DSP Studio

PC Control for Xcellence Line Array

![master audio logo]

Pol. Ind. Norte - Perpinyà, 25
08226 TERRASSA (Barcelona-SPAIN)

info@master-audio.com
www.master-audio.com

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Quick Installation Guide

1 Planning the installation

The Xcellence Line Array active elements (X210A, X215W & X218W) are equipped with an Ethernet port. This allows interconnecting all the units of the line array system in the same way as computers in a local area network (LAN). Standard Ethernet switches and/or wireless access points may be used to interconnect the elements.

A PC computer connected to the network is used to access the entire system, modify the audio settings and get information about its status. The user interface is made through the dedicated Master Audio **DSPStudio** software.

This manual describes how to build up the network connection and operate the system.

1.1 Setting up the Cabinets

1.1.1 Configuring the IP Address

Before flying the cabinets, it is necessary to set an IP address to each one. This IP address is the unique identifier of the cabinet in the network, so it must be **different** for each element. If two cabinets with the same IP are connected at the same time, it will be not possible to control them properly.

All the components in the network (computer, switches/access points and cabinets) must have an IP address in the same subnet. This means that the three first fields of the IP address must be the same, and the last field is the unique identifier of each element in the bus.

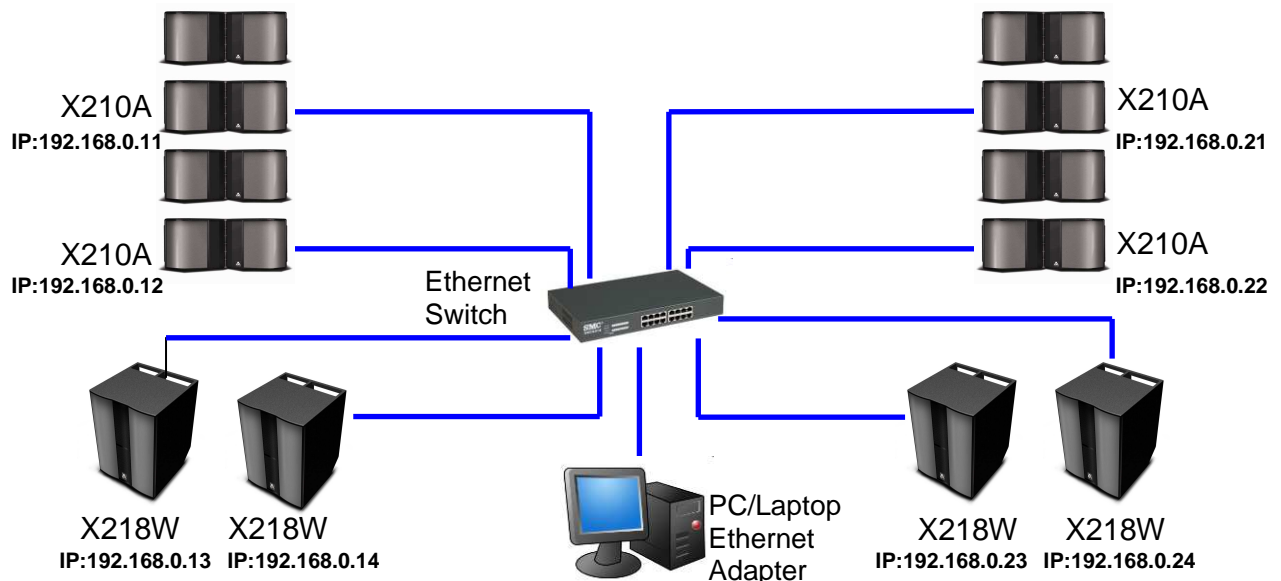| Field 1	Field 2	Field 3	Field 4
192	168	000	xxx

