

PROJECT FEATURES

DX 1616
MATRIX AUDIO PROCESSOR

PROJECT
DX 1616 CR V1.4



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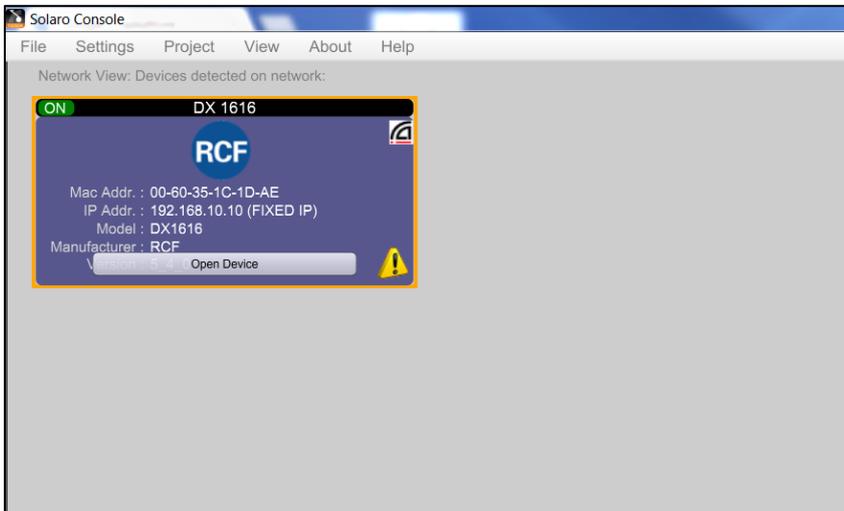
1. GENERAL INFORMATIONS

Before you start working with the Solaro Console software and your DX 1616 processor, visit RCF’s website on www.rcf.it to check and download the DX 1616 project files (.pjson files) available.

IMPORTANT NOTE: This manual only describes the characteristics of the **DX1616_CR_V1_4** project files. For more information about using the Solaro Console and Control software, installations, network configurations and customization of the Control interface, please see the respective manuals.

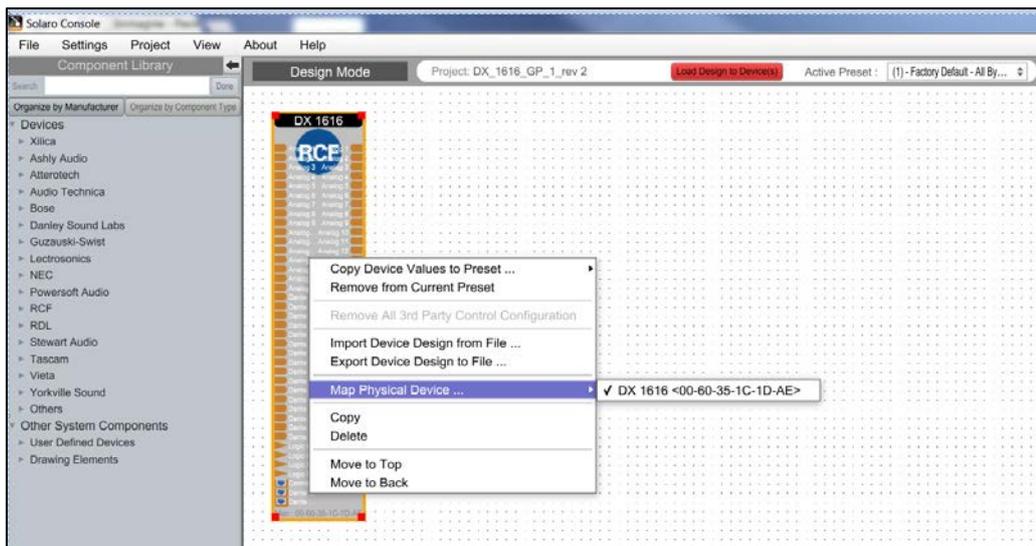
1.1 GETTING STARTED

After connecting the device to our Solaro Console software we’ll access to the Network view as follow:



Clicking on “Open Device” button we access at all the modules and parameters of this project to manage our audio system. (See figure 2). Notice that in this way we can control the modules without the possibility to save or load any preset.

Figure 1: Network View



To do it we have to load the project.pjson file; **File>Open Project...** and then we have to “Map Physical Device”, in this case our DX 1616 processor. Now our project is matched to the device and we can access at the load and save

Figure 2: Mapping Devices

preset functions. See the “EXAMPLE” chapter.

2. PROJECT FEATURES

2.1 Home screen Router

Home screen (Router 1-8)

Philosophy: The main screen is called “Home” and gives the most important information about all the incoming signals (on top of the screen), its routing(s) to DSP output modules (on the right of the screen), mutes, levels, limits and delays.

The output DSP modules have easy to understand common labels (cannot be edited by the user) like “Main L”, “Side L”, “Fill Front”, “Fill Center”, “Sub 1” and so on.

Output Delay: For each DSP output you can set a delay by double clicking the parameter. The maximum is 500ms. You can type in the delay in the “home” screen or in the DSP module screen.

Note: If you need more delay, use the “Delay L/R” or “AUX” DSP modules in “Router 9-16” section

Router: The router in the center of the screen allows to assign each input channel to one or several DSP modules individually. For each connection you can adjust the level from 0dB to negative values by double clicking the parameter.

Note: You can assign at the same time several inputs to a DSP module (Desk A, B, C, D and so on) please be aware the more inputs are routed (X) and connected, the more noise occurs on the output! We recommend using the “Group Mute” button to mute the not (yet) needed inputs or de-select them in the matrix!

Mutes: The mute bottoms on the left will mute the complete signal paths (all signals from input section) to its DSP module on the right.

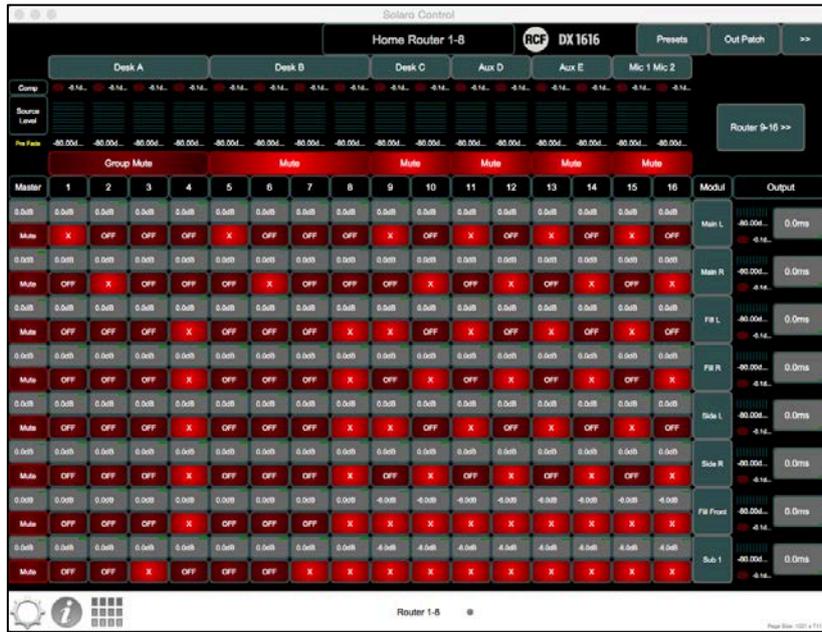


Figure 3: Home Screen (Router 1-8)

Home screen (Router 9-16)

Use that button to get access to the output DSPs 9 to 16

Note: The “Delay” and “AUX” outputs can have 1000ms of delay!

To go back use the “<<back” or “Home” or “<<Router 1-8” button



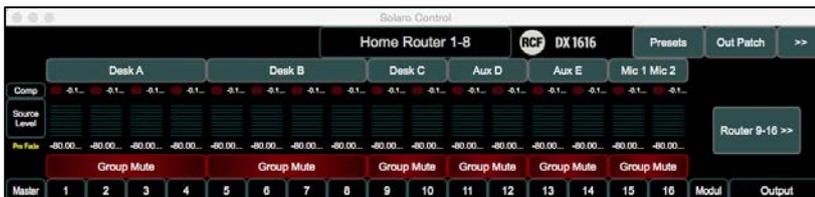
Figure 4: Home Screen (Router 9-16)

2.2 Input section

Desk A, B

Philosophy: In most live situations/ festivals the engineer has to adapt the input section to different scenarios:

- A mixing desk with just L+R sum
- A mixing desk with L+R for main PA + Subs + Fills
- An easy change-over from different setups + auxiliary inputs for DJ, Video and so on.



