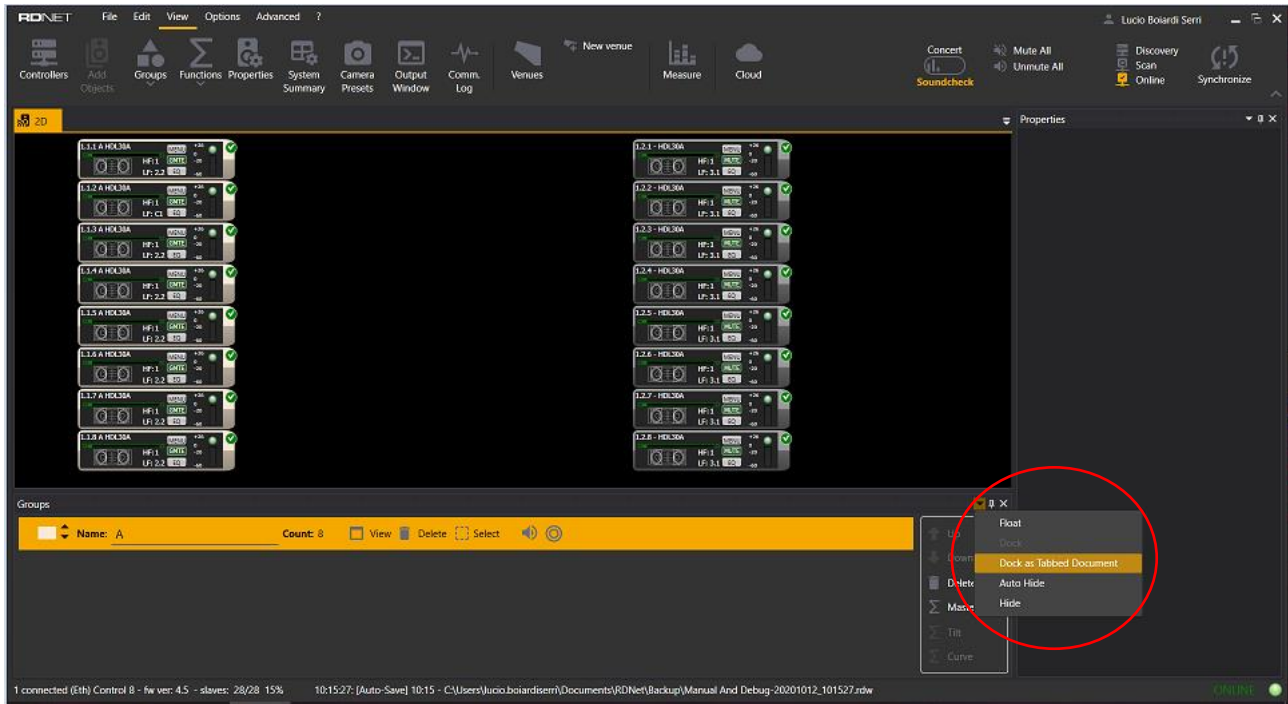
The 'Groups' window (select either **Tools > Groups** in the menu or click **<Groups>** in the toolbar) shows in detail all groups of the current project.

Each group can be named and it is also possible to change its colour, modify its object list or delete it.

NOTE: DSP default settings of a new group are directly copied from the lowest object on the right (among all selected). To assign a desired equalization to a group:

- 1) Select the object having the desired equalization and add it to a new group.
- 2) Select the other objects and add them to the existing group.

Note that all accessible windows (i.e. Properties, Groups, Functions) can be floating or sub-windows.



The group function is really useful on various occasions, for example, to manage subsystems (front-fill, down-fill, and subwoofer parameters as well as, in general, all the RDNet objects which are not line array modules arranged in clusters).¹

In order to manage the line array modules arranged in a cluster it is necessary to use the "Array" advanced group.

1 – Sometimes the line array modules are not arranged in clusters when used as front-fill, in pole mount, in stacking.

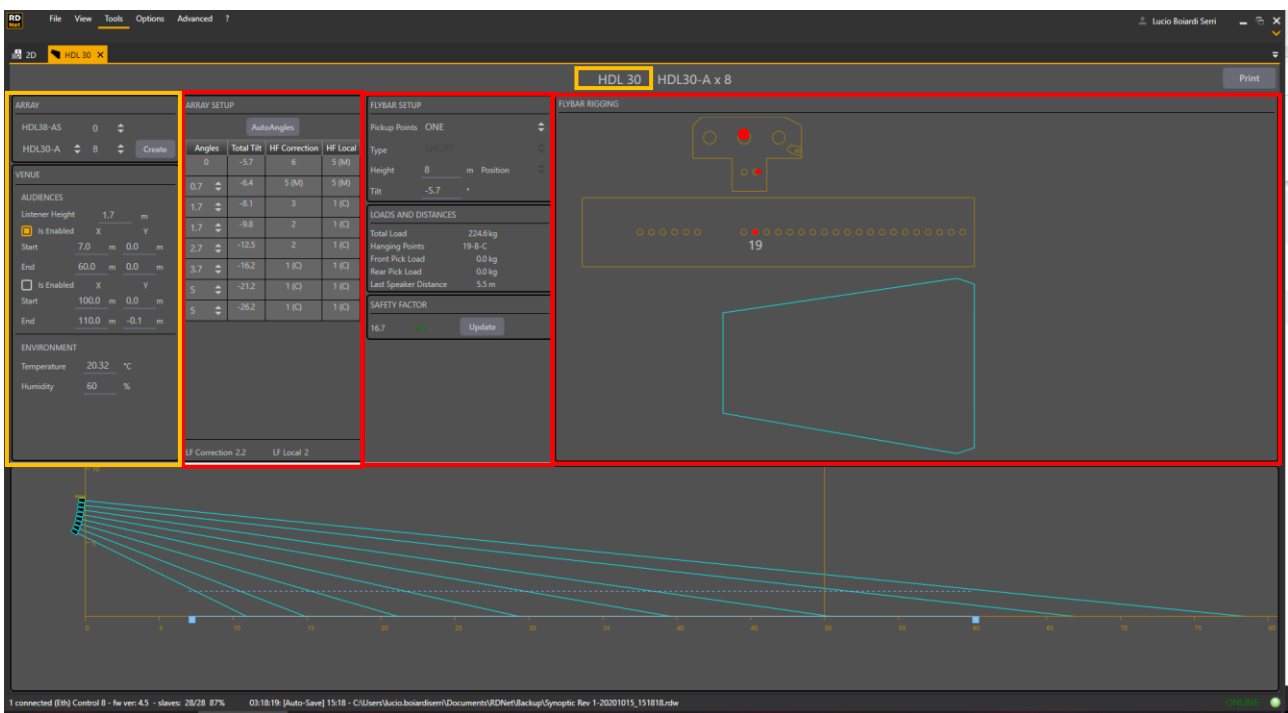
7.3 5.3 ARRAY SYSTEM DESIGN

The Easy Shape Designer prediction software is now available within RDNet 4.0 and serves to design and get all the mechanical data to fly the cluster as well as to apply presets according with temperature and relative humidity.

Select **<Tools> → <New Venue>**

A new window will open with the possibility to create the cluster and input the data of the venue.

<Tools> → <Venues> in the toolbar, lists all the existing venue projects



First the venue can be named by double clicking on the name.

We can see marked in yellow the input data field as well as in red the output ones.

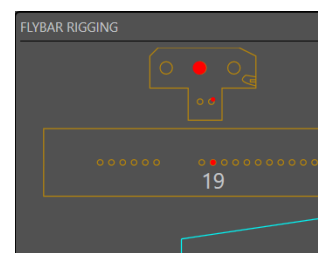
In the ARRAY field select the model among all RCF line array equipped with RDNet and the numbers of modules. Click **<Create>** to build the cluster.

In the AUDIENCE field enter the data about the listening areas: Listener Height, Start and End of coverage points and, if necessary, enable the second audience (balcony, bleachers, etc.). In the Y column input the height of the listening areas if necessary.

In the ENVIRONMENT field enter the temperature and humidity. This will affect the HF correction that will be applied at the clusters.

In the FLYBAR field enter the height (lowest point as shown in the picture) and type and position of the fly bar, (changing according with different line array systems), and the number of pick up points.

Now by pressing **<Autosplay>** the software suggests the optimal splay angles and the fly bar pick up holes to achieve the best coverage of the audience. Working with 1 pick-up point, the cluster will automatically take the right tilting related to the project audience data.



ARRAY SETUP			
AutoAngles			
Angles	Total Tilt	HF Correction	HF Local
0	-5.7	6	5 (M)
0.7	-6.4	5 (M)	5 (M)
1.7	-8.1	3	1 (C)
1.7	-9.8	2	1 (C)
2.7	-12.5	2	1 (C)
3.7	-16.2	1 (C)	1 (C)
5	-21.2	1 (C)	1 (C)
5	-26.2	1 (C)	1 (C)

FLYBAR SETUP	
Pickup Points	ONE
Type	SHORT
Height	8 m
Tilt	-5.7 °

LOADS AND DISTANCES	
Total Load	224.6 kg
Hanging Points	19-B-C
Front Pick Load	0.0 kg
Rear Pick Load	0.0 kg
Last Speaker Distance	5.5 m

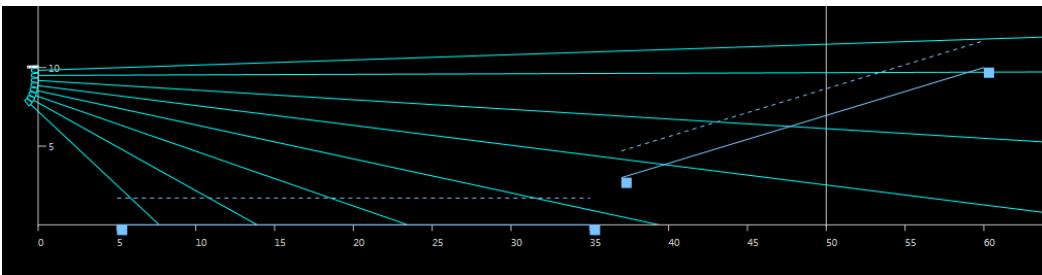
SAFETY FACTOR	
16.7	OK

In accordance with custom projects it is possible to change manually the angles in the **Splay** field as well as the **Tilt**. In this case, the new pick up point will be automatically calculated and displayed.

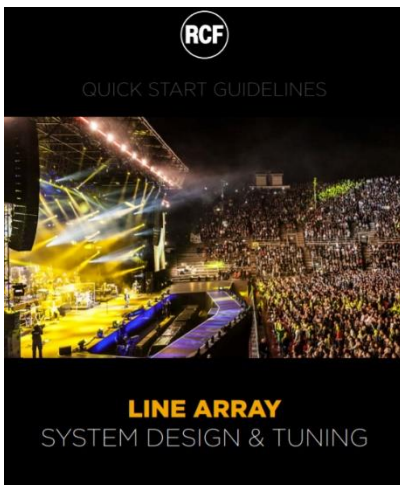
In the right part of the workspace the fly bar pin and pick up holes are displayed as well as the direction of the shackle. Be sure to set up the clusters according to this data in order to ensure the right coverage at the system.

At the bottom the cluster is displayed with the aiming

of the modules and it is also possible to drag with the mouse the ends of the listener areas.



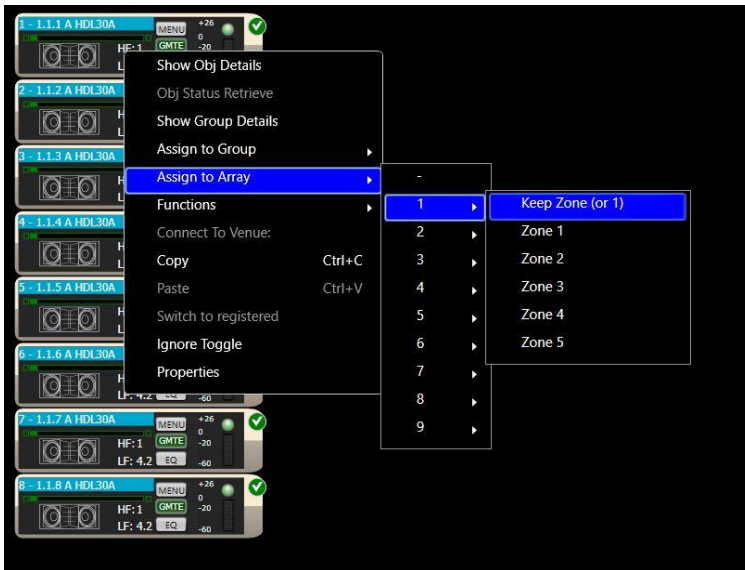
Close the “venues” window to come back into the clusters workspace.



In order to create a good design, we recommend to download and read our “Line Array System Design & tuning” available for download in the technical document section of the RCF website.

7.4 5.4 ARRAY GROUPING – PRESETS APPLY

The grouping function “Array” represents an advanced group. It has all the same characteristics of a group adding the Zone, Air Compensation, Cluster Size and FIR Gain properties.



To create an array, select the objects that you want to regroup on it, then, by using the right mouse button, select the label **<Assign to Array>** and then choose the number of the array (from 1 to 9) and the number of the zone (from 1 to 5).

Indeed, if necessary, it is possible to divide an array into 5 zones. Every object can be assigned to only one zone. Every zone can contain only the same model's objects.

It is not possible to create an array with different models.

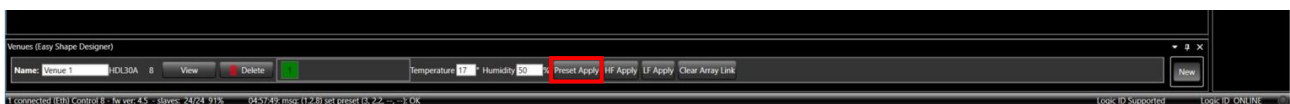
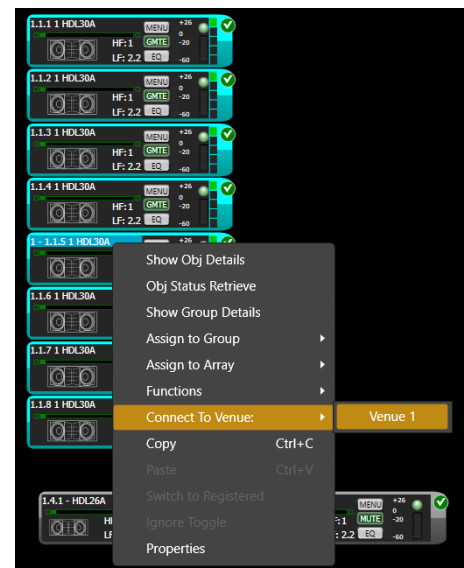
The venue-devices link is a necessary condition to apply preset calculated on the venue project to the array devices on the synoptic.

This link can be established using context menu by right clicking on one of any objects inside the array and then **<Connect To Venue>**.

The “HF Correction” column suggests to the user an optimal HF preset for every box in order to compensate the air absorption produced by relative humidity and temperature. These presets are available for use only in RDNet; users can select from the rear panel of the array boxes only some of them, the ones suggested in the column “HF Local”.

The low frequency presets are shown at the end of the panel. As in the high frequency section, Local is used to identify the preset available from the rear panel of the array boxes.

In order to apply the preset suggested by Easy Shape Designer click on the “venues” button in the toolbar and select “Preset Apply”



At this point the proper HF and LF preset will be sent to the clusters. It is possible to send individually the HF or LF preset if they have been edited and we want to keep their setting.

7.5 5.5 ARRAY FINE TUNING

Zone

A zone is an objects' grouping into the same array. Each zone has an associated color, used to clearly distinguish its properties. Each object belonging to the array should be associated to a single zone. This can be done by the contextual menu "Assign to Array x, Zone y" or by clicking on one of the squares on the right side of the object's icon. Each square corresponds to a zone where the first one on the top is the number 1.

By pressing the "EQ" button of an object belonging to an array, you access the detail view of the array.



Each zone is characterized by a **trio of FIRPhase Gain values**. On top-left there is the zones' list. For each zone you can see how many objects it contains. By selecting each zone you select the FIRPhase Gain's related block. This represents the FIRPhase Gain assigned to each object of the zone. To modify the values you have to write inside the block under the list, otherwise you can also move the points inside the graphic on the right side.