The IP address can be set from the cabinet, follow these steps:
1) Power up the cabinet. The LCD display will light up
2) Unlock the keypad pressing the key "Preset" followed by "OK"
3) Press the "IP" key. The current IP address will be displayed. The factory default is 192.168.000.009
4) Press "OK" to start changing the address. The Field 1 of the IP address will blink. Use the cursors up/down to change it and "OK" to accept and go to the next field
5) Once the four fields are modified press the "left" cursor to go back to the main screen. The "ID" will show the three digits of Field 4 of the IP address.
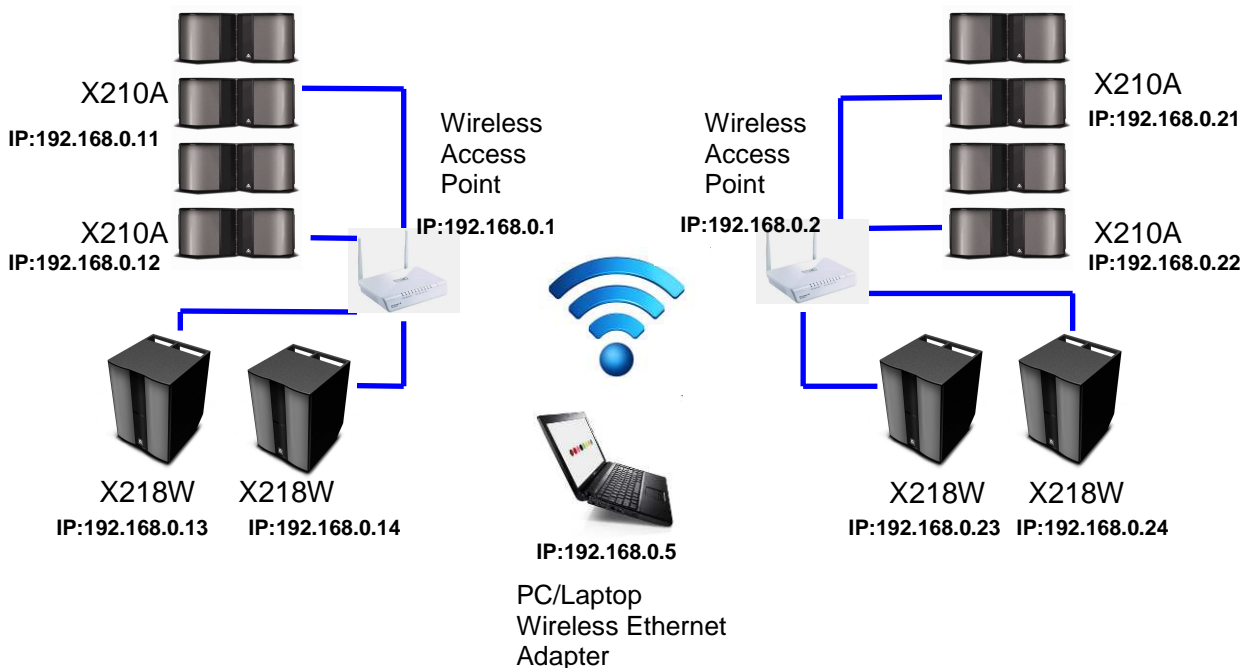
Recommendations:
- Always keep track of the IP's assigned in order to don't use one address twice
- Remember to use always the same subnet for all elements (Field 1 to Field 3 always the same)
- Assign an address in Field 4 between 10 and 255, but always trying to use lower numbers possible
- Reserve addresses with Field 4 between 0 and 9 for the computer and access points.

1.1.2 Wiring possibilities

Each cabinet must be connected to a port of a switch/wireless access point with a Cat-5 or Cat-6 Ethernet cable. The following diagram shows an example of a wired connection:

Alternatively, a wireless connection can be set up using Wireless Access Points, like the supplied with the **Wireless Communication Kit**. The connection will be confiured as in the example shown below:

IMPORTANT

When more than one Wireless Access Points are used, they must be linked together using a wireless protocol such as WDS (Wireless Distribution System). Otherwise the computer will not be able to access to all the elements in the network.

1.2 Setting up the Wireless Access Points

If you are using the **Wireless Communication Kit** supplied by Master Audio, the Wireless Access Points are preconfigured with factory defaults that allow you an easy setup. Each Wireless Access Point is labelled as following:

Label for BRIDGE unit

> BRIDGE   IP: 192.168.0.1
> SSID: MASTERxxxx   CH: 9
> S/N: 12345678901

Label for REPEATER units

> REPEATER   IP: 192.168.0.2
> SSID: MASTERxxxx   CH: 9
> S/N: 12345678901

If a second wireless communication kit is used

> REPEATER   IP: 192.168.0.3
> SSID: MASTERxxxx   CH: 9
> S/N: 12345678901

> REPEATER   IP: 192.168.0.4
> SSID: MASTERxxxx   CH: 9
> S/N: 12345678901

For each Access Point (AP) the following information is available:

- BRIDGE/REPEATER: there is only one BRIDGE AP in the network, which is managing all the Wi-Fi links with the other APs (REPEATERs).
- IP: Unique IP address of the AP in the system. The address 192.168.0.1 will be reserved for the BRIDGE.
- SSID (Network Name): It will be the word MASTER followed by 4 digits, unique for each communication kit.
- CH (Network radio channel): The channel used for the Wi-Fi transmission. Default is 9, but may be changed in case of need.
- S/N: The serial number of the communication kit. Will be also used as default WEP-key, as described below.

IMPORTANT:
- The Wireless Access Points have an own IP address. This address should be also unique, so it can not be assigned to another element in the network.
- The Wireless Access Point labelled as "BRIDGE" is the one that is making the link between the other access points, labelled as "REPEATER". So the "BRIDGE" must be always present in the network in order to assure the communication between all the elements.
- The Wi-Fi network has WEP security. The WEP key is composed of the letters SN (capital) followed by the serial number of the kit, as written on the label. In the example shown the WEP-key will be: SN12345678901

Should you need to change any of the parameters of the access points, please refer to section 1.3.3.

1.3 Setting up your computer

A Windows-based computer with an Ethernet interface is needed to connect to the system. The Ethernet interface can we wired or wireless, depending on your needs. When using the **Wireless Communication Kit** supplied by Master Audio, a wireless Ethernet interface is needed. Most of the laptop computers have both interfaces available.

