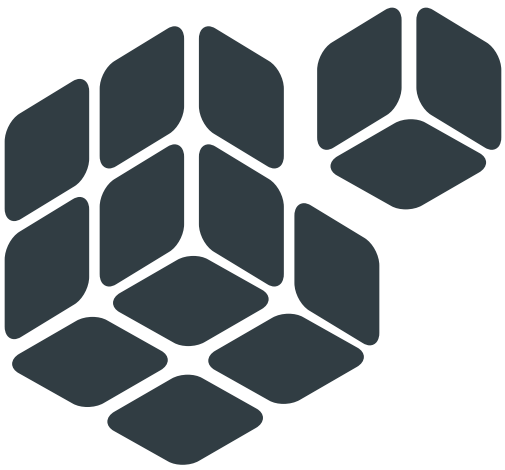
Outline

NEWTON

FPGA-based processing platform



Outline Dashboard v. 1.9.5
Device Firmware: 0.97
Document Review: 1.9.1

OPERATING MANUAL

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1. NEWTON | IMPORTANT SAFETY INSTRUCTIONS

In order to avoid risks for the user's and other people's safety, as well as annulling the warranty, it is advisable to read the suggestions in this section for the correct use of the product.

Do not expose the unit to rain and don't use it in locations with a high humidity level. Ensure that no liquids or solid objects accidentally enter the unit; should this occur, stop using the unit and contact Outline or qualified service personnel.

When connecting the unit, ALWAYS check the ground connection as required by technical and safety norms. If the original power cord is worn or damaged, it must be replaced with a new one of the same type. The connections should be carried out by skilled staff only. Move the unit only when disconnected.

Refer all servicing to qualified service personnel only. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

For any technical issues please contact Outline.

1.1. DISPOSAL OF WASTE MATERIALS

Your product is designed and manufactured with high quality materials and components, which can be recycled and reused. When this crossed-out wheeled bin symbol is attached to a product, it means the product is covered by the European Directive 2012/19/EU and subsequent amendments. This means that the product must NOT be disposed of with other household-type waste. It is the users' responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved processor. For more information about where you can send your equipment for recycling, please contact your local distributor. The correct disposal of your old product will help prevent potential negative consequences for the environment and human health.

1.2. CONFORMITY AND WARRANTY

All the Outline electro-acoustic and electronic devices are in conformity with the provisions of EC/EU directives (as stated in our CE declaration of conformity).
The CE declaration of conformity is attached to the product warranty certificate and is shipped with the product.

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2. NEWTON | WELCOME TO OUTLINE WORLD

Welcome to our large family! Congratulations on choosing Newton for your audio processing, indeed as you will see Newton is out of the ordinary!

So please, take the necessary time to read this operating manual which contains the information required to safely install and deploy the product. In case you have any questions, please contact your local dealer or distributor.

2.1. MAIN FEATURES

Outline is proud to introduce Newton, the next generation in audio system control and networking. Newton advances the management of sophisticated audio systems by combining new filter technology, multi-channel audio signal routing, multi-format standards conversion and digital signal synchronization in a single 1RU networkable chassis. Powerful processing features and multiple audio network standards combine to make Newton the ideal control core for any audio system from Touring to Live Broadcast Events and Fixed Installations.

2.2. GENERAL OVERVIEW

Newton comes in three hardware versions: Newton 16, Newton 16+4 and Newton 16+8. Newton 16 offers simultaneous signal connections over Dante™ (AES67 compliant), AES3, MADI Optical and MADI Coaxial, with the capability of fully processing up to 16 inputs and 16 Outputs simultaneously. Each Newton processor combines powerful WFIR filters (unique to Outline), clock management and a very high number of hardware input and output sources (up to 216 x 216). Internal synchronous and asynchronous sample rate converters manage all I/O operations and Newton can be synchronized with any one of the 14 available clock sources.

It's possible to upgrade the units by just adding the analog i/o cards and changing the front label (i.e. from Newton 16 to Newton 16+4 or Newton 16+8)

2.3. SIGNAL FLOW

Newton processing offers the possibility to handle up to 216 input and output sources on various protocols. Newton offers the possibility to define, for each processed input, a priority backup strategy. The full processing involves 16 input channels and 16 output channels. Newton offers a high flexibility in terms of output routing, allowing to feed to the outputs also signals in the middle of the processing path. These points in-between the processing are called *pick-off points*.

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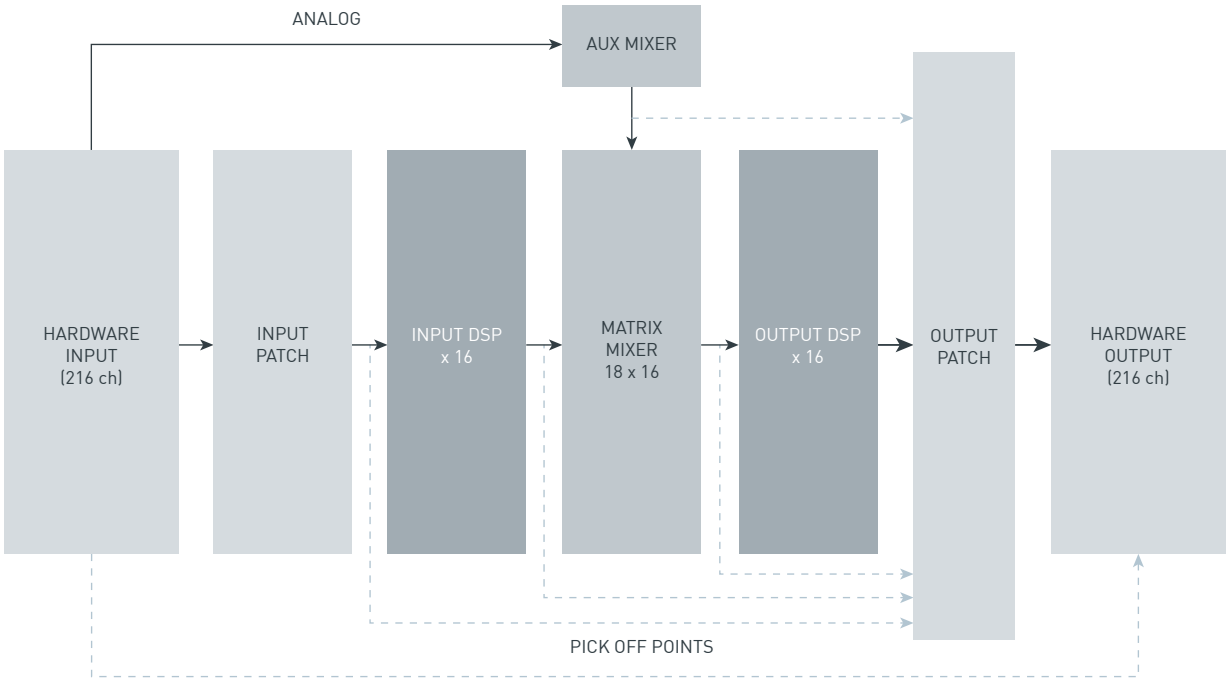

2.4. CLOCKING NEWTON

Newton can be synchronized with any valid 48 kHz-based clock. A fail-over backup strategy is available both for the input sources and for the clock selection. Newton can also be used to distribute clocks to other devices, having two completely independent wordclock outputs (section 9.2.9).

2.5. ASYNCHRONOUS AND SYNCHRONOUS SAMPLE RATE CONVERTERS

Newton accepts different digital sources, each with its own clock domain. ASRC (Asynchronous Sample Rate Converters) are used for input signals, and SSRC (Synchronous Sample Rate Converters) are used for the output signals. This advanced capability ensures seamless synchronization and reliable operation between Newton and all external devices.

ASRC are required for digital sources with a clock that is different from Newton's Master Clock and are used for the input signals to ensure that any digital incoming signal, regardless of its clock, can be accepted by Newton.

SSRC are used to down-sample the outputs from 96 kHz (Newton fixed sample rate) to 48 kHz. This results in the possibility to use Newton to feed 64 signals of Madi and Dante to other devices, as well as driving longer cable lengths with AES3 protocol.

2.6. BROADCASTING INTEROPERABILITY AND VIDEO REFERENCE

Newton offers the possibility to work together with broadcasting and video systems: it accepts video clock references, and this clock source can be used as Newton's master clock. Newton can also deliver through the Wordclock out 1 & 2 any of the incoming clocks for recording or reference purposes with other devices.

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3. NEWTON | INSTALLATION

Carefully open the shipping box and check for any damage to the device or the supplied accessories. If you find any damage, please do not hesitate to notify your dealer or distributor. Each Outline product leaves the factory only after an accurate testing procedure.

In addition to the device unite, the shipping carton includes the following items:

- two VDE power cables;
- one cat.5e ethernet cable;
- warranty certificate.

Please keep the original box and associated packaging to facilitate the shipping of the device in case of need.

3.1. COOLING

Airflow for cooling the device is from and to the side panels. Please ensure that no objects, such as rack doors or covers, obstruct the correct air flow. It is recommended to keep the ambient temperature from 0°C to 45°C.

Despite this, Newton is equipped with a sophisticated temperature sensing system. Temperature can be monitored directly from Outline Dashboard through the device inspector (chapter 8.6).

3.2. CLEANING

In order to clean the vent filters, please use a vacuum cleaner directed to the main fans.

Warning: disconnect the AC mains source before attempting to clean any part of Newton!

3.3. AC MAINS SUPPLY

Newton offers worldwide AC acceptance and direct connection to any regional power line configuration. All the Newton models incorporate a universal power supply operating from 100 V to 240 V (nominal), without requiring any adjustment. Just connect the mains cable (AC cord) to an AC source.

This device should be powered exclusively by earth connected mains sockets in electrical networks compliant to the IEC 364 or equivalent.

If you do not feel confident about replacing the mains plugs (AC plug), please contact qualified personnel. Once an AC power supply is connected, the device will automatically power on. Once the device is turned on, the power LED(s) will change from red (Standby) to green (Active).

3.4. REDUNDANT POWER SUPPLY

There are two independent power supplies in redundant configuration, meaning that they are both feeding the main board and they are isolated one from the other.

In case of power supply failure, Newton will continue working without suffering any kind of power cycle.

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3.5. MOUNTING IN A RACK

Newton has been designed for 19" standard rack mounting and occupies one unit (44.5 mm). It is very important to keep the ventilation ports free.

Newton has front and back ears that should be used in case of transportation or high vibration installations (such as cruise ships). Anyhow we strongly recommend using them regardless the application.

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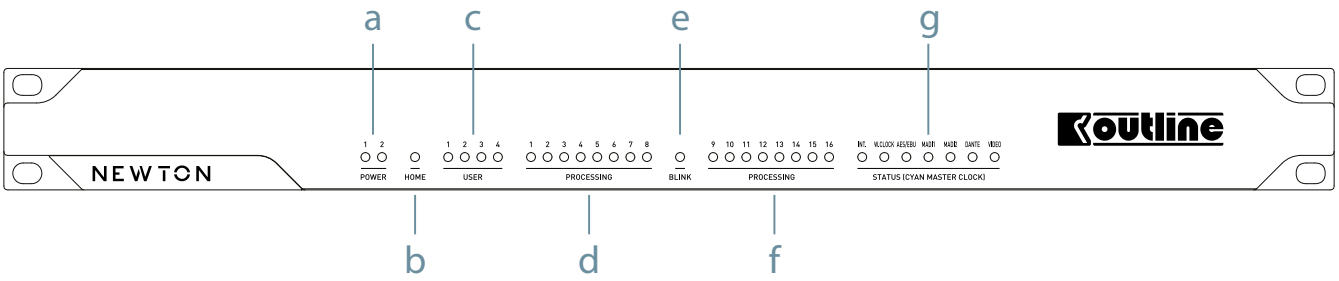
4. NEWTON | SPECIFIC OVERVIEW

The front panel offers a quick and easy to consult experience, thanks to its simplicity. As for the rear panel, to facilitate reliable temporary portable connections, Outline also offers an optional series of cabled expansion rack panels, providing access to all the analog and digital signals available on rugged, industry standard connectors.

4.1. FRONT PANEL AND LED CHART



a. ***Power*** LEDs: when the device is turned on, the power LED change from red (Standby) to green (Active). You can also hear a sound (like a little "click") which confirms that the device is starting.

b. ***Home*** button: this button is used to change the User LED configuration (the key is recessed in order to avoid unwanted changes and something thin is required to operate it). Keep on pressing this button to cycle the User LEDs configuration.

c. ***User*** LEDs: reports the actual processing LEDs configuration.

d. ***Processing*** LEDs: I/O processing metering references, depending on actual User LEDs configuration. The colours green, yellow or red are a reference to understand if the signal is present or if it is approaching or reaching 0 dB FS.

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User LEDs can be set by using the Home button to change the Processing LEDs configurations as follows:

1 (Green – User) - When Newton starts, this is the standard configuration. The processing LEDs show the peaks of all 16 input processed channels (Input DSP).

2 (Green – User) – The processing LEDs show the **peaks hold** of the 16 **input** processed channels (Input DSP).

3 (Green – User) – The processing LEDs show the **RMS** of the 16 **input** processed channels (Input DSP).

1 (Blue – User) – The processing LEDs show the **peaks** of all 16 **output** processed channels (Input DSP).

2 (Blue – User) – The processing LEDs show the **peaks** hold of the 16 **output** processed channels (Input DSP).

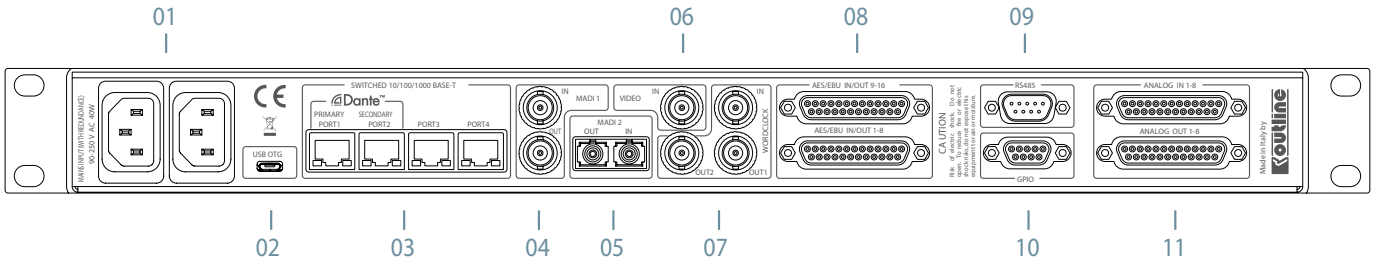
3 (Blue – User) – The processing LEDs show the **RMS** of the 16 **output** processed channels (Input DSP).

All LEDs turn on (Blue – User) – This configuration adds a temporary IP address to Newton (192.168.1.34) that is useful for the first connection without DHCP server.

e. *Blink*: this LED can be activated from Outline Dashboard to identify different Newton units in the same networks.

f. *Clock Status* LEDs: The green LEDs show the available valid clock sources and the blue one refers to Newton's master clock.

4.2. REAR PANEL



01. *Power Supplies*: Newton has two power supplies in switch-mode configuration in order to provide a reliable and redundant setup. Newton accepts input voltages from 100 V AC to 240 V AC (nominal).

02. *USB OTG (On The Go)*: USB port (future developments).

03. *Ethernet Switched 100/1000 Base-T* (Port1, Port2, Port3, Port4) 1 Gbps managed Ethernet ports, that can be used to control Newton and Dante operations. The configuration of these ports can be changed from Dante Controller (appendix A).

04. *MADI 1*: Madi input and output, both capable of up to 64 **MADI** channels on coaxial connection, 75 Ω terminated.

05. *MADI 2*: Madi input and output, both capable of up to 64 **MADI** channels: optical connection with duplex LC connectors.

06. *Video Sync Input*: Video input for clock reference, BNC connector, 75 Ω terminated (software selectable).

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07. ***Wordclock input / output***: one input, 75 Ω terminated (software selectable), and two outputs (completely independent), BNC connectors.

08. ***AES3 inputs / outputs***: female DB25 connectors, TASCAM® standard, providing a total of 16 input and 16 output channels.

09. ***RS485***: male DB9 connector intended to be used for serial communication (RS 485) with external devices, for future developments.

10. ***GPIO***: General Purpose Input Output (2 In and 2 Out) on a female DB9 connector, remotely programmable. For future developments.

11. ***Analog inputs / outputs***: female DB25 connectors, TASCAM® standard, for analog input and output sources.

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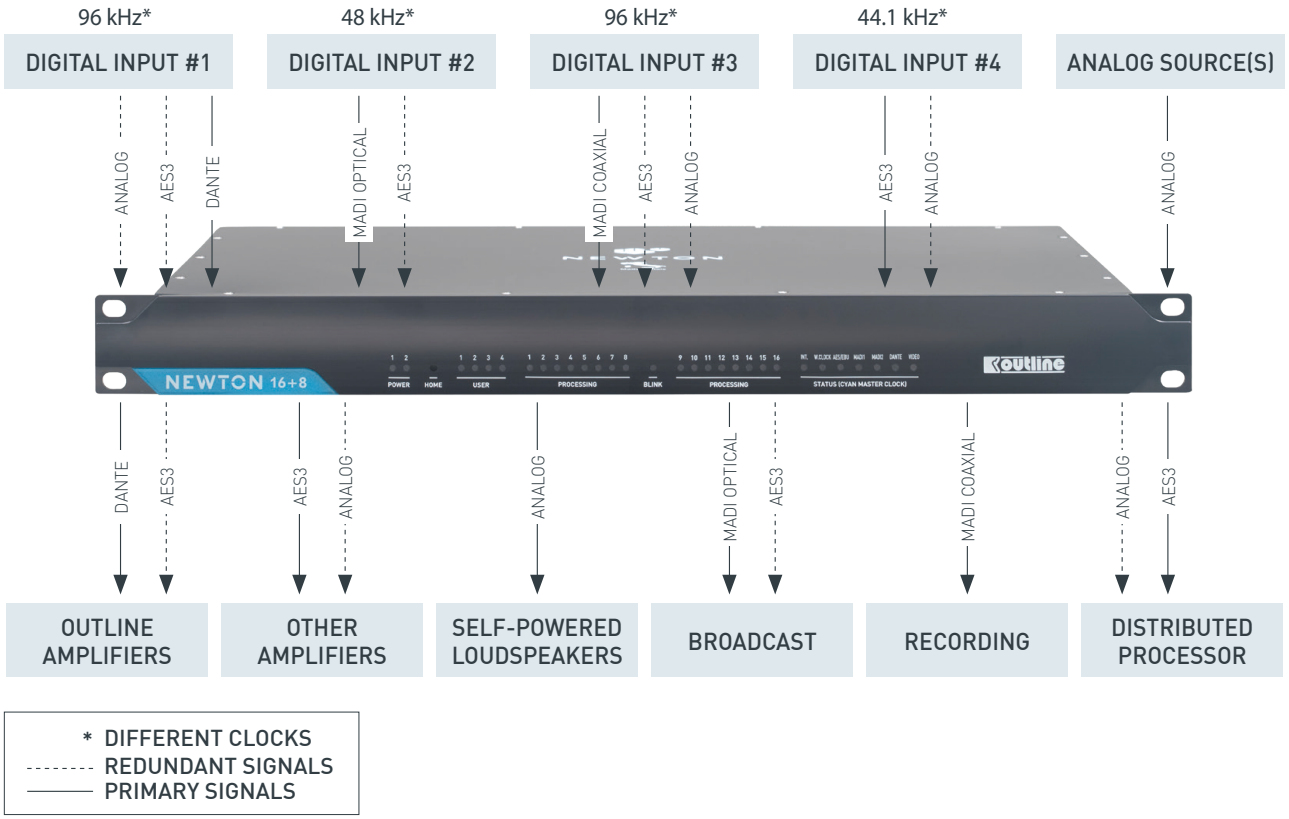
5. NEWTON | CONNECTION AND PROCESSING

All processed signals and direct outputs can be routed out of Newton using any of the available audio standards (e.g. signals to be received over MADI, processed and then transmitted over plus an additional AES3 output for backup purposes). This direct out, processing and routing feature can be also used to create a daisy chain connection and share signals between multiple Newtons.

96 kHz PROCESSING

The internal processing is at **96 kHz**, with an internal data depth up to **64 bit**. In each processing section users have precise control over level, delay, polarity and filters, all functions that are required to manage and optimize a loudspeaker system.