A dedicated microphone input for safety announcements, independent from the console (If you like you can use that two microphone inputs also for your TFT analyzer without the need of an audio interface!)

Figure 5: Home Screen Inputs

By selecting on of the input groups called i.e. “Desk X”, “Aux X” a new window opens and shows the according input channels with its options. The channel designs of Desk A and B are identical and offers a stereo channel (1+2) and two mono inputs 3,4



Figure 6: Input sources 1-4 (Desk A) and Source Processing

i.e. “Desk A” = “Source inputs 1-4” allows to mix and configure:

- Selecting by pairs (1+2, 3+4, 5+6, 7+8): analog input or AES/EBU
- Dante inputs
- Analog gain for perfect matching to your sources’ output level (default 0dB)
- Invert polarities of each source independently
- Level-Faders and mutes for each of the inputs.

- Master Mute and Master Level of “Desk X”

Source processing: You will have a stereo channel (1+2) and two mono channels 3,4 with paired

Parameters:

- EQ (tasty pre-EQ for overall system)
- Input delay of 50ms to time-align desks or align PA to backline
- Input compressors to pre-limit the overall PA’s SPL

Tip: To navigate very quickly through the sources “Desk A”> “Desk B” and so on, you can use the “<< back” and “>>forward” buttons on top of the screen



Figure 7: Quick navigation << and >> through the source inputs

Input EQs

Each of the input groups offers fixed stereo paired or mono EQs:

- Low Shelf (Gain +/-15dB, Frequency 20Hz-20kHz, Bandwidth 1.6 – 3.0 Oct)
- 4x parametric EQ (Gain +/-15dB, Frequency 20Hz-20kHz, Bandwidth 0.01 – 4.0 Oct)
- High Shelf (Gain +/-15dB, Frequency 20Hz-20kHz, Bandwidth 1.6 – 3.0 Oct)

Note: due to the architectural DSP design you will have separated EQ windows for each type!

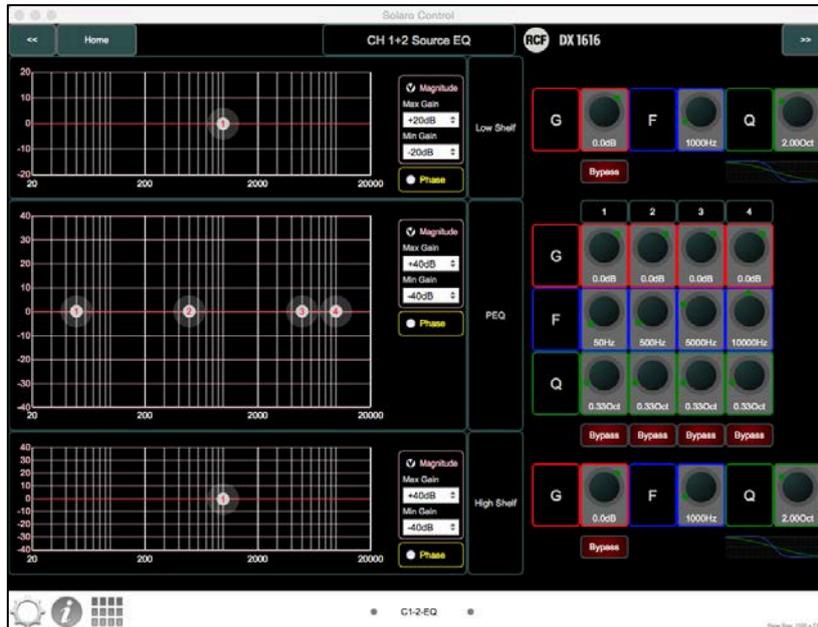


Figure 8: Source EQ – LS, PEQ, HS

Input source compensation

Beside the input delay for the signal processing section, a separated “source compensation” is available in each pair of the input channels

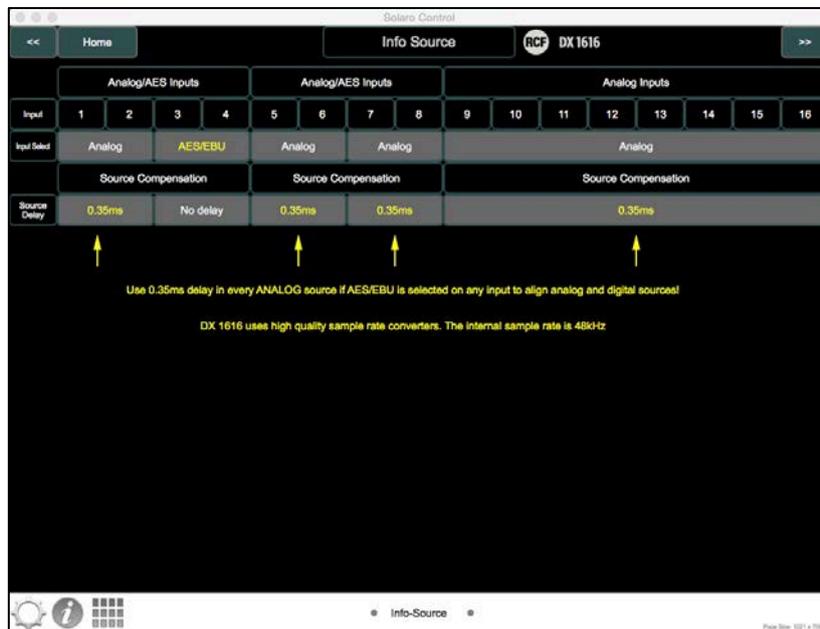


Figure 9: Info menu about “source compensation”

Why this?

Imagine you desk(s) can send AES/EBU or analog signal at the same time, the inputs of DX 1616 must be switched between analog or AES/EBU.

Note: while switching an input channel pair to AES/EBU, you will have 0.35ms more latency compared to the analog inputs. The reason is, that DX1616 uses a high quality sample rate converter switching all incoming sample rates to its internal 48kHz.

When you click the “info” button next to the section source compensation you will see the help file explaining this

Desk C, Aux D, Aux E

These input groups offer pre-configured stereo routings and will be used for desks with L+R sum or other stereo sources. The performance is the same compared to “Desk A and B”

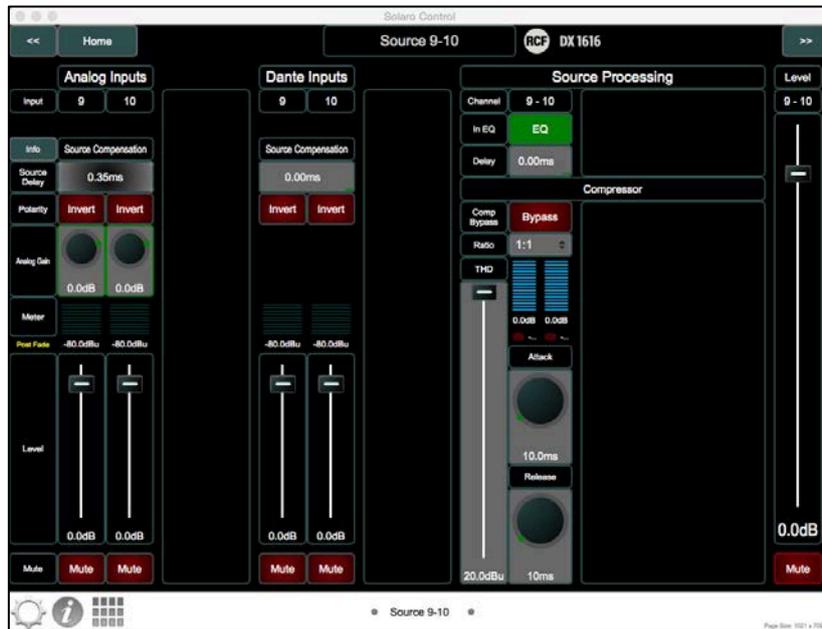


Figure 10: Input section “Desk C, Aux D, Aux E”

Mic 1&2

The input group “Mic 1&2” (source 15, 16) offers beside line inputs also additionally switchable Line/Mic inputs.

The source processing is managed by two separate mono channels 15, 16.