1.3.1 Configure your Network Card

For Windows 2000/XP
1) Go to the Start button and click **Control Panel**
2) Select **Network Connections**
3) Select the network interface you are going to use. Right click on it and choose **Properties**
4) There select "Internet Protocol (TCP/IP)" and click on **Properties**. Enter the following parameters:
   Check the button **Use the following IP address**
   IP Address: 192.168.0.xxx (*)
   Subnet Mask: 255.255.255.0
   The other parameters in the window may be left blank.
   (*) xxx is the unique address, so it must be different to other components in the network (cabinets and access points). Range between 0 and 255.
5) Click on **Accept**

or Windows Vista/7
1) Go to the Start button and click **Control Panel**. There click **Network and Internet**
2) Now click on **Network and Sharing Center**
3) On the left panel click on **Manage Network Connections**
4) This will bring up a window with your Network Connections. Select the network interface you are going to use. Right click on it and choose **Properties**
5) In the properties window select *Internet Protocol Version 4 (TCP/IPv4)* and click on **Properties**
   Check the button **Use the following IP address**
   IP Address: 192.168.0.xxx (*)
   Subnet Mask: 255.255.255.0
   The other parameters in the window may be left blank.
   (*) xxx is the unique address, so it must be different to other components in the network (cabinets and access points). Range between 0 and 255.
6) Click on **Accept**

1.3.2 Installing Master Audio DSPStudio

Double click on the installer file (DSPStudio-1.x.x.msi) and follow the steps of the installation wizard.

DSPStudio needs to install Microsoft .NET Framework 3.5 in your computer to work properly. If the installer does not find this software in your computer, you will be asked to install it via internet download.

If you don't have an Internet connection, you can find the .NET redistributable installer together with **DSPStudio**, in the documentation supplied by Master Audio.

1.3.3 Connecting the system

Wired connection:
Connect the computer to the switch where the other network elements are connected.

Wi-Fi connection:
Your computer should detect now a Wireless Network named "**MASTERxxxx**", where "xxxx" is a 4-digit number that is written on each label of the Access Point. Connect to this network and then you will be asked for a WEP key.

The default WEP key is composed of the letters SN followed by the serial number of the connection kit, which is also written on each label of the AP. For example, if your APs are labelled with "S/N: 12345678901", your WEP key will be SN12345678901. Once the connection is established, you are ready to start.

OPTIONAL:
Should you need to change any of the parameters of the access points, follow these steps: (Valid for model SMC EZ Connect N)

1) Open a web-browser window, i.e. Firefox or Internet Explorer
2) Enter in the address bar the IP of the access point required, i.e. 192.168.0.1
3) Enter user and password:
   User: admin
   Password: smcadmin
4) A web-based used interface allows the user to change all the desired parameters, such as SSID (Network Name), wireless channel, etc. If you change these parameters, check to do it consistently in all Wireless Access Points.

Together with the software and this documentation, the configuration files of each AP will be also supplied. In case you change some of the parameters and want to set the AP back to the factory parameters, just go to the "Administration/Configuration" menu and select "Import Configuration File". Then select the corresponding ".dat" file, depending on the unit you want to update.

12345678901_BR.dat: for the BRIDGE 192.168.0.1
12345678901_R1.dat: for the REPEATER 192.168.0.2
12345678901_R2.dat: for the REPEATER 192.168.0.3
12345678901_R3.dat: for the REPEATER 192.168.0.4

After that, the AP should be restarted.

2 Operating the system
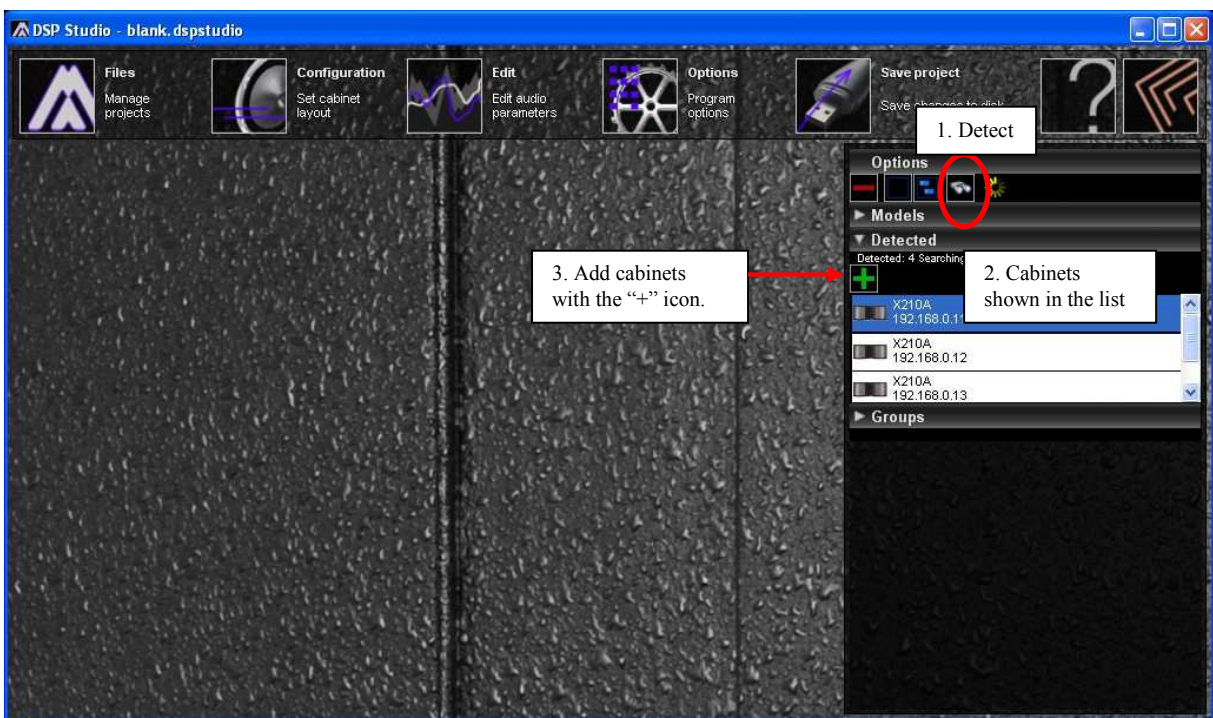
2.1 Starting a new Project

Open Master Audio **DSPStudio** by double-clicking on the icon.