5.1. AES3

AES3 is a standard for the exchange of digital audio signals between professional audio devices. An AES3 signal can carry two channels of digital audio over several transmission media. Newton processed 32 channels (16 Input & 16 Output) in AES3 protocol with two balanced 25 (24+1) pin connectors to 3-pin XLR connectors (110 ohm twisted pair cabling with XLR connectors – 8 Input and 8 Output) with any input sample rate and 48/96 kHz output sample rate. You can set output's sample rate with *Outline Dashboard* software.

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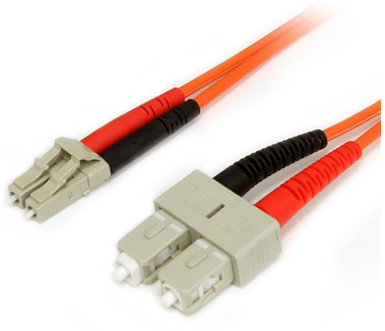
The standard used for the DB 25 is TASCAM® – chapter 15.2.

5.2. MADI COAXIAL AND MADI OPTICAL

Multichannel Audio Digital Interface (MADI) or AES10 is an Audio Engineering Society (AES) standard that defines the data format and electrical characteristics of an interface that carries multiple channels of digital audio. Newton accepts 28/56 or 32/64 channels over MADI coaxial (75 Ω cable BNC connection) and MADI optical (multimode, dual SC connector). The two Madi streams are independent and any input sample rate is accepted. The Output sample rate is selectable to 48/96 kHz. Outputs sample rate, frame rate and channels mode are controllable with *Outline Dashboard*.

BNC connectors (coaxial)



Fiber-optic cable LC (top) & SC (bottom) connectors

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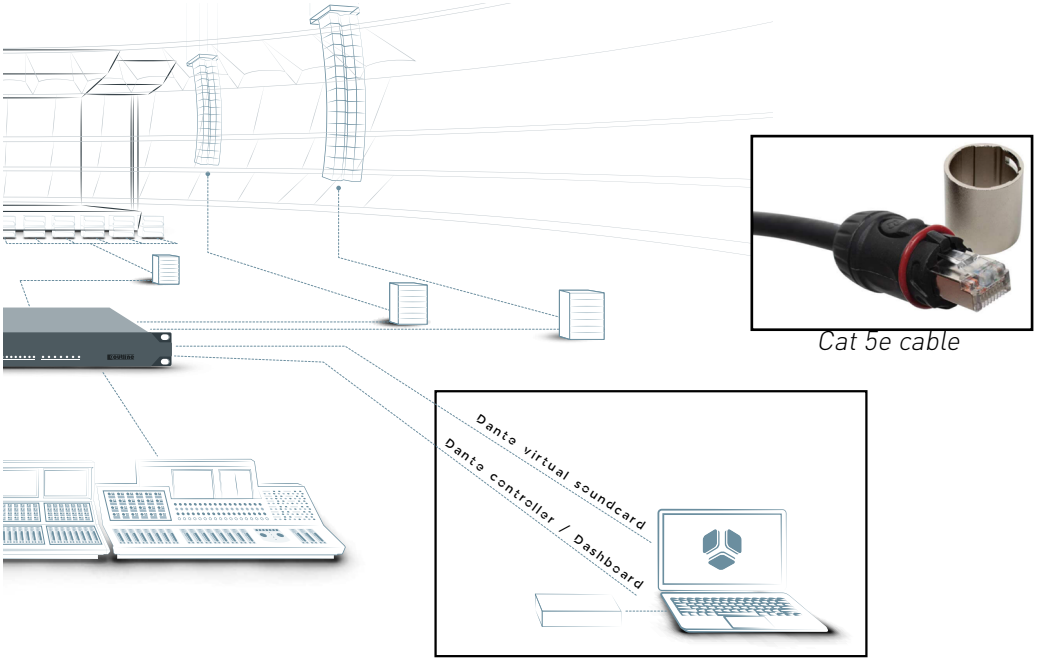
5.3. ETHERNET SWITCHED 100/1000 BASE-T AND DANTE™ NETWORKING

100/1000 BASE-T is a standard for megabit and gigabit Ethernet over copper wiring. These ports can be used to control Newton and also for the Dante operations. Cat5e cable or higher must be used. The four ports can be configured using Dante Controller (Appendix A).



Cat 5e cable

5.4. ANALOG I/O FOR NEWTON 16+4/16+8

While Newton 16 is an all-digital device, both Newton 16+4 and Newton 16+8 have local analog inputs and outputs (respectively 4 in/out and 8 in/out). All three Newton versions share the same motherboard and it's possible to upgrade from Newton 16 to Newton 16+4 or Newton 16+8 by just adding the analog input and output boards. The input sensitivity can be set to +20 dBu or +26 dBu (adjustable via *Outline Dashboard* software) with two balanced 25 (24+1) pin connectors (d-sub25 connector) to 3-pin XLR connectors (standard TASCAM®) – chapter 14.2.

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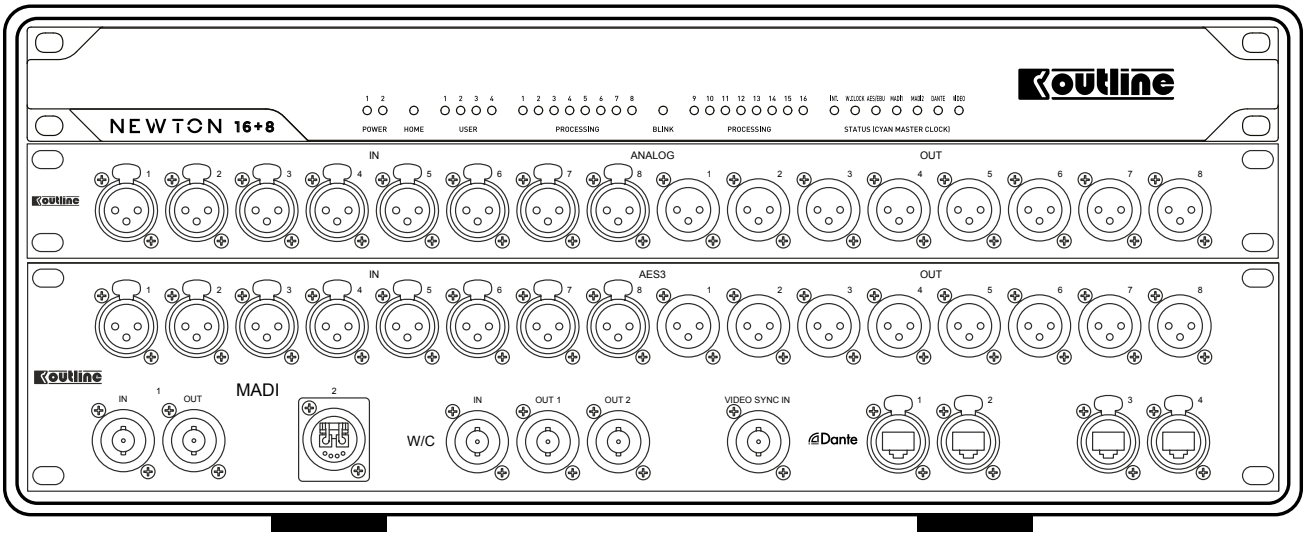
5.5. 19" RACK CABLING PANELS

Cabling panels are available as accessories for a quick connection of all the available audio protocols of Newton on standard 19" rack size.

The panel called *CABLANWT-ANL* offers 8 analog input and 8 analog output connectors on a single rack unit panel and is equipped with two cables with DB25 male connectors. The panel called *CABLANWT-DGT* offers connections for the digital protocols, the clocks and the control.

This panel occupies two rack units and offers 8 male and 8 female XLR connectors for AES3, Madi optical connections (Neutrik opticalCON DUO, based on LC-Duplex connector and designed for touring use), Madi Coaxial, Wordclock in & out, Video in, four lockable Ethernet ports (etherCON) and all the required patch cables.



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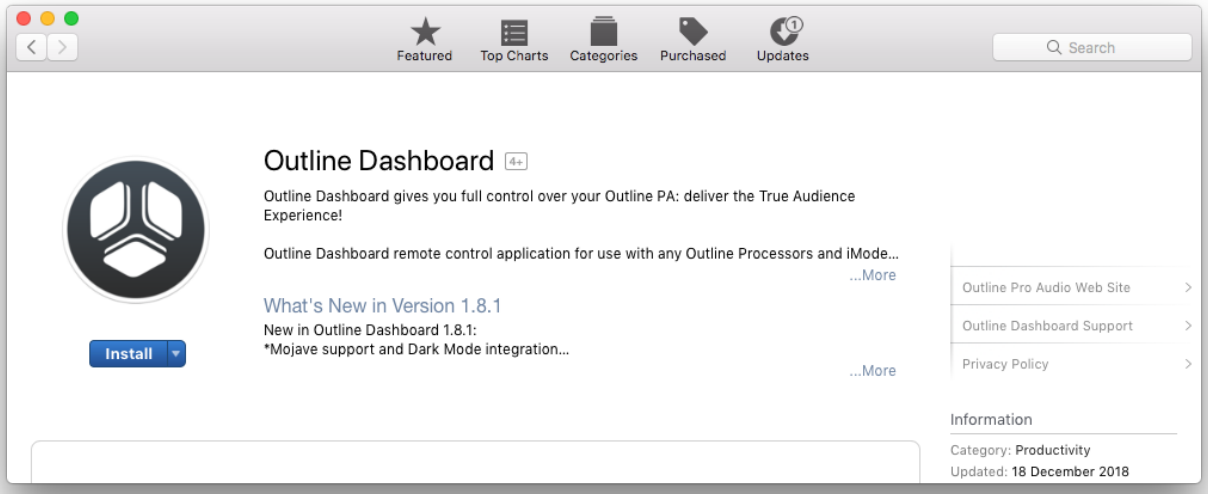
6. OUTLINE DASHBOARD | INSTALLATION

Outline's IT team developed *Outline Dashboard*, a step forward in loudspeaker systems control. One Newton or a distributed network of Newtons can be controlled via *Outline Dashboard*. This software offers real time monitoring of the units' status and quick access to all their parameters. *Outline Dashboard* has been developed for MacOS and extensively uses native multi-touch gestures including Virtual Spaces and Mission Control.

All the following examples will consider the use of a Mac computer as the control PC.

Outline Dashboard can be downloaded from the Mac App Store. The software is completely free!



https://geo.itunes.apple.com/app/outline-dashboard/id1064061009?mt=12

If you already have a version of *Outline Dashboard*, we strongly recommend to select "Automatically check for updates" in Mac system preferences. In this way you'll be sure to be always updated to the latest available software version.

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7. NEWTON AND CONTROL PC SETUP

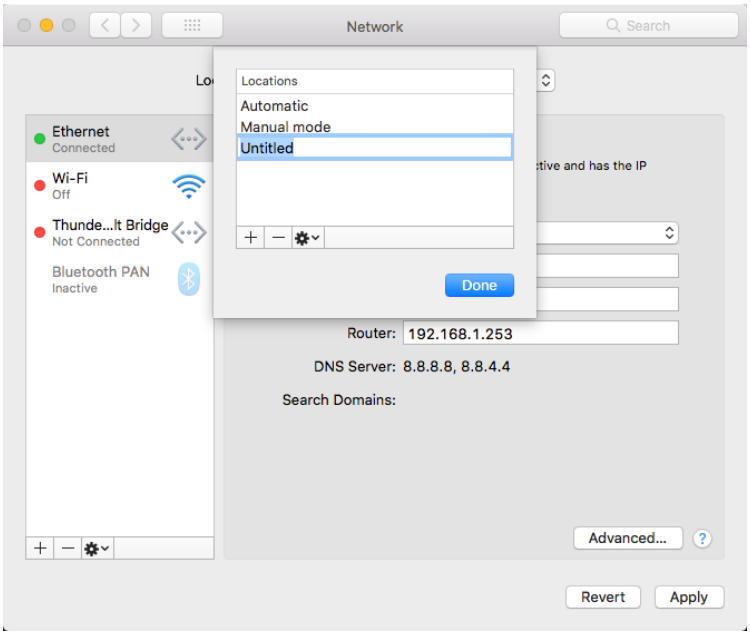
Let's start with Mac settings configuration for the correct use. First of all, *Outline Dashboard* requires an Ethernet connection between your control PC and Newton.

By default, Newton is set up in DHCP mode, thus an active DHCP server is required in order to set valid IP addresses to the devices connected to the same network. Otherwise Newton can be set up with a static IP address (manual mode).

ⓘ If during the first setup there is no active DHCP server available, it is possible to enable a factory default fixed IP address by using Newton's *home* button (see chapter 4.1).

In order to modify the control PC network settings, go to the Network preferences panel.

If required you can setup and use different "Locations" (network configurations) depending on the needs, as shown in the following picture (e.g. to set a location with static IP address and another one with automatic IP address).



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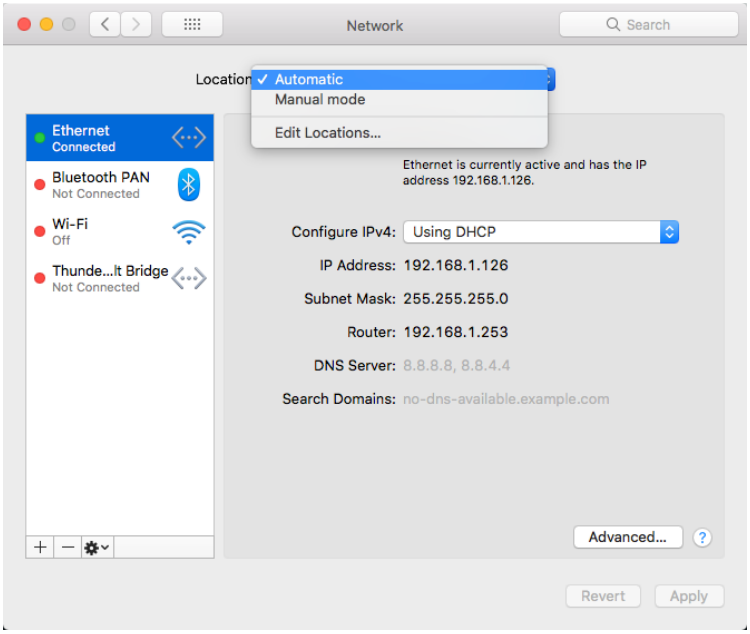
7.1. AUTOMATIC MODE

In automatic IP mode the DHCP server takes care to assign a unique IP address to each device on the network. This configuration is the simplest to use, but a DHCP server is always required.

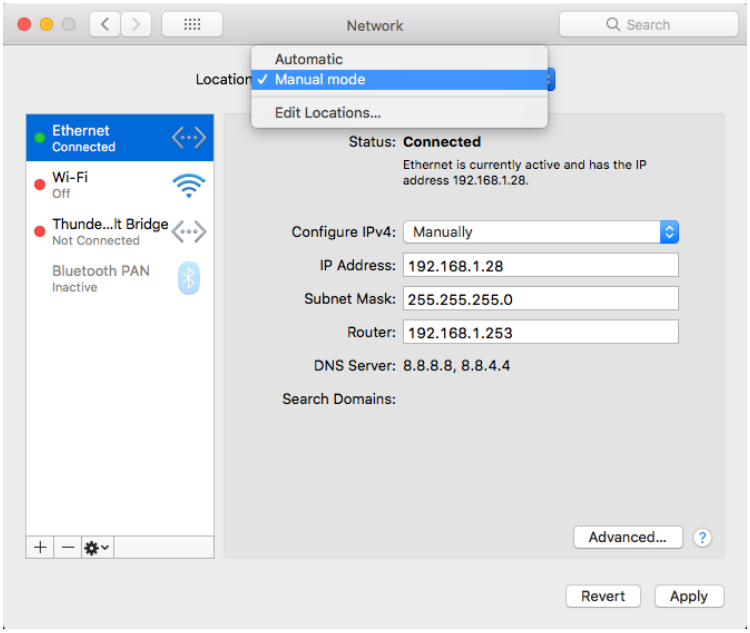


7.2. MANUAL MODE

In manual IP mode each device must have a valid IP address, that is manually set. It is important to know the basic rules of IP addressing that are the following:

- each device must have an assigned IP address;
- the IP addresses of each device must be unique (no duplicates);
- all the IP addresses must belong to the same subnet according to the subnet mask.

E.g. if Newton has the fixed IP address 192.168.1.69 and 255.255.255.0 as a subnet mask, the Control PC must have a different IP address on the same subnet (192.168.1.xxx) and the same subnet mask.



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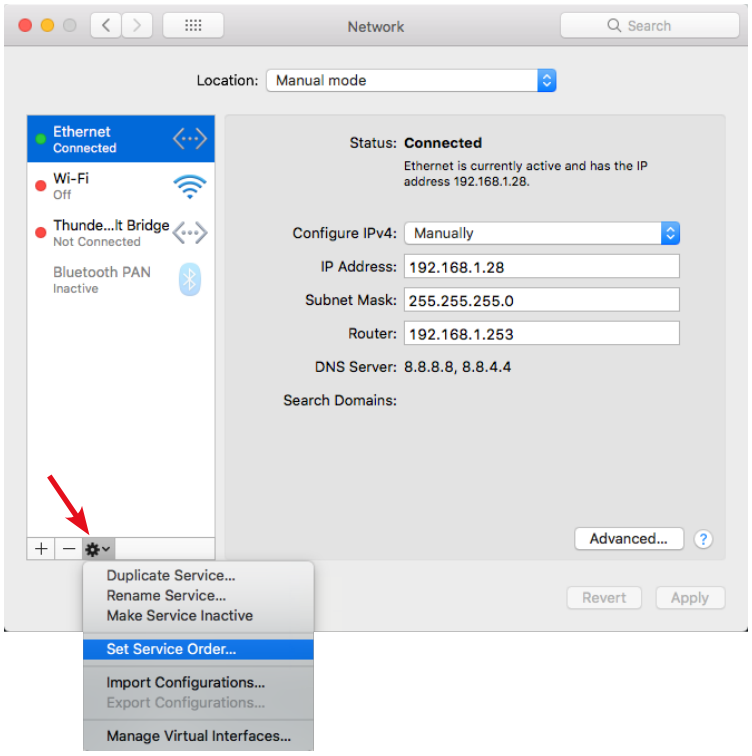
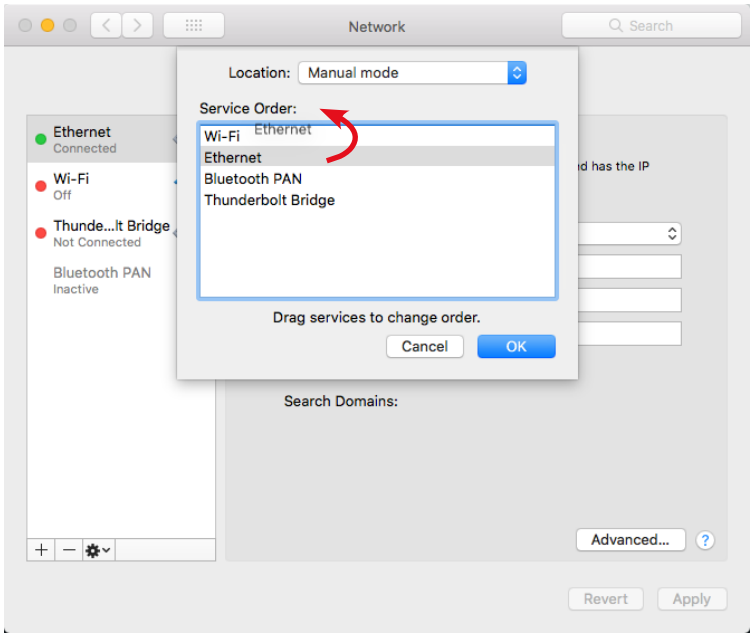
7.3. NETWORK SERVICE ORDER

In case different networks are active in the control PC (e.g. a cabled and a Wi-Fi network), a proper network service order must be configured.





Outline Dashboard will scan only the first service in the list.

If an active Internet connection is available on any network interface, the Mac will use that service for the network scan, regardless of its position in the service order list.