Figure 11: Input section Mic 1&2 (Source 15 and 16)

2.3 DSP modules output section

In total you have 16 output DSP modules, offering:

- 4 Band parametric EQ
- All-Pass Filter 1st and 2nd order (not in modules “Subs”, “Delay” and “Aux”)
- High Pass Filter: 6dB, 12dB, 18dB, 24dB slope
- Low Pass Filter: 6dB, 12dB, 18dB, 24dB slope
- Output level
- Polarity switch
- Output delay of 500ms (1000ms in modules “Delay” and “Aux”)
- Output compressor: adjustable ratio, THD, attack, release, bypass

Note: The default THD is +20dB and bypass on (=compressor off) to get the full, not compressed level out of the DX1616. This compressor is used to set an acoustical level (i.e. of a front fill speaker). It is not needed (or even recommended) to set a protection limiter. This is done in the active RCF speaker itself.



Figure 12: Example of DSP module “Main L”

Tip: To navigate very quickly through the DSP output modules “Main L”> “Main R” and so on, you can use the “<< back” and “>>forward” buttons on top of the screen

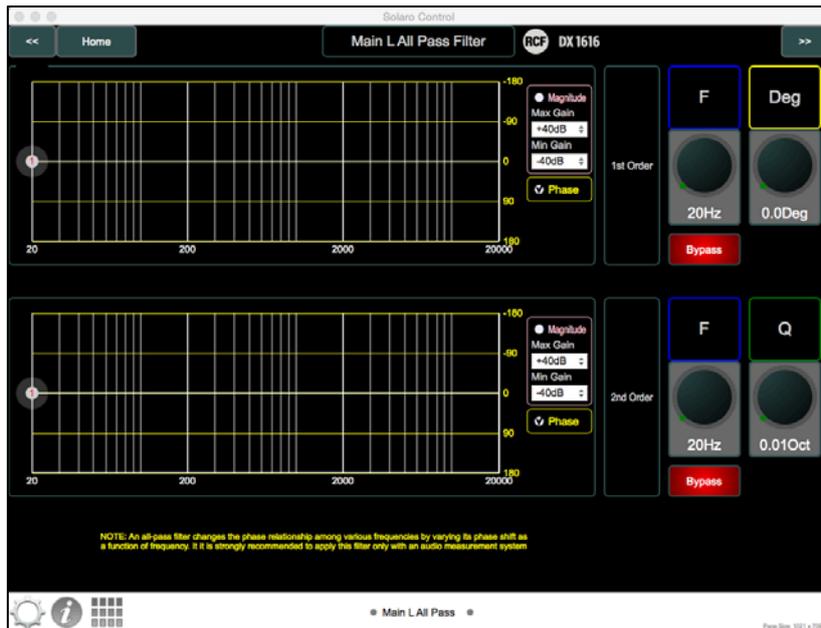


Figure 13: Quick navigation << and >> through the DSP modules

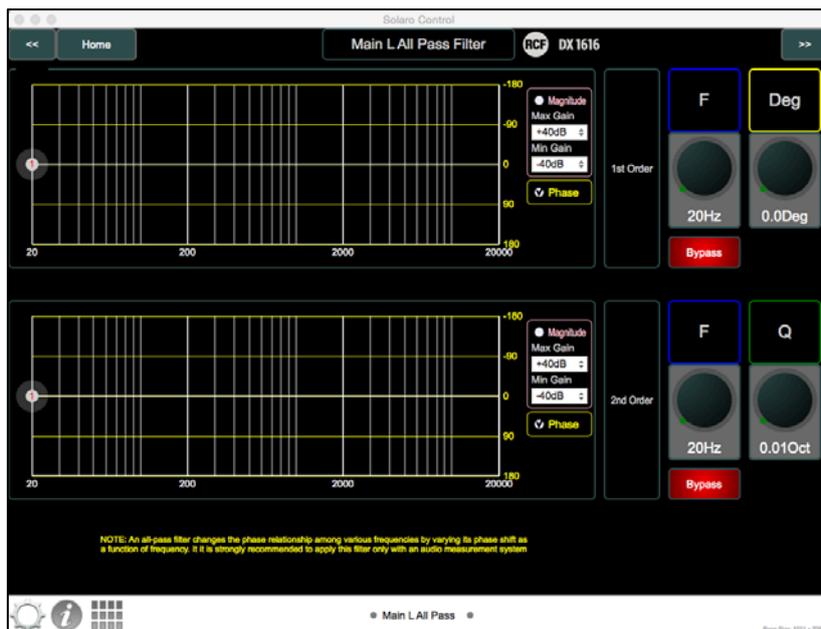


Figure 14: DSP module with All-Pass Filter

Note: An All-Pass filter shifts phase, not magnitude! Use that filter only in combination with a FFT analyzer to optimize the phase transfer of a speaker system!

By default, the All-Pass filters in DX1616 are switched off (bypass is on)

Analog/ AES Output patch



Figure 15: Analog/ AES output patch

DX1616 offers a powerful and fully flexible output patch to assign specific analog outputs (XLR socket and LK25 multipin) to a DSP module.

Example: The physical output of the module “Main L” can be assigned to output 1+2+3+4 or any other to use i.e. several outputs as line drivers. This will be done within an array to drive just 4 or 6 cabinets in daisy chain. Technical background: By connecting input boards in daisy chain, the overall impedance will decrease and this can result in hearable high frequency losses (also depending on the quality of the output drivers o your source).

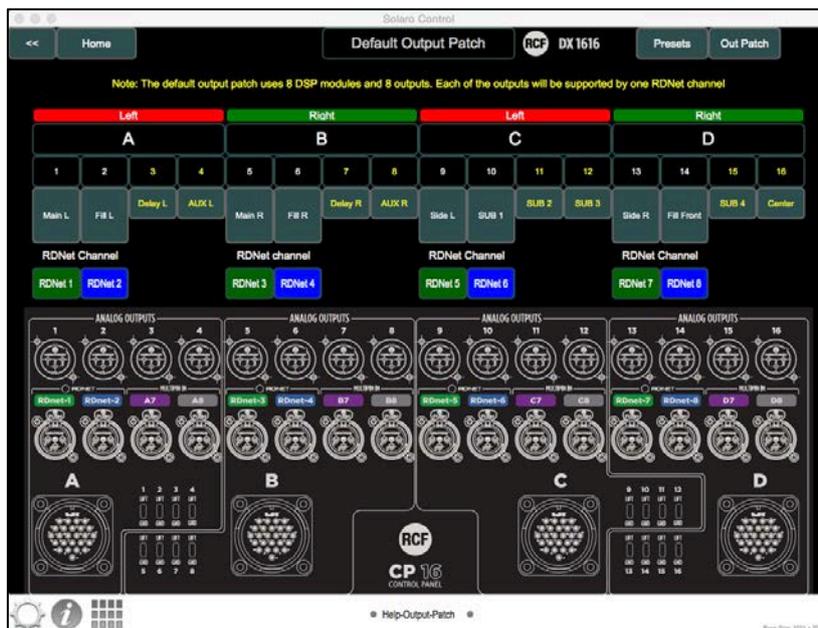


Figure 16: Default output patch – help file

For your reference the “? Patch” screen explains the default RCF patch in combination with CP16 control panel offering XLR sockets and LK25 multipin linked into parallel.

Note: When selecting an analog output patch, the corresponding AES/EBU will be assigned in parallel according to your choice (Only available in output channels 1-8 !).

Example: “Main R” patched to XLR output 6 means “Main R” AES/EBU will be assigned to AES channel 6 also.

Dante Output Patch

Note: The Dante outputs will NOT follow in the way you assign the analog/ AES patch! Each Dante output channel is fixed permanently to a DSP output module.

The table below shows the fixed routing:

DSP	Main L	Main R	Fill L	Fill R	Side L	Side R	Fill Front	Sub 1
Dante Out	1	2	3	4	5	6	7	8

DSP	Sub 2	Sub 3	Sub 4	Fill Center	Delay L	Delay R	Aux L	Aux R
Dante Out	9	10	11	12	13	14	15	16

Figure 17: Fixed Dante output patch

2.4 Presets & Resets



Figure 18: Presets

DX 1616 is equipped with a preset library.

- System resets:
 - o Default: resets all settings of DX1616 back to RCF default values
 - o Input Processing: resets all settings in all input channels back to RCF default values
 - o Reset output patch: resets all output patches back to RCF default values
- Module resets:
 - o Reset DSP output modules “Mains”, “Fills”, “Side PA”, “Fill Front”, “Subs 1+2, 3+4”, “Fill Center” back to default values (0dB, EQ flat, delay 0ms, no compressor ...)
- All Module Reset
 - o Reset all modules: resets all settings in all output DSP modules back to default values (0dB, EQ flat, delay 0ms, no compressor ...).