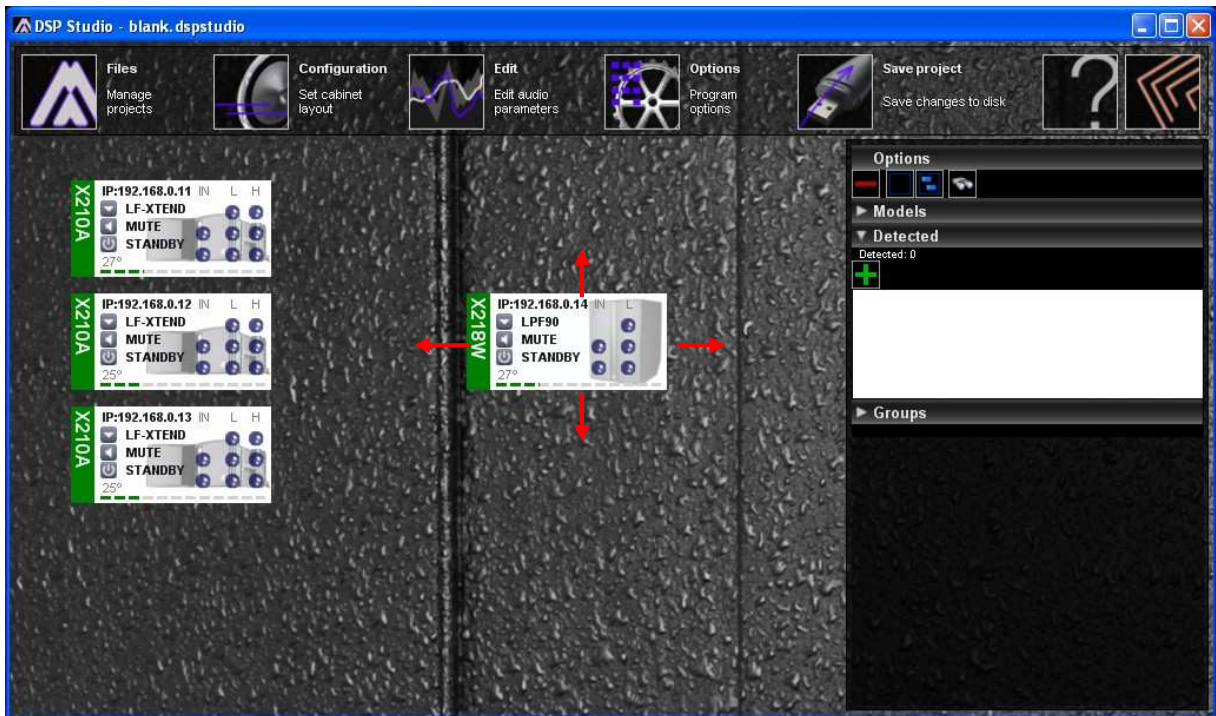A pop-up window will appear asking to open a project, click on "New".

If you have all cabinets connected and powered up, you can proceed with an auto-detect command, as following:

1) Click on the "Auto-detect" icon (binoculars icon)
2) The cabinets will be automatically detected and shown in the "Detected" List.
3) Click on the "Plus" icon to add the cabinets to the Project

The cabinets will be added to the desktop, where you can locate the elements at your convenience by "clicking and dragging"

At this point you can assign your cabinets to groups. This is very useful to change the configuration of more than one element at a time. To do this, follow these steps:

1) Create a new group
2) Select the cabinets you want to add to the group (to select several cabinets use Shift+click)
3) Add the cabinets by clicking the "plus" icon.

2.2 Changing audio settings

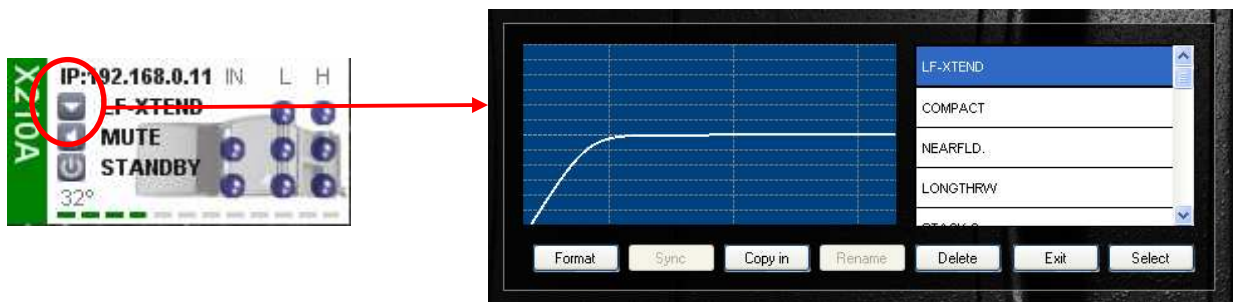Once all cabinets are detected, switch to the **Edit Mode** in order to modify audio parameters.