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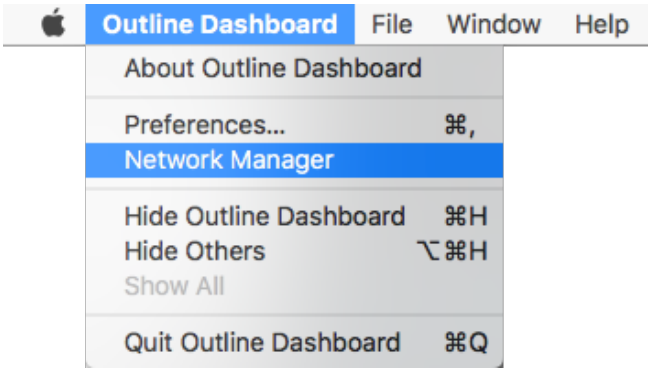
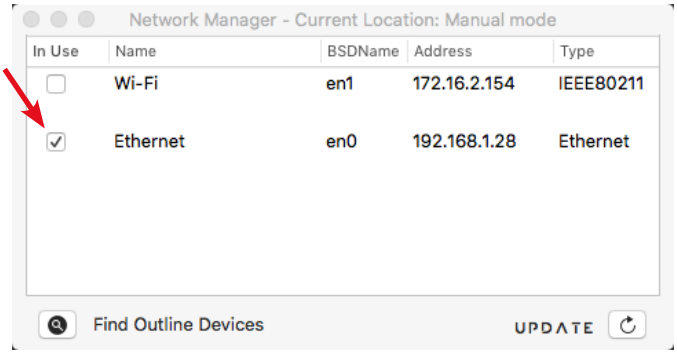
7.4. OUTLINE DASHBOARD NETWORK MANAGER

If the Network Preferences of the control PC have not been configured, Outline Dashboard gives the possibility to choose the primary network (in use), in order to be able to choose the network to which Newton is connected.
This is definitely a faster and more intuitive feature that will help to avoid eventual conflicts between cabled and wireless networks.

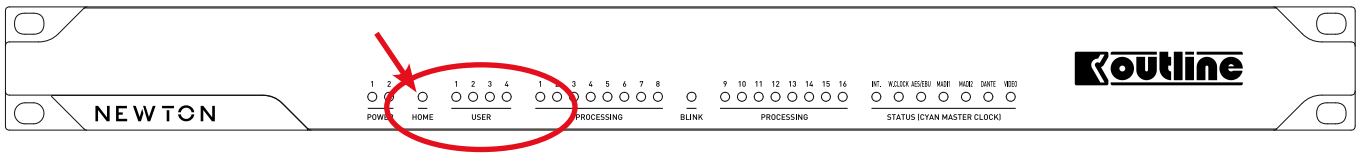


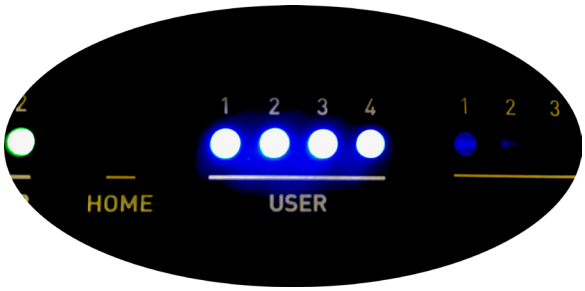


N.B.: this feature allows to check and monitor Newton without any problem, however, there still are a few limitations to enjoying some of the additional Dashboard services such as: firmware update, Smaart connection, receiving notifications from Newton, that use the primary network interface of the operating system to work correctly.

7.5. FIRST CONNECTION TO NEWTON WITHOUT DHCP SERVER

In order to enable the factory default fixed IP address on Newton, push the home button seven times till the four "user" LEDs become blue.





By doing this, an additional IP address (192.168.1.34) is assigned to Newton, so it is possible to connect to it using a Control PC in manual IP mode as explained in the section above.

This configuration is temporary, which means that it will be lost at each power cycle and once you push the home button again.

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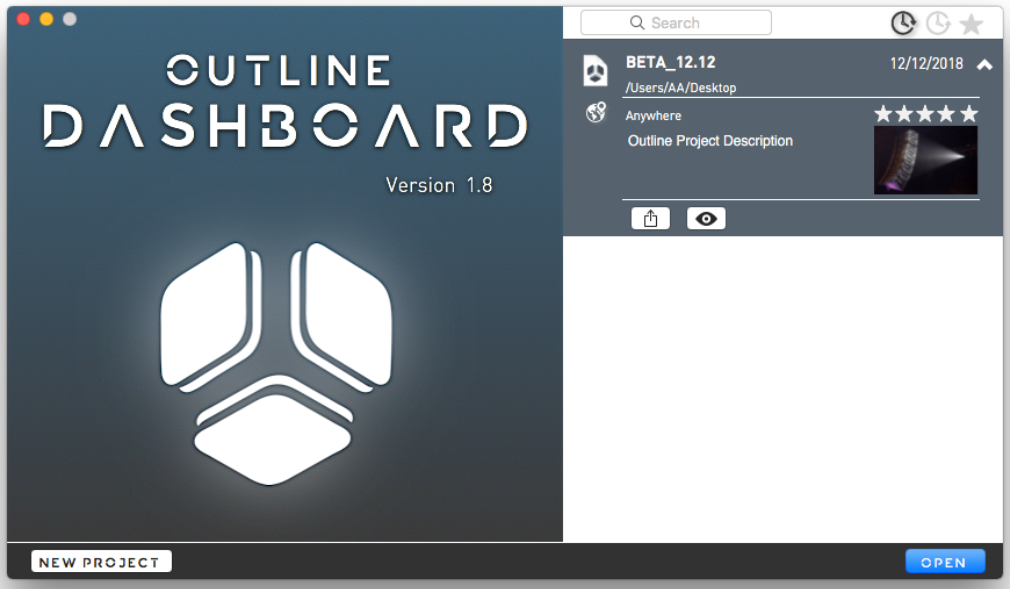
8. OUTLINE DASHBOARD | OVERVIEW

8.1. INTRODUCTION

The following chapters are intended as a software user guide to correctly use all the available features. All of them will be analysed to enable the user to fully exploit the potential of the software and the controllable devices.

8.2. STARTING OUTLINE DASHBOARD

As soon as you start the application an initial window will pop up. On the right side of the window you can see all the recent projects. To get more information on one of these files - without opening it - you can click on each one of them and get details useful to identify and recognize the project, including a quick look into its elements (connected units, groups, custom panels, etc...). The projects can be sorted by date or by rating, and a search spotlight tool is available to look for Outline Dashboard files in your computer.



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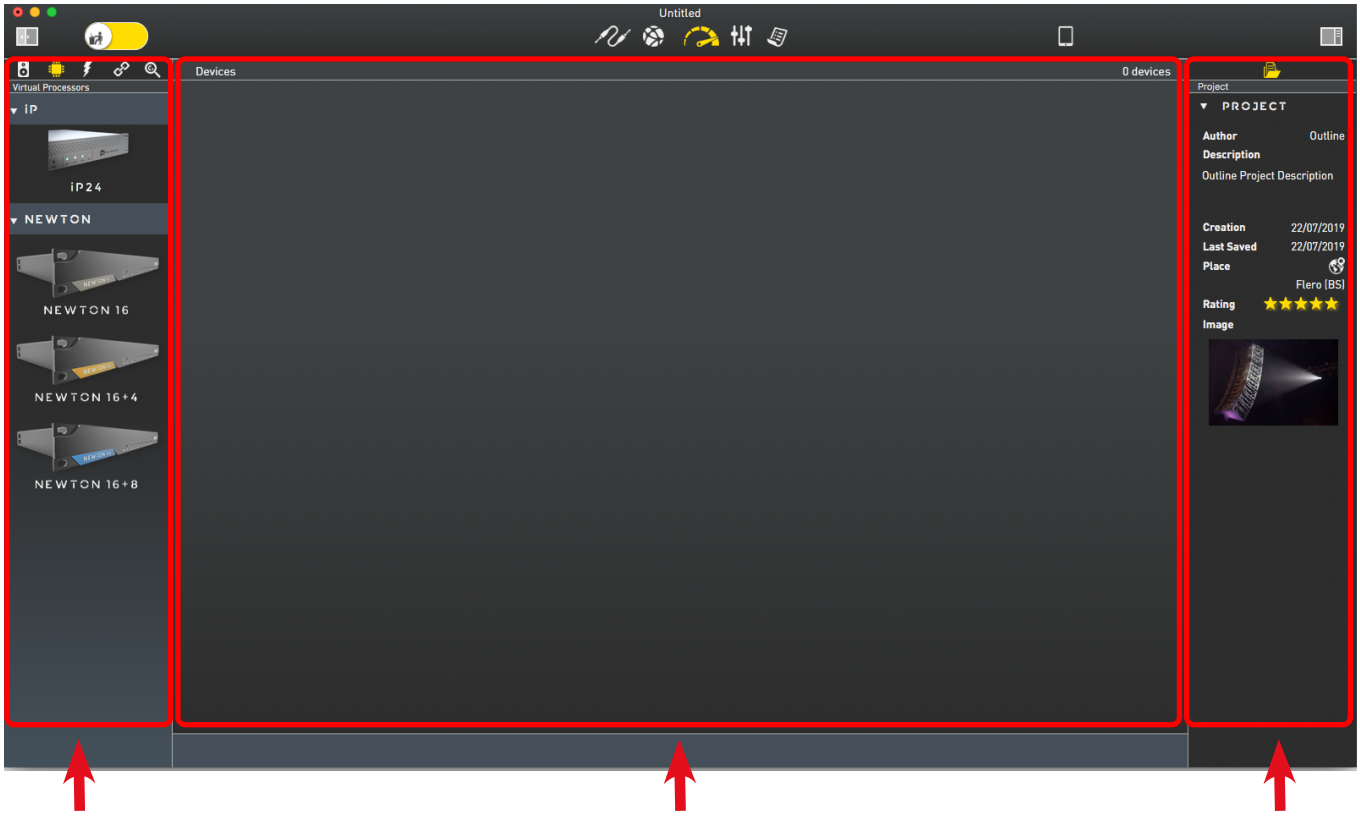
8.3. STARTING A NEW PROJECT

Let's start with a new project and see the main software areas.



Left sidebar:
Library

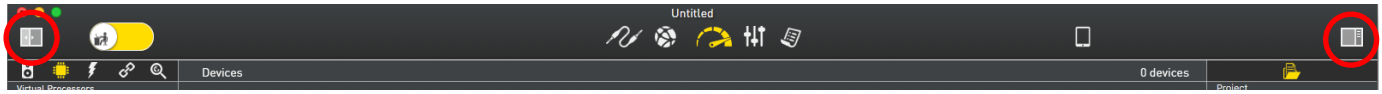
Center area:
Workspace

Right sidebar:
Inspector

The main window is divided into three areas:

- the *Library* with all the elements to be used on the left;
- the main *Workspace* on the center;
- the *Inspector* on the right.

The left and the right sidebars can be hidden using the buttons at the top of the main window.



8.4. LIBRARY

In the *Library* the following elements are available:

- Virtual Loudspeakers (coming soon)
- Virtual Processors
- Virtual Outline X series amplifiers (coming soon)
- Groups and Custom Panels
- On-line devices

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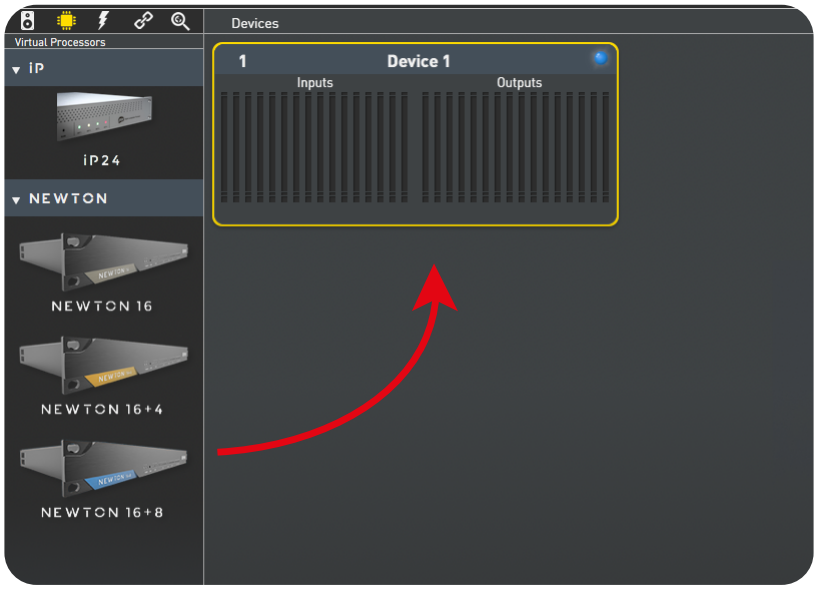
Each processor can have three different states: Online, Offline and Virtual. Online and Offline states refer to a real hardware unit that is actually connected or not. A virtual unit is a device that is not bound to any real unit and is suitable for several different applications (section 9.1.3).

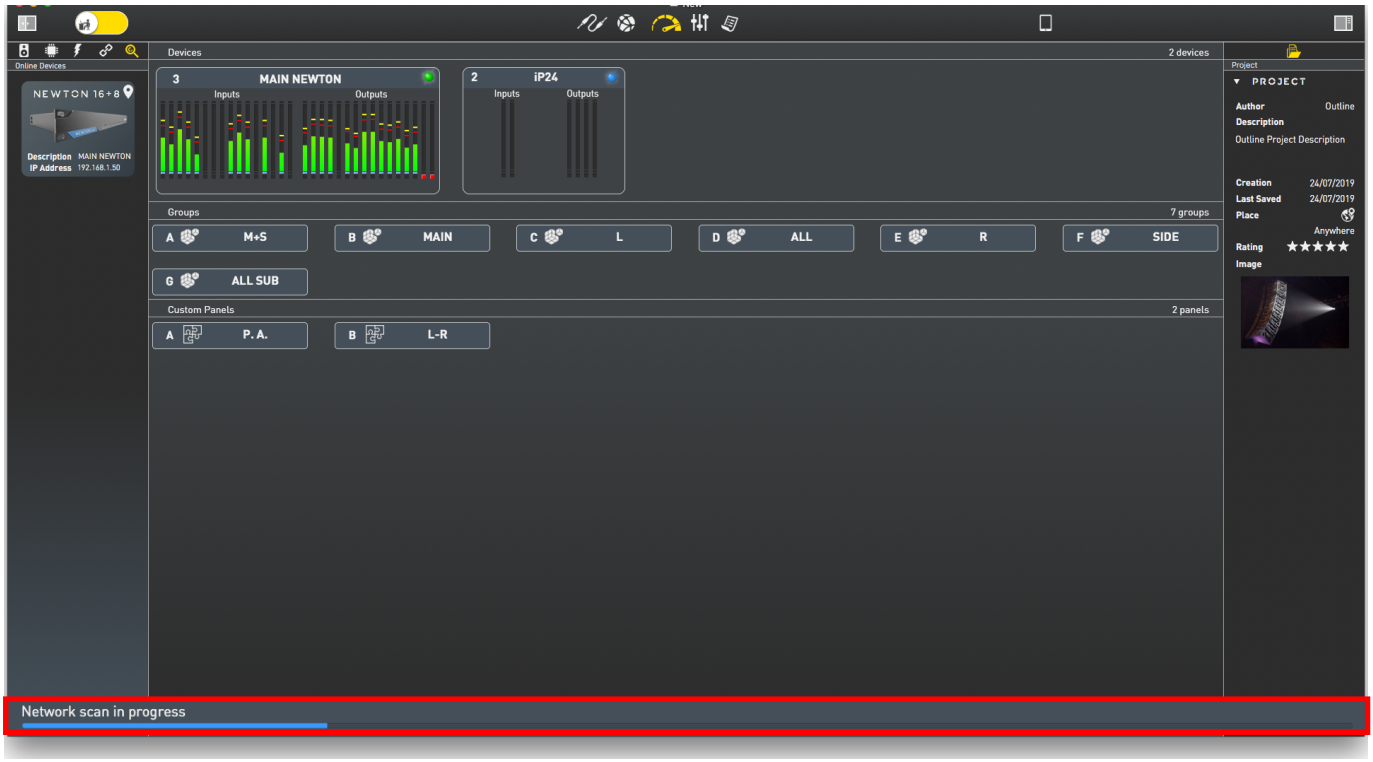
We can drag and drop any element from the Library to the Workspace to use it.



8.5. WORKSPACE

The workspace contains all the elements in use by the software. From here it is possible to operate them, organize them, as well as to monitor their status.

The bottom part of the workspace is a status bar that shows contextual information such as the network scanning.



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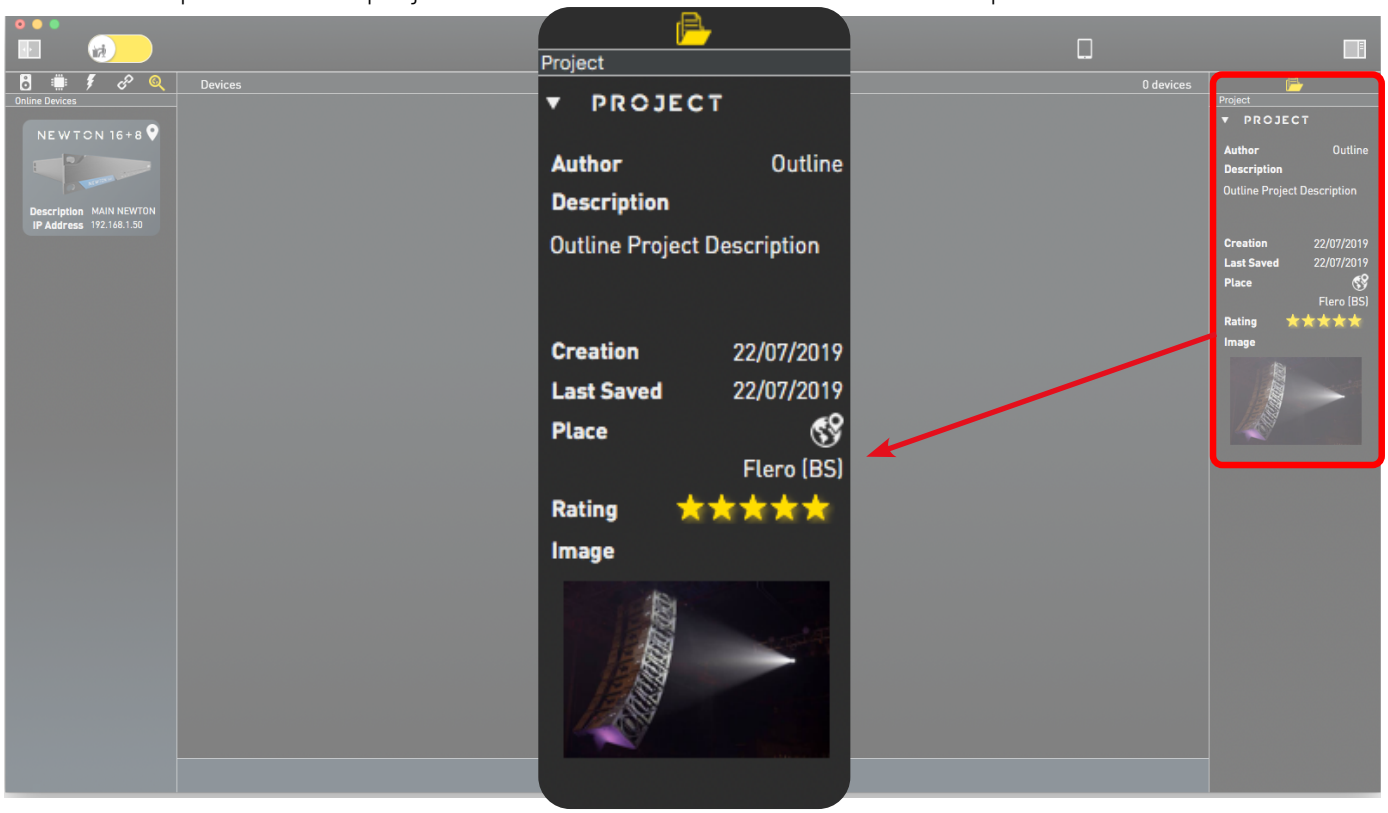
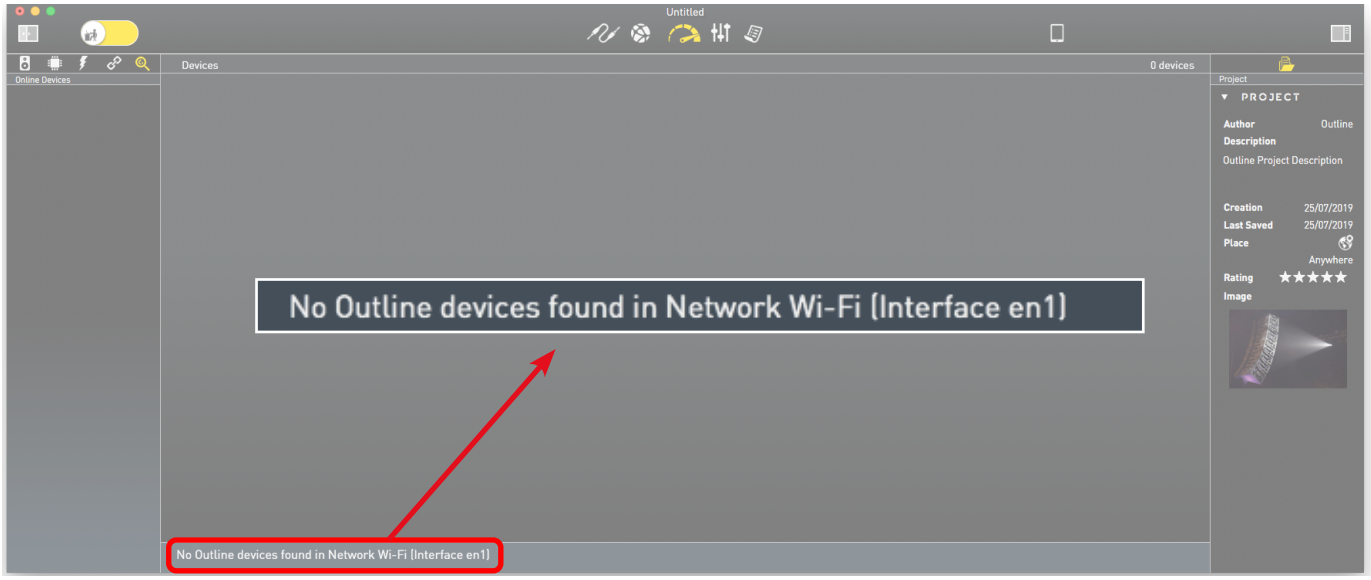
8.6. INSPECTOR

The *inspector* on the right panel shows the information related to the selected elements in the *workspace*. When no elements are selected, the inspector shows the details of the project. Here it is possible to edit some important parameters: author name, description, location, rating and the picture. Please note that to activate your current position it is necessary to enable the WI-Fi. These details are reported in the project list on the initial *Outline Dashboard* splash screen.