Note: Presets are part of the project file (*.pjson). Check RCF website for updates of DX1616 project files.

Note: How to create User Presets, please refer to the chapter “How can I create a (user) preset?” It has to be done in Solara Console software!

2.5 SolaroConsole – without Solaro Control App

(in combination with a project (*.pjxml) file)

Start the Console software and load the DX1616 project file (*.pjxml).

Note: If this done for the first time, it is needed to map the devices. Please refer to chapter “Map physical devices” above.

Note: Once the devices are mapped, the IP- and Mac Addresses are stored in the project file.

Next you should select “Load Design to Devices” to switch to online mode.

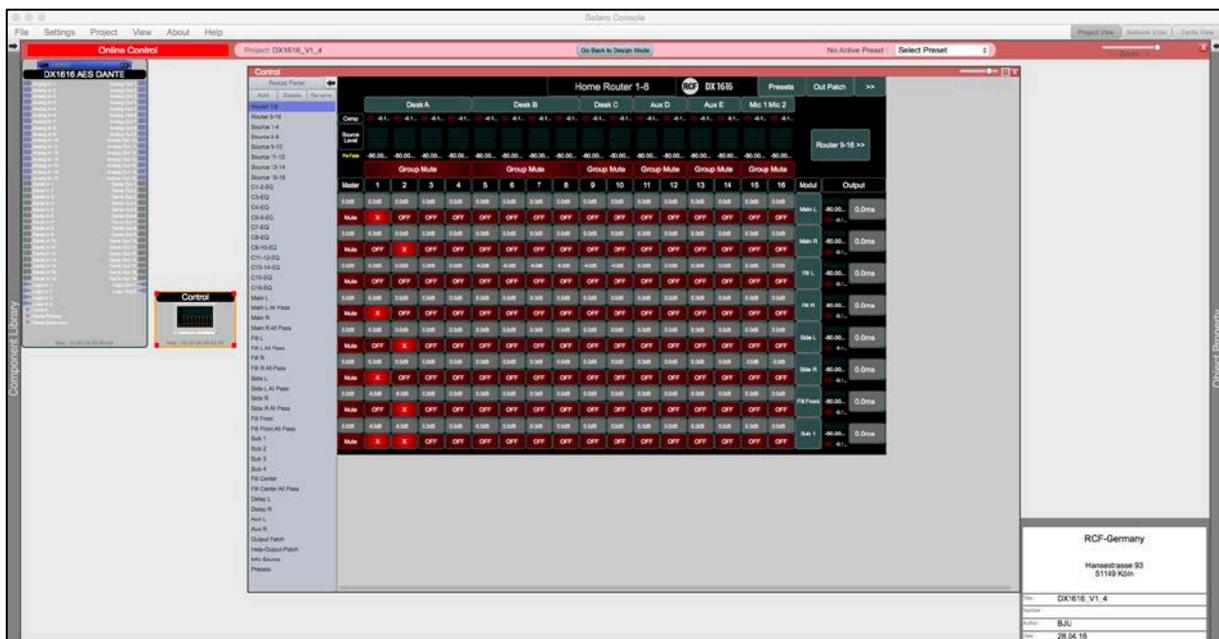


Figure 19: “Online Control” with opened “Control” window

Within the project file, you will see the DX1616 processor and the software Control icon “Control”.

Double click the “Control” icon and you will see the Control Panel and its different screens shown in the menu on the left.

Note: This is the same screen you know from your Control Software App, but to select different screens (to navigate through the architecture) you have to use the left menu.

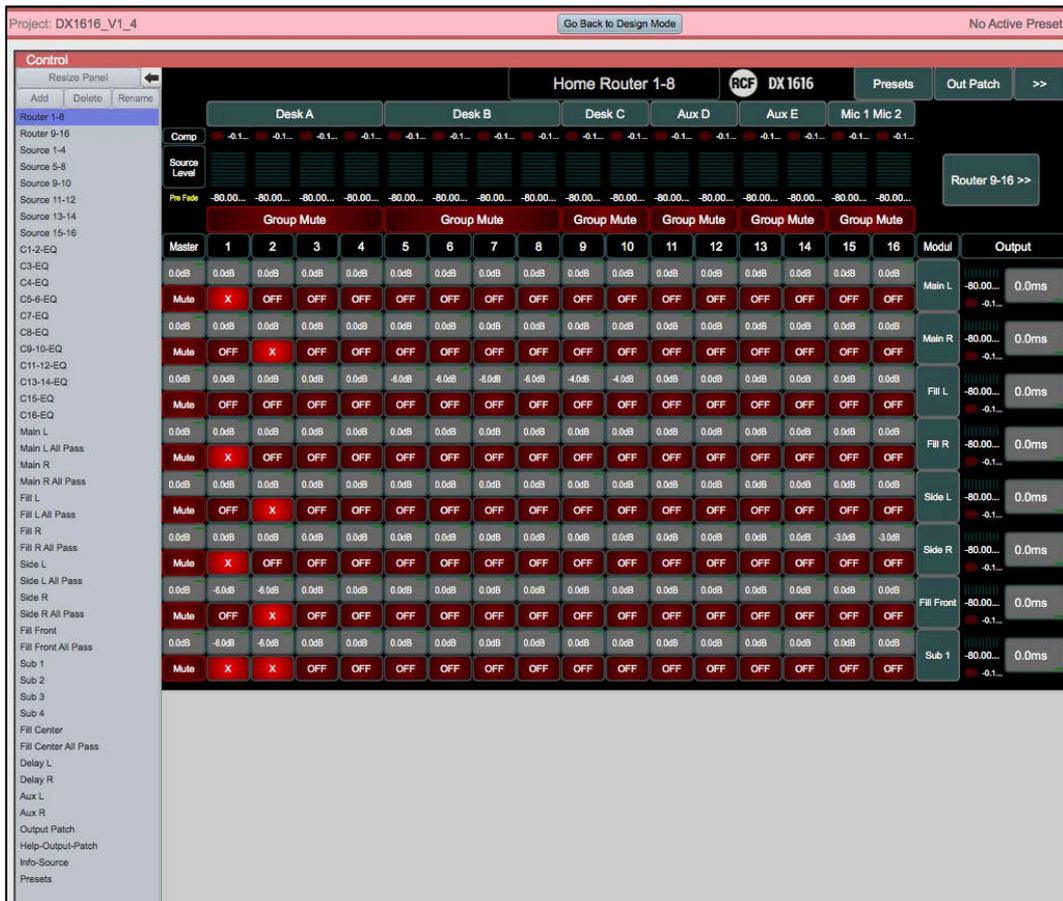


Figure 20: “Online Control” control panels and left menu

Note: this way to operate the DX1616 is suitable only if Solaro Control App is not running!

Solaro Console – without Solaro Control and without project file

This chapter explains the „emergency operating of DX1616“ without the use of Solaro Control App and if no project file is loaded.

Even if no „Control“ panel is mapped, or the computer with Solaro Control is not available, you can have (limited) access to the DX1616.

Note: this way to operate the DX1616 is very different because no GUI is available. You are directly changing parameters in the architecture level!

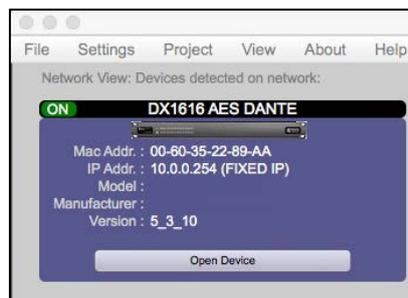


Figure 21: Solaro Console “Network View”

As soon the devices are powered up and you start the Solaro Console software, you will find the DX1616 in the section „Network View“. Click the „Open Device“ button and a new window opens showing you the DSP architecture of DX1616 with access to its single modules and functions.