IMPORTANT
While in **Configuration Mode**, cabinets can be added and removed to the project and moved along the desktop, but any parameters can be modified. Preset, Mute and Standby buttons will also not be active. In **Edit Mode**, parameters can be modified but cabinets are fixed in the desktop.

In the **Edit Mode**, it is possible to change the audio configuration can be made to a single cabinet or to a group of cabinets (multiple selection), as explained in the following chapters.

2.2.1 Changing parameters to a single cabinet

First you can select between the factory presets that are stored in the internal memory of each cabinet. To do this, click on the "arrow" icon inside the element box. A window will show you the available presets and user memories, if any has been stored previously:
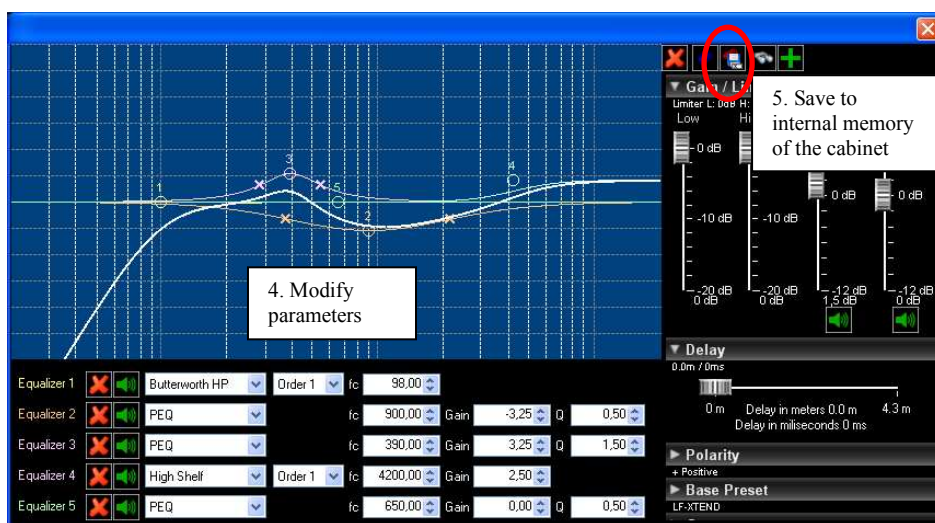
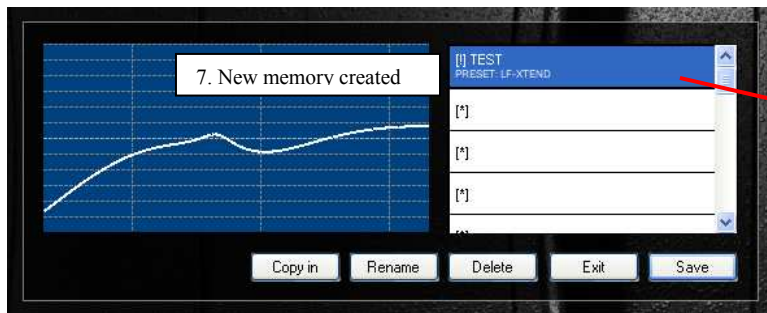If you would like to do further modifications to the audio settings of one cabinet, proceed as following:

1) Make sure that the program is in **Edit Mode**
2) Click on the element to be modified (it will be highlighted in dark blue)
3) Double click on the EQ window to open the extended mode editor,

4) Modify all the desired parameters. The changes will be sent to the cabinet in real-time
5) If desired, save the changes to the element's internal memory (disk icon)

6) A window with the user memories will be opened. Select one free slot to allocate your new settings and click **Save**.

7) A new memory will be created and selected automatically as active in the element.

IMPORTANT

Modifications of audio parameters always have a Factory Preset as a basis. This means that each user setting has two parts: the audio parameters modified by the user and the "Base Preset".

When a user memory is recalled, both the Base Preset and the user-modified parameters are loaded again, so the result obtained is exactly the same as when the parameters are saved.

In the example shown, the TEST setting has been made with the LF-XTEND preset as basis. If the user changes to another preset (for example, COMPACT), this one will be loaded as basis preset. Then if memory TEST is recalled again, both the user-modified parameters and the LF-XTEND preset will be loaded.