8.7. USING THE RIGHT NETWORK INTERFACE

Before scanning the network looking for a connected devices, please check the Network Manager in Dashboard or the service order list, as explained in section 7.4 and 7.3. Once the scanning process is completed, Outline Dashboard will display the scanned network and its interfaces in the status bar.



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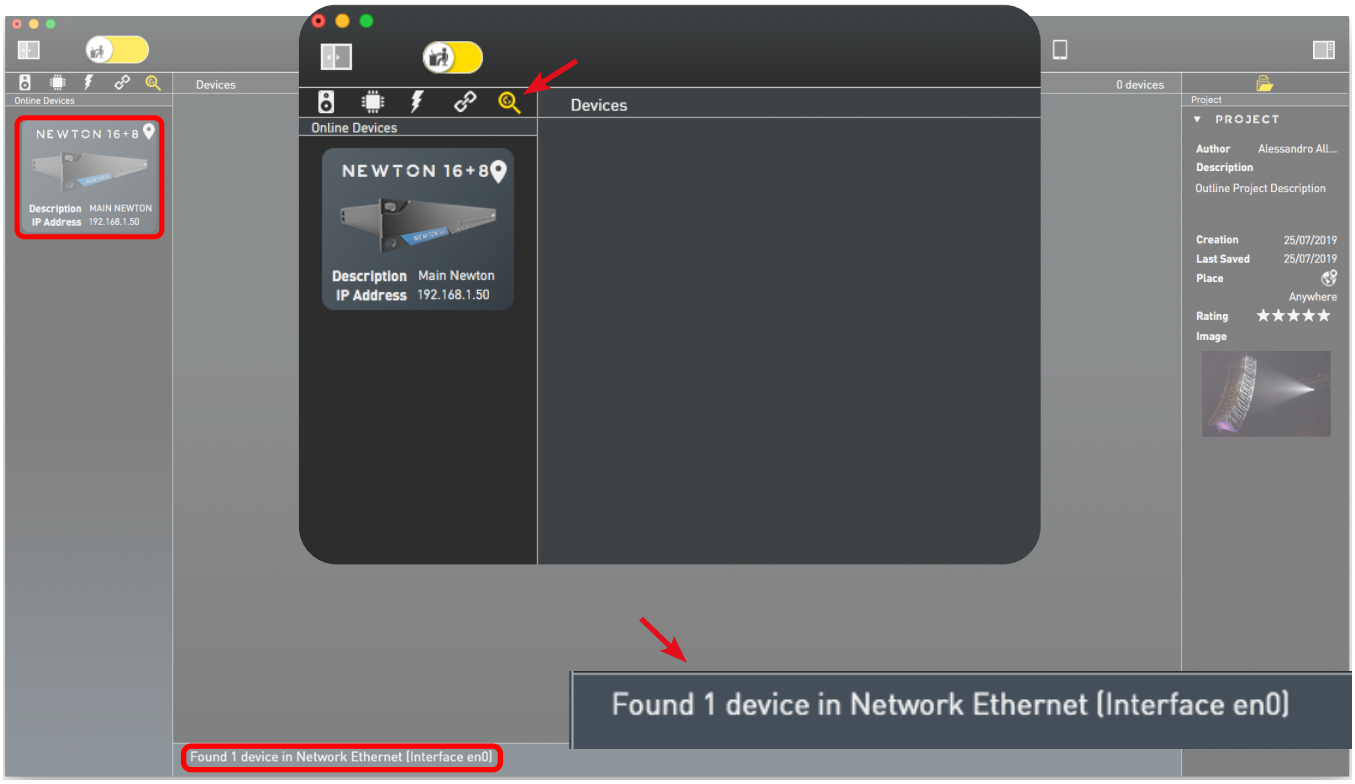
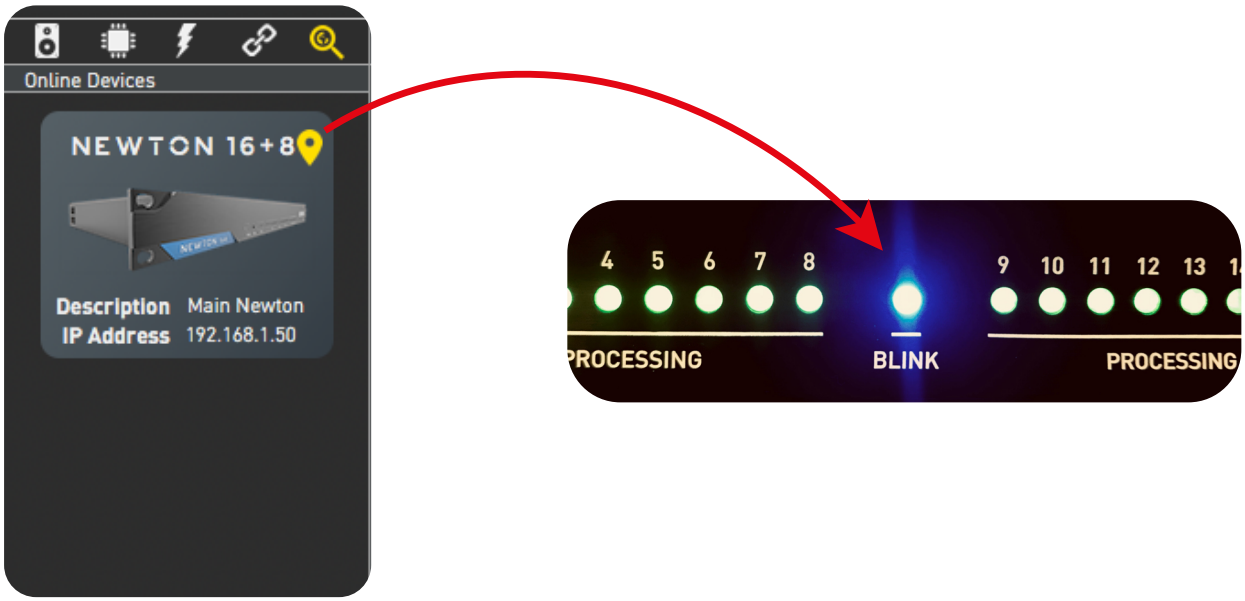
8.8. FINDING ONLINE DEVICE

By clicking on the online devices button the software will scan the network. The bottom status bar will report in real time the result of the scan. The online devices will be shown in the *Library*. After this, units can be controlled and edited.



It might happen that multiple online devices are identified by the scanning process. In this case the locate button will help to identify the corresponding hardware: by clicking on it the blink LED on the front panel of the related unit will turn on and off.



In order to operate the Newton simply drag and drop it from the online devices list to the *Workspace*.

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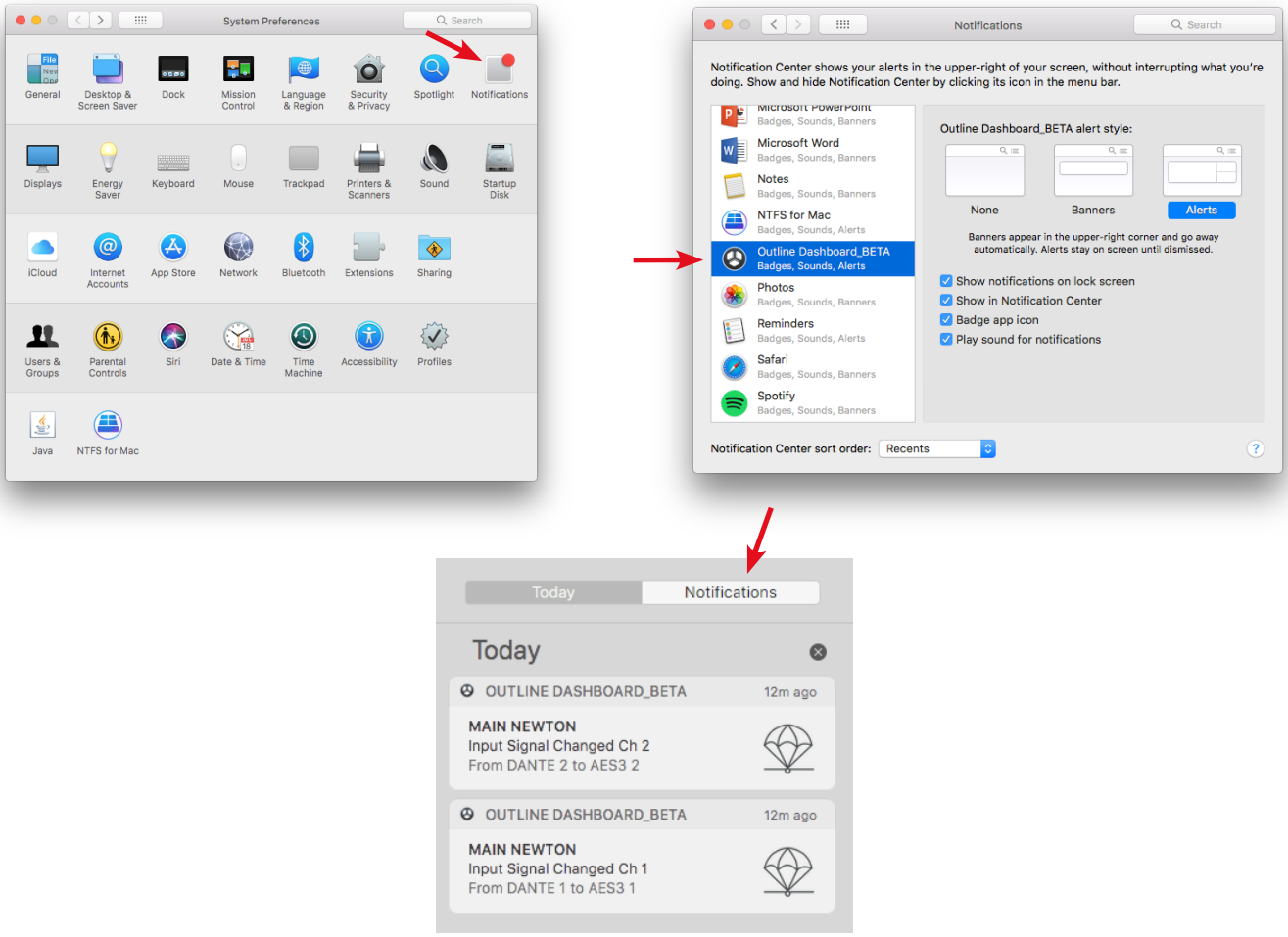
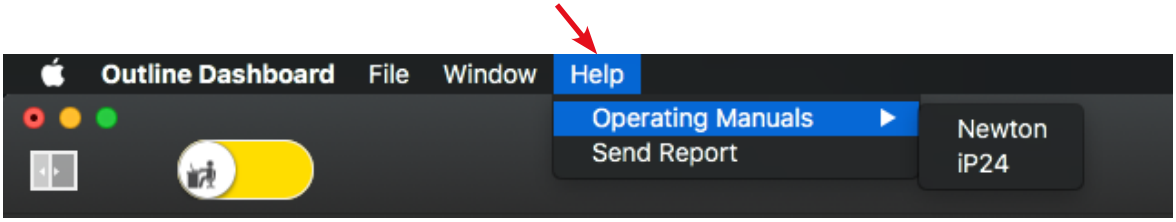
8.9. SYSTEM NOTIFICATION AND DASHBOARD WARNINGS

To see the Dashboard notifications when the software is in use, it is necessary to enable the notifications in the system preferences menu. This additional option enables to know in real time if there are any failures of the input backup or clock backup systems (which will be analyzed further).



8.10. HELP

From this menu you can download Newton and iP24 operating manuals and send a report which will aid Outline Engineers to retrieve all archived information about any Dashboard, Newton or iP24 issue. Please compile it carefully to help us build a superior experience for you while controlling your PA. Please note that an internet connection is required.



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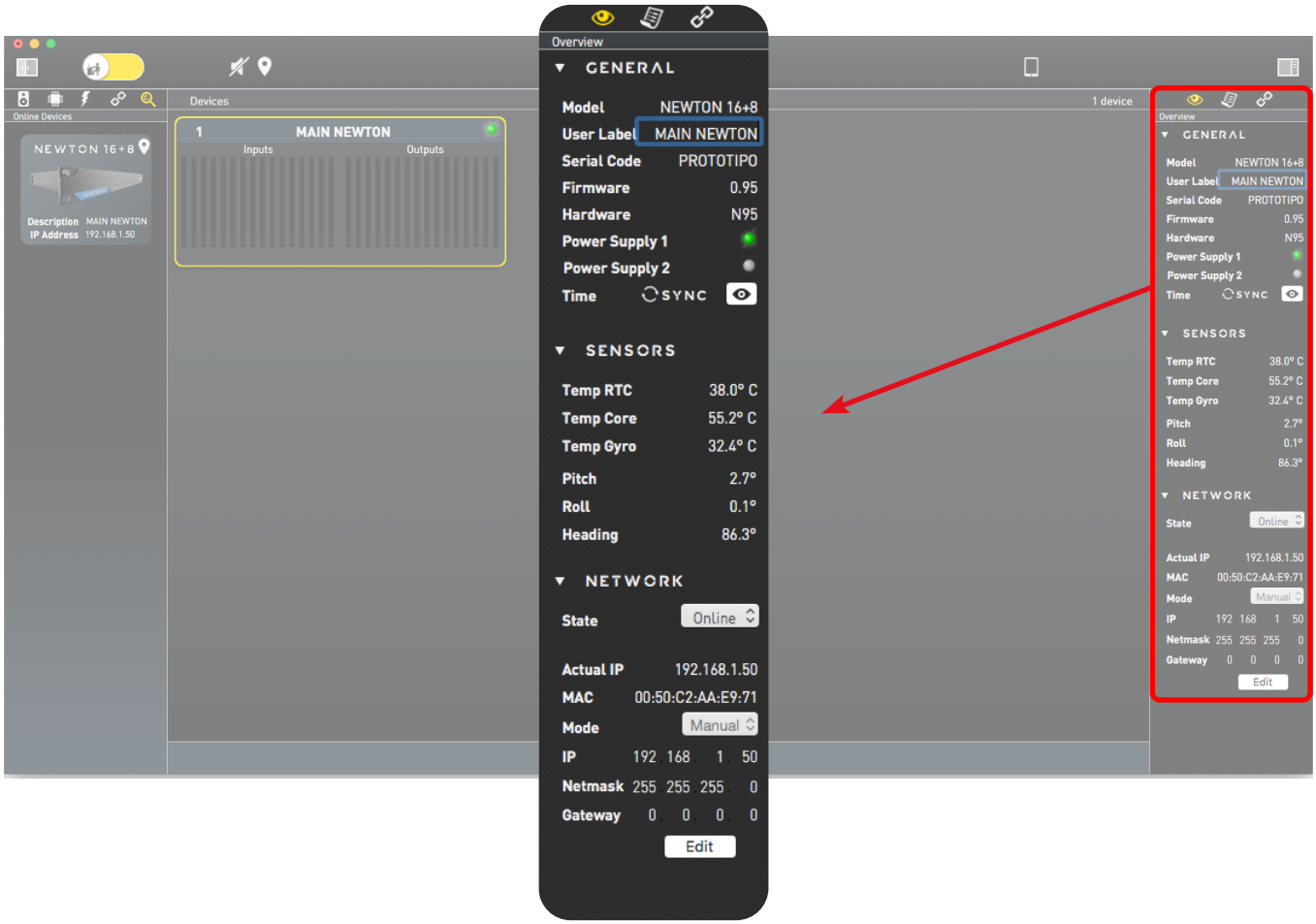
9. OUTLINE DASHBOARD | NEWTON CONTROL

9.1. CHANGING NEWTON'S GENERAL PARAMETERS

Click on an item in the workspace to see and edit its general parameters in the Inspector bar. From here it is possible to quickly change the name of the unit (User Label), check the actual hardware and software versions, check the power supply status, the internal temperatures, the network settings.



9.1.1. FIRMWARE UPDATE

If a new firmware is available, an Update button will be shown close to the firmware version. Then an update is required in order to operate the unit. A power cycle is required to complete the procedure.

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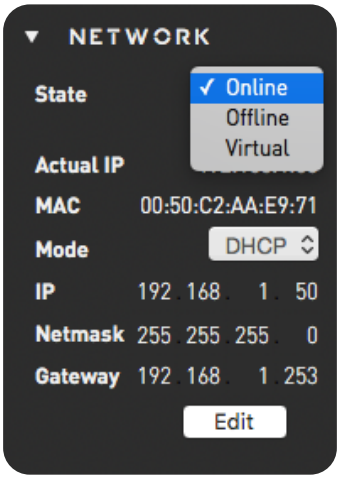
9.1.2. NEWTON DATE AND TIME SYNCHRONIZATION

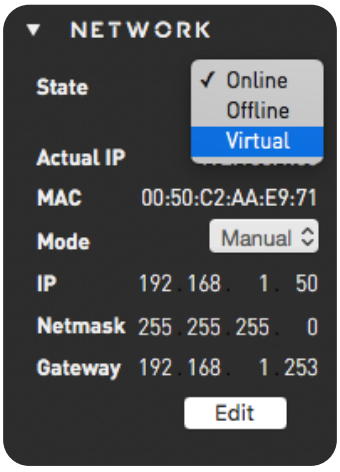
Newton has an on-board real time clock that stores the date and time for logging purposes. To see the actual Newton's clock, click on the "eye" button on the inspector. To update it use the *Sync* button

9.1.3. NETWORK STATUS: VIRTUAL, ONLINE, OFFLINE

Each processor can have three different states: Online, Offline and Virtual. Online and offline refer to a real unit that is actually connected or not. A virtual unit is a device that is not bound to any real unit and is suitable for several different applications.