Air Compensation

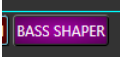
The High Frequency Correction (Air Absorption Compensation) works on all the array's objects in an incremental way. By clicking on the arrow on top, the Air Absorption Compensation is increased by 1 for all the array's devices. On the same panel you can see the value of the top and bottom device.

Global Array FIRPhase Gain

By clicking the arrow in the Global Array FIRPhase field, all the zones modify their FIRPhase Gain values on the corresponding filter. Next to the arrows the Gain of the first (at least 1 object) and last zone are represented.

Cluster Size

The Low Frequency Correction (Cluster Size) works on all the array's objects. There is also a new advanced feature regarding the Cluster Size Correction: The Bass Shaper functionality.

It is unlockable by selecting Bass Shaper button () on the left-lower side of the graph.

This will substitute the Bass Shaper interface to the User Equalizer view, resulting as follows.



The Bass Shaper allows, starting from an existing Cluster Size Correction preset, the LF preset values to be customized, acting on three properties: LF Level, Frequency Slider and Strength.

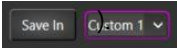
"LF Level": is a low shelf filter that acts on the frequencies under 200 Hz

"Frequency Slider": if the "LF Level" has a negative gain, this slider moves the central frequency of a further and localized subtraction of gain from the global equalization; if "LF Level" has a positive gain, this slider moves the central frequency of a further and localized addition of gain to the global equalization. Higher is the presence of the positive or negative gain, higher is the localized addition or subtraction.

"Strength": this parameter gives a general boost to the Bass Shaper equalization with an additional boost between 300 Hz and 800 Hz, useful to adapt the sound to the curvature of the array.

It is therefore possible to create complex low frequency equalizations that, if performed with standard parametric equalizers, would require the control of a large number of parameters. The equalization made with Bass Shaper should always be accompanied by measures out in the field in order to verify the desired shape of the frequency spectrum.

Changing the value of at least one of these properties triggers the LF Preset changing on a "live" preset called "L*"

L* preset is unreachable using arrows control and if you decide to change the current preset in the traditional way (using arrow control) you will lose all the Bass Shaper changes made before. In order to save these changes you must copy them into one of two rewritable custom presets "C1" and "C2". To do this you have to click "Save In" button specifying the destination custom preset ()

These two custom presets can be set using arrow control.

"Flat" button allows LF Level, Frequency Slider and Strength values to be set in order to create a flat configuration.

It is also possible to export/import a Bass Shaper (LF Level, Frequency Slider and Strength values) on/from a file using "Load" and "Save" buttons.

To come back to Equalizer view click on the "EQ" button.

User Equalizer view has two modes.

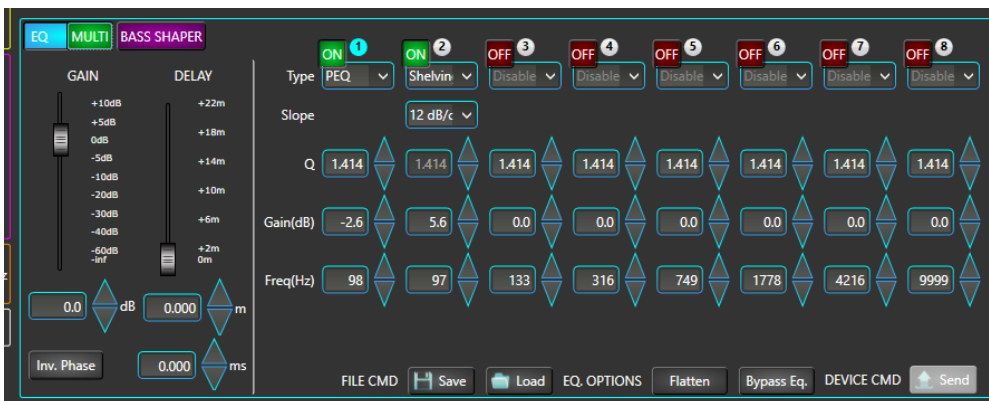
"Single filter" mode that allows a single filter a time to be edited.



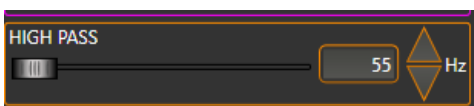
To edit the filter parameters select first the filter, "F1...F8" buttons. Then to enable/disable it, click on "ON/OFF" button and you can select the filter type from the multi-selection box.

To change filter parameters you can use rotary controlor text-arrows control.

On the other side equalization can be controlled using "All filters" mode that shows all the filter values at the same time. To enter in this mode you must press the "MULTI" button.



High Pass



Here select the high pass filter frequency using slider or text-arrows control.

All the modification applied will be displayed on the graph.

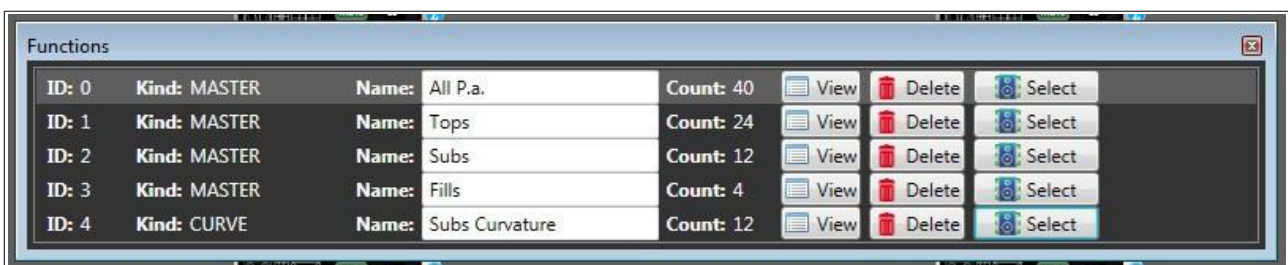
8. FUNCTIONS

Functions are tools for grouping objects that (unlike Groups) have the following properties:

- 1) Functions only act on Gain, Delay and Polarity (equalizers are not affected).
- 2) More Functions can be assigned to the same object, regardless of whether the object belongs to a group (or not).
- 3) Gain, Delay and Polarity values of the Functions are relative and, therefore, summed to the ones of the single object (before sending data to devices).

Functions allow many objects to be controlled in detail, for simple operations like the input gain control and also for more complex settings as curve or tilt of speaker arrays.

Either click **<Functions>** on the toolbar or select **Function > View** in the menu to open a window showing all active functions.



In this window, a function can be named, shown in detail (click **View**), deleted (click **Delete**). It is also possible to choose objects on the workspace (click **Select**).

Click **ID** to select the '**Current Function**', useful to add objects to an existing function through the **<Add>** command in the object menu.



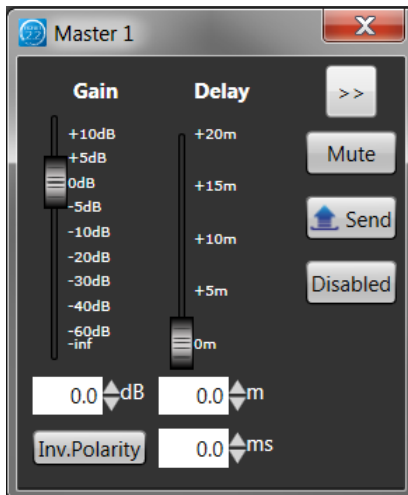
When an object is assigned to one or more functions, it is marked by the graphic symbol Σ on the right side.

8.1 MASTER FUNCTION

The **Master** function allows the Gain, Delay and Phase relative value control of the selected objects on the workspace. To assign the **Master** function to the selected objects:

- 1) Select with the mouse (click and hold to make an area) all objects to be assigned to the function.
- 2) Right-click an object and select **Functions** > **New** > **Master** in the menu.

The following window appears:



Gain and **Delay** values (set in this window) are algebraically added to the ones (DSP settings) of each single object assigned to the function. Example: if an object has its gain value set to +2 dB and the master function is set to -2 dB, the resulting value sent to the physical device will be 0 dB. The resulting phase will be the object initial polarity (DSP settings) in 'exclusive or' with all phases of all master functions assigned to that same object.

Click '**Disabled**' to disable the selected function (removing all gain, delay and phase setting of the included objects).

Click '**Send**' to send data when in Online-Concert mode.

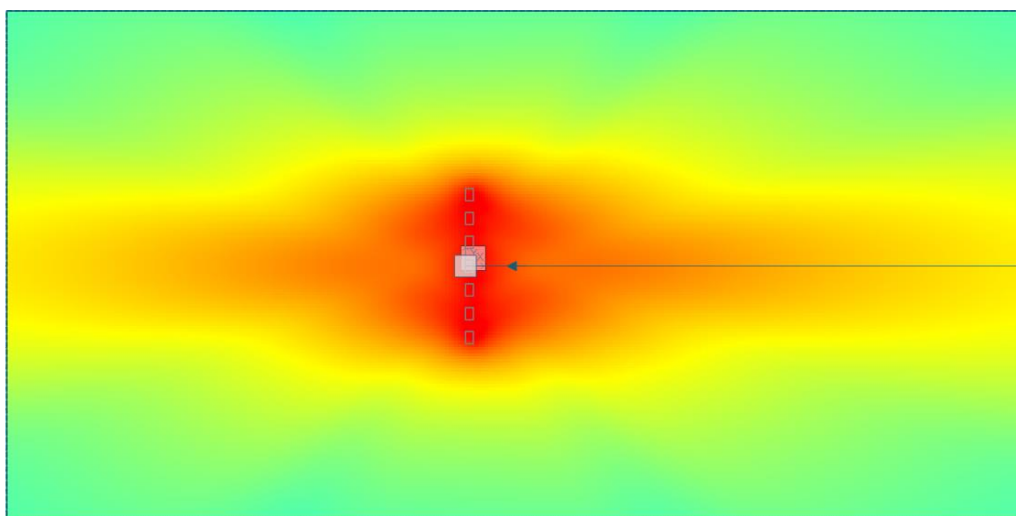
Click '**Mute**' to mute all included objects.

Click '>>' to expand the current window and show the list.

8.2 CURVE FUNCTION

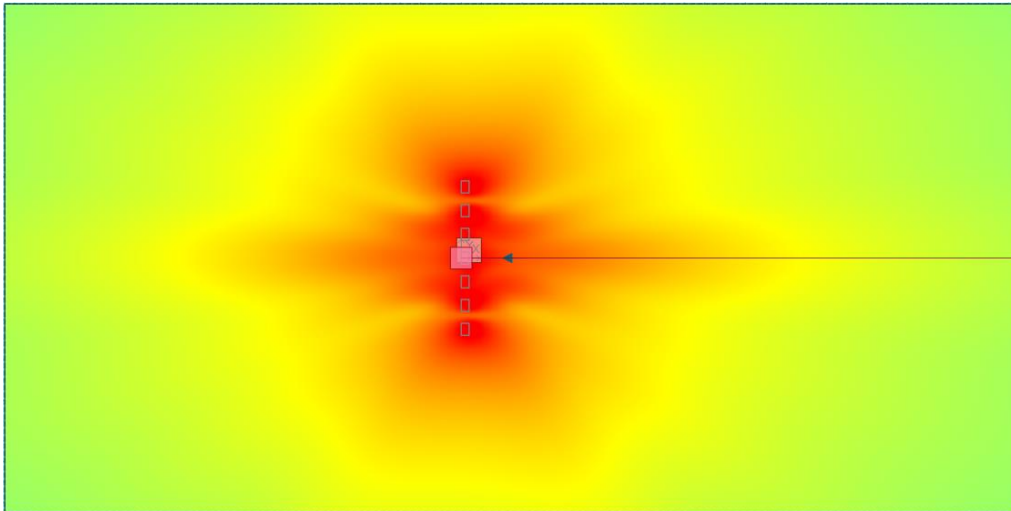
The Curve function allows the natural curvature of a horizontal array made of equidistant subwoofers, to be electronically simulated in order to control its horizontal polar pattern.

For example (figure below): this is an acoustic simulation showing the sound field at the frequency 63 Hz of a 12-subwoofer array (top view):



As shown in the figure, this type of arrangement tends to concentrate most of the energy available on the perpendicular to the array centre, uncovering the lateral areas. Physically bending the array, it is possible to control its polar pattern, ensuring a more uniform sound coverage throughout the listening area.

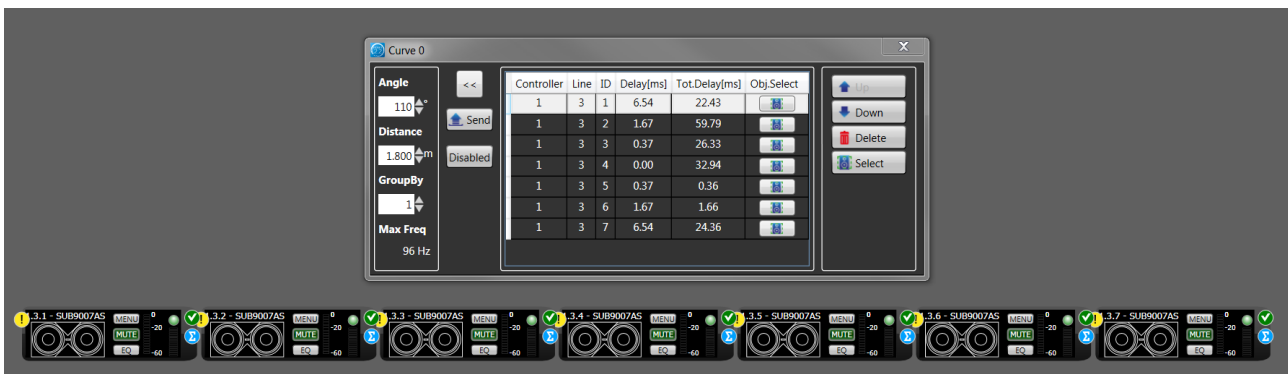
Now, the sound coverage of the considered frequency is much more uniform in the listening area, with a consequent improvement in the sound reproduction quality.



To make a new Curve function:

- 1) Select with the mouse (click and hold to make an area) all objects to be assigned to the function.
- 2) Right-click an object and select Functions > New in the menu.

For example, select all the 7 subwoofers. The following window appears:



As a rule: RDNet objects are added to a function starting from the first upper left to the last in the bottom right. If objects are properly positioned on the workspace, a new function will be immediately ready for use.

Otherwise, it is possible to change the item order by clicking either **Up** or **Down**, in order to respect physical subwoofer positions. Available parameters:

Angle: horizontal coverage angle of the entire array. The algorithm will calculate the delay to be applied to each subwoofer to get the coverage required by this value.

Distance: distance between two subwoofer axes. The algorithm needs this value to calculate the delay values (to achieve the required angle). For a correct operation, all subwoofers should be arranged on a straight line and equally spaced by the exact value here specified. The distance between two subwoofer axes determines the maximum operating frequency of the entire array.

Increasing this value reduces the maximum frequency (**Max Freq**).

Max Freq: this value is calculated by the algorithm and is the maximum operating frequency of the subwoofer array. It shall be always higher than the low-pass cut-off frequency set to each single array subwoofer.

Group By: This allows you to group individual elements of the array by this number.

Example: to get an array made of 12 stacks, each with 3 subwoofers, the Group By value shall be set to 3. The algorithm will assign all calculated delays to every subwoofer stack, instead of each single object, considering the stack as if it were a single sound source.

Click '**Disabled**' to disable the curve function, removing all object delay settings.

Click '**Send**' to send data when in Online-Concert mode.

Click '**Delete**' to delete the selected object from the function.

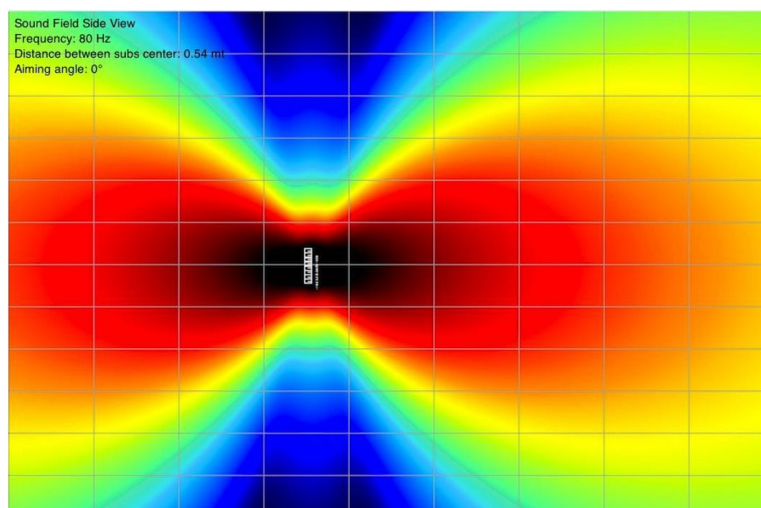
Click '**Obj. Select**' to select the respective single object in the list only.