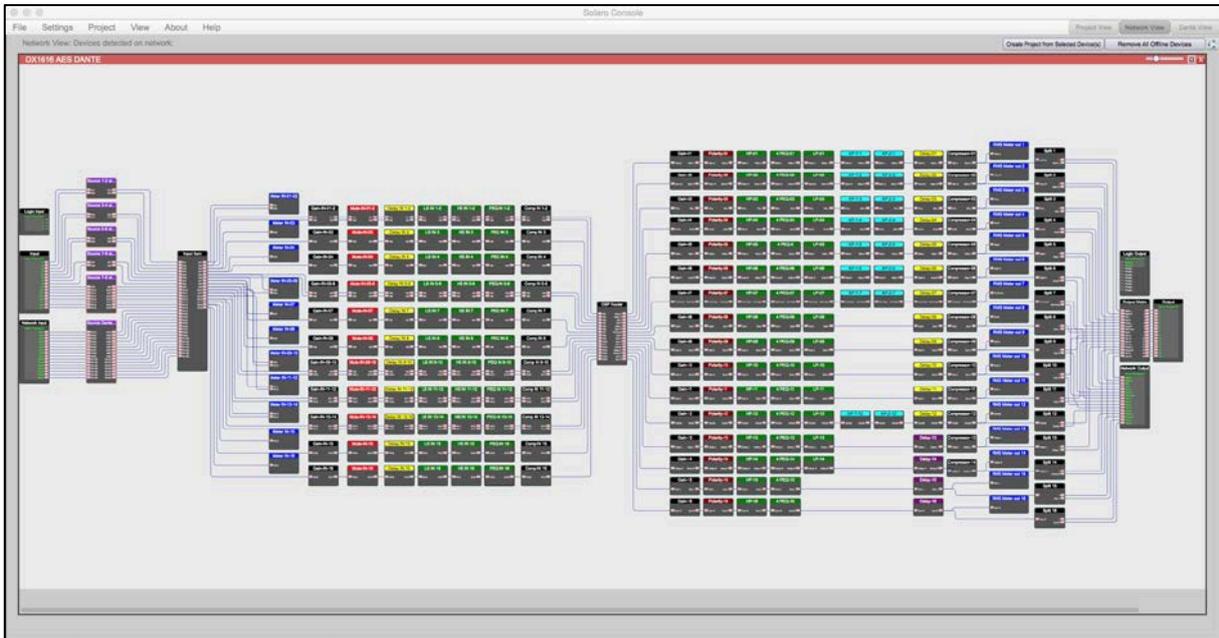


Figure 22: “Open Device” in “Network View” – the DSP schematics

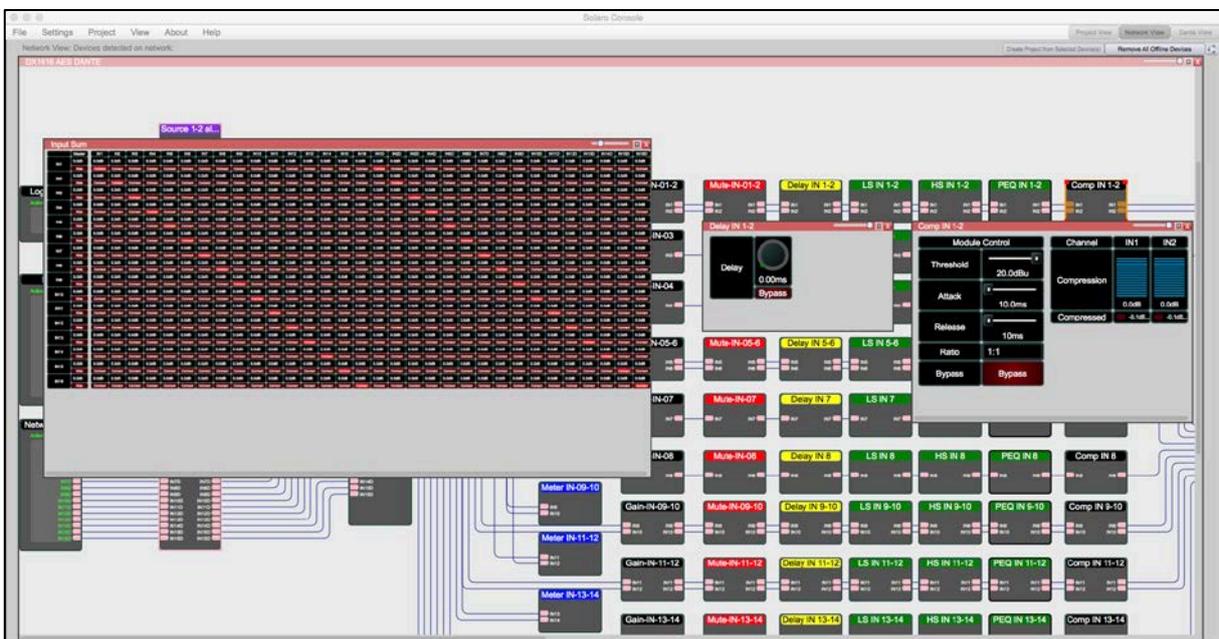


Figure 23: “Open Device” – DSP windows and its settings

This layer is dedicated to the designer of a project file and not meant to operate a DX1616 processor by a (not educated) user.

3. FAQs

Which are the “sync” options when connecting to DX1616?

Sync from PC to DX1616

To sync from PC to DX1616 means that you want to transfer settings from your project file (offline) to DX1616:

(a) Click the red “Load Design To Device” button at the top of the Project View / Design Mode work area page – as shown below (not visible if a network interface is not detected – you are working Offline)

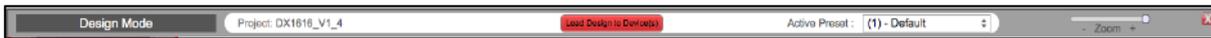


Figure 24: “Load Design to Devices” button

(b) You will be asked if you want to load the settings to the DX1616 (“device”).

“Yes”: when want you load this project file settings to the DX1616 you have to confirm with “yes”.

Sync from DX1616 to PC

You want to connect to DX1616 (switch online), but you want to use the current settings which are in DX1616:

(a) Click the red “Load Design To Device” button at the top of the Project View / Design Mode work area page – as shown below (not visible if a network interface is not detected – you are working Offline)



(b) You will be asked if you want to load the settings to the DX1616 (“device”).

“No”: Select “No” if you want to switch to Online Mode and still want to use the current parameter settings in DX1616.

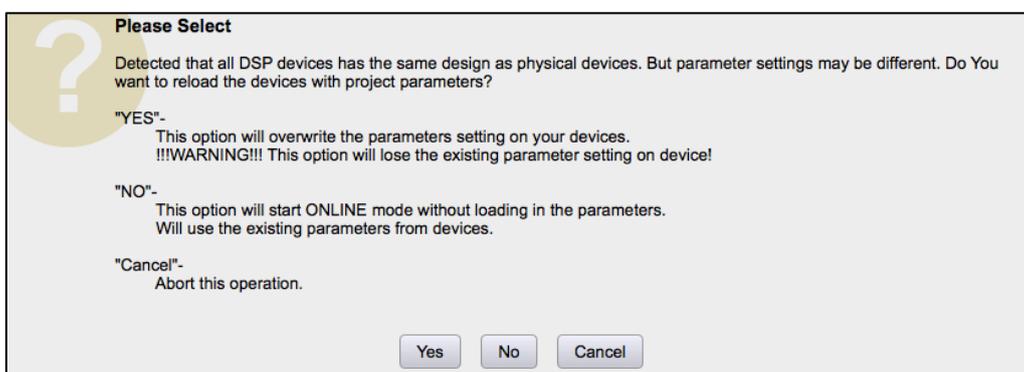


Figure 25: Syncing from PC to DX1616

After confirming with “No” a second message box might open and your confirmation with “Ok” is needed to proceed with the process.

Note: Please be not confused. You will get connected with all the last parameter settings done in DX1616 before. Important is, that you selected “No” in the first message box “No = This option will start online mode without loading in the parameters. Will use the existing parameters from device”.

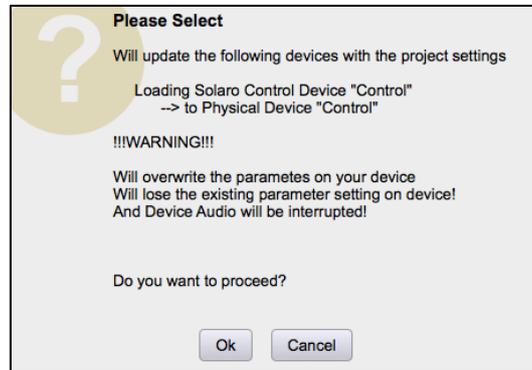


Figure 26: Update devices with project settings

What happens with my last settings in DX1616 when power is switched off?