It is possible to change the device connection status from the Network section in the *Inspector*.



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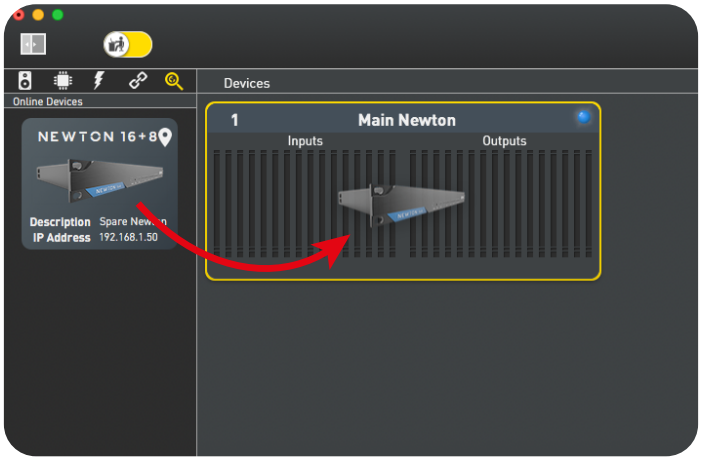
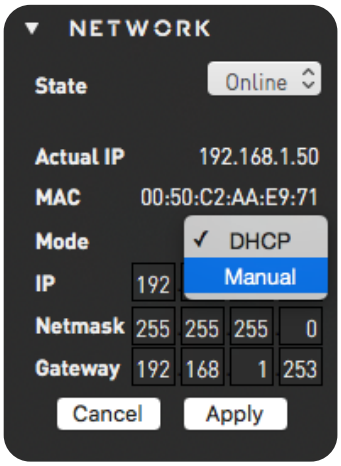
To assign a real hardware unit to a virtual unit, just drag and drop an on-line device over a virtual one.

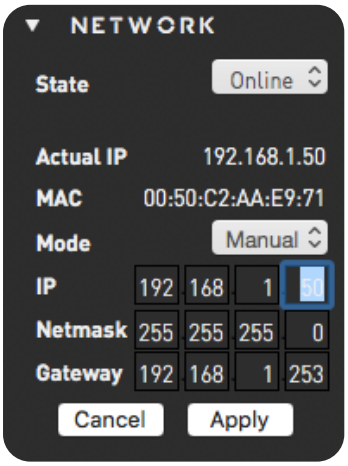
In this way the settings of the virtual device will be transferred to the real unit, with the only exception of the IP address settings.



9.1.4. NETWORK SETTINGS

Open network overview on the *Inspector*. The IP address of the device is shown as *Actual IP*. Click on "Edit" to modify the unit's network settings, the *Mode* can be selected as DHCP or Manual. To set a manual IP address write the IP address (or leave the standard one if already suitable), considering the general rules of manual IP address settings, and click on "Apply".





For Local Area Network the Gateway is not an important parameter and does not affect the performances of the system.

The default subnet mask is 255.255.255.0.

If a wrong manual IP address is set up or if the device has an unknown manual IP address it is possible to use the temporary factory default IP address as explained in chapter 7.

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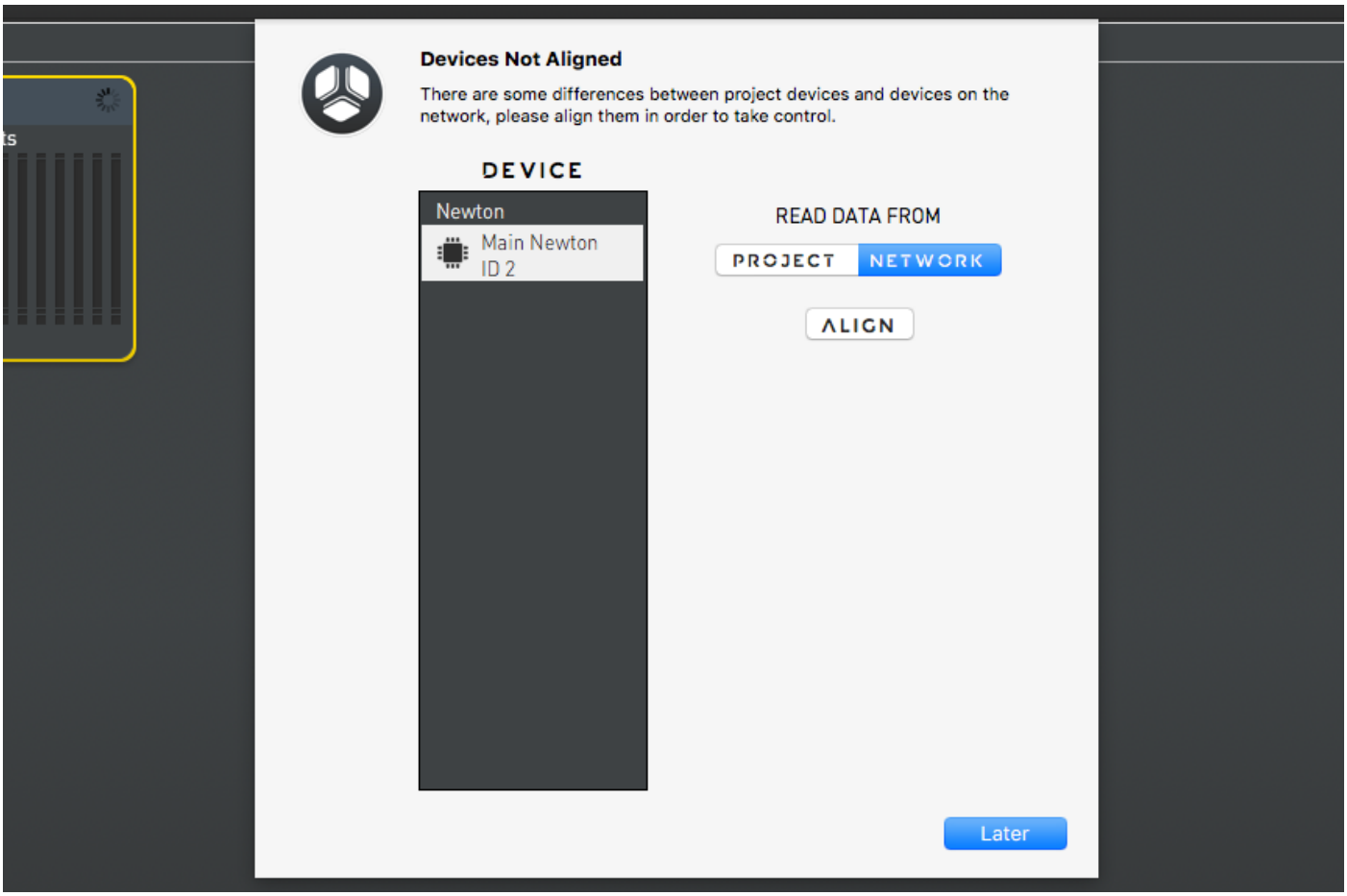
9.2. DEVICES ALIGNMENT

If the devices in the project are not aligned with the real ones this window will appear automatically. With this feature it is possible to choose whether the device must be aligned with the settings of the project (PROJECT) or with the settings already loaded on the machine (NETWORK).



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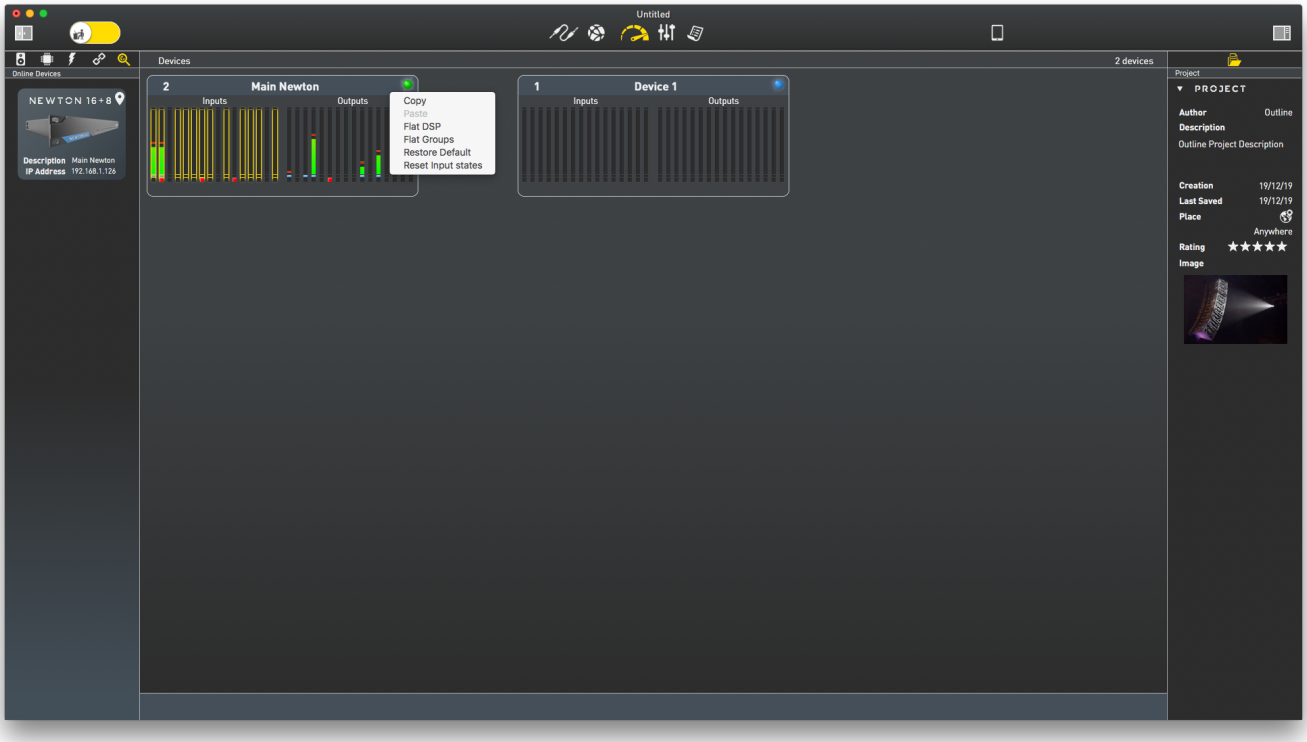
9.3. NEWTON WORKSPACE MENU (COPY, PASTE, FLAT DSP, FLAT GROUPS, RESTORE DEFAULT, RESET INPUT STATES)



A right click on one device opens Newton's workspace menu. From this menu you can:

- Copy: all the parameters and settings of that device will be copied;
- Paste: all the parameters and settings will be pasted;
- Flat DSP: reset all DSP including group assignments to default settings, leaving unchanged input & output patch, links, matrix mixer, clock and IO config.;
- Flat groups: reset all group processing to default settings but not the assignments;
- Restore Default: reset everything to the default factory settings.
- Reset Input states: brings the input patch to the highest available priority (the channel failover is indicated with a blinking effect in the workspace as shown in the image above). Please note that the reset command will succeed only if there is an available interface with a higher priority.

Please note that all these commands don't affect the network settings.

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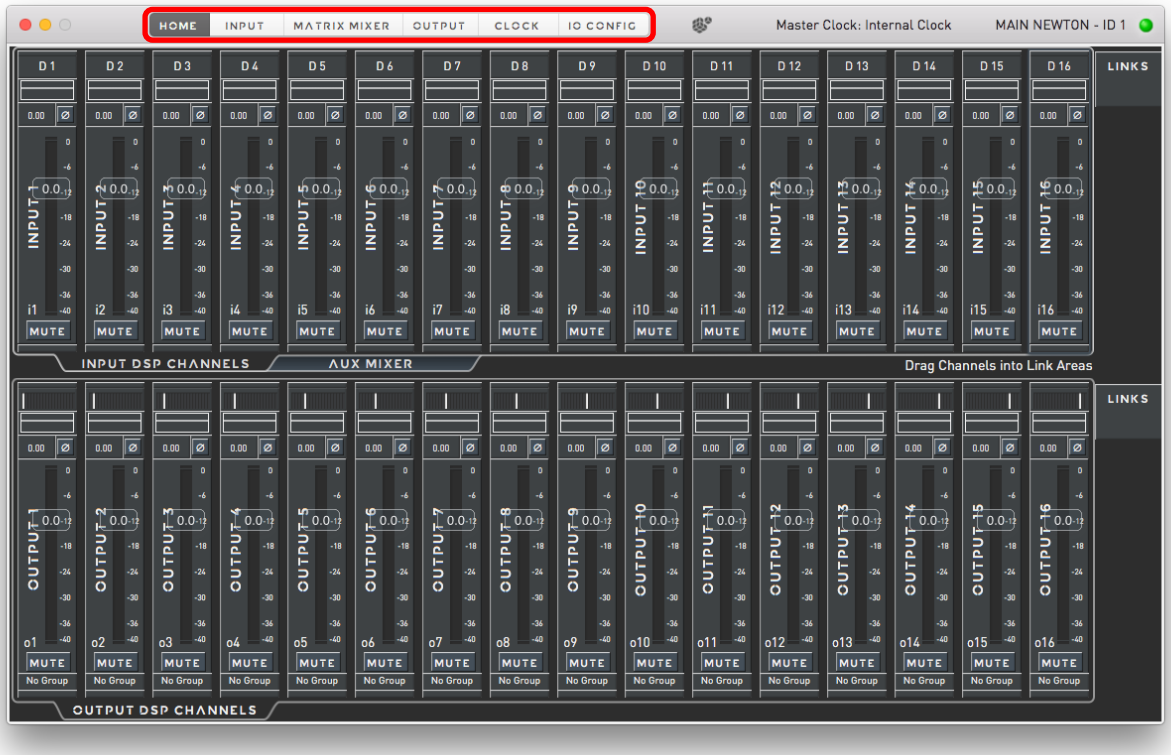
9.4. NEWTON MAIN WINDOW

A double click on one device opens Newton's main window. This window is divided in six tabs, selectable from the buttons in the upper bar:

- Home: the main section, with real time VU meters and processing overview. "Links" area for the permanent links grouping;
- Input: assignment between hardware input sources to processed input channels, with backup priorities;
- Matrix Mixer: routing between processed input and output channels;
- Output: routing of the processed output channels and pickoff points to the hardware output sources;
- Clock: management of Newton's master clock and Wordclock Out 1 & 2;
- IO config: monitoring and control of hardware input and output parameters.



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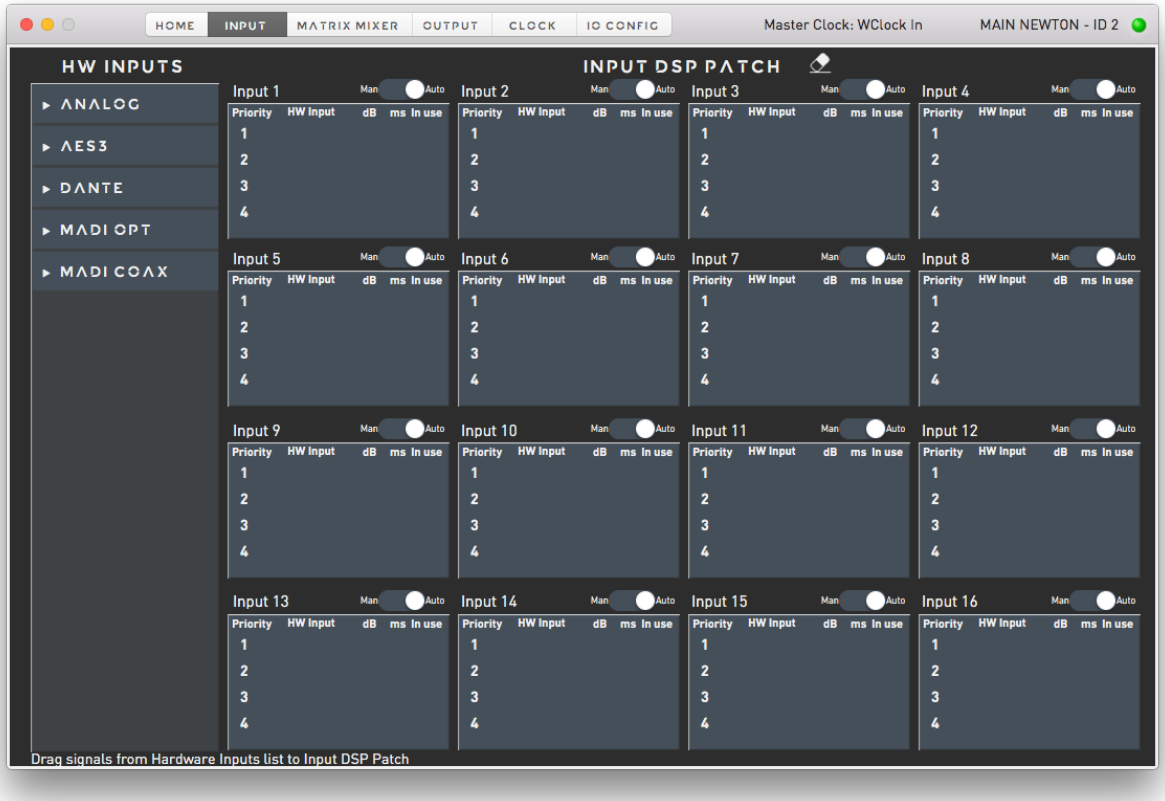
9.4.1. INPUT DSP PATCH



Newton offers 16 channels of processing and accepts up to 216 hardware input sources. The Input tab defines the association between the hardware inputs and the processed inputs (*Input DSP*), that can be controlled from the *Home* view.

Newton's architecture itself is based on a complete fail-safe design. From the input point of view Newton has the possibility to define a failover strategy with up to four priority levels for each input channel. These priorities can be selected amongst all the different audio formats: AES3, Madi Optical, Madi Coaxial, Dante and Analog (for Newton 16+4 and 16+8).

The Input tab is divided into two areas: the *hardware input* sources organized in families (Analog, AES3, Dante, Madi Optical, Madi Coaxial) on the left and the *Input DSP Patch* in the center.

The *hardware input* list shows the available sources in black colour and those that are not yet available in grey. It is possible to assign to the input DSP patch both available and not available sources.

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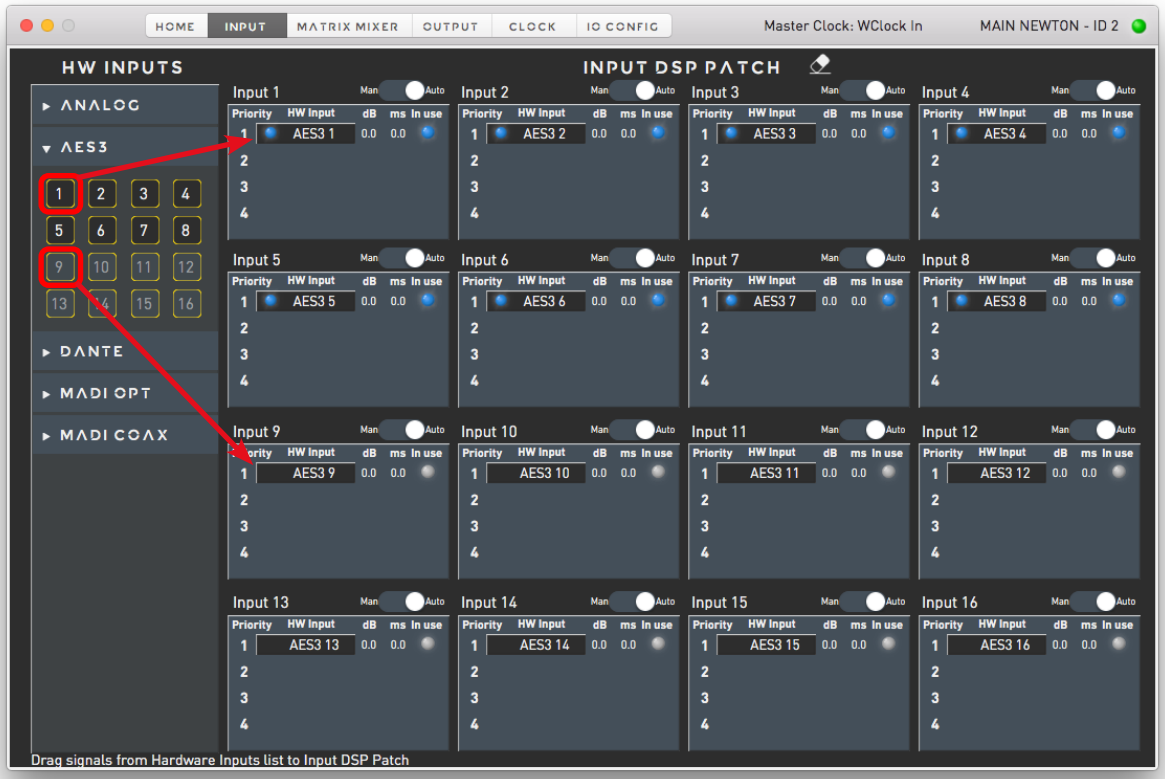


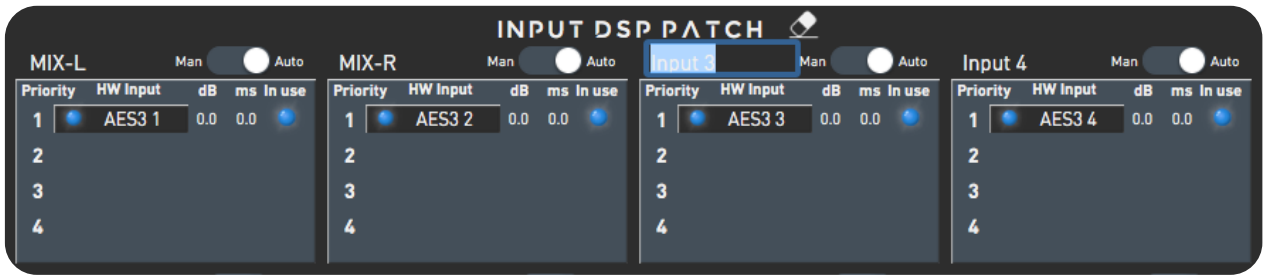
For Madi and Dante the number of available channels depends on the protocol's sample rate and format.