Click '**Select**' to select all listed objects.

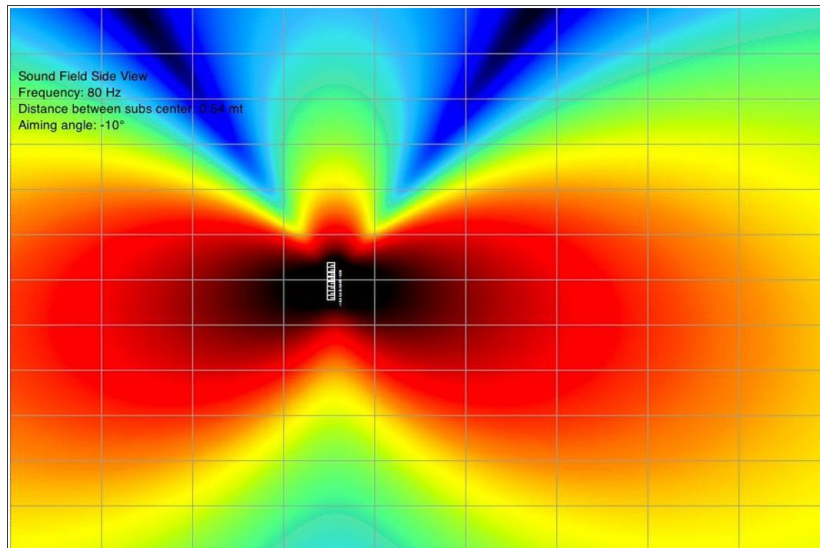
8.3 TILT FUNCTION

The **Tilt** function electronically simulates the physical aiming of a vertical array made of equidistant subwoofers, with the purpose of controlling the vertical directivity.

In order to clarify its usefulness, consider the sound field simulation at the frequency 80 Hz of a suspended 8-subwoofer array (side view):



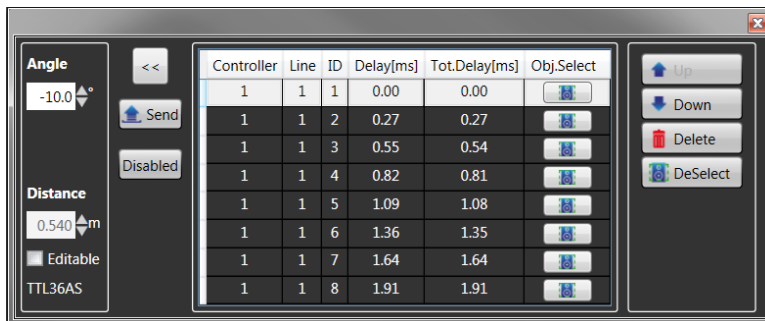
As shown in the previous figure, this arrangement tends to concentrate most of the available energy on the perpendicular at the array centre, leaving uncovered the audience listening area (in the lower right). The **Tilt** function allows the array physical tilt to be simulated by using a digital steering algorithm, with visible results in the following figure:



To create a new **Tilt** function:

- 1) Click and drag all objects to be assigned to the tilt function.
- 2) Move the mouse on an object, right-click and select **Functions > New > Tilt** in the menu.

The following window appears:



As default, RDNet objects are sorted from left to right. If 2 or more objects are placed in the same horizontal position, it will also consider their vertical position, from top to bottom. If objects are placed properly on the workspace, the new function is correct and immediately ready for use. Otherwise, click either **Up** or **Down** to change the object order, in order to reflect the

subwoofer physical layout.

Angle: vertical tilt angle of the entire array. 0° means an array perpendicular to the ground, while positive values are aiming upward (negative values: downward).

Distance: distance between two subwoofer axes. The algorithm needs this value to calculate the delay values (to achieve the required angle). The default value is calculated according to the selected subwoofer. Example: in the figure above, the vertical tilt angle is -10° (cluster made of TTL 36-AS subwoofers). In this case, the distance value is set (as default) to 0.54 m, which should be the distance between two suspended subwoofers.

If '**Editable**' is checked, different distance values will be allowed (due to particular system needs).

Click '**Disabled**' to bypass the tilt function.

Click '**Send**' to send data when in Online-Concert mode.

Click '**Delete**' to delete the selected object from the function.

Click '**Obj. Select**' to select the respective single object in the list only.

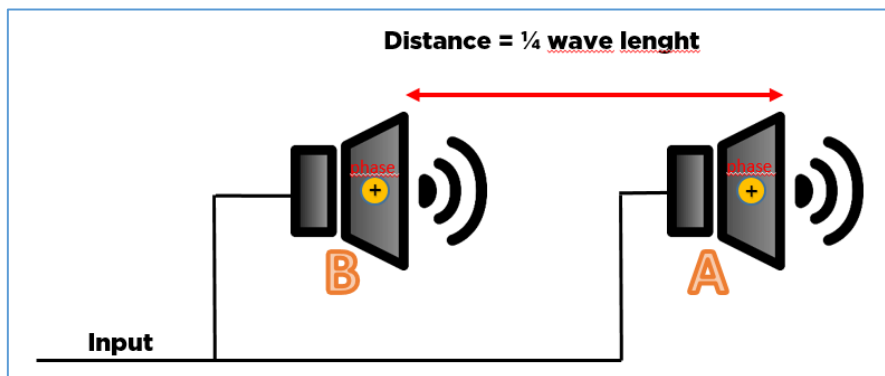
Click '**Select**' to select all listed objects.

In addition to these functions, 'Master' functions can be used to create other subwoofer configurations (for example: 'Endfire', 'Cardioid', etc.) very quickly.

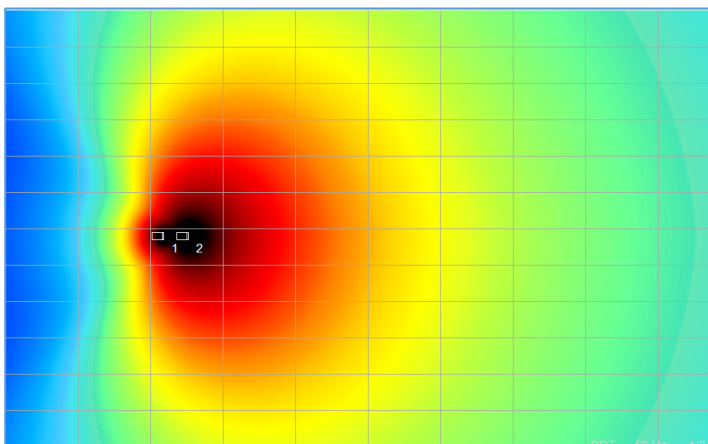
Saving the workspace with different settings permits differences in several setups to be easily appreciated, useful to optimize the system and get a result that would require working hours when using external processors instead.

8.4 END-FIRE / GRADIENT FUNCTION

This configuration is achieved by aligning two subwoofers (or two subwoofer arrays) in the same direction and placing them in front of each other.



The subwoofer A is delayed to virtually overlap the subwoofer B. This way allows the maximum sound pressure to be obtained and the cancellation of a part of the sound spectrum behind the speakers. Typically, the frequency wavelength at which the cardioid effect (cancellation) is at maximum is 4 times the distance between the speakers.



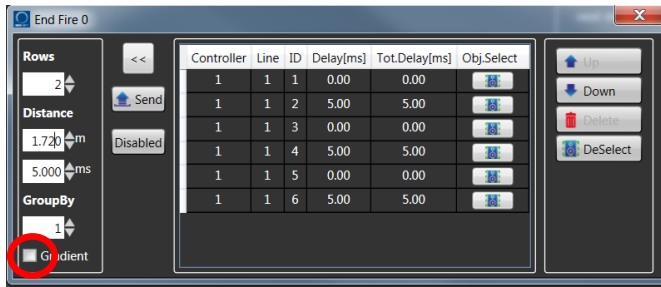
This figure shows the simulation of an End-Fire configuration at 50 Hz 1/3 octave.

The distance between the two sources is 1.72 meters, therefore the wavelength of the frequency to get the maximum rear cancellation is $4 \times 1.72 = 6.88$ meters, which corresponds to the frequency 50 Hz.

It is therefore possible to modify the distance between the sources according to the frequency that needs to be cancelled on the rear side. This procedure can also be useful to control part of

stationary waves on the stage in closed environments, avoiding annoying resonances.

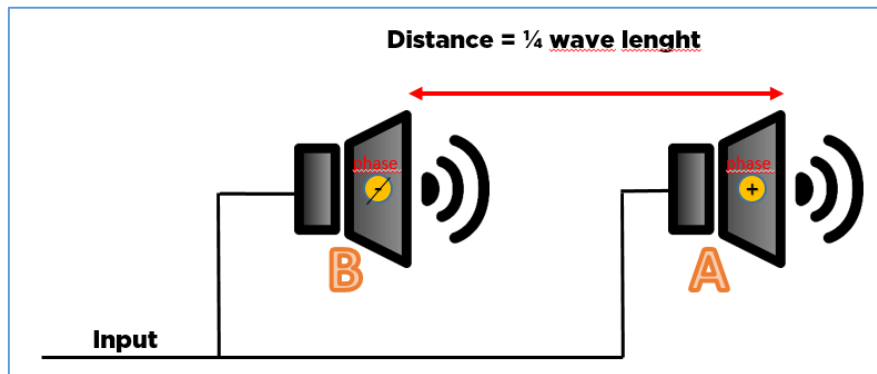
When leaving the sources at the same places, this RDNet function also allows (with just a click) switching from the End Fire to the Gradient configuration.



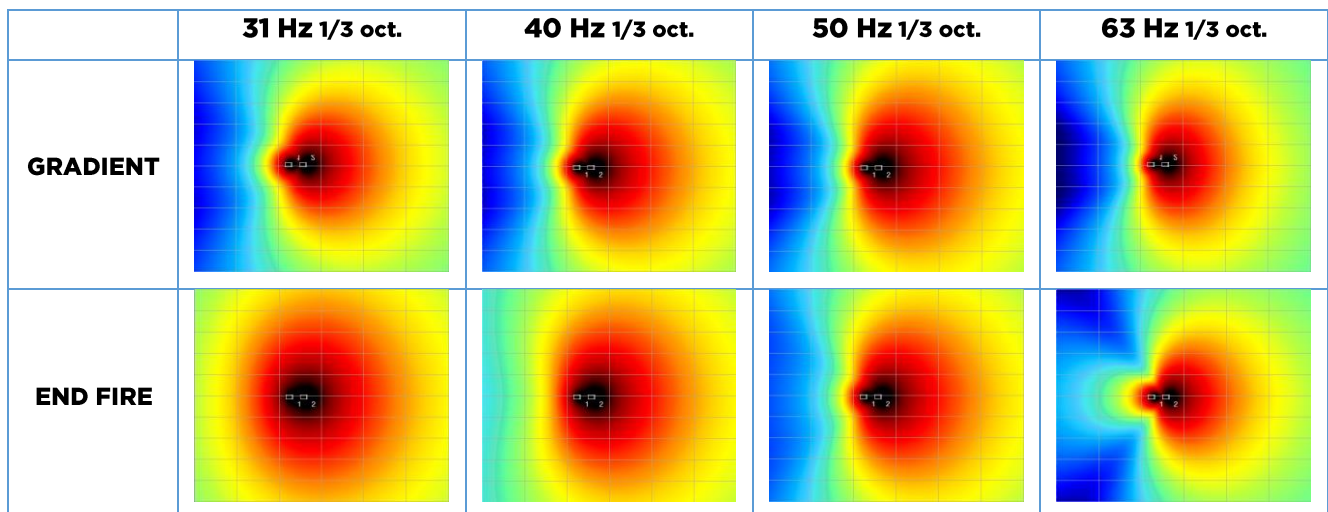
In this way, it is possible to compare (in real time) the performance of the two different configurations, with obvious advantages when optimizing sound reinforcement systems. Furthermore, on the stage, you will be able to appreciate the difference in the cardioid behavior of the two different configurations.

Subwoofers in the Gradient configuration have a polar pattern comparable to that of directional microphones. This means (unlike the End Fire configuration) cancellations will be present (cardioid effect) at all frequencies sent to speakers.

The Gradient configuration represents the only way to control the polar pattern at low frequencies and can provide (when properly set) useful patterns (cardioid, hyper cardioid, super cardioid, etc.) that allow the listening area to be 'shaped' at low frequencies according to your needs.



Conversely, compared to the End Fire configuration, in the Gradient configuration the subwoofer B is delayed, but in this case its phase is 180°. In the following figure, speaker behaviours can be compared (in the same places) at different frequencies (1/3 Oct.).



In the Gradient configuration, the directionality is more pronounced at all frequencies, while only at 50 Hz it can be compared to the End Fire configuration, which has a higher efficiency (1-2 dB more) than the Gradient configuration at the low frequencies 31 and 40 Hz.

Conclusion: when the need is to avoid excessive low frequencies on the stage, the Gradient configuration is surely to be preferred, while in cases where the frontal sound pressure needs to be maximized (especially at very low frequencies), the End Fire configuration is preferable.

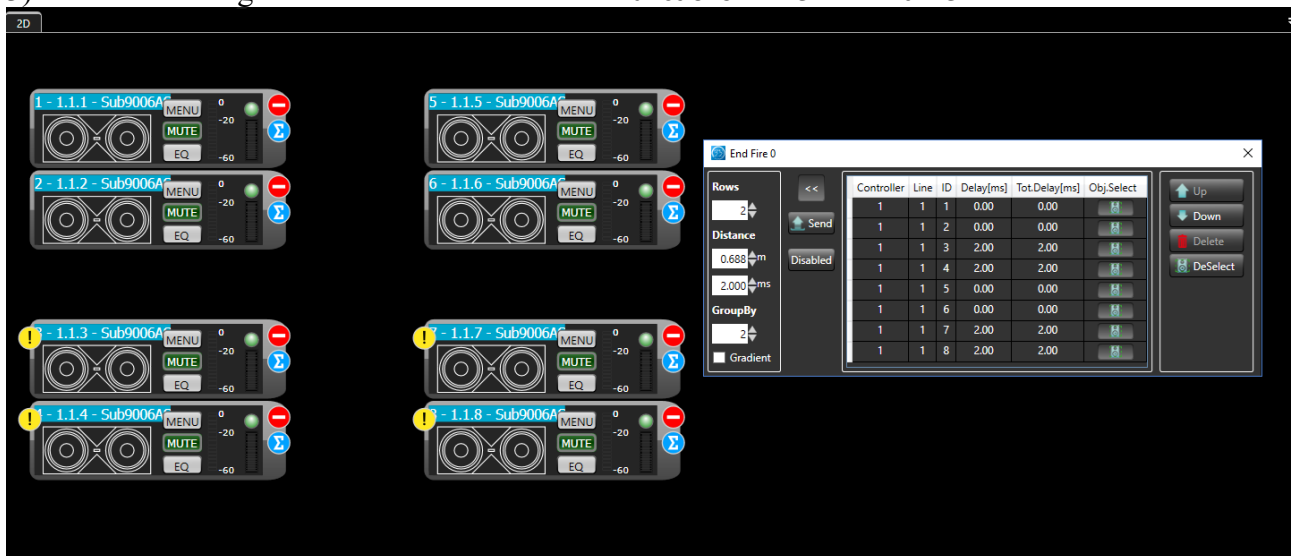
To work with RDNet for this purpose, proceed as follows:

- 1) Select with the mouse the objects that you intent to assign to the function.
- 2) Check that the order of the object is corrected, with the first device on top-left and the last one on bottom-right, by using the first number on the device name.



If the order is not corrected, you have to move devices on the working area. <Workspace Design → Align> menu label can help you to do this, or by dragging the device until it does not touch another one (self-positioning on releasing).

- 3) Click on right mouse button and select <Functions → New → Endfire>.



As the others function, on ordering error, you can fix it by using “Up” and “Down” buttons on function detail view.

With “Rows” it means the number of rows of sub, with “Distance” the distance between the center of 2 sub

of 2 different rows (meters or milliseconds) and, at the end, with “Group By” the number of sub for each stack (see curve function).