The DX1616 remembers the last settings. Means if you switch off and on, the DX1616 will restart with all the last settings done before switching off.

Stand by of remote computer or network interruption

If your remote computer is shutting down to sleep mode/ stand by, the network connection of Solaro Control App and DX1616 is lost. You will see on your host computer a RED network indicator in the network view.



Figure 27: Control is shown “OFF” after stand by or in stand by of Control App

When the remote computer is awaking from stand by, the screen of Solaro Control is shown greyed (see picture below).

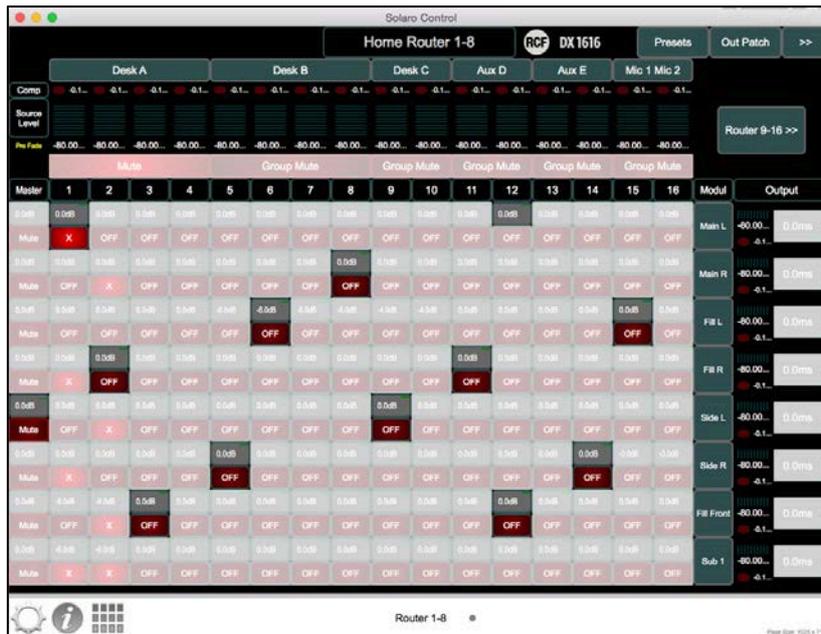


Figure 28: Control App re-syncing process

Usually the computer's network adapter automatically reconnects to the network and it takes up to 30 seconds to re-sync Solaro Control App.

Note: When the Solaro Control on the remote computer is not available, you can have access to DX1616 with the host computer and Solaro Console software instead: Just double click in the "Project View" the "Control" icon. Please see chapter "SolaroConsole – without Solaro Control App in combination with a project (*.pjxml) file" for more information.

Can I operate the DX1616 with Solaro Control App only?

Yes! As soon a project file is loaded to DX1616 and all devices (DX1616, Control Panel) are mapped before, you can just launch Solaro Control App and operate DX1616.

Note: This works because the Mac Address and IP Address is part of the project file. Make sure, that you are still working in the same network.

Note: While operating DX1616 with Solaro Control App only, please be aware that you are not able to save your settings to a project file! You can do it later on with Solaro Console, because your last settings will be kept in DX1616 even if power is switched off.

To save settings in DX1616 to a project file, please have a look in the chapter "Which are the "sync" options when connecting to DX1616?" and "Sync from DX1616 to PC"

How can I save my settings?

If you would like to save the settings of your current DX1616 project, please proceed like this:

1. Switch back to Design Mode (Offline Mode). You will be asked, if your current settings shall be copied from DX1616 to the project file.
2. Confirm with “Yes” and save your project file “File>Save as” on your computer.
3. You can create a preset of your parameters. Please refer to the chapter “How can I create a (user) preset?” below.

Note: Again, please remember to keep the origin RCF project file as back up!

Can I use a second Control Devices (iPad) to manage DX1616?

Yes. You have to edit the formally created copy of the origin RCF project file like this:

- (a) Launch Solaro Console software and open the project file and stay in Design Mode.
- (b) Copy by right mouse click the “Control” icon and paste it.
- (c) The name of the copied icon will be “Control-1”. You shall re-name it into “iPad” and edit the object color using the object properties on the right side of Solaro Console software.
- (d) Resize the new panel “iPad”: Double click the panel icon and select “Resize Panel” in the menu with 1024 x 718px