Please note that the analog sources are always present, regardless if there's something plugged or not!

All assignments in the Input DSP patch can be deleted at once by means of the "clear all" button.

Warning! All input assignments will be cleared.

All the assigned channels will have a yellow outline. It is possible to edit the name for each input DSP channel by simply clicking it. We will find the same name also in the Home view.



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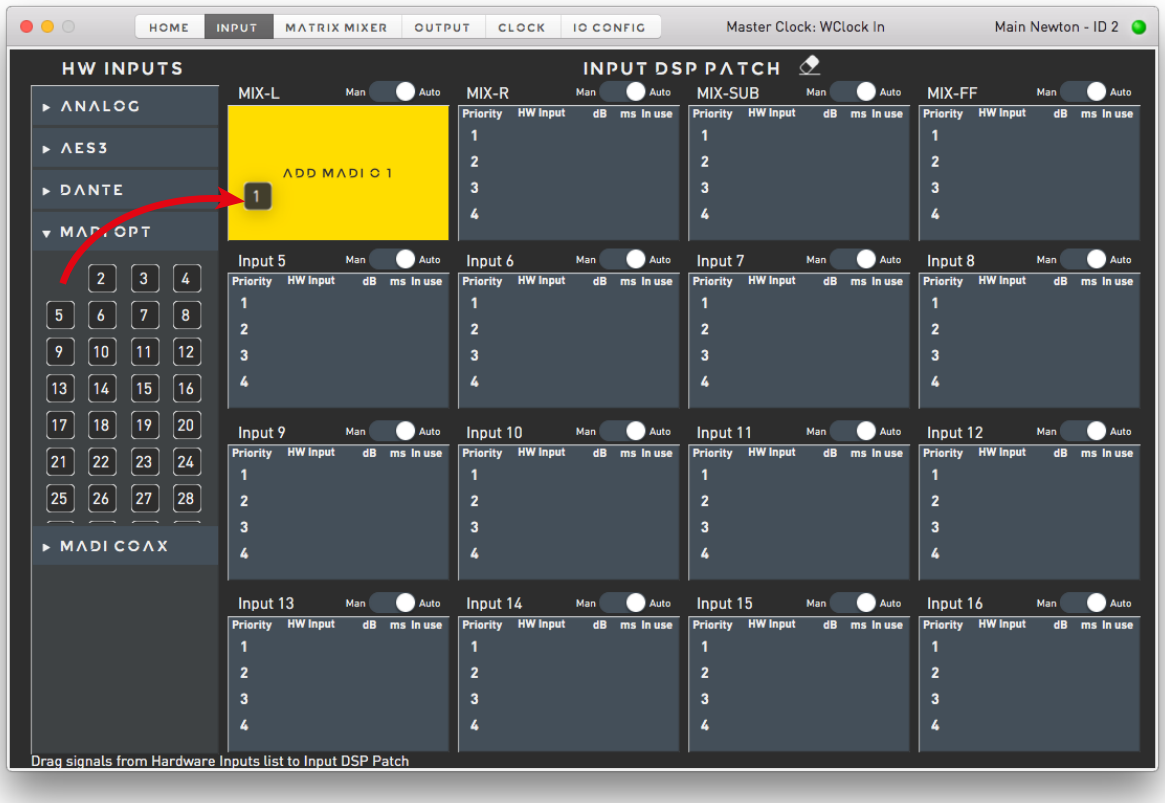
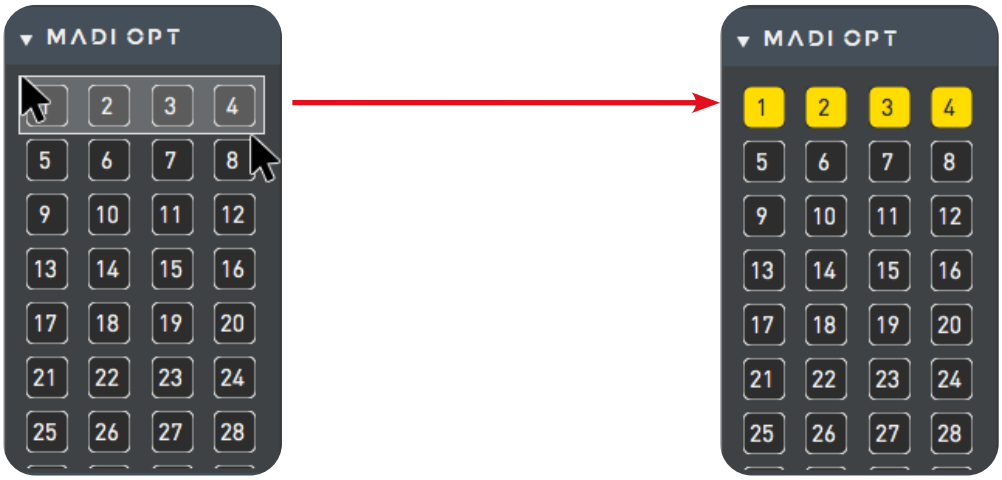
To assign a hardware input to input DSP patch, just drag and drop the source from the *hardware input list* to the desired *input DSP* channel *patch*. This assigns the selected hardware input source to the first available priority (if there's any).



It is also possible to assign multiple hardware input sources at once: just create a selection area over the desired channels or use command (⌘) + click or shift (⇧) + click to select a batch of sources. Drag and drop these sources to any box to assign them to the batch of channels.



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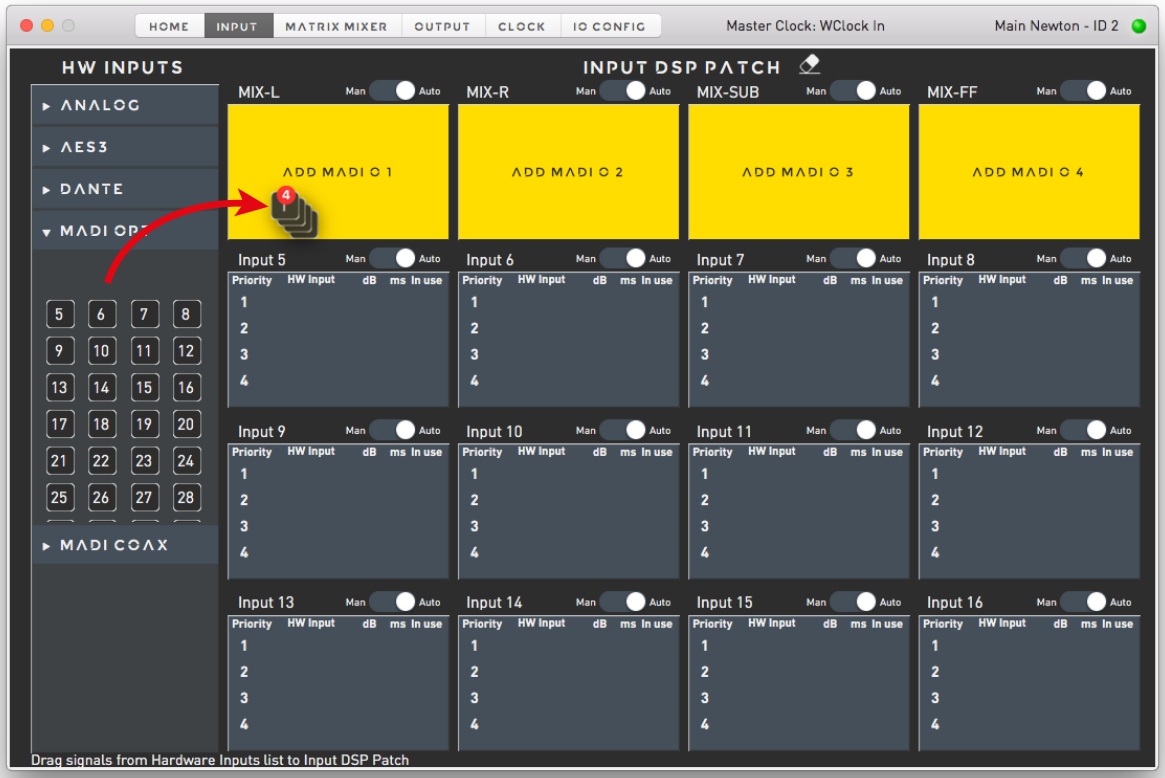
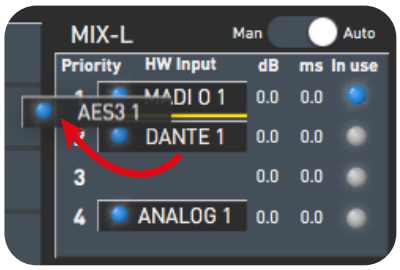


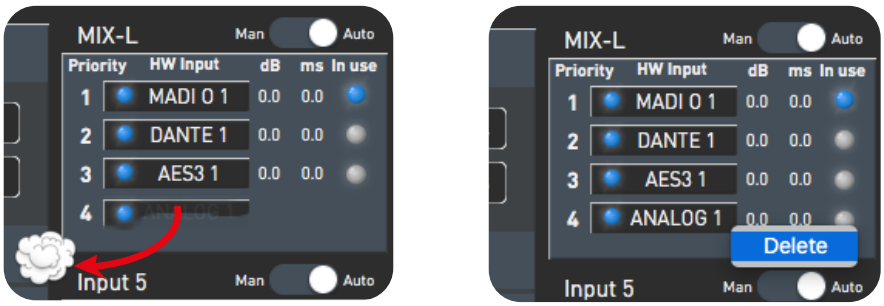
To add more priority sources, repeat the above procedure.

When an analog source is used in a backup strategy, it should be the last one since analog hardware inputs are always available and no failover backup strategy will take place once they are disconnected or just muted.

To change the priority order of a specific channel, drag and drop a single source up and down in the list.



To eliminate an assignment, click and move it outside the box or right click on it and delete.



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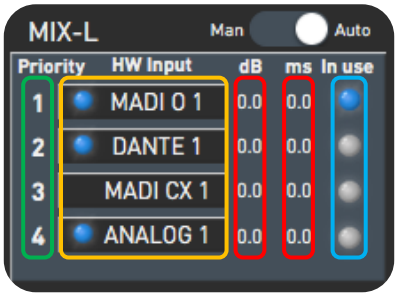
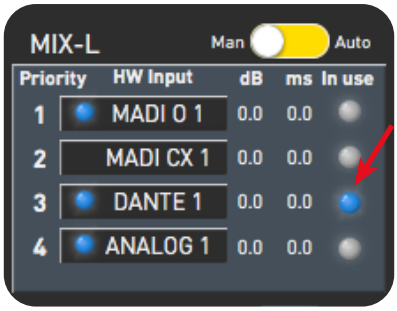
Once the input DSP patch has been populated, we can have an overview of the input backup strategy (***Priority***). In detail we can see the sources that are available and can be used (***HW Input***) and the one that we are actually using (***In use***). The available sources are shown with a blue dot next to their name. In automatic mode (default configuration) the uppermost available source is the one that is actually feeding the input DSP channel and is also marked with a blue dot under the *In use* column.

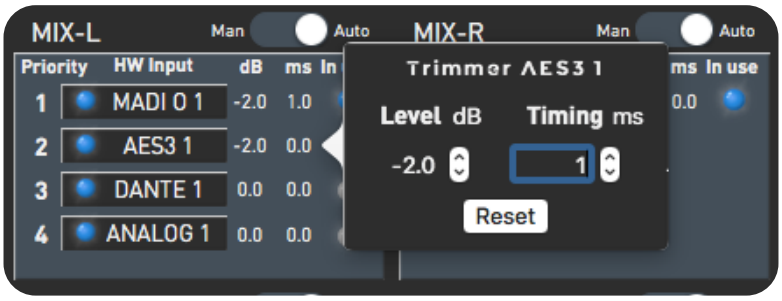


It is also possible to manually choose the actual source for each input in order to force that specific source: just use the Auto/Manual switch and select the desired source and click on the corresponding "in use" dot.



ⓘ In manual mode, the in use selection is kept even if the source is not available. This is very useful for test purposes, but please note that no backup procedure will take place.

For each source you can set different level and delay trims (*dB – ms*) to have a seamless transition between the sources.



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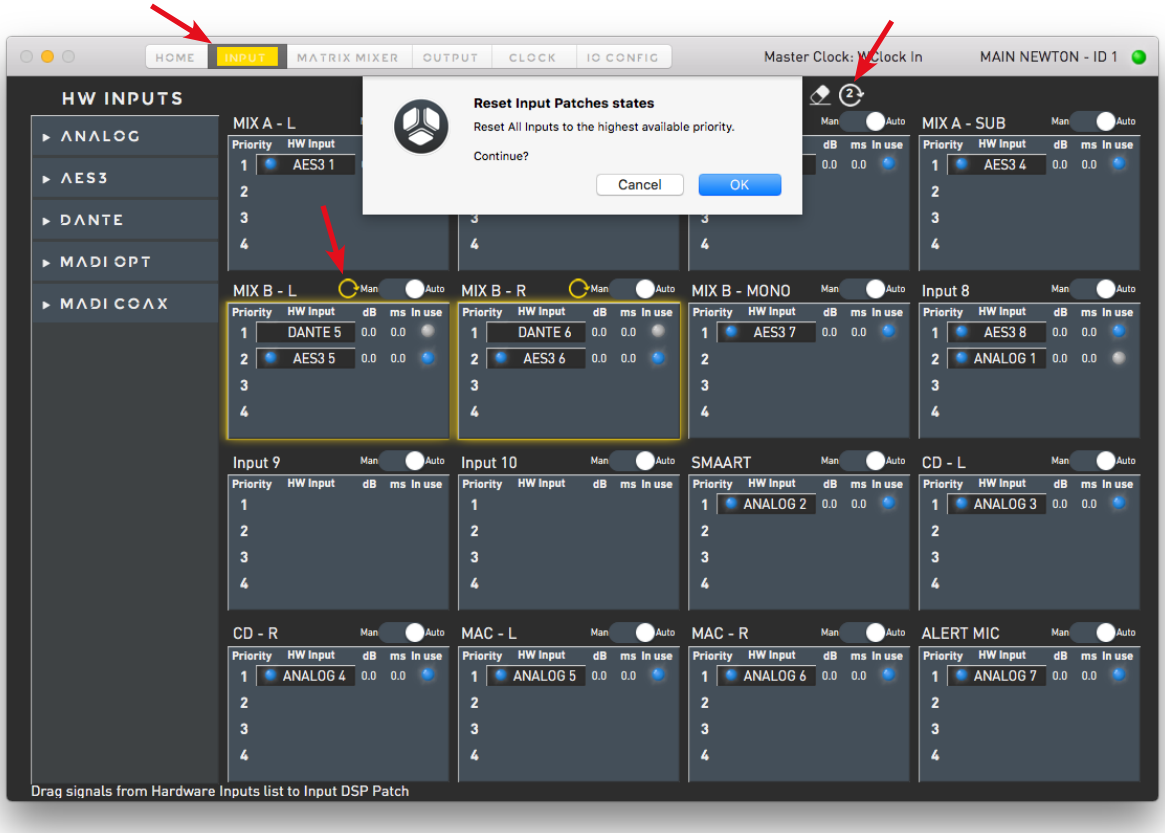
RESET (ALL) INPUT PATCH PRIORITY STATES

When a lost protocol resumes to work, Outline Dashboard allows to reset the highest input priority for a single channel or for all the channels by means of a dedicated button. If an input patch loses a protocol priority, its box and the "Input" select window (upper bar) will be yellow highlighted (see the image below).

This makes the user sure about which protocols are used especially after a backup caused by issues external to Newton management.

Click on the **circle arrow** button to trig the priority up to the highest state set before. The user can use this further function only during the *automatic mode* backup strategy.



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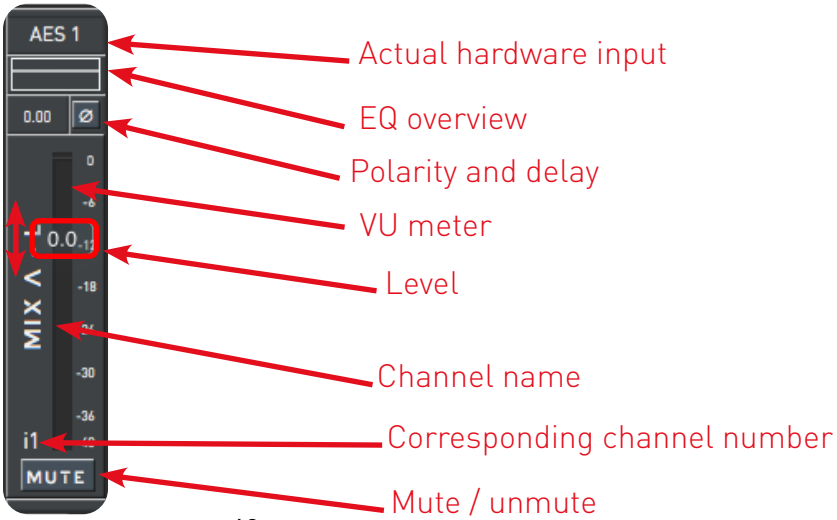
9.4.2. HOME TAB: INPUT DSP

Once the hardware sources have been assigned to the input DSP channels, it is possible to control them from the *Home* tab. The top section of the *Home* tab is referred to the input DSP channels, represented by 16 channel strips.

Each input channel strip reports:

- the actual hardware input source according to the priority defined in the input patch;
- an overview of the active equalization (IIR filters);
- delay and polarity;
- VU meters overlapped to the level fader;
- channel name;
- input (i#) / output (o#) corresponding index;
- mute/unmute button.