8.5 SUMMARY WINDOW

The Summary window (that can be opened from the menu **Tools > System Summary** or by clicking **Summary** in the toolbar) includes all RDNet objects on the workspace.

M	Description	Line	ID	Group	Zone	Delay[ms]	Gain[dB]	Phase	Sync	Fw Ver	Match	By Override	Mute	Group Mute	Group Solo	Fault	Equalizer	Cluster Size	HF Correction	Preset	Band Limit	Angle	FPS	FPSV	FPS m	FPS M	Y
	HDL30A	Line 1	1	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	6	--	--	-7.5	20	1038	9	21	
	HDL30A	Line 1	2	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	3	--	--	7.3	20	1038	9	21	
	HDL30A	Line 1	3	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	2	--	--	7.5	20	1038	9	21	
	HDL30A	Line 1	4	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	2	--	--	7.6	20	1038	9	21	
	HDL30A	Line 1	5	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.5	20	956	9	21	
	HDL30A	Line 1	6	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.9	20	956	9	21	
	HDL30A	Line 1	7	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.4	20	955	9	21	
	HDL30A	Line 1	8	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.5	20	955	9	21	
	HDL30A	Line 2	1	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	6	--	--	7.4	20	844	9	21	
	HDL30A	Line 2	2	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	3	--	--	7.5	20	845	9	21	
	HDL30A	Line 2	3	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	2	--	--	7.5	20	845	9	21	
	HDL30A	Line 2	4	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	2	--	--	7	20	845	9	21	
	HDL30A	Line 2	5	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.5	20	1026	9	21	
	HDL30A	Line 2	6	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.5	20	1025	9	21	
	HDL30A	Line 2	7	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.4	20	1024	9	21	
	HDL30A	Line 2	8	1	1	0.0	0.0	0°	-	85	yes	--					EQ	C1	1 (C)	--	--	7.6	20	1024	9	21	
	SUB9007AS	Line 3	1	A	--	0.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	916	9	21	
	SUB9007AS	Line 3	2	A	--	0.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	916	9	21	
	SUB9007AS	Line 3	3	A	--	0.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	916	9	21	
	SUB9007AS	Line 3	4	A	--	0.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	916	9	21	
	SUB9007AS	Line 3	5	A	--	2.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	944	9	21	
	SUB9007AS	Line 3	6	A	--	2.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	945	9	21	
	SUB9007AS	Line 3	7	A	--	2.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	944	9	21	
	SUB9007AS	Line 3	8	A	--	2.0	0.0	0°	-	13	yes	--					EQ	--	--	S1	--	--	20	943	9	21	
	HDL26A	Line 4	1	B	--	0.0	0.0	0°	-	33	yes	--					EQ	2.2	1 (C)	--	--	5	20	1016	9	21	
	HDL26A	Line 4	2	B	--	0.0	0.0	0°	-	33	yes	--					EQ	2.2	1 (C)	--	--	5	20	1018	9	21	
	HDL26A	Line 4	3	B	--	0.0	0.0	0°	-	33	yes	--					EQ	2.2	1 (C)	--	--	4.5	20	1018	9	21	
	HDL26A	Line 4	4	B	--	0.0	0.0	0°	-	33	yes	--					EQ	2.2	1 (C)	--	--	4.9	20	1018	9	21	

'Group by' allows all objects to be sorted in the desired way.

'Column Setup' allows displayed parameters to be selected (in the columns of the 'Summary' window).

9. RDNet MEASURE

RDNet 4.0 includes a new FFT-Based Audio Analysis Software able to perform real time transfer function with:

- Magnitude (Frequency Response) with Coherence plots
- Phase response
- RTA (Real Time Analyzer)
- Live IR (Impulse Response centered at the TF's delay)
- SPL meter with logging (time history) with SPL alarms
- Save and recall measurements from user cloud

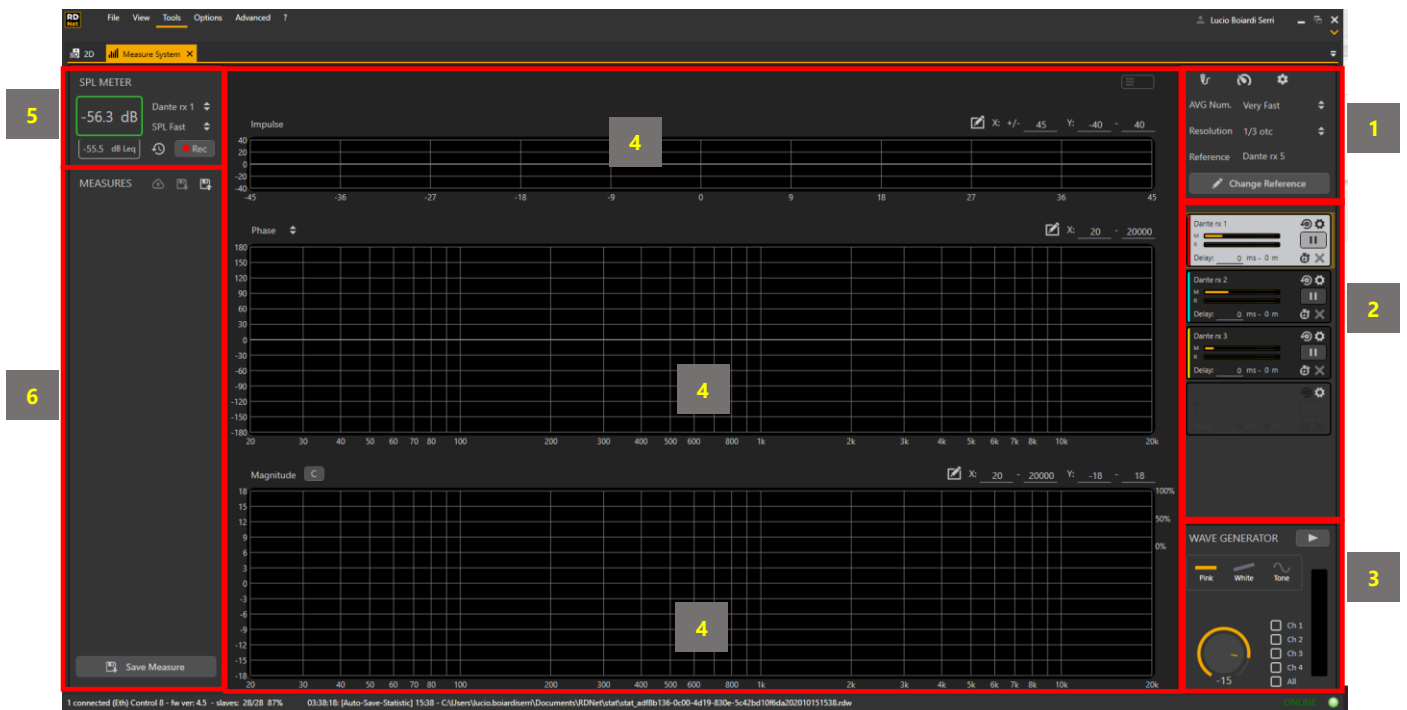
The measurements will be saved within the RDNet project. This allow to save, as well as the data relating to the eq, delay etc., also the system performances coming from measurements. Very useful to recall particularly performing states for example when often return to the same venue.

By clicking **<Tools>** → **<Measure>**, the new measurement software will open.



The software interface is divided in 6 main section:

1. Audio Settings and Graph resolution
2. Measurement Player – RDNet measure support up to 4 simultaneous players
3. Internal Generator
4. Plots - Live IR – Phase – Magnitude
5. SPL Meter and Leq Meter with log
6. Loading and Saving Measure

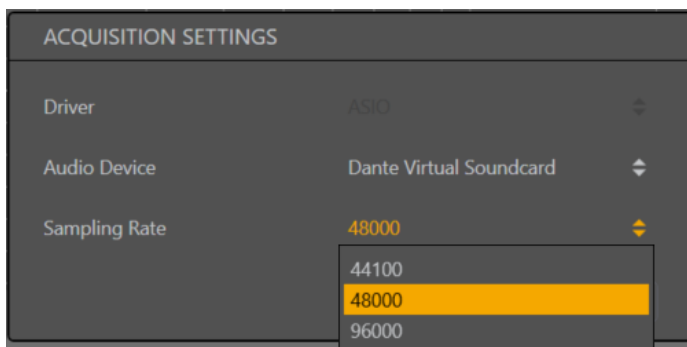
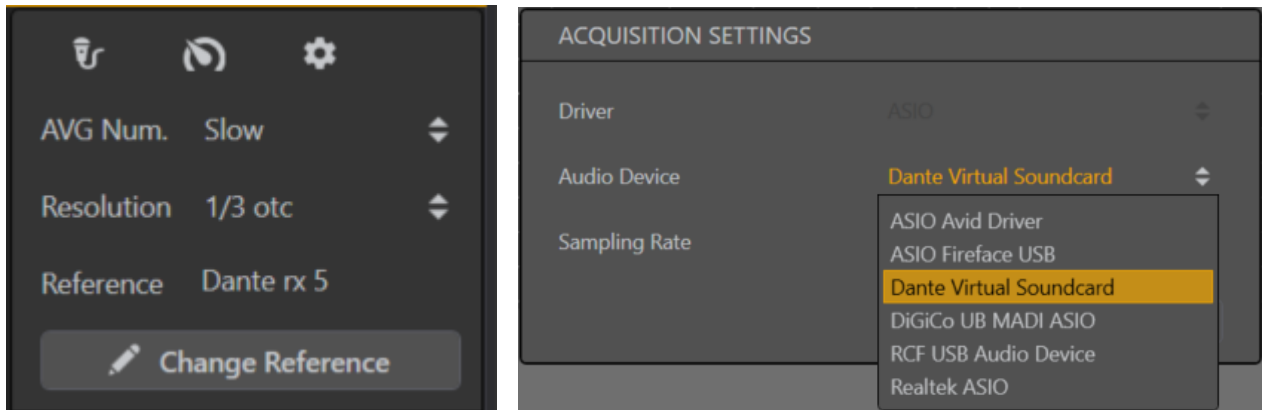


9.1 AUDIO SETTING

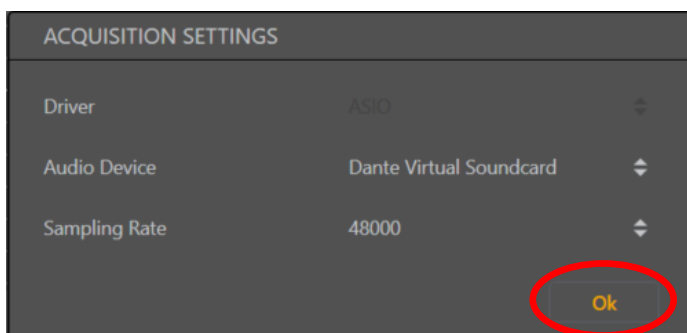
RDNet measure works even without RDNet speakers connected. It means that the software could be used as a standalone audio measurement tool

Before start working with measurement it is needed to select a proper audio driver.

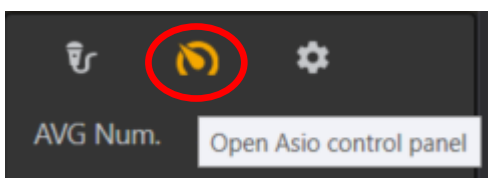
By pressing the Audio Setting button, a new window will open with the selection of the driver audio. At the moment only Asio Driver is supported by RDNet measure.



Select the audio driver as well as the sample rate.



Press <Ok>

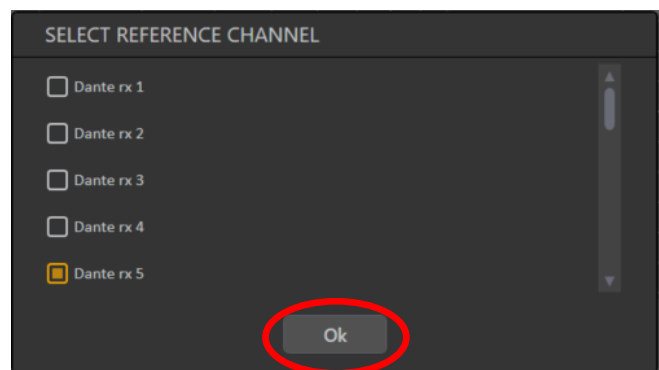


By pressing the Asio Control Panel button it is possible to access the Asio Driver Settings. (different according with the selected audio card model).

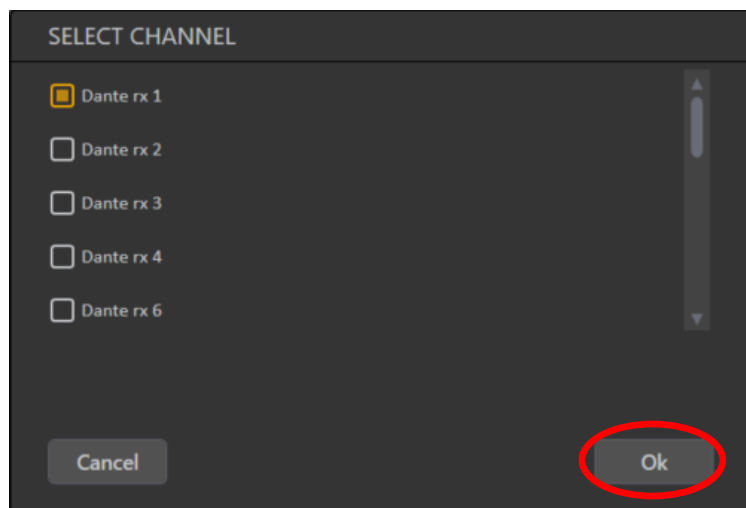
RDNet measure is a multichannel audio measurement tool able to perform up to 4 players simultaneously.

By pressing <Change Reference> button select the proper reference channel and press <Ok>.

To avoid losing physical audio channel of the audio card, the internal reference is available as well.



It is now possible to enable up to 4 player which will refer to the physical audio channel inputs.



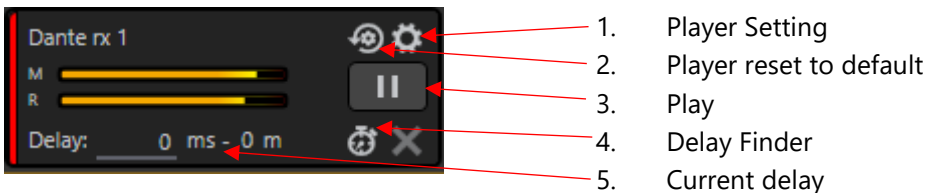
Press the setting button of the first player and the select the input channel where the measurement microphone is plugged in.

If working with more than 1 measurement microphone, do the same procedure for the following players.

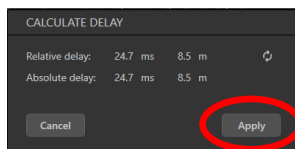
Press <Ok>

9.2 PLAYERS

As soon as the audio setting of the player are set, the player/s appear. In this example we are using 2 players with Dante Virtual Sound Card Asio. The reference signal is Ch 5 and the player are respectively on channel 1 and 2.



1. To change the player input channel.
2. The player will return at its default setting, without any input assigned.
3. Play/Pause button allows to Show/Hide the measurement plots.
4. Delay Finder open the delay finder utility which allow automatically to find and apply the delta delay between the reference and player channel. Mandatory to align on the two signals for comparison.

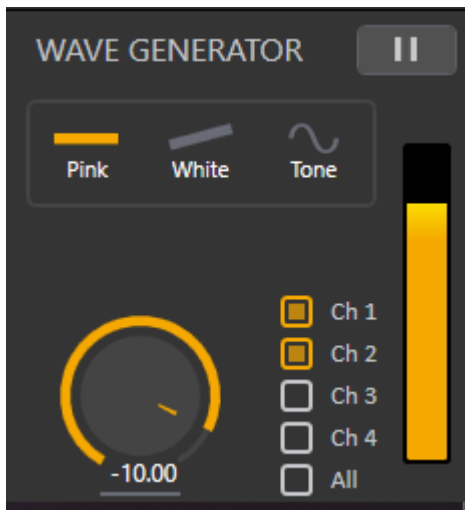


As soon as the delay is found, click on **<Apply>** to insert it in the measurement chain.

5. Here it is shown the delay applied, in milliseconds and meters.

If the delay is not applied between reference and player channel, the Live IR and Phase plots will be not calculated and consequently they will not be displayed correctly.