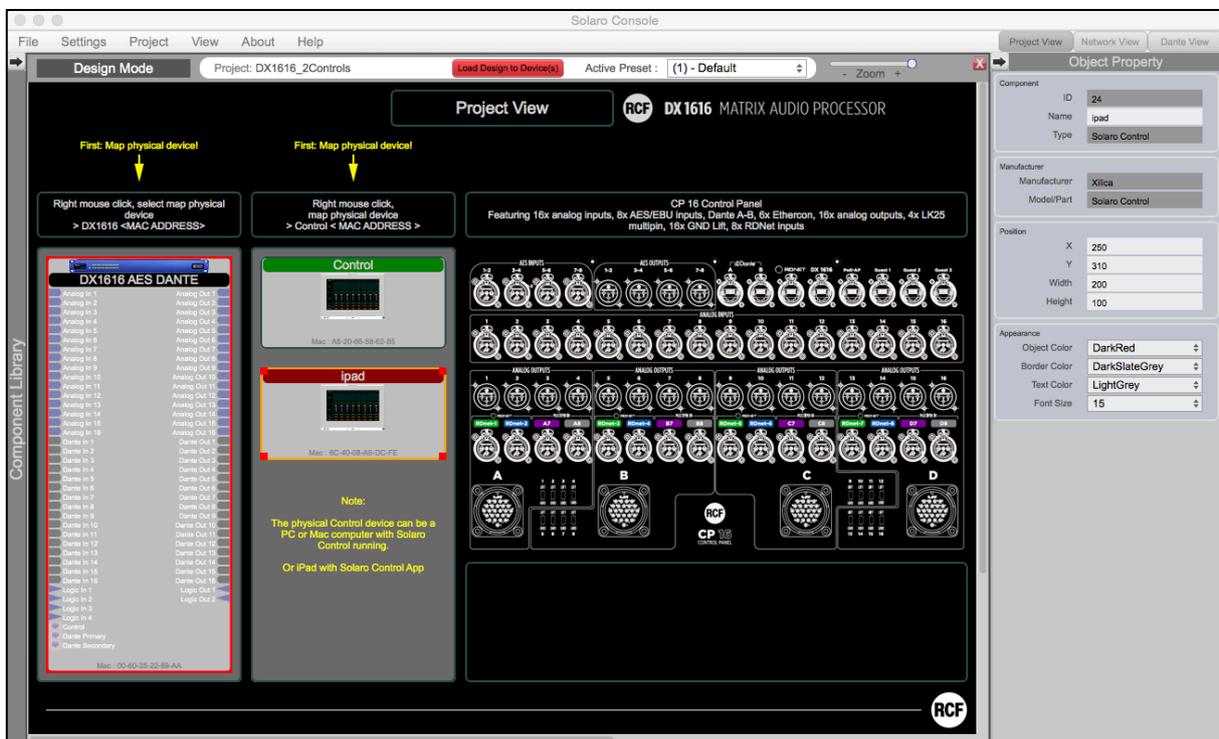


Figure 29: Creating a second “Control” device

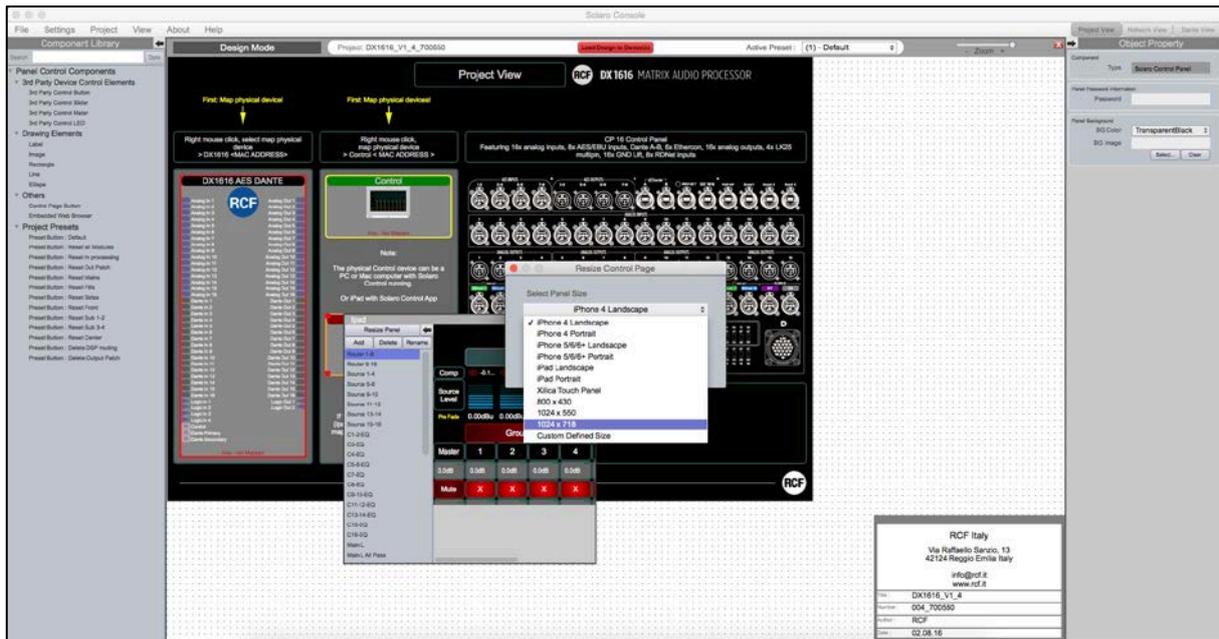


Figure 30: Resize “iPad” Panel in 1024x718

- (e) Start your hardware device (iPad, second computer) in the same network and launch Solaro Control software on it.
- (f) Map your recently created “iPad” device. See Map Physical Devices – DX1616 and Control Panel.
- (g) Save your project file on your computer and proceed with “load Design to Devices”.

Note: You will not be able to “Load Design to Device” until your second control panel is mapped to a physical device. In other words: If the second device (iPad) is not available, the only way is to delete the panel “iPad”.

How can I create a (user) preset?

You did some personal settings in DX1616 and you would like to save it as a preset for future recall.

- (a) Switch back to Design Mode (Offline Mode)

When switching back to Design Mode you will be asked:

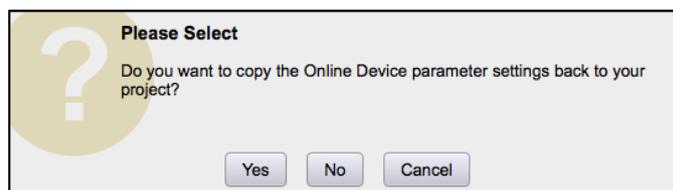


Figure 31: Switching back to Design Mode – Copying parameters to project file

“do you want to copy the Online Device parameter settings back to your project (file)” – “yes” or “no”.

Select “Yes” to modify your (personal) project file and “Save As” immediately to save the changed processor settings to new project file.

Note: Remember to keep the origin RCF default project file *.pjxml as backup!

- (b) Double click the “DX 1616” icon in the project view and maximize the window

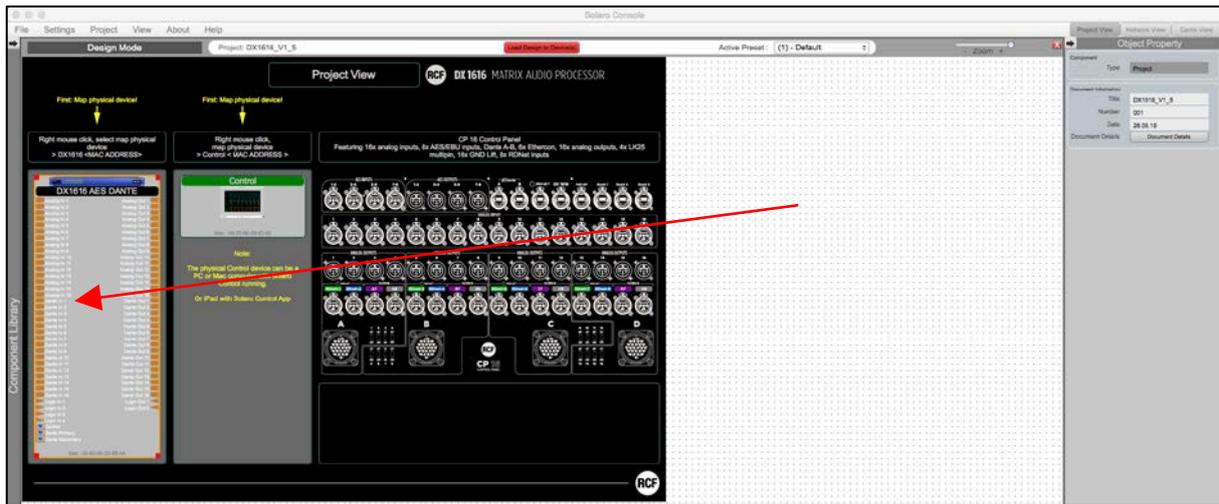


Figure 32: “Design Mode” – project view

(c) Select the DSP circuit(s) you want to save. This can be just one module parameter (level, EQ, Mute and so on) or even all currently set parameters. What ever you select will be saved.



Figure 33: “Design Mode” – Save Module Values to Preset

(d) After selection click the right mouse button and select “Save Module Value to Preset” > “Create New Preset”

Note: Be careful! You can overwrite existing presets (also the default RCF ones).

(e) Close the DX1616 window and double click now the “Control” icon in the project view and maximize the window if needed.

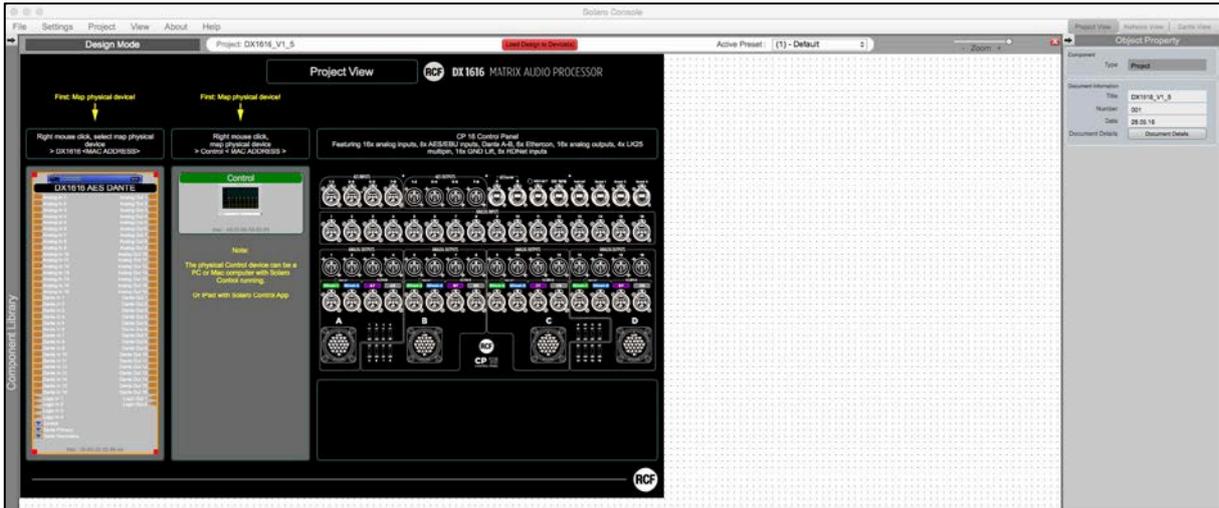


Figure 34: “Design Mode” – project view

(f) Click with your mouse in the free dotted background area of the Control Panel. Now on the left side you will find in the Component Library all project presets including your new one.

(g) Select the new preset and drag it to the Control Panel screen “Preset” like shown below. Drop it on the screen. For better orientation you will see pre-designed areas.