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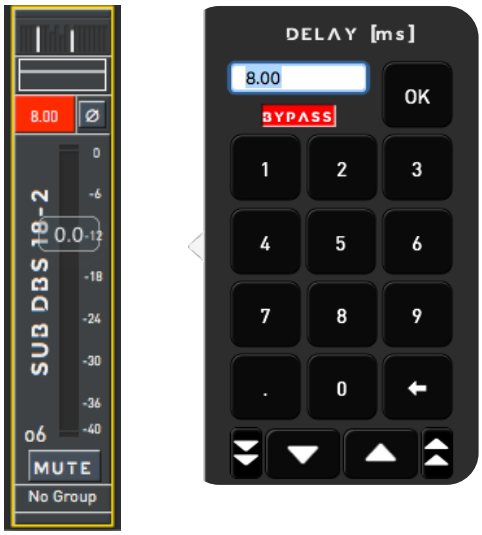
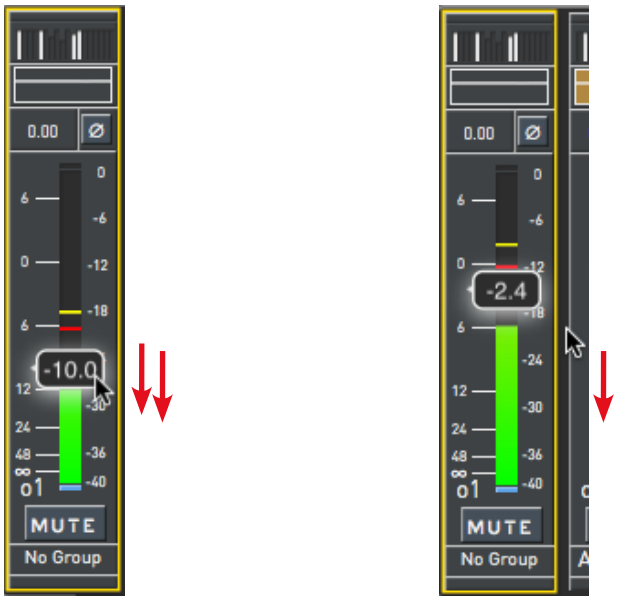
DELAY: In order to change the delay, click on the delay value, a window will pop up, just type in the desired delay value using the computer keyboard followed by ↲ (Enter key), or use the buttons with the numbers and the arrows to modify the delay in larger steps (1 ms) or in smaller steps (0.1 ms). All the channel, including the groups master fader, are able to bypass delay by the specific button (the delay box turns on red).



LEVEL: In order to modify the level, different tricks are available:

- drag and drop the fader's cursor; the fader spans from -∞ to +6 dB and follows the mouse movement;
- click and hold on the cursor, then move on the side to have a more refined control;
- right click on the cursor and write the desired value followed by ↲ (Enter key), please note that for safety reasons any value written is considered as negative unless the "+" sign is specified (e.g. to modify the level to +3 dB you need to write "+3");
- between -6 and +6 dB double click on the cursor to set the fader to 0 dB;
- use the arrow keys on the keyboard to move the fader up and down in 0.1 dB steps.



Underlined to the fader there is the channel's VU meter. The VU meters span from -40 dBFS to 0 dBFS: the RMS value is shown in green, the peak value in red and the peak hold in yellow.

ⓘ Peak and peak hold are enabled from Outline Dashboard preferences.

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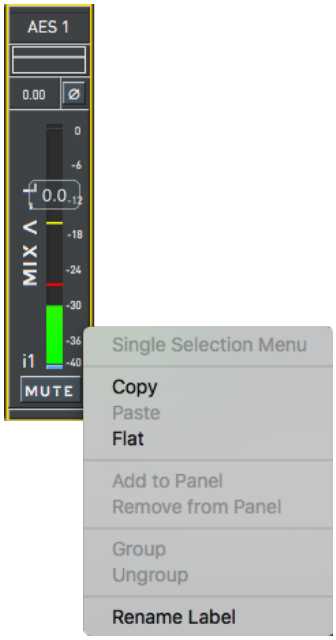
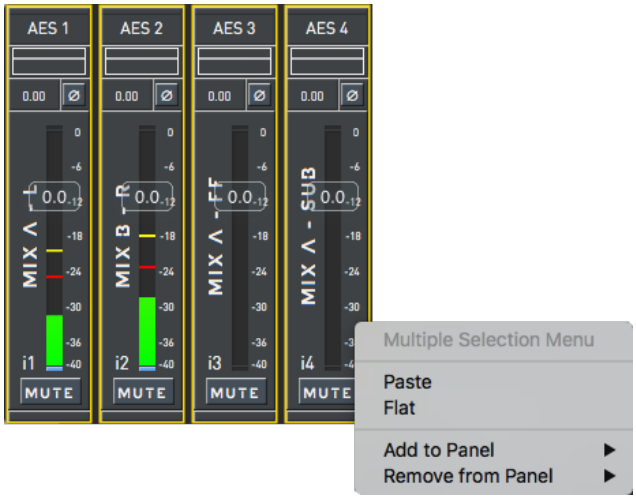
Right click on a channel strip to access the advanced functions (*single channel selection*). These are:

- Copy channel DSP settings
- Paste channel DSP settings
- Flat channel DSP settings
- Add to / remove from Panels
- Rename label
- Direct Transfer

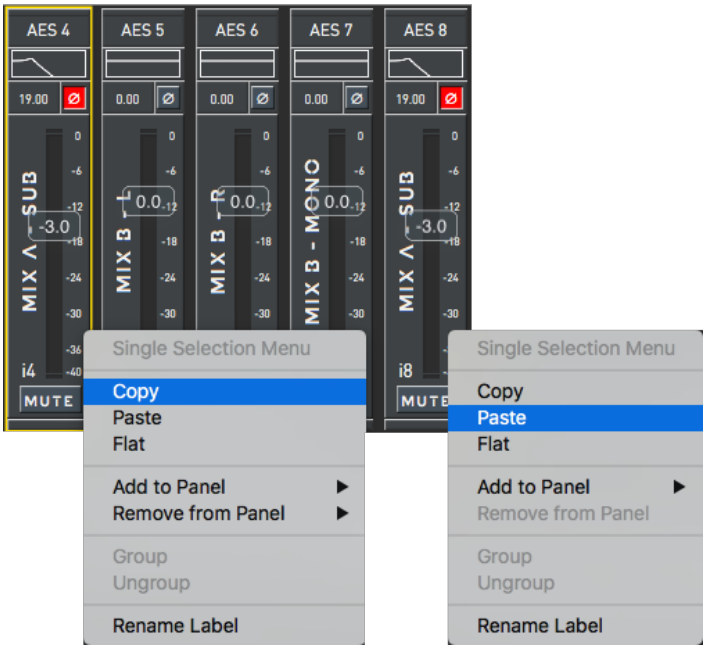
Click on two or more channel strips (left click + shift ⇧ to select contiguous elements or command⌘ to select a single element) and then open (right click) the *multiple selection menu*:

- Paste channel DSP settings
- Flat channel DSP settings
- Add to / remove from Panels





ⓘ Copy & Paste copies the DSP settings from one channel to one or more channels. These include: EQ, delay, polarity, level, mute status and label.



ⓘ Group / ungroup function is not available for the input channels.

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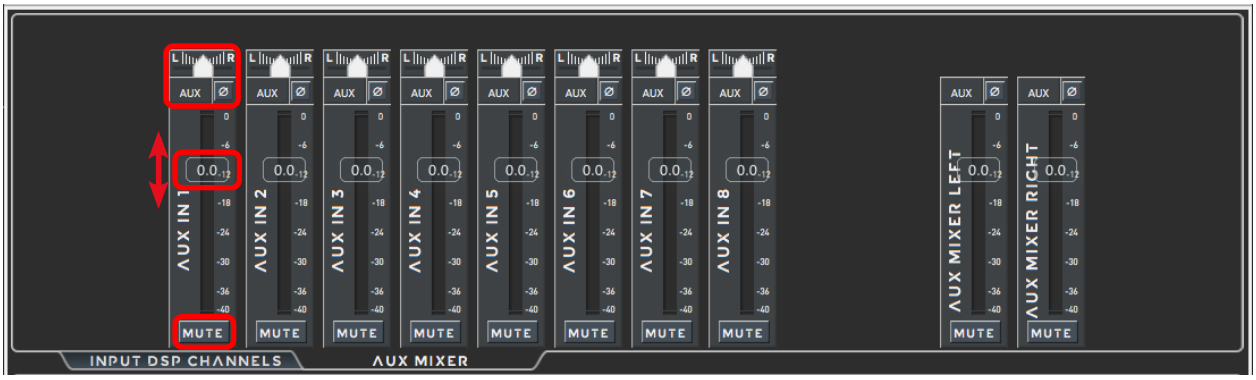
9.4.3. HOME TAB AUX MIXER



This control is reserved to Newton 16+4 and 16+8 and is an additional processing dedicated to the analog sources to be used as an extra input mixer. This section can be seen as a small mixer with 4 or 8 analog input and 2 outputs. These outputs, using the matrix mixer, can be routed and mixed to the output DSP channels, selectable from the *Matrix Mixer*.

ⓘ E.g. in a festival application with all input DSP channels in use by different consoles, the Auxiliary Mixer can be used to accept the walk-in/walk-out music or emergency messages.

For each channel in the auxiliary mixer the following functions are available:

- Pan pot
- Polarity
- Level with VU meter
- Mute / unmute

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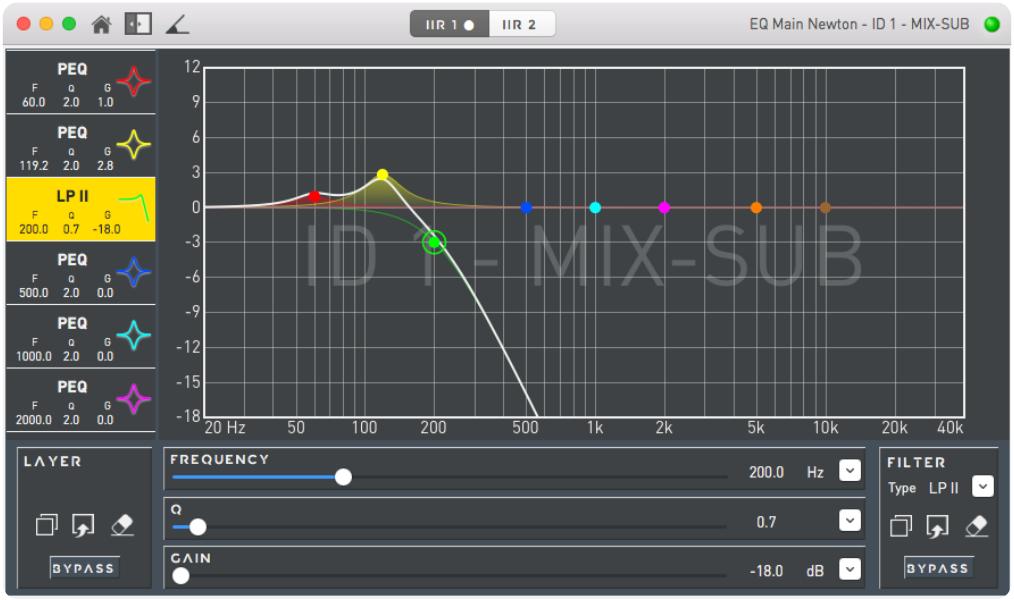
9.4.4. INPUT DSP CHANNELS EQ

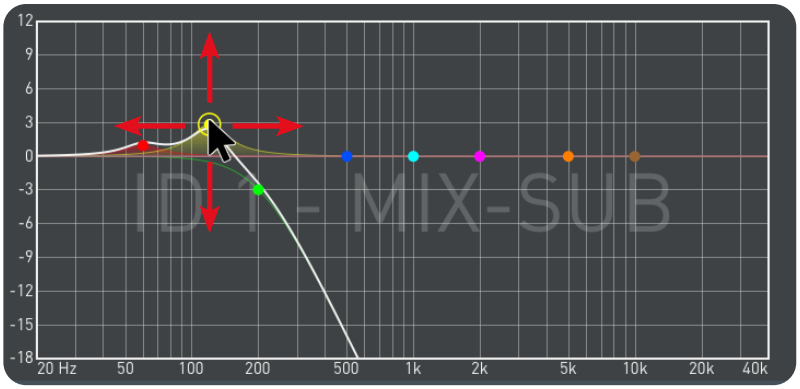


The EQ window has four main areas:

- Graphic area (in the centre);
- Layer selection and various tools (at the top);
- Filters list and overview (on the left);
- Filter and layer options (at the bottom).

On each input EQ there are two available independent layers, each one with 8 IIR filters, for a total of 16 filters.

To quickly change a filter just click on one of the coloured dots in the graphic area and drag it in order to change the frequency and the gain of that specific filter. These two parameters can also be precisely modified using the scrollbars and clicking on the arrows on the bottom part of this window. To change the width of the filter you can also use the pinch-to-zoom gesture on the Mac trackpad.



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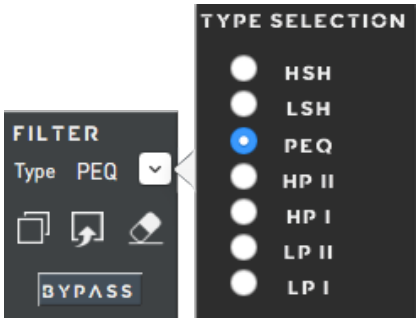
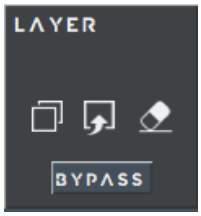
In the *Filter* area it is possible to select the filter type, to copy, paste, reset and bypass the actual filter. The available filters are the following:

- **HSH**: High SHelving
- **LSH**: Low SHelving
- **PEQ**: Parametric EQualizer
- **HP II**: High Pass 2nd order
- **HP I**: High Pass 1st order
- **LP II**: Low Pass 2nd order
- **LP I**: Low Pass 1st order



In the *Layer* area the available commands are: copy, paste, flat and bypass. Please note that all these commands will be applied to all the filters in the active layer.



Some useful tools are also available in the top bar:

- A button to return to the device main window
- A button to show/hide the filters list on the left
- A button to show the phase response of the applied EQ

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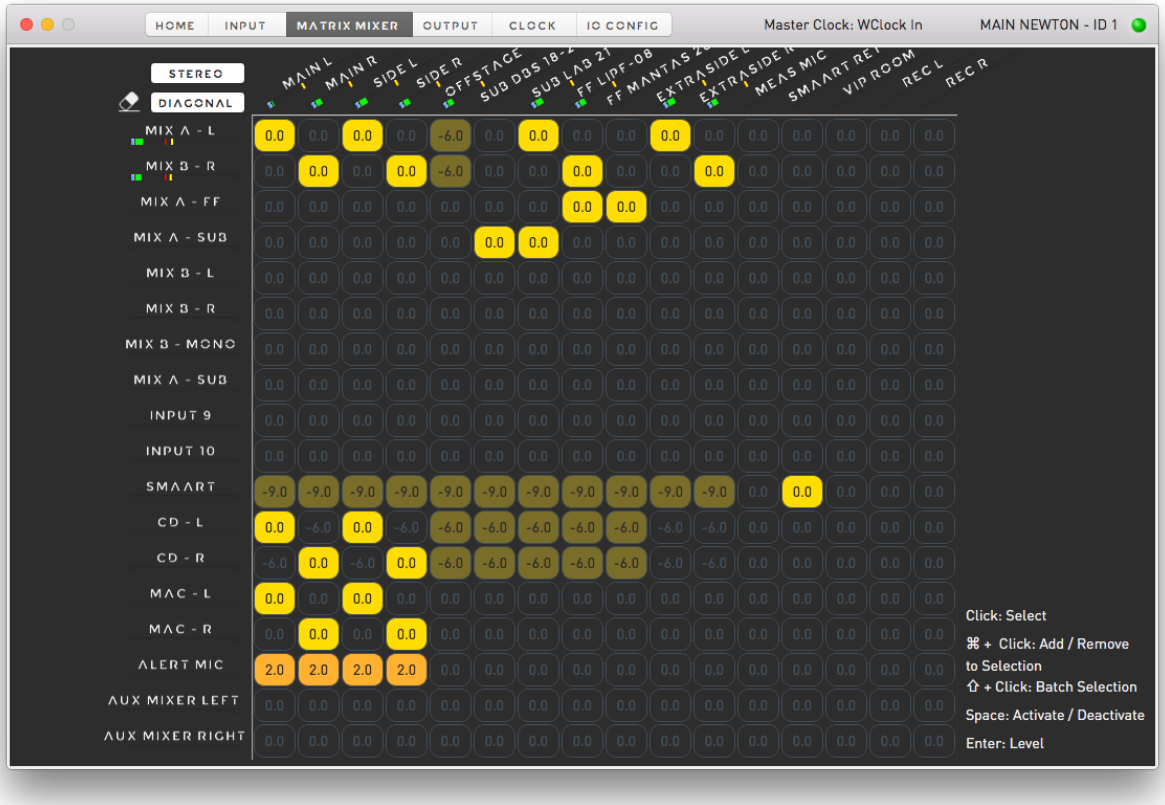
9.4.5. MATRIX MIXER



In this tab it is possible to assign one or more input DSP channels to the output DSP channels. For Newton 16+4 and 16+8 the Aux Mixer L & R are also available.

The matrix mixer works like a standard "battleship game": each point in the matrix represents the mixing point between a specific input channel and a specific output channel, with level and on/off status.

It is possible to clear the matrix mixer using the "eraser" button a the top left corner of this tab. Here it is also possible to use a couple of macros to quickly set the matrix: click multiple times on "Stereo" to assign two input DSP channels to all 16 output DSP channels; click on "Diagonal" for a diagonal input to output assignment.

You can select a single point just by clicking on it or you can select:

- a row clicking on one input channel name
- a column clicking on output channel name
- a batch of contiguous elements clicking on one cell and on another cell in the same row or in the same column holding the shift (⇧) key
- various cells by holding the cmd (⌘) key and clicking on the cells that you would like to add

For a quick reminder all these functions are reported in the bottom right corner of this tab.

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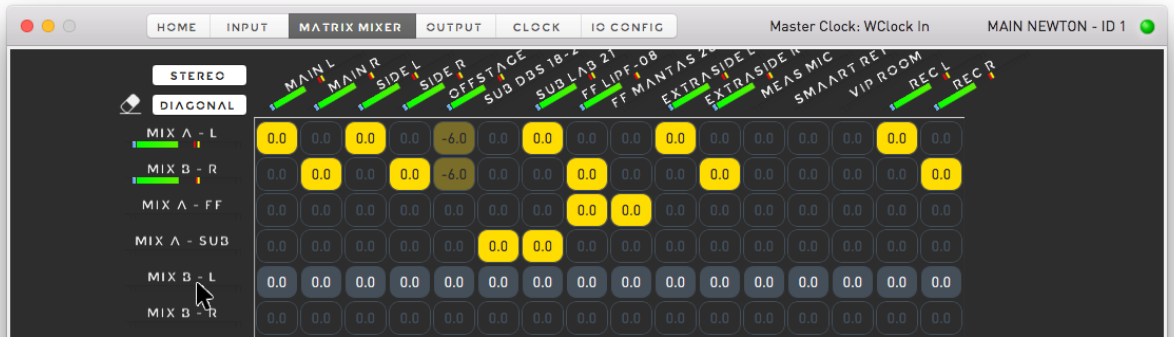
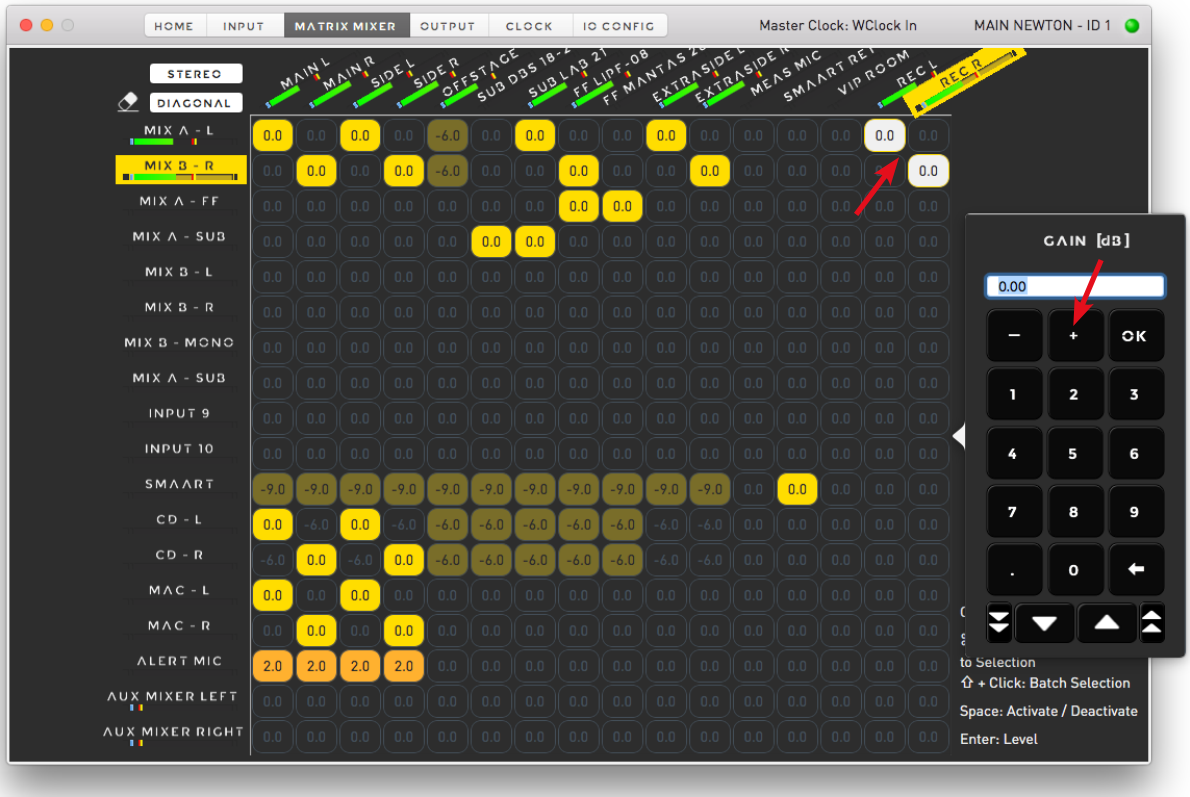


Change the current selection in the matrix using the keyboard arrow keys and moving up, down, left and right. Right click on the corresponding input / output to rename the label.