9.3 WAVE GENERATOR



The signal generator of RDNet measure will play according with the audio driver selected in the audio setting preferences.

There are three different noise type: Pink Noise, White Noise and Sine Generator with selectable frequency.

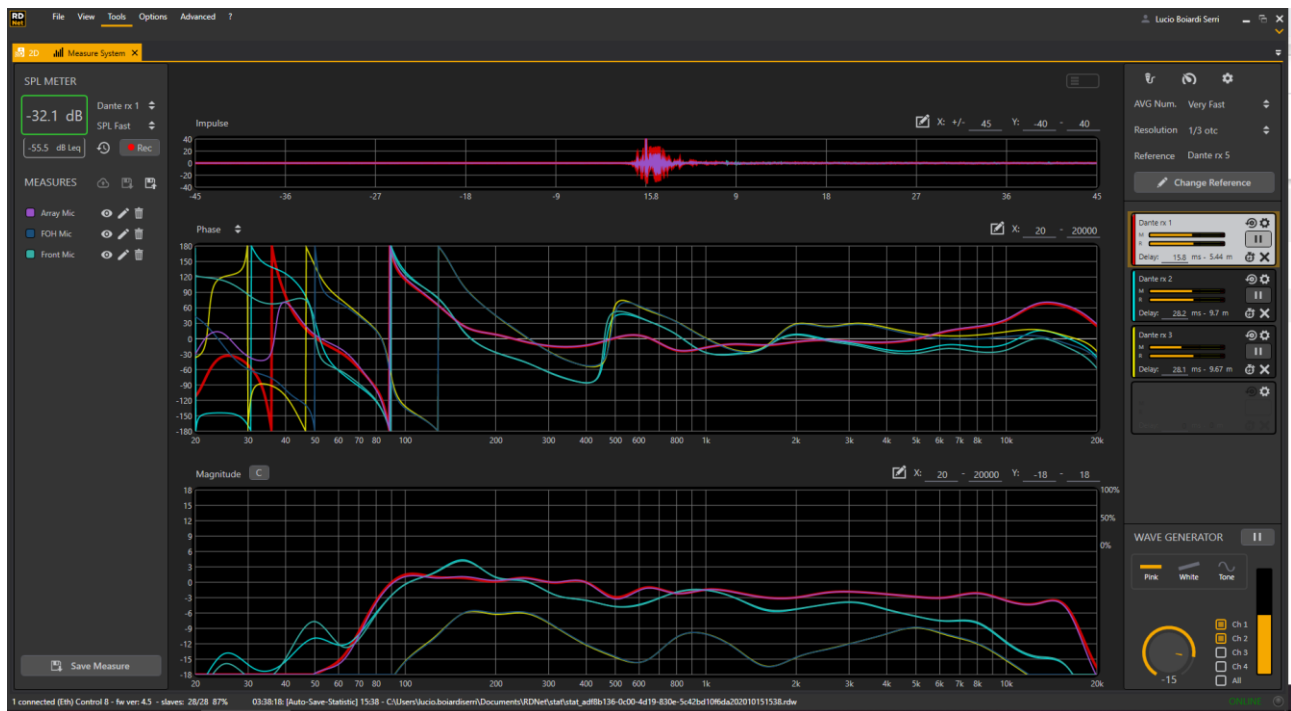
It is possible to assign individually the outputs to out 1,2,3, and/or 4 or to all the outputs available on the audio card.

Type, drag or scroll with the mouse wheel to adjust the noise level.

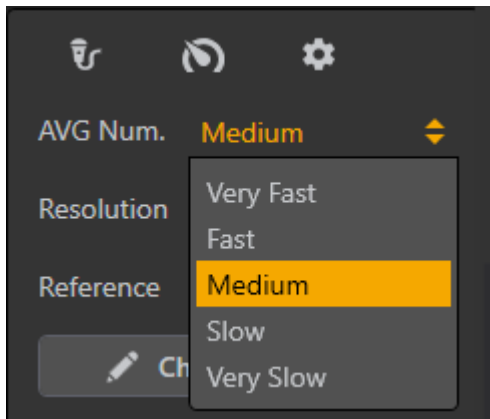
Play/pause the generator to turn on/off.

9.4 MEASUREMENT

Adjust appropriately levels and gains of reference and input signals looking at the meters of the relative players. The performances of the software will be maximized when the meters are both around -6dBfs .



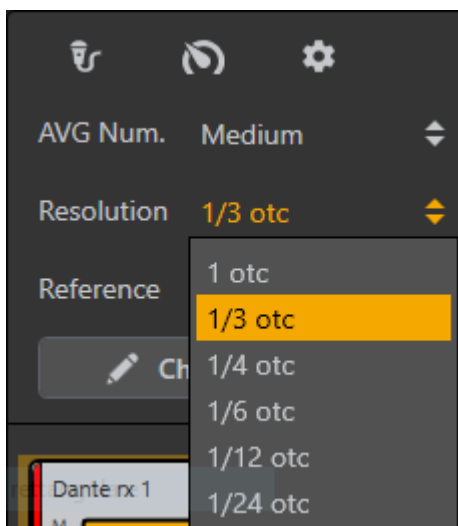
The Live Impulse Response graph show the IR of the selected player, (highlighted in white), or/and the IR of saved measurements;



Time integrations will affect all the plots at the same time. It is not possible to have different time integration for different graphs.

From Very Fast to Very Slow time integrations are respectively

1s – 3s – 5s – 10s – 20s

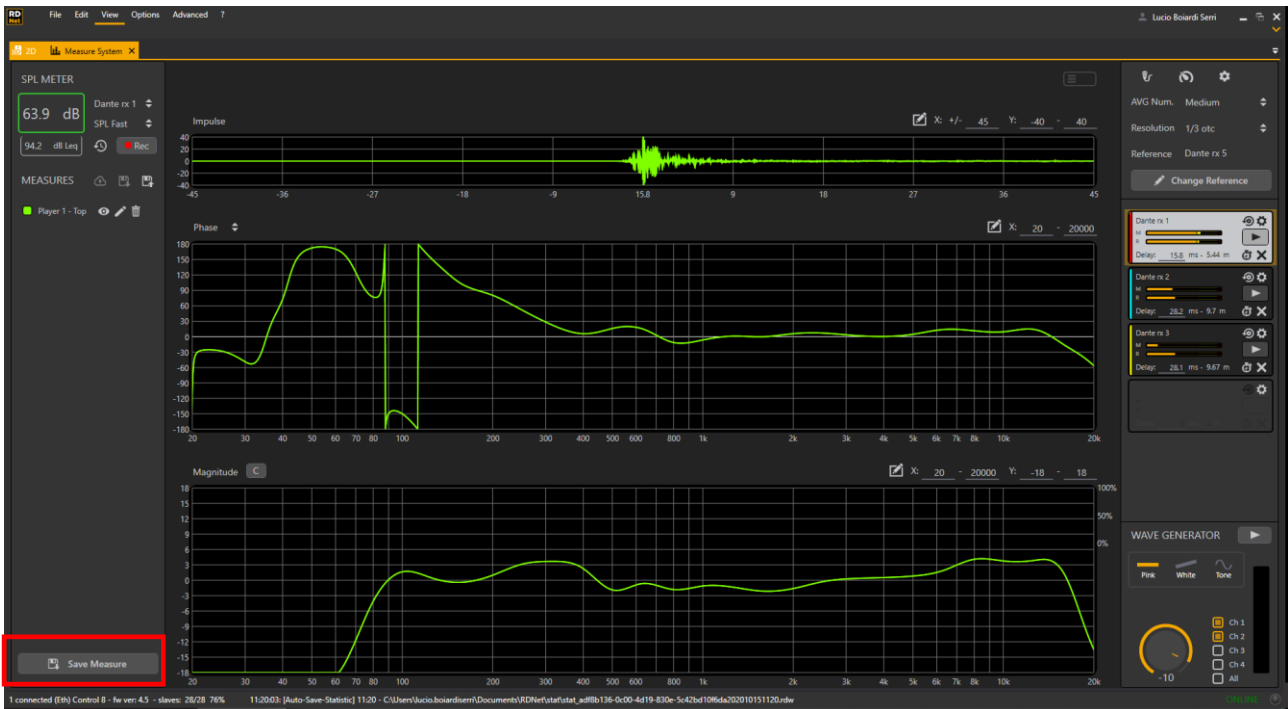


The selectable resolution the plots start with 1 oct till 1/24 oct.

9.5 MEASUREMENT SAVE & RECALL

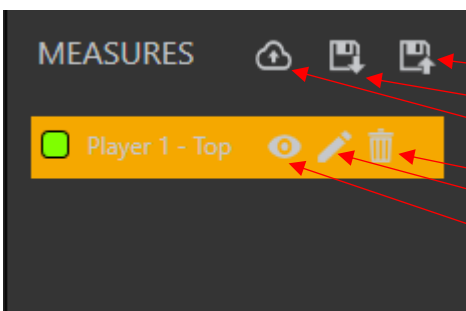
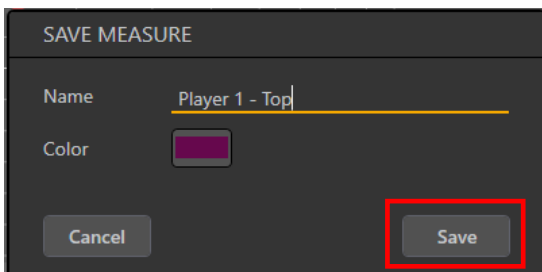
It is possible to load and save measurements from/to local drives and from/to cloud.

Once a player is on (highlighted in white), click on <Save Measure> and the measurement will be stored.



Click on <Save Measure> to open the dialog window.

It is also possible to change the plot color. Click on <Save> to store.



Once the measure has been saved there are the following options:

1. Save to local drives
2. Load from local drives
3. Upload on cloud
4. Delete
5. Modify. (name and color)
6. Hide/Show

To load a saved measurement from the cloud, just double click on and the measure will appear in the saved measurements.

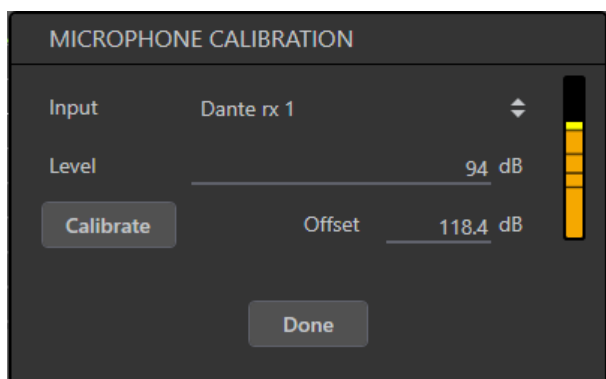
9.6 SOUND PRESSURE LEVEL MEASUREMENT

RDNet measure can be used to measure the SPL level related to one of the players enabled in a measurement session.



First, to get real values of SPL it is necessary to calibrate the measurement chain. To calibrate the microphone the calibration tool must be used.

Press the button with the microphone icon and the calibration window will open.



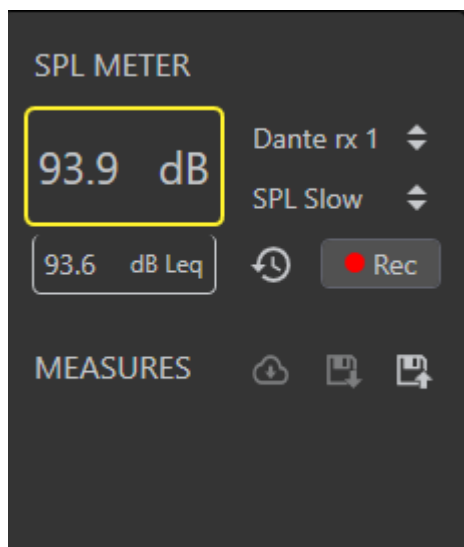
A Sound Level Meter calibrator is needed to do it. Typically, calibrators produce 94 dB or 114 dB SPL at 1 Khz.

Select the input channel of the audio card and insert the microphone in the calibrator set to 94 dB.

Adjust the input gain of the related audio card channel in order to have enough "headroom" to measure your target Sound Pressure Level. The 4 small marks on the meter are -40, -30, -20 and -10 dBfs.

Now type 94 dB in the **<Level>** field and press **<Calibrate>**.

As soon as the calibration process is finished, press **<Done>**.



If the calibration has been correctly done, at this point, with the calibrator still on, the SPL meter should show 94 dB SPL (set to Slow for a more stable reading).

If yes, the software is now calibrated ready to measure the SPL at the microphone position. (typically the FOH position, otherwise places where it is necessary to check for the sound pressure level according with local regulations and limitations).

It is possible to measure the Leq as well.

By click on the **<Rec>** button it is possible to record the time history of the SPL level. This is useful to demonstrate the SPL level also after the event.

As soon as the **<Rec>** button is pressed again, to stop the recording, a .csv file is created in Documents/RDNet with the related measured

values.

9.7 RDNet MEASURE SHORTCUT

Spacebar	=	Save measure
C	=	Show/Hide Coherence
G	=	Noise Generator On/Off
V	=	Reset Averages
D	=	Open Delay finder on the selected player

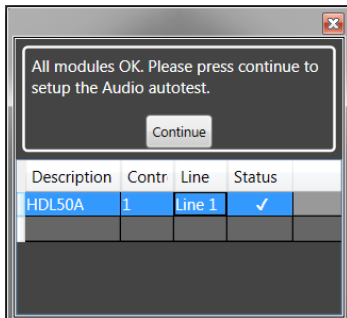
10. SPECIAL FUNCTIONS AND UTILITIES

This chapter is about the software special functions and utilities.

10.1 AUTOTEST

The Autotest allows the proper operation of each way of selected RDNet devices to be checked. Before using this function, it is necessary to be in online mode.

Select the objects to be checked and activate this function from the menu **<Advanced> → <Autotest>**, then a device list is shown. After clicking **Continue**, devices will be muted.

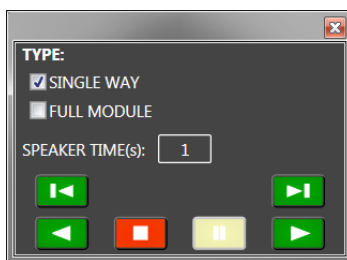


Now, after sending an audio signal (as reference, e.g. pink noise), it is possible to listen to (as solo) each single way of selected devices. At the end, the initial mute state will be restored and the software will return to the workspace home page.

This function is useful when wiring the system, as it helps easily find malfunctions / wrong wiring and solves issues (before suspending speakers).

If **'Single Way'** is selected, the pink noise will be sent to each way of each single device (when selected).

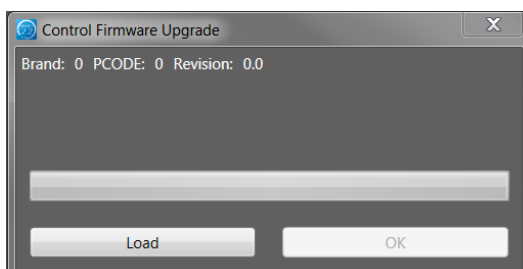
If **'Full Module'** is selected, the pink noise will be simultaneously sent to all ways of each selected device.



10.2 FIRMWARE UPGRADE

CONTROL 8 and CONTROL 2 upgrade

The CONTROL 8 and CONTROL 2 firmware upgrade can be started from the menu **<Advanced> → <Firmware Update> → <Controller>**



Click **Load** to proceed, select the right file (the firmware to be loaded) and follow all instructions.

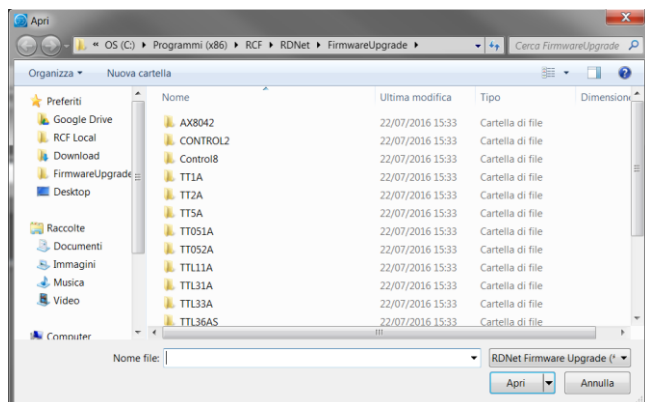
The CONTROL 8 firmware upgrade can be made via USB only.