2.2.2 Changing parameters of a group

If you would like to change audio parameters of more than one element at a time, you can use the "multiple selection" feature.
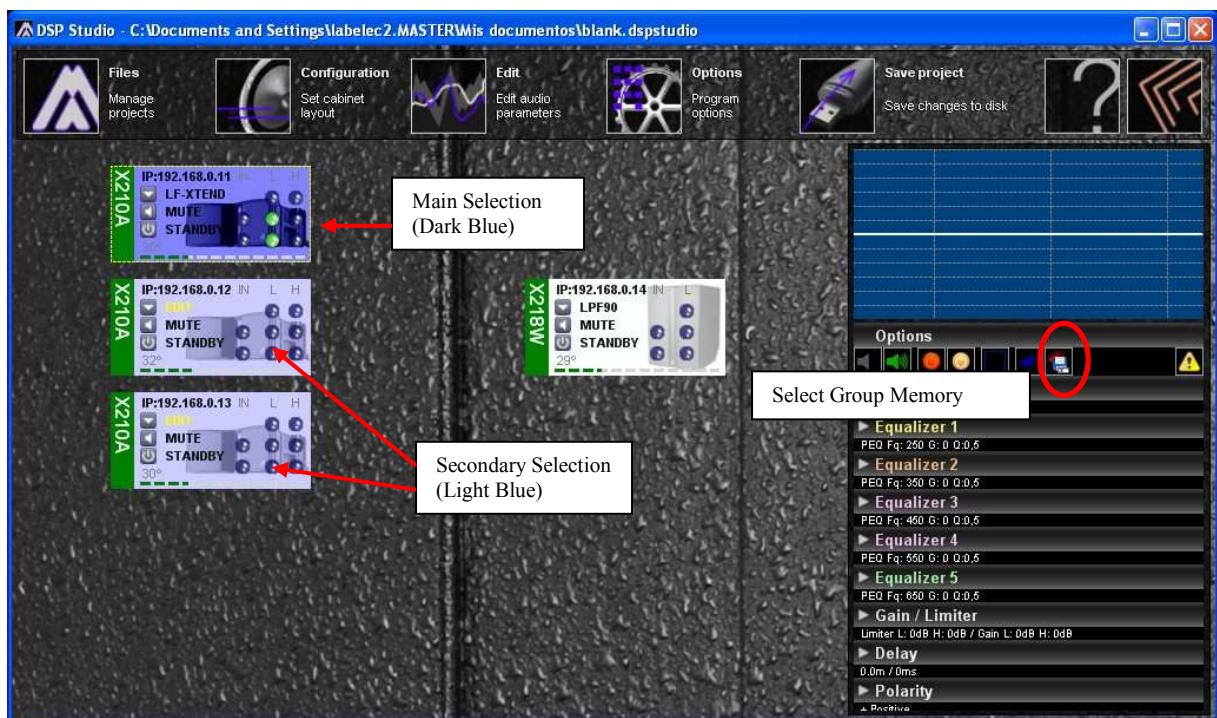
To select more than one cabinet, you can either select a previously defined group (under the **Group** tab), or select different cabinets using **SHIFT+click**. Each time a multiple selection is done, the following message will appear:

- Clicking **Yes** means that the cabinets in the selection will receive the same audio configuration as the **first selected cabinet** (highlighted in dark blue). This means that all cabinets in the selection will have the same audio parameters. The secondary selections will be highlighted in light blue. The word **EDIT** will be shown in the Preset Name, to notice that this element is being edited.

- Clicking **No** will keep the multiple selection available for the Mute and Standby commands, but since the audio parameters are not synchronised, the audio command will be blocked.

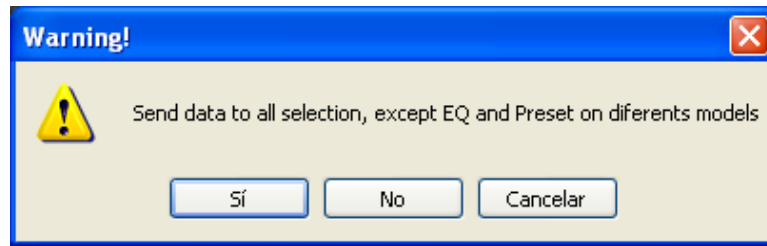- Clicking **Cancel** will abort the selection

After the selection is made, if you selected **Yes**, you can proceed with the process described in the previous chapter to modify the data: double click on the EQ window. All the modifications done will be sent in **Real-Time** to all the selected cabinets.

It is also possible to load a preset or user memory to a group selection at the same time. To do that, select the button **Select Group Memory** at the Options Bar. The preset window will be shown to select the desired preset.

When selecting cabinets of **different models**, only a part of the parameters will be available for editing. Since different models have different base presets, the Base Preset and the EQ window are blocked (EQ Window will change its colour to grey). Gain, Limiter, Delay and Polarity will be available.

A message will appear to notice that, and the options available are again **Yes**, **No**, and **Cancel**, with the same functionality as explained before.

Warning!

⚠ Send data to all selection, except EQ and Preset on diferents models
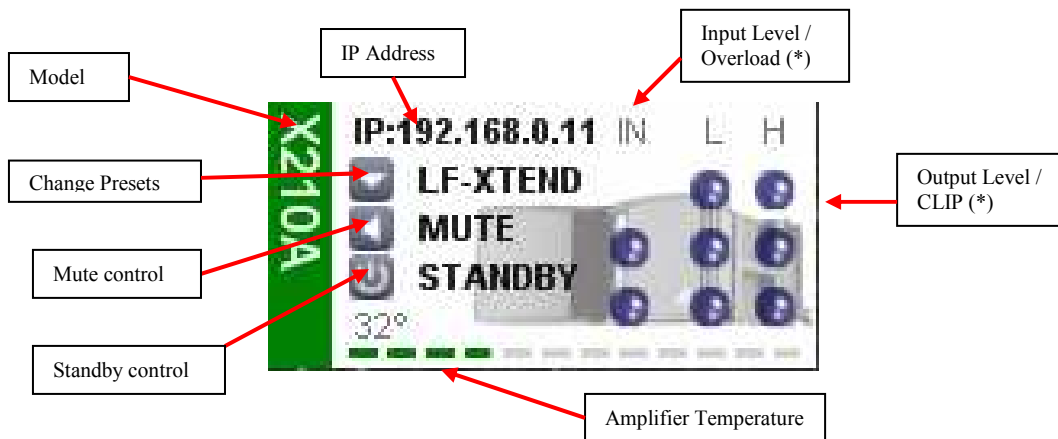
[Sí] [No] [Cancelar]

2.3 Cabinet monitoring

Each cabinet is depicted by an element box. From this box the current preset can be changed and the unit can be set in mute (amplifiers off), Standby (high voltage power supply off). These changes can be made when you are in **Edit Mode**.