Fig.: 54: Reserved area to put user presets

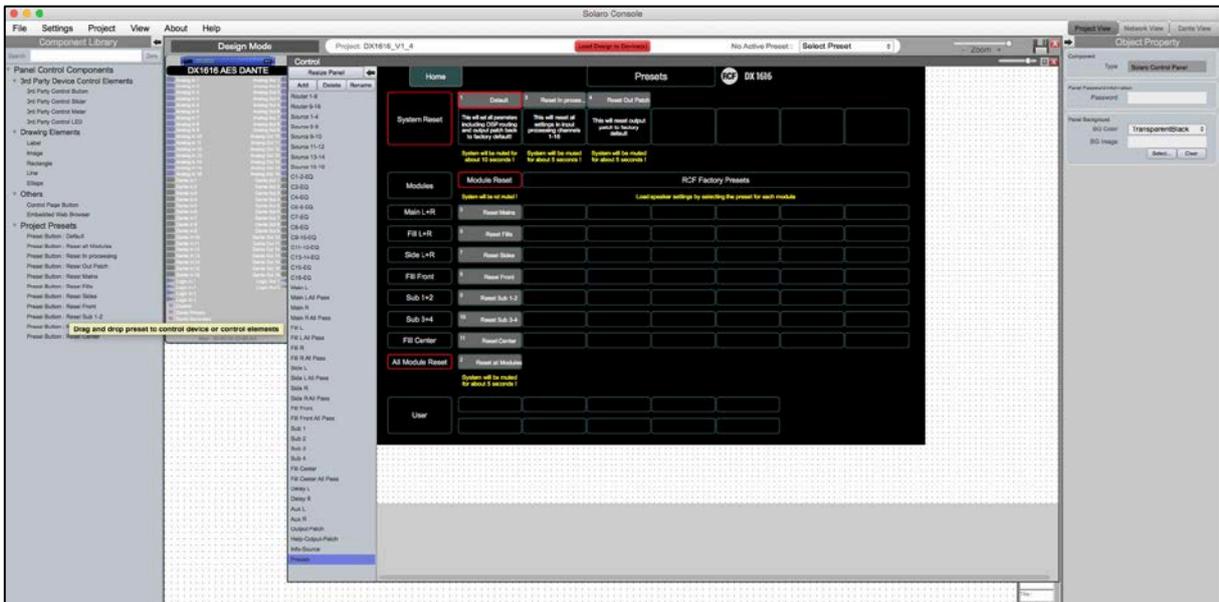


Figure 35: Drag and drop presets from component library to a control panel

(h) Now you can edit the new created button. Adjust colors, font sizes and even text labels with the tools available in “Object Property” on the right side of the screen.

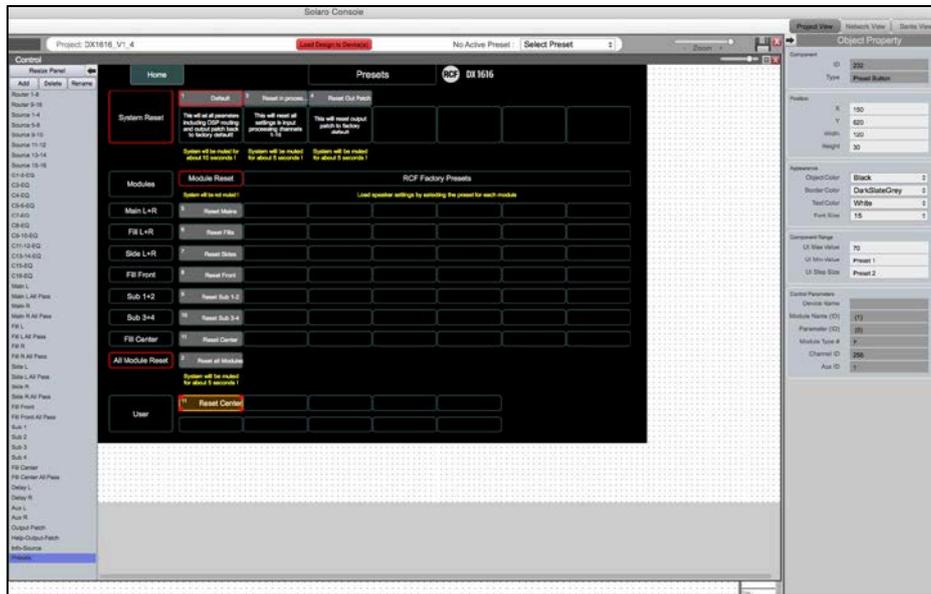


Figure 36: Control panel – Edit presets button

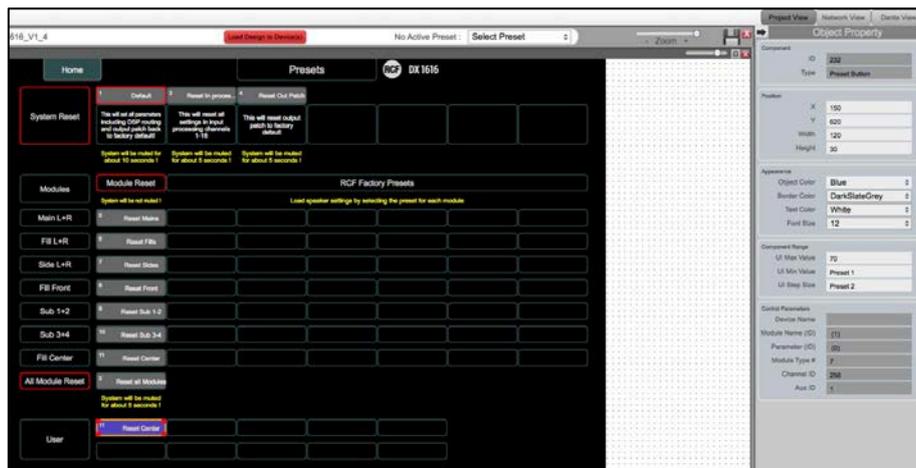


Figure 37: Control panel – Edit preset button

(i) Now save the new project file “Save Project As”.

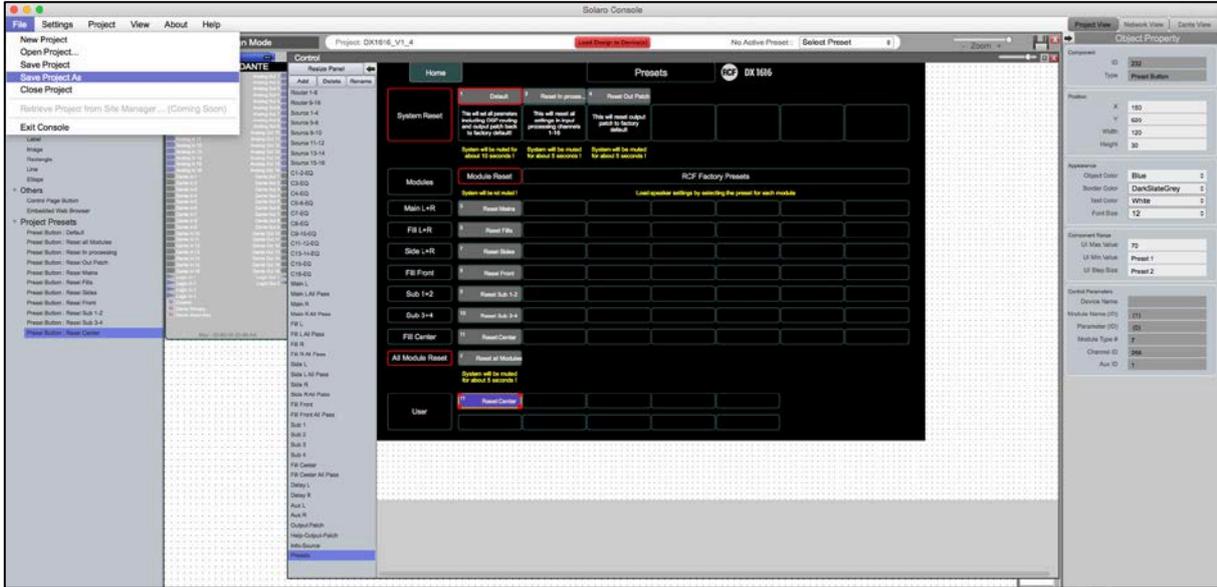


Figure 38: “Design Mode” – Save Project As

(j) To transfer the new project file including your new preset you have click “Load Design To Device” like described in the chapter “Switch to Online Mode: (Transfer/Save DSP design project to DX1616)”. Now you have to commit with “Yes” in all windows.

How can I edit and save a preset?

You exactly start like shown in the chapter “Create preset”. Instead of selecting “Create New Preset”, just select the one you would like to overwrite (edit).

Note: Doing so, you have to follow exactly the same steps starting from (e) like described in the chapter “How can I create a (user) preset?”. Otherwise your new values/settings are NOT available in Solaro Control App!

RCF Engineering Support Group is at your disposal for any information and clarification you might require techsupport.pro@rcf.it.



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