RDNET DEVICES

To upgrade the firmware of a single RDNet device, proceed as follows:

- Connect the device to RDNet and switch to Online mode.
- Select the device to be upgraded (click it).
- Start the upgrade from the menu **<Advanced> → <Firmware Upgrade> → <Slave>**

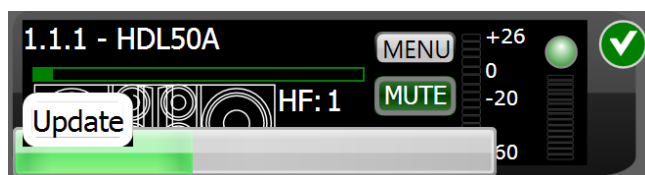
The Firmware Upgrade with all available releases will be shown:



All firmware of supported products is installed automatically inside the folder **C:\Program\RCF\RDNET\Firmware Upgrade**.

Occasionally, it is important to check if new upgrades are available.

Select the file corresponding to the device model to be upgraded and click **Open**. A progress bar will appear on the RDNet object being upgraded



At the end, the device will be automatically rebooted, yet some models may require manual switching off/on. When rebooting, all linked downstream devices are disconnected. It is necessary to select first 'Offline' then 'Online' (again) to restore control and

connections of all devices.

FIRMWARE RECOVERY – SEND OBJECT 0

The firmware recovery procedure forces the firmware download to a device without being in online mode, allowing the recovery even in the case of RDNet communication fault. This procedure should be used with extreme caution and only if it is impossible to upgrade in the standard mode. **Sending a wrong firmware may damage the device irreversibly** (damage not covered by RCF warranty). Proceed as follows:

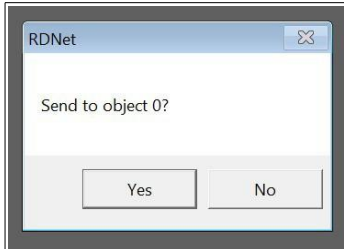
- 1) Connect the CONTROL 2 / CONTROL 8 interface device to the PC via USB. The Ethernet port is not supported in this procedure.
- 2) Turn the device interface on and run the RDNet software on the PC. Verify (on the RDNet software status bar) that the interface device is properly found.
- 3) Connect the device to be upgraded to the first channel of the interface device and switch it on.

NOTE: The Firmware Recovery exploits the fact that all RDNet devices (when powering on) get the reserved ID 1.1.0. Do not execute Scan or QuickStart to avoid changing this state.

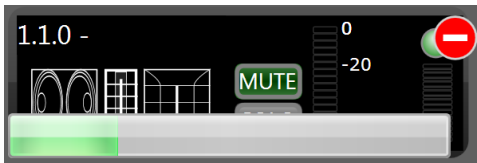
- 4) From the menu Advanced, choose **Firmware Update...** and select the right file (the firmware) to be sent to the device.

NOTE: a wrong firmware choice may damage the device irreversibly, as RDNet software sends it to an unidentified object and there is no way to stop sending a wrong file. Double check if the selected firmware exactly matches to the connected device model.

5) A new window will be shown:



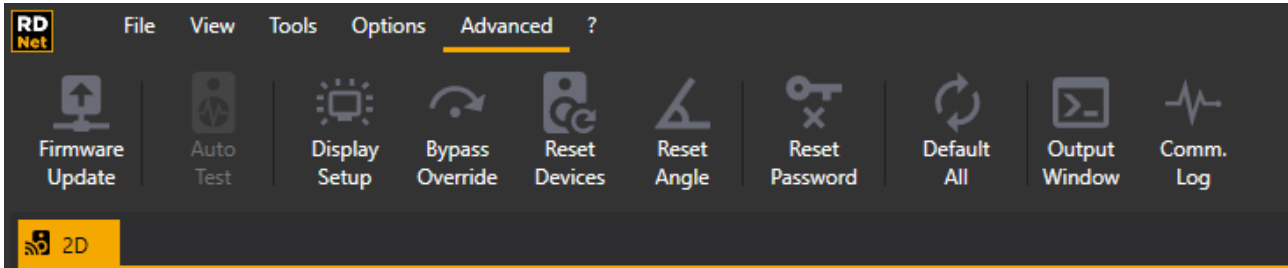
Click Yes to confirm and start sending the file. The next figure shows the workspace during the recovery.



At the end, the device will be automatically rebooted.

10.3 SPECIAL FUNCTIONS

From the '<**Advanced**>' toolbar menu, it is possible to enable the following special functions:



DISPLAY SETUP

Some speaker models have an LED display for their parameter editing. In situations of use in low-light environments, the light emitted by displays may interfere with the show. Select <**Advanced** > <**Objects Display Setup**> allows you to turn on / off all RDNet device displays.

RESET PASSWORD

Select this function to reset / delete the password. After toggling from <**Concert**> to <**Sound Check**> mode, a new password will be required. This precaution allows the sound engineer (only) to toggle to <**Sound Check**> mode and edit parameters.

RESET DEVICES

<**Powercycle**> performs a device reboot without switching it off. When rebooting, all linked downstream devices are disconnected. It is necessary to select first <**Offline**>' then <**Online**> (again) to restore control and connections of all devices.

<**Set Default Values**> restores factory settings to the device.

RESET ANGLE

Most devices have an internal inclinometer. The device tilt ('**Angle**') can be read in its extended attributes. This value is important when using two engines to suspend a line array.

Select the devices where the inclinometer must be reset and click on <**Reset Angle**>.

To reset it properly: **place the device on a perfectly flat ground** and then click '**Reset Angle on selection**'.

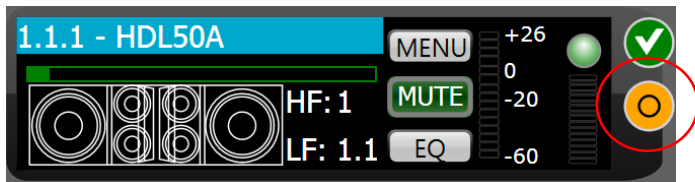
This procedure is periodically needed, due to possible shocks experienced by devices during their transport and assembly.

BYPASS OVERRIDE

<**Bypass Override**> (**broadcast**) allows the device 'bypass' button (on rear panel) to be disabled. If disabled, the device can only be remote controlled by RDNet (even if the 'bypass' button is released).

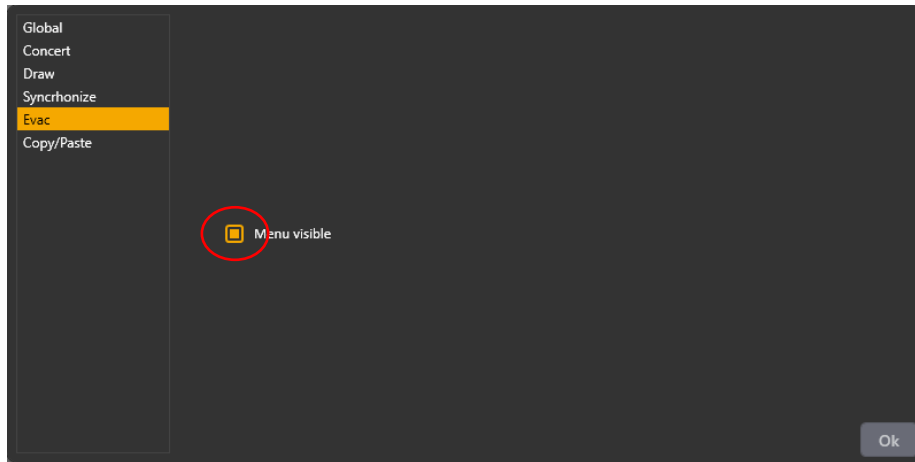
This command is a precaution to avoid any activation (by mistake) of 'bypass' buttons which can affect RDNet control, especially in events in which clusters need to be moved many times.

Be careful when using this feature, because if inadvertently left enabled, the device cannot be controlled manually.



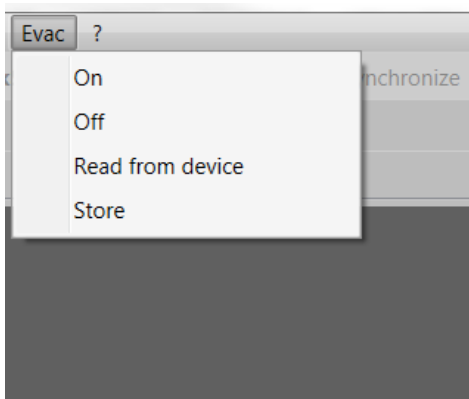
11. EVAC MENU

11.1 MAKE THE EVAC MENU VISIBLE



To make the EVAC menu visible, it is necessary to select '**Menu Visible**' ('Evac Options' in the 'Settings' window).

11.2 FUNCTIONALITY MENU' EVAC



'On': enables the EVAC mode on all connected controllers.

'Off': disables the EVAC mode on all connected controllers.

'Read from device': allows the current controller mode (either NORMAL or EVAC) to be read. The 'EVAC' indication is displayed on all controllers set to the EVAC mode.

'Store': stores to the controller the number and location of the devices connected to it. In such a way, at start-up, the controller can perform a comparison between the real network and the anticipated one, in order to point out any possible difference.

11.3 DEVICE DETAILS

Currently, the EVAC mode is only available in two speaker models:

- TTL33A Stadia
- TTL55A Stadia

In their settings, these speakers have 2 new sections:

- Tone Detector Setting
- Device Failure Status

a. TTL33A

b. TTL55A

a) Tone Detector Setting

It allows the tone sent to speakers (to check their connections) to be set. The tone needs to be generated by an external device included in an EVAC system. The frequency value shall be set to the same of the generated tone by the EVAC system.

b) Device Failure Status

This allows the proper operation of each device way to be monitored and checked.

AMP: indicates possible differences in the amplifier between read values and the RDNet ones.

CARR: indicates the current amplifier status (red: faulty, green: OK).

SHORT: indicates issues on transducers.

TONE: allows the selected tone to be checked.

12. BUSINESS MUSIC – DMA 82, DMA 162, DMA 162P

12.1 DESCRIPTION

DMA 82 and DMA 162 are two-channel class-D matrix amplifiers, both equipped with a powerful DSP platform, allowing managing inputs and outputs in terms of routing and equalization (a complete set of processing functions is available, including PEQ, bass enhancement, limiters, compressors and environmental equalization); moreover, dedicated presets for RCF speakers have been implemented to optimize their acoustic performance.

The two models only differ in the output power:

- DMA 82 either 2 channels x 80 W RMS @ 4 Ω or a single 160 W 70 V line
- DMA 162 either 2 channels x 160 W RMS @ 4 Ω or a single 320 W 70 V line.

DMA 162P is a two-channel class-D power amplifier.

Output power: either 2 channels x 160 W RMS @ 4 Ω or a single 320 W 70 V line.

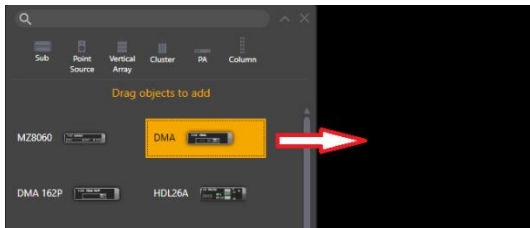
Up to 4 DMA 162P can be linked to a single DMA unit in order to increase the system output power and implement multi-room architectures. However, each DMA 162P can be used as a standalone amplifier as well.

DMA 162P can receive processed audio signals from a DMA amplifier on a four-channel audio BUS or, as alternative, it is possible to select the local stereo LINE input.

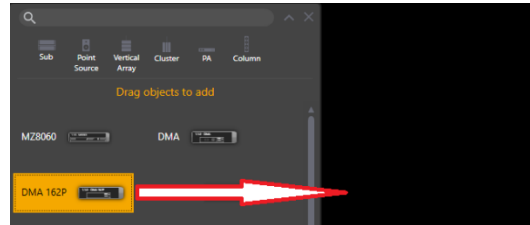
Please refer to the DMA 82-162-162P user manual for further information.

12.2 ADD A DMA OBJECT

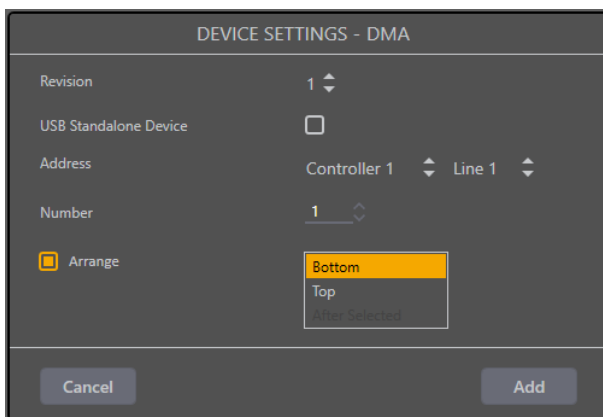
Click 'Add Object' in the main menu bar to view the object list.



Drag and drop either the DMA (DMA 82, DMA 162) or the DMA 162P object into the workspace.

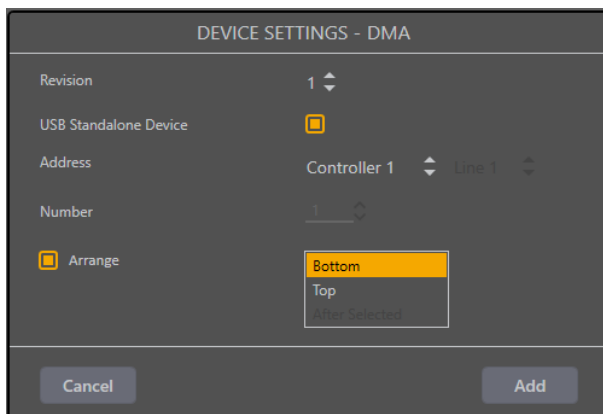


In the device setting window, set the RDNet addresses (both controller and line).



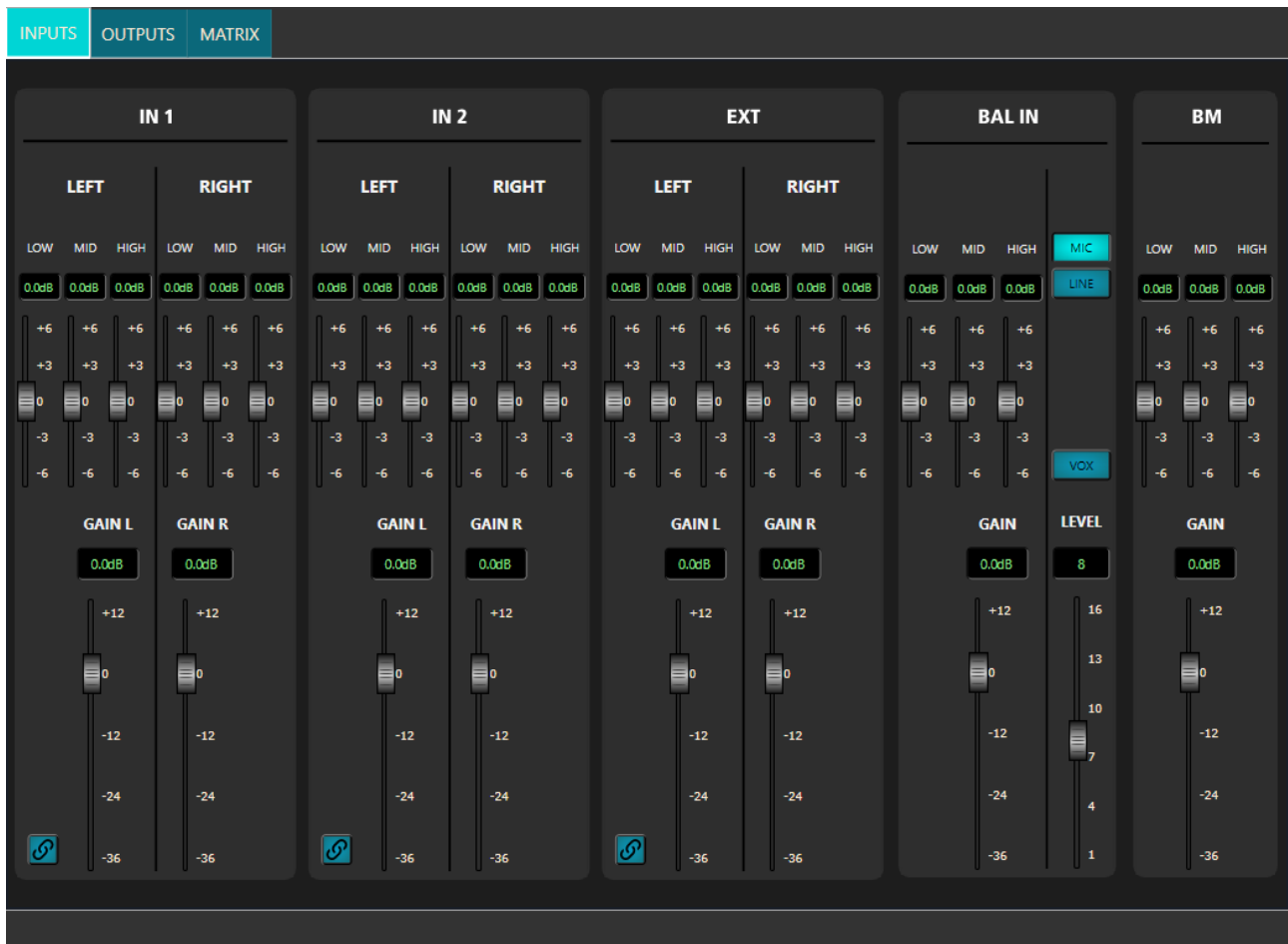
It is also possible to arrange that object in the current workspace.