Input and output signal of the amplifier, clip limiter, protect status and temperature of the amplifier are continuously monitored in **Real-Time**.

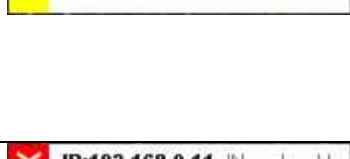The element box provides several information of the cabinet status, as seen in the following diagram:

(*) The led indicators for the input and output levels are placed as following:

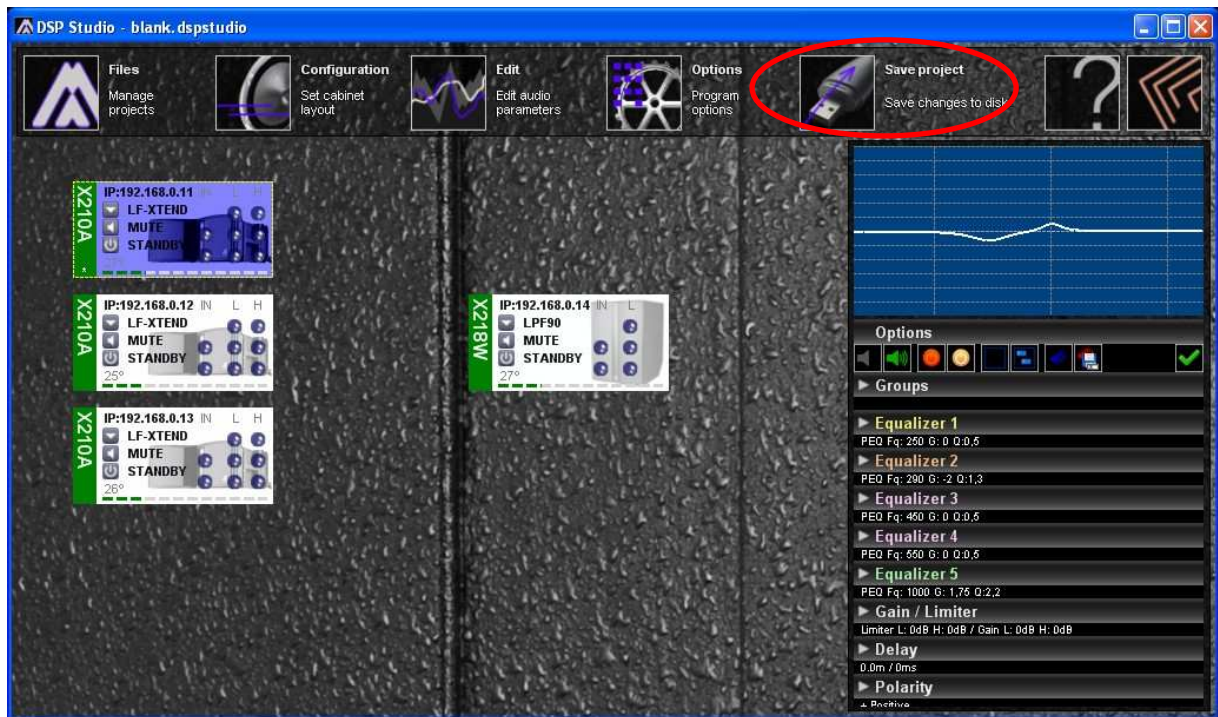| IN (Input)	L (Low Frequency Output)	H (High Frequency Output)
-	CLIP (RED)	CLIP (RED)
OVERLOAD (RED)	-12dB (GREEN)	-12dB (GREEN)
SIGNAL PRESENT (GREEN)	-24dB (GREEN)	-24dB (GREEN)

In order to provide clear information to the user, the element box will change its aspect depending on its status. All the possible indications are summarised in the following table.

ELEMENT BOX	CONDITION	DESCRIPTION
	OFFLINE	Cabinet is present in the project but the connection is not established. **DSPStudio** tries periodically to re-establish lost communication, so you just need to wait for the connection to be re-established.
	ONLINE	Cabinet is connected and waiting for instructions
	MAIN SELECTION	Dark blue means that the cabinet is selected. The parameters of this cabinet will be taken as basis for audio parameters.
	SECONDARY SELECTION	Light blue means that the cabinet belongs to a selection in which another element is the main element
	EDIT	The **EDIT** word in yellow at the Preset means that in this element some parameters have been changed but not saved in its internal memory. If the cabinet is powered down, changes will be lost.
	SIGNAL IN/OUT/CLIP	Green leds show presence of audio signal at the input and output (**L**=Low, **H**=High) Red leds stand for overload (input) and amplifier clipping (output)
	MUTE ON	When pressing the **MUTE** button, amplifiers will be switched off. The **MUTE** word will be lit up in red. The amplifier will send a protect condition so the left tab will be shown in red. Press again MUTE to return to normal operation.
	STANDBY ON	The Standby or "power hibernation" mode switches off the high power stage of the amplifier's power supply, allowing a low-power consumption mode. **STANDBY** and left tab will be lit in yellow. Temperature reading will be suspended. Press again the **STANDBY** button to return to normal operation (3 to 4 seconds of startup time is required)
	PROTECT	When the left tab is lit in red, the amplifier is communicating a protect condition. This condition can be caused by overvoltage / overcurrent at the output, high temperature (>90ºC) or other malfunction. If the protect signal is not released, the unit must be serviced.