If the DMA / DMA 162P is instead a **USB standalone device**, click its respective checkbox.



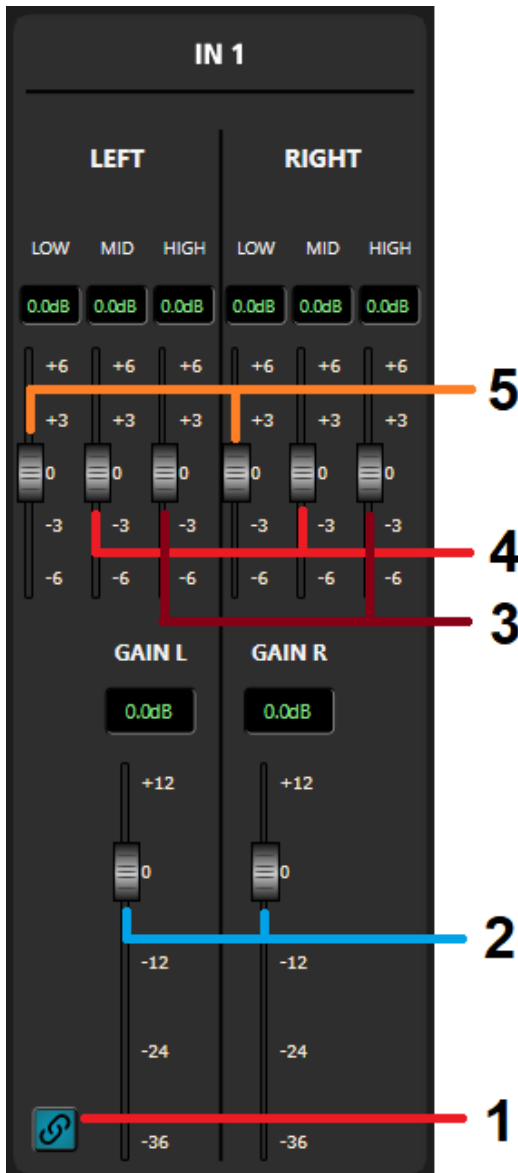
Now, in the workspace, point the mouse on the DMA / DMA 162P object, either double-click or right-click and select '**Show Obj Details**' to open its properties.

12.3 DMA 82 – DMA 162 INPUTS



NOTE:

When DMA 82 / DMA 162 are remote controlled via RDNet software, front panel controls are disabled!



IN 1 – IN 2 – EXT

1. STEREO UNLINK

When off, left and right inputs are managed as a stereo pair (left and right channels), so all setting values are exactly the same and every single adjust affects the other channel too.

When on, all controls are separate and independent.

2. GAIN

Gain level adjustment of its respective channel.

3. HIGH

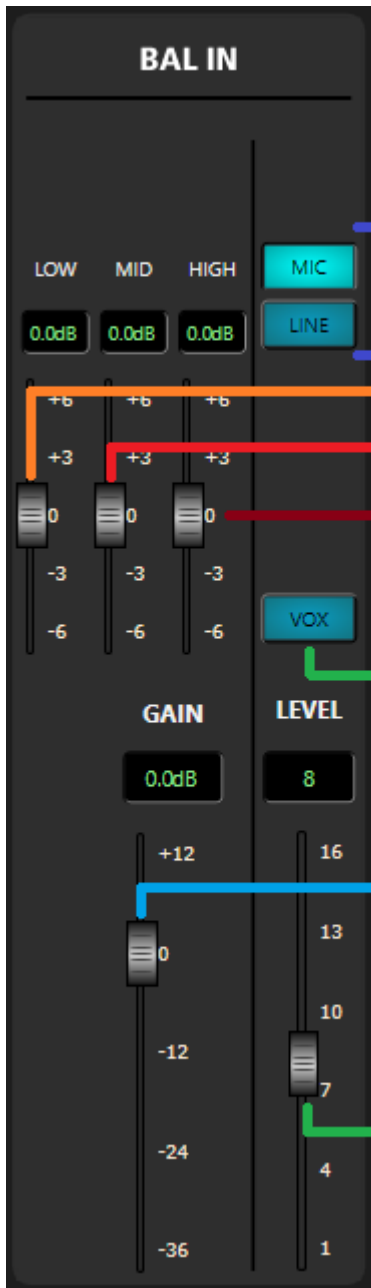
High frequency level adjustment of its respective channel.

4. MID

Mid frequency level adjustment of its respective channel.

5. LOW

Low frequency level adjustment of its respective channel.



BAL IN

1. MIC / LINE buttons

Select the BAL IN level either as LINE or MIC.

2. GAIN

Gain level adjustment.

3. HIGH

High frequency level adjustment.

4. MID

Mid frequency level adjustment.

5. LOW

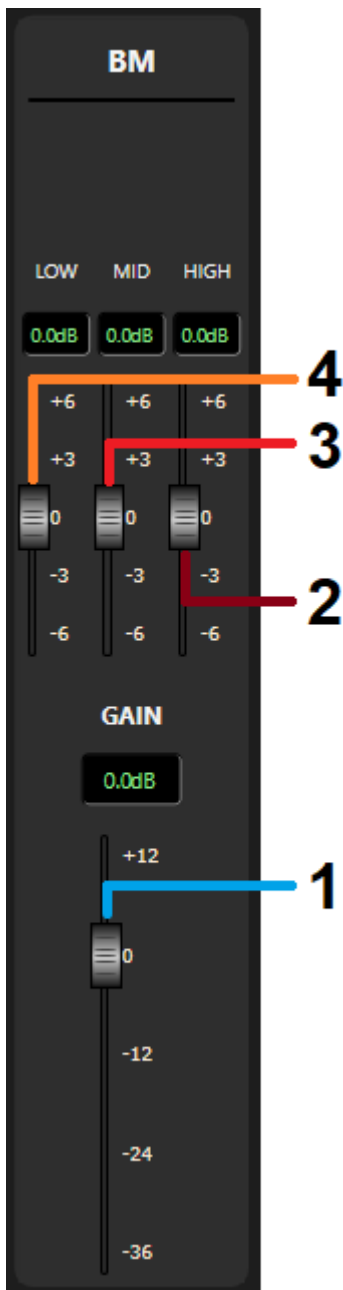
Low frequency level adjustment.

6. VOX button

It toggles ON / OFF the VOX function (automatic priority when a signal is detected at the BAL IN).

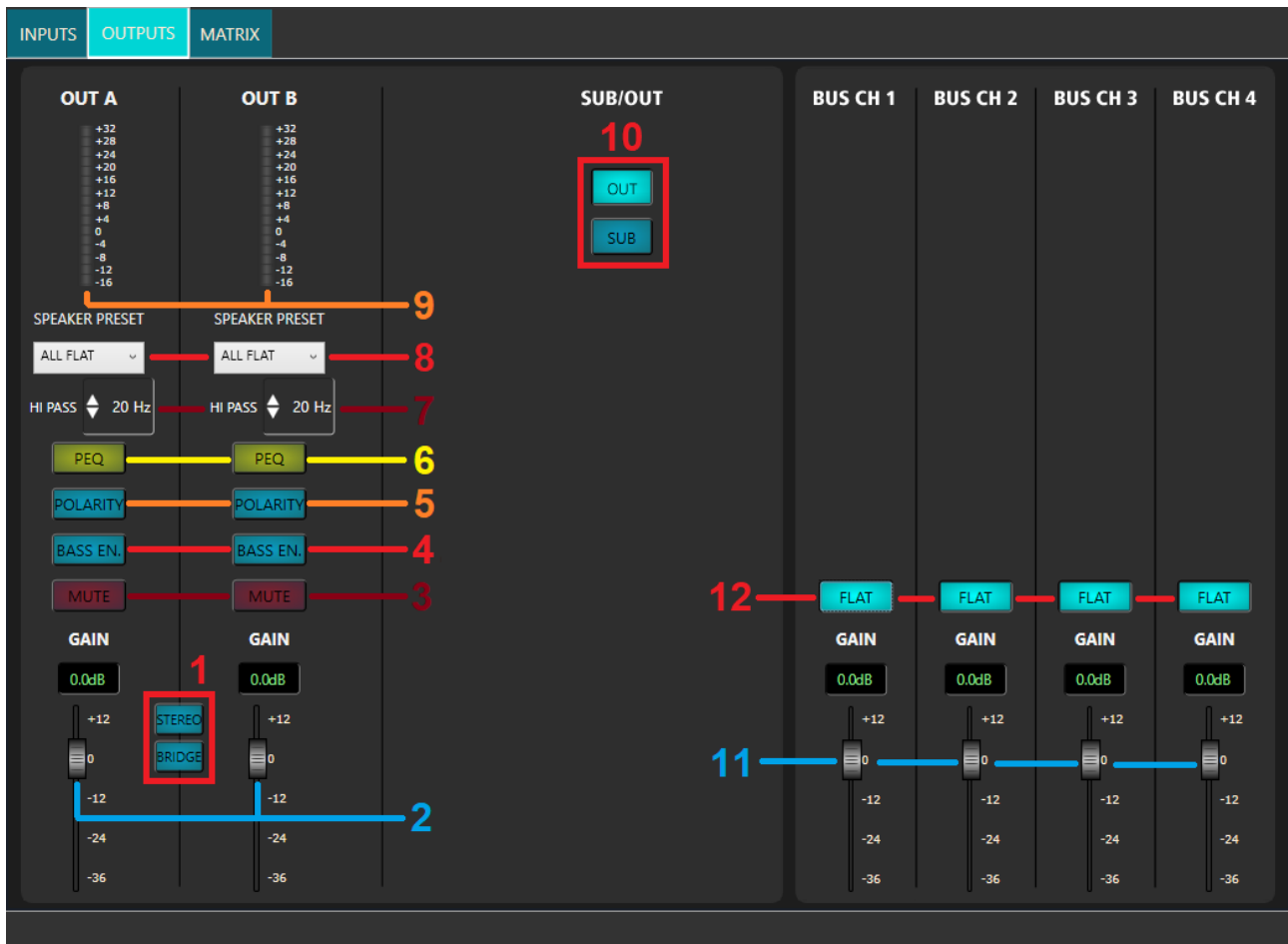
7. VOX THRESHOLD LEVEL

VOX function threshold level adjustment.

**BM**

1. GAIN
Gain level adjustment.
2. HIGH
High frequency level adjustment.
3. MID
Mid frequency level adjustment.
4. LOW
Low frequency level adjustment.

12.4 DMA 82 – DMA 162 OUTPUTS



1. STEREO / BRIDGE (/ MONO) MODE SELECTION

To activate the stereo mode, click the STEREO button (it lights up). Click it again to turn it off.

To activate the bridge mode (single 70 V line output), click the BRIDGE button (it lights up). Click it again to turn it off.

When either the stereo or the bridge mode is selected, OUT B controls are disabled and its GAIN is linked to the OUT A GAIN level.

The two buttons STEREO and BRIDGE are mutually exclusive: when turning one on, the other automatically turns off. For the MONO mode (two separate and independent outputs), leave both set to OFF.

2. GAIN

Gain level adjustment of its respective output.

3. MUTE

Click the MUTE button to mute its respective output. Click it again to unmute.

4. BASS ENHANCER

Click the BASS ENHANCER button to enable the bass enhancer on its respective output. Click it again to disable it.

5. POLARITY

Click the POLARITY button to invert the signal polarity of its respective output. Click it again to disable it and restore normal polarity.

6. PEQ (2-BAND PARAMETRIC EQUALIZER)

Click it to open the 2-band parametric equalizer window of its respective output. See the next manual section **12.5 2-BAND PARAMETRIC EQUALIZER**.

7. HI-PASS FILTER

Click on the up/down arrows to increase/decrease the hi-pass filter cutoff frequency of its respective output (note: it is also possible to directly insert its value by using the computer numeric keyboard after clicking the number).

8. SPEAKER PRESET

Click it to open a drop-down menu to select the speaker preset (suitable for the used speakers) of its respective output. The default ALL FLAT option: no equalization applied.

9. Vu meter

LED bar indicating the current signal level of its respective output.

10. SUB/OUT

The two buttons OUT and SUB are mutually exclusive. If SUB is selected, the OUT / SUB rear panel outputs are affected by an 80 Hz low-pass filter, useful for connecting active subwoofers. If OUT is selected, the low-pass filter is not inserted.

11. BUS GAIN

Gain level adjustment of its respective BUS channel.

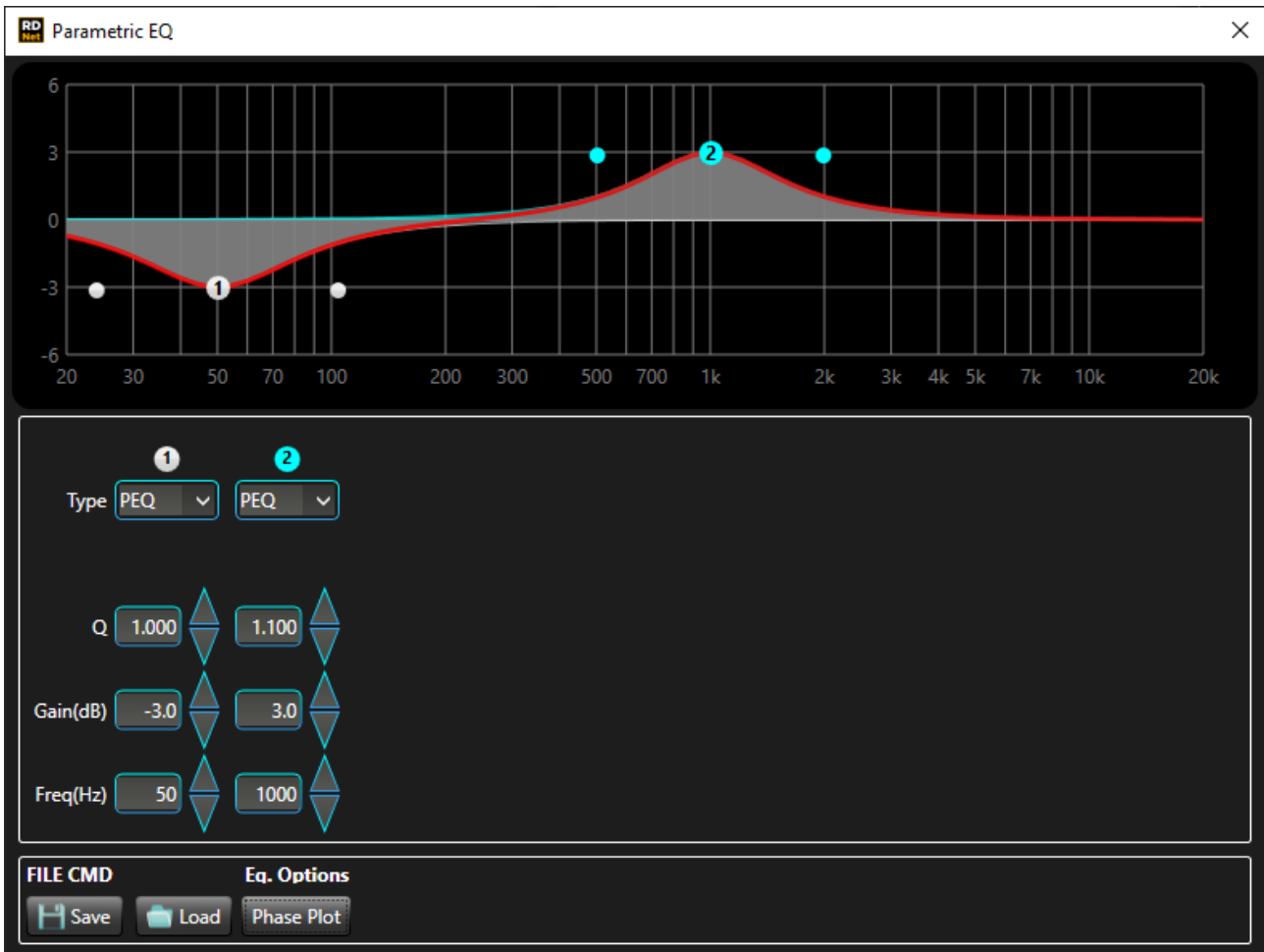
12. BUS FLAT

Click the FLAT button to toggle the FLAT EQ (no equalization) of its respective BUS channel.