2.4 Saving changes

In DSPStudio it is possible to save your workspace: Cabinet models and IP Addresses, Desktop Layout and memories created. Then, next time you need to work with the same setting you can save up configuration time by just loading a project file.

Use the **Save Project** icon in order to save the project to your disk. The next time you open the program you can recall the same configuration by loading the "*.dspstudio" file.

3 Troubleshooting

Problem:
Wi-Fi Network not found / cannot access

Solution:
1. Make sure that the Ethernet adapter of your PC/Laptop is enabled.

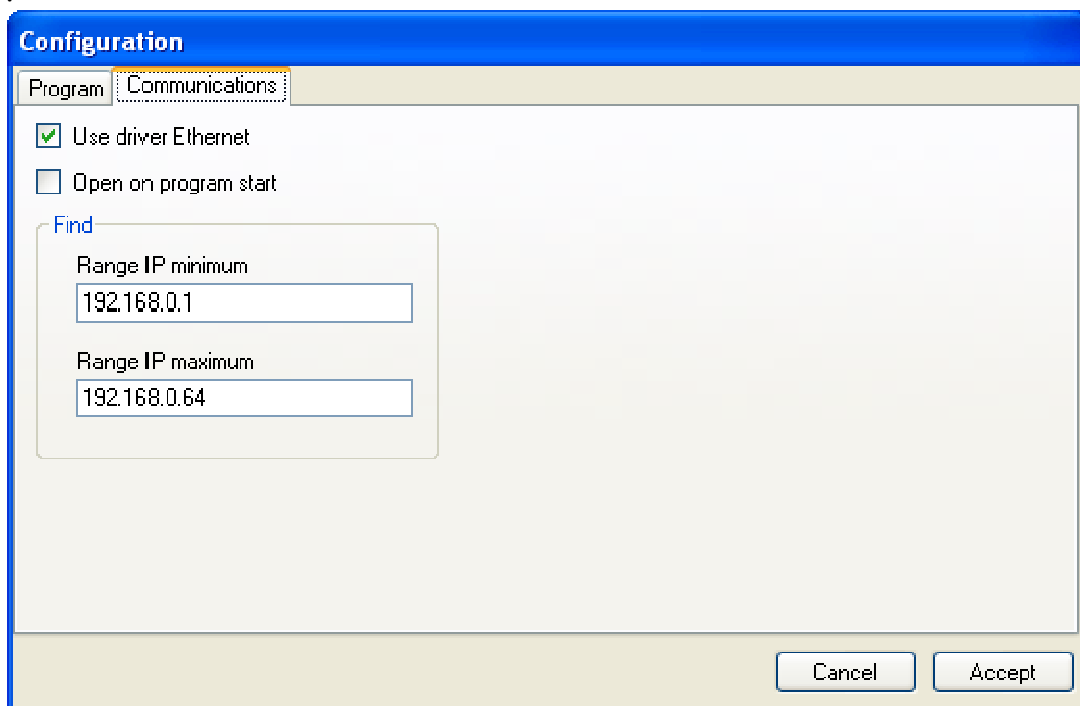2. Power up all the Wi-Fi access points of the system

Problem:
Cannot find the elements in the network (with auto-detect or opening a new project)

Solution:
1. Make sure that all elements in the network are powered up, including switches and/or access points

2. Check that all elements in the network (including the computer and the switches and/or access points) have a unique IP address and in the same subnet (Fields 1 to 3 are the same, Field 4 different. Please note that after IP changes you must restart the switches/ access points.

3. Check that your coumputer's network card is properly connected and configured

4. In **DSPStudio** check that under Options/Communications the IP ranges are correct
   - **Range IP minimum** is the start IP address that **DSPStudio** will use to start scanning the network.
   - **Range IP maximum** is the end IP address.

   Make sure that all the elements in your network are within the IP address range specified by **Range IP minimum** and **Range IP maximum**
   .

5. Check that any antivirus or firewall application is blocking your connection

If none of the above mentioned possibilities work, you may perform a **Hardware check** to maker sure that the elements are properly attached to the network:

Hardware check
1) Go to the **Start** orb and click on **Run…**
2) Type "cmd" and press **Enter**
3) In the command line write "ping 192.168.0.xxx", with "xxx" being the ID of the element in the network to be checked.
4) Check if the system is responding (see examples below).

Connection OK
```
Pinging 192.168.0.11 with 32 bytes of data:

Reply from 192.168.0.11: bytes=32 time=80ms TTL=53
Reply from 192.168.0.11: bytes=32 time=81ms TTL=53
Reply from 192.168.0.11: bytes=32 time=84ms TTL=53
Reply from 192.168.0.11: bytes=32 time=84ms TTL=53

Ping statistics for 192.168.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 80ms, Maximum = 84ms, Average = 82ms
```

Connection not established
```
Pinging 192.168.0.11 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

If the system is not responding, there is a hardware problem. Check all the connections and to power down and up again the Wi-Fi access points to re-establish the link

Problem:
Application hangs (does not respond)

Solution:
Compatibility with some antivirus/firewall applications may be causing this problem. Disable or uninstall antivirus/firewall software that may be blocking the connection to the system.

Problem:
Not all the elements in the network are accessible

Solution:
One or more access points may be down. Please check you connections and/or restart the Wi-Fi access points