When lit: FLAT EQ is enabled.

12.5 2-BAND PARAMETRIC EQUALIZER

Click PEQ (in the OUTPUTS window) to open the 2-band PEQ settings of the respective audio output.



It is possible to set two independent parametric equalizers. Each PEQ can be adjusted either graphically by dragging its little circle (1, 2, the current selection is shown in cyan) or clicking the up/down arrows or in an analytical way (by directly inserting the values in the cells with the numeric keyboard).

The overall equalization is shown as a red line, the intervention of the selected PEQ as a cyan line, the intervention of the other PEQ (that is not selected) as a white line.

Type: parametric equalizer (PEQ) that allows to adjust the level at the center frequency and specify the Q factor (the adjusted level can be widened or narrowed).

Q: Q-factor setting.

Gain (dB): filter gain setting.

Freq (Hz): central frequency setting.

File Commands:

- **SAVE:** it saves to PC the current equalization as .rde file.
- **LOAD:** it loads from PC an equalization previously saved as .rde file.

Eq. Options:

- **PHASE PLOT:** if selected, the phase plot is graphically shown (yellow line).

12.6 DMA 82 – DMA 162 MATRIX

	OUT A				OUT B			
	BUS CH 1	BUS CH 2	BUS CH 3	BUS CH 4	BUS CH 1	BUS CH 2	BUS CH 3	BUS CH 4
IN 1 - LEFT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IN 1 - RIGHT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IN 1 - MONO	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IN 2 - LEFT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IN 2 - RIGHT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IN 2 - MONO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXT - LEFT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXT - RIGHT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXT - MONO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BAL IN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The matrix allows to route each input to one or more outputs:

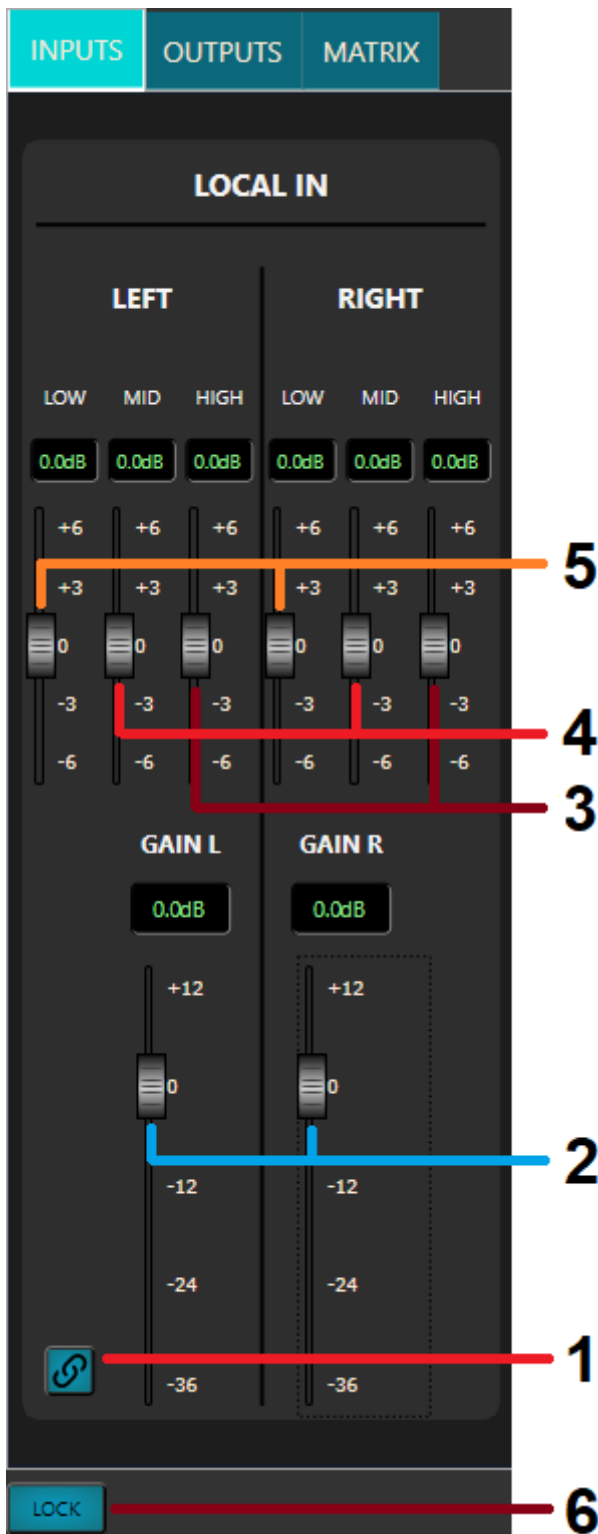
OUT A / BUS CH1, OUT B / BUS CH2, BUS CH3, BUS CH4

Click all the matrix point checkboxes that need to be enabled.

About stereo inputs, the selection is mutually exclusive for each output: either the left channel only or the right channel only or both summed to mono.

12.7 DMA 162P INPUTS

If the LOCAL/BUS button in the MATRIX window is on (when lit), only the LOCAL IN settings are available.



LOCAL IN

1. STEREO UNLINK

When off, left and right inputs are managed as a stereo pair (left and right channels), so all setting values are exactly the same and every single adjust affects the other channel too.

When on, all controls are separate and independent.

2. GAIN

Gain level adjustment of its respective channel.

3. HIGH

High frequency level adjustment of its respective channel.

4. MID

Mid frequency level adjustment of its respective channel.

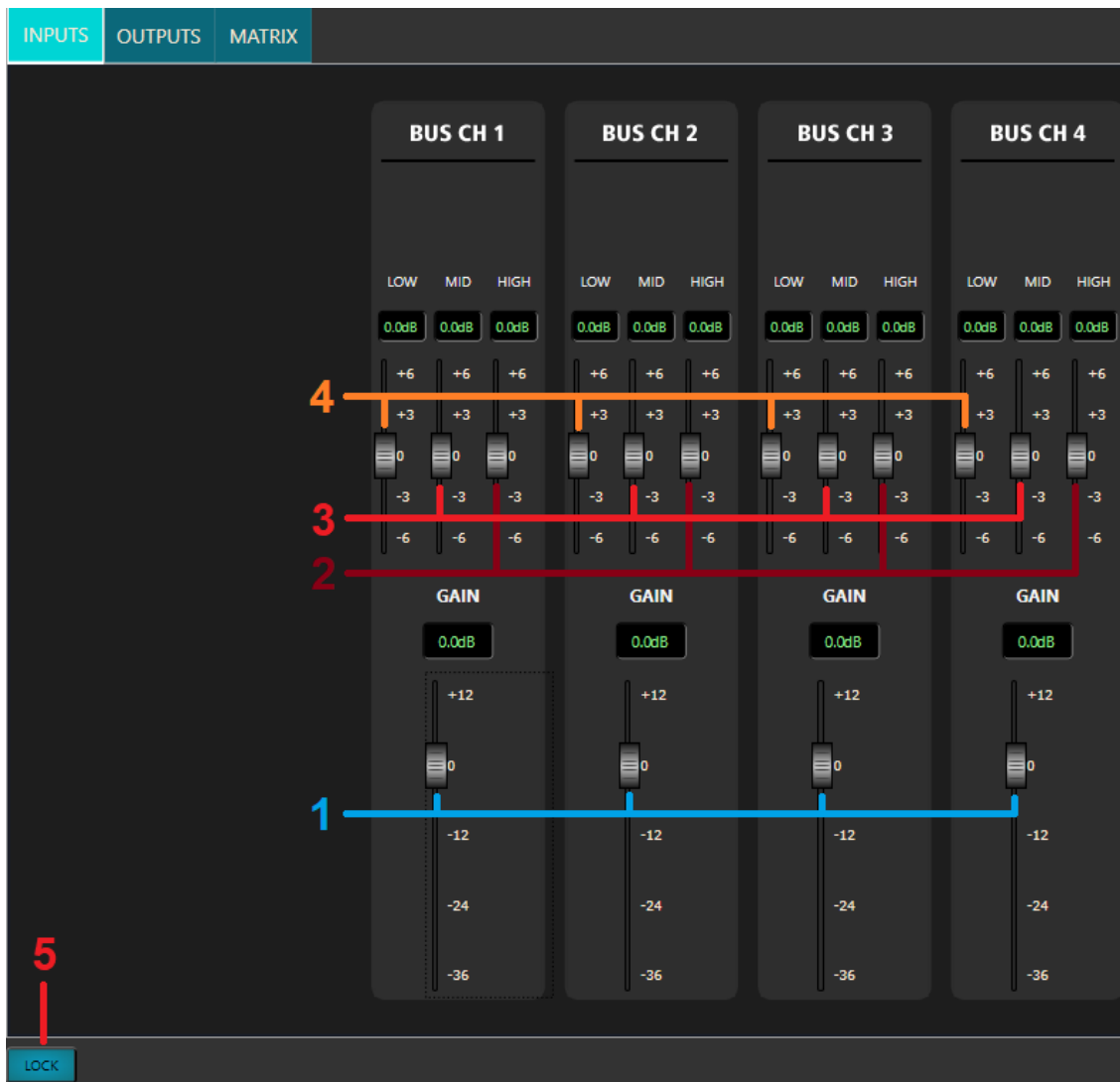
5. LOW

Low frequency level adjustment of its respective channel.

6. LOCK

Click the LOCK button to prevent (when lit) a configuration made via RDNet software from being messed up by a user acting on DMA 162P rear panel controls (dip-switches and trimmers). The MUTE and BUS / LOCAL contacts are excluded from the LOCK function.

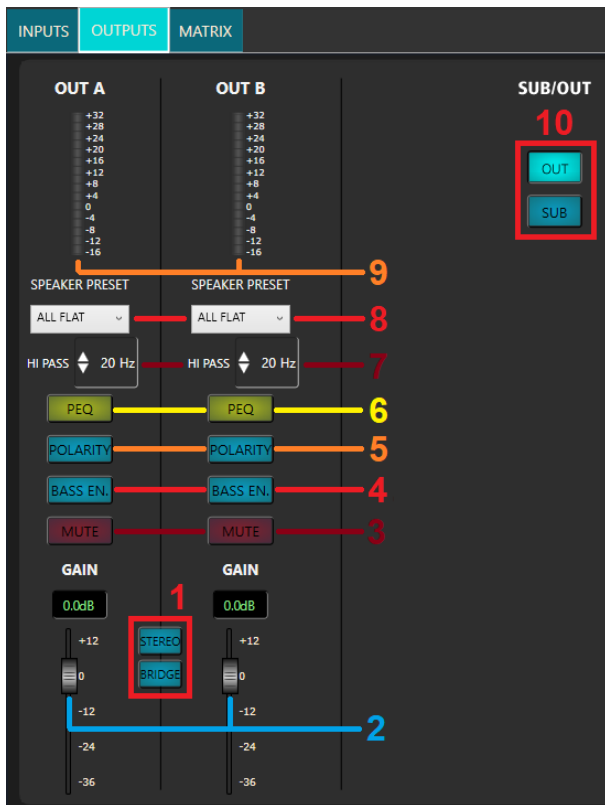
If the LOCAL/BUS button in the MATRIX window is off, only the BUS settings are available.



BUS

1. GAIN
Gain level adjustment of its BUS channel.
2. HIGH
High frequency level adjustment of its BUS channel.
3. MID
Mid frequency level adjustment of its BUS channel.
4. LOW
Low frequency level adjustment of its BUS channel.
5. LOCK
Click the LOCK button to prevent (when lit) a configuration made via RDNet software from being messed up by a user acting on DMA 162P rear panel controls (dip-switches and trimmers).
The MUTE and BUS / LOCAL contacts are excluded from the LOCK function.

12.8 DMA 162P OUTPUTS



1. STEREO / BRIDGE (/ MONO) MODE SELECTION

To activate the stereo mode, click the STEREO button (it lights up). Click it again to turn it off.

To activate the bridge mode (single 70 V line output), click the BRIDGE button (it lights up). Click it again to turn it off.

When either the stereo or the bridge mode is selected, OUT B controls are disabled and its GAIN is linked to the OUT A GAIN level. The two buttons STEREO and BRIDGE are mutually exclusive: when turning one on, the other automatically turns off. For the MONO mode (two separate and independent outputs), leave both set to OFF.

2. GAIN

Gain level adjustment of its respective output.

3. MUTE

Click the MUTE button to mute its respective output.

Click it again to unmute.

4. BASS ENHANCER

Click the BASS ENHANCER button to enable the bass enhancer on its respective output. Click it again to disable it.

5. POLARITY

Click the POLARITY button to invert the signal polarity of its respective output. Click it again to disable it and restore normal polarity.

6. PEQ (2-BAND PARAMETRIC EQUALIZER)

Click it to open the 2-band parametric equalizer window of its respective output. See the manual section **12.5 2-BAND PARAMETRIC EQUALIZER**.

7. HI-PASS FILTER

Click on the up/down arrows to increase/decrease the hi-pass filter cutoff frequency (note: it is also possible to directly insert its value by using the computer numeric keyboard after clicking the number) of its respective output.

8. SPEAKER PRESET

Click it to open a drop-down menu to select the speaker preset (suitable for the used speakers) of its respective output. The default ALL FLAT option: no equalization applied.

9. Vu meter

LED bar indicating the current signal level of its respective output.

10. SUB/OUT

The two buttons OUT and SUB are mutually exclusive. If SUB is selected, the OUT / SUB rear panel outputs are affected by an 80 Hz low-pass filter, useful for connecting active subwoofers. If OUT is selected, the low-pass filter is not inserted.

12.9 DMA 162P MATRIX

LOCAL

	OUT A	OUT B
LOCAL IN - LEFT	<input checked="" type="checkbox"/>	<input type="checkbox"/>
LOCAL IN - RIGHT	<input type="checkbox"/>	<input checked="" type="checkbox"/>
LOCAL IN - MONO	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BUS CH 1	<input type="checkbox"/>	<input type="checkbox"/>
BUS CH 2	<input type="checkbox"/>	<input type="checkbox"/>
BUS CH 3	<input type="checkbox"/>	<input type="checkbox"/>
BUS CH 4	<input type="checkbox"/>	<input type="checkbox"/>

BUS

	OUT A	OUT B
LOCAL IN - LEFT	<input type="checkbox"/>	<input type="checkbox"/>
LOCAL IN - RIGHT	<input type="checkbox"/>	<input type="checkbox"/>
LOCAL IN - MONO	<input type="checkbox"/>	<input type="checkbox"/>
BUS CH 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BUS CH 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BUS CH 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
BUS CH 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The matrix allows to route either the LOCAL INPUT or BUSES to one or both outputs.

If the LOCAL/BUS button is on (when lit), only the LOCAL INPUT matrix section is enabled and the local input can be routed to the outputs. If off, only the BUS matrix section is enabled and the four buses can be routed to the outputs.

Click all the matrix point checkboxes that need to be enabled.

About the stereo LOCAL INPUT, the selection is mutually exclusive for each output: either the left channel only or the right channel only or both summed to mono.

About the four BUSES: only one can be assigned to the same output (or both).



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