To enable the selected point(s) in the matrix, press the spacebar.

To change the level of the selected point(s) press ↲ (Enter key) or right click on it; a keypad will popup. You can directly write the desired value and press ↲ (Enter key) or use the numbers on the keypad or change the actual value in 1 dB or 0.1 dB steps using the arrow buttons. Please remember that for safety reasons any value with no sign will be interpreted as a negative value; e.g. in order to have a positive gain of 3 dB you have to write "+3". Any level between -80 to +6 dB can be accepted.



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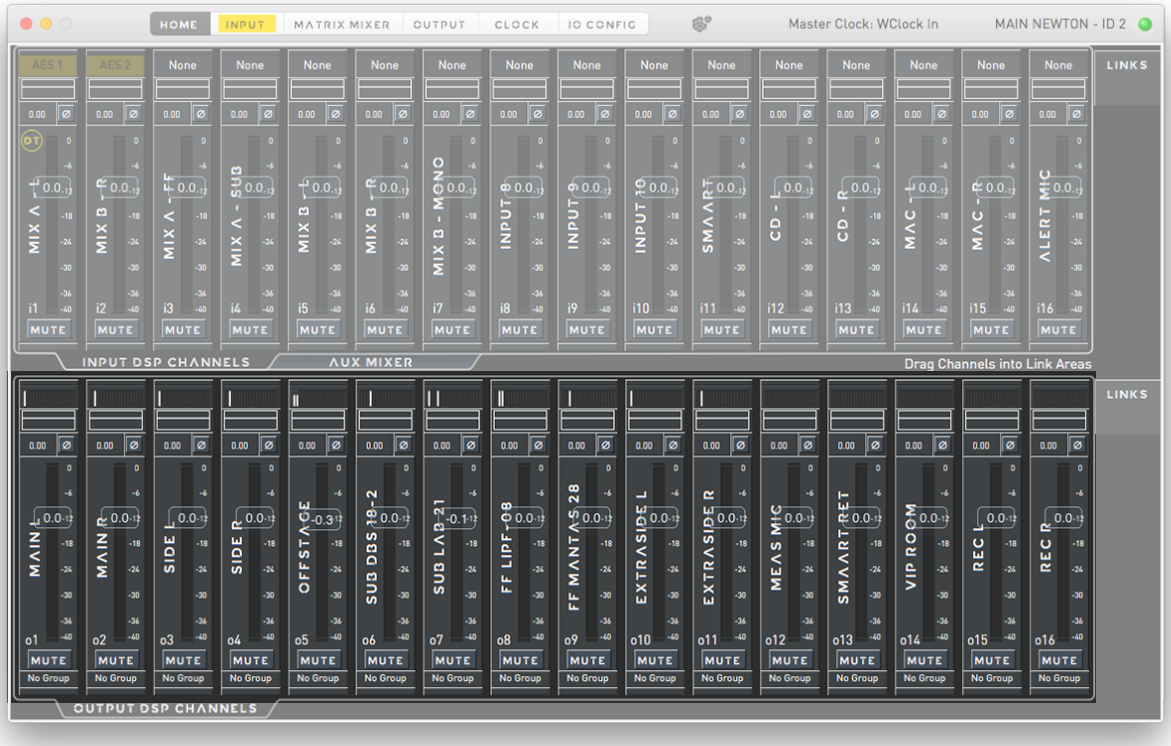
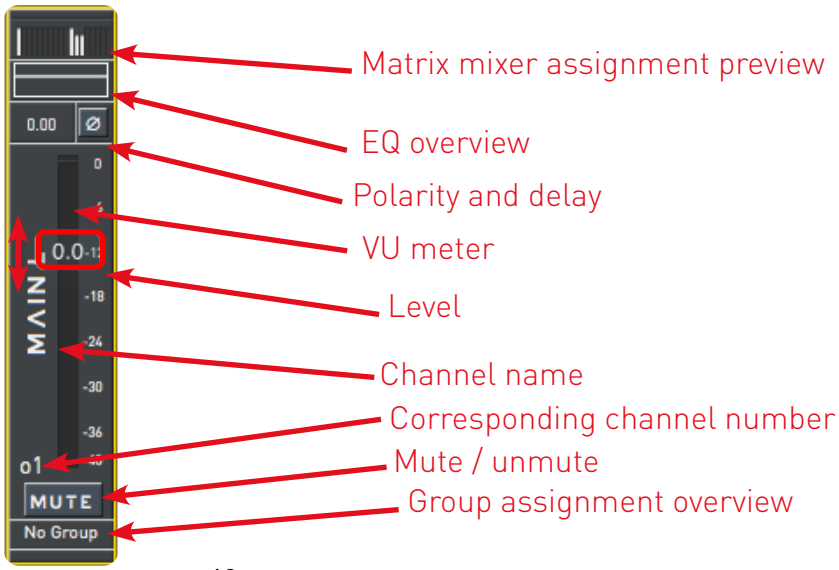
The following colour code is used for the cells:

- bright yellow colour for 0 dB **ACTIVE** cells
- faded yellow colour for **ACTIVE** cells with a negative value
- orange colour for **ACTIVE** cells with a positive value
- background colour for **NON-ACTIVE** cells
- highlighted cells for **SELECTED** cells

9.4.6. HOME TAB: OUTPUT DSP



The output DSP channels are organized as channel strips similar to the input ones, with the only difference that the topmost icon reports a quick overview of the matrix mixer assignment for that specific channel. For the general use and commands please refer to the input channel strip chapter.



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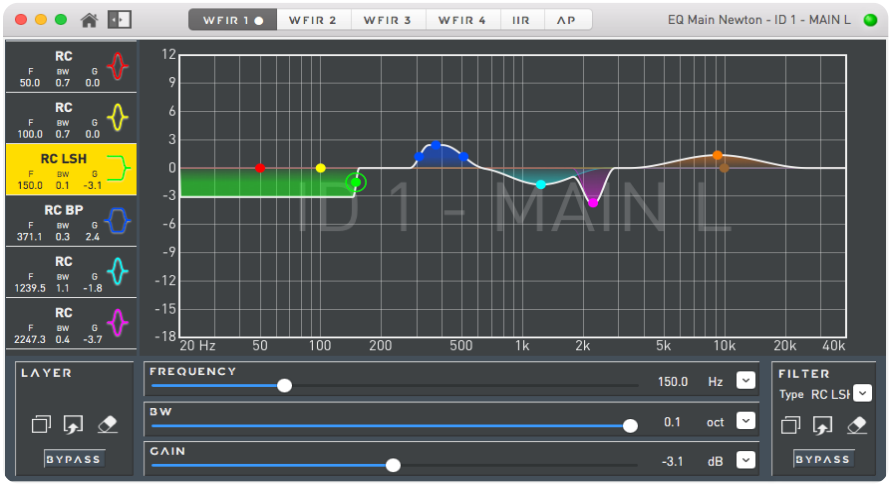
9.4.7. OUTPUT DSP CHANNELS EQ

The EQ window for the output channels uses the same concepts of the input EQ window, described in chapter 9.2.4. The main difference is in the quantity of available layers and in the types of filters that can be applied: while for the input EQ there are two layers of IIR filters, for the output EQ there are 6 available layers, as follows:

- 4 WFIR layers with 8 filters each (Raised Cosine)
- 1 IIR layer with 8 filters
- 1 All Pass layer with 8 filters



The WFIR filters implementation is the result of a patent-pending Outline technology. In brief, the WFIR allows to reproduce any kind of frequency response with a very precise resolution without adding latency.

In Newton, the WFIR filters are used to create overlapping filters, in this way it is possible to create groups of Output DSP channels and use even more EQ points in the groups.

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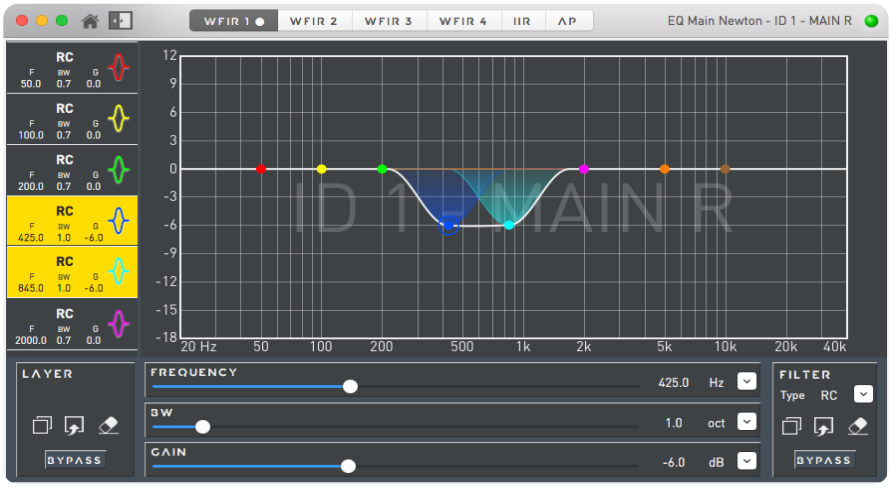
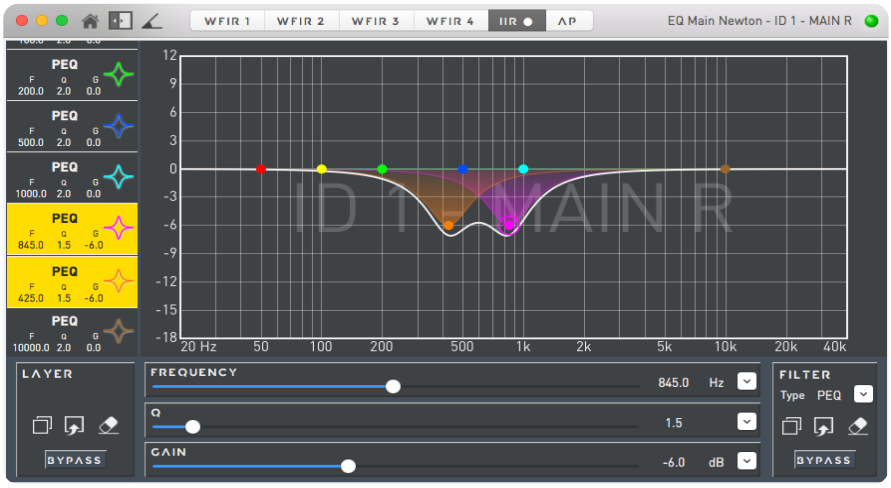
Each WFIR layer offers a selection of Raised Cosine filters. These, compared to the traditional IIR filters, offer a better separation between nearby filters and higher flexibility of shape, to achieve greater precision.



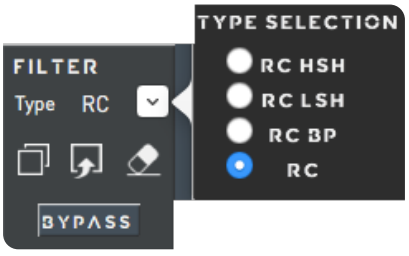
EQ #1: two raised cosine filters (WFIR) @ -6 dB, 425 Hz and 845 Hz, 1 octave bandwidth



EQ #2: two parametric filters (IIR) @ -6 dB, 425 Hz and 845 Hz, 1.5 quality factor (≃ 1 octave bandwidth)

These are the available filter types in the WFIR layers:

- **RC HSH**: Raised Cosine High SHelving
- **RC LSH**: Raised Cosine Low SHelving
- **RC BP**: Raised Cosine Band Pass
- **RC**: Raised Cosine



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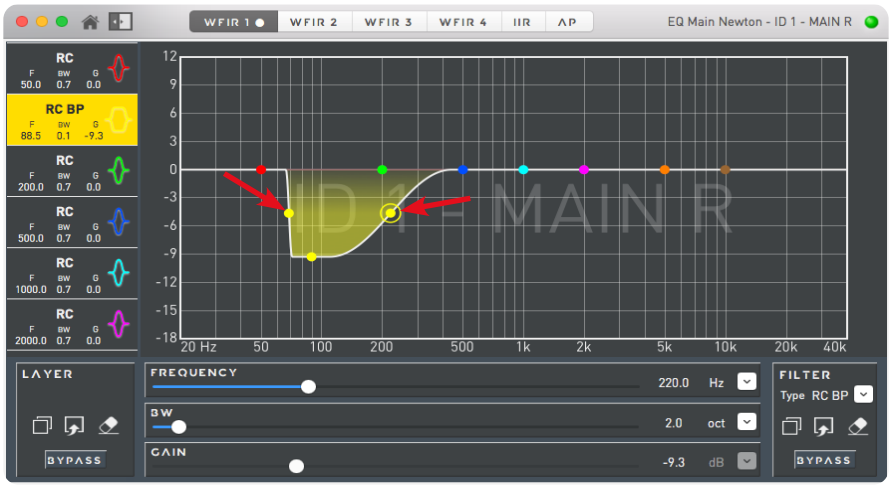
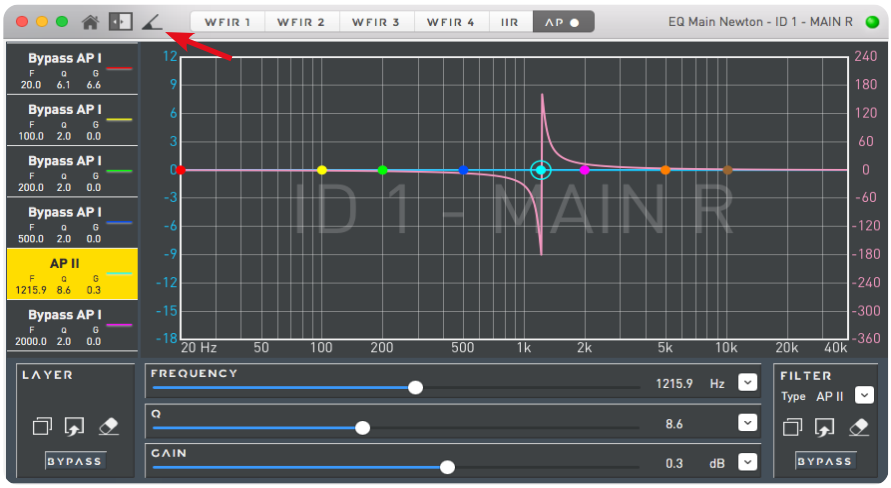
One of the unique features of Raised Cosine filters is the possibility to create sharp shelving filters and asymmetric band pass filters. A standard Raised Cosine filter has three parameters: frequency, gain and bandwidth. To adjust these parameters simply drag and drop the dot and move it around; to change the width use the "pinch to zoom" on the trackpad. You can change the parameters of the filter using the bottom sliders. The Raised Cosine Shelving filters can be controlled in the same way. The Raised Cosine filters offer much more flexibility and are featuring a flat part and two independent side slopes. A Raised Cosine Filter is shown with three dots: click on the central point to adjust the filter's frequency and gain; click on one of the side dots to change the width of the filter and the slope (bandwidth) of that specific part.



The All Pass Layer offers 1st and 2nd order all pass filters. In order to see how these filters effect the phase, click on the "show phase" button. All the filters in this layer are bypassed by default so, in order to use them, select the filter to activate, select the type (AP I for 1st order and AP II for 2nd order), remove the bypass and adjust its parameters.



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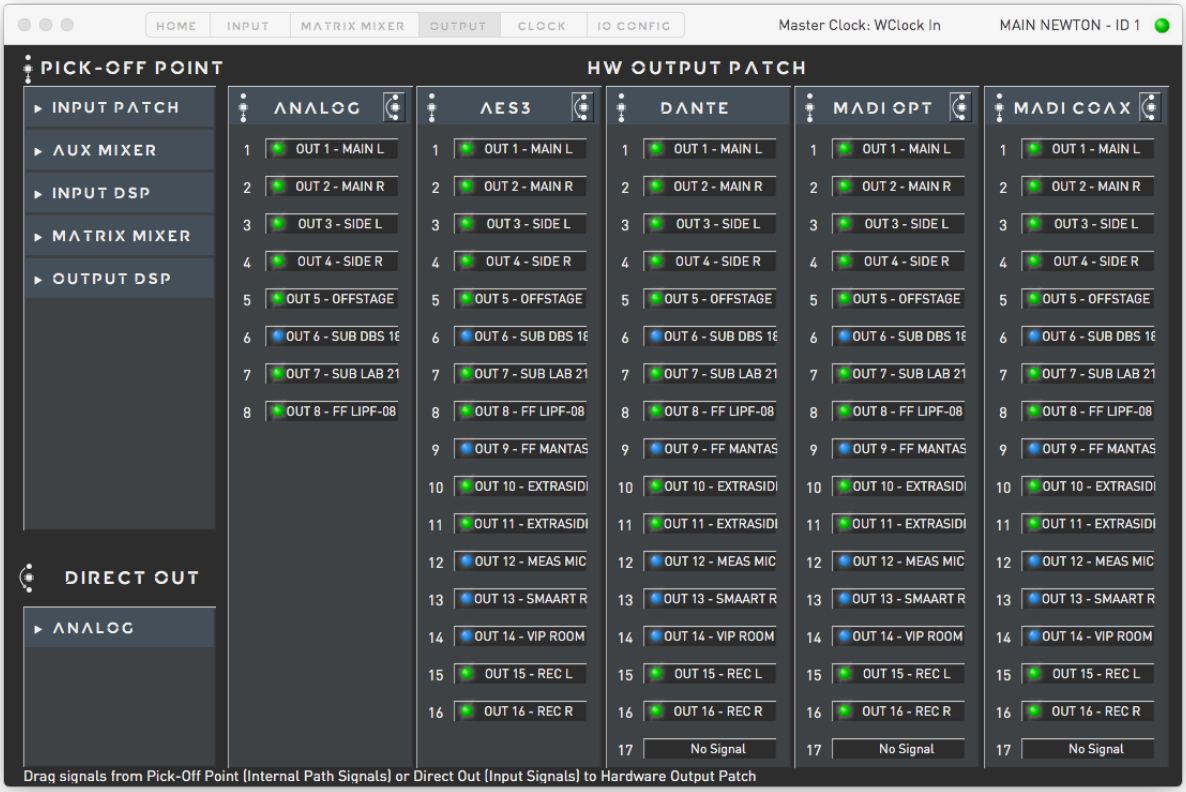
9.4.8. HARDWARE OUTPUT PATCH



Newton's architecture allows a high output routing flexibility that is set in the *Output* tab. On the left side of this panel there are all the available pick-off points and direct outputs. The *pick-off points* are the points in between the processing flow that can be routed to any hardware output.

In the central area there is the *hardware output patch*. It shows an overview of the signals that are routed to the hardware outputs. In order to route a signal, drag and drop a single pick-off point (or a selection) from the list on the left to the hardware output(s). Please note that if a hardware output already has a *pick-off point* or a *direct out* routed, a new assignment will overwrite the existing one. By default, the 16 Output DSP channels (completely processed) are routed to all hardware protocols. With the default routing a green LED represents the signal presence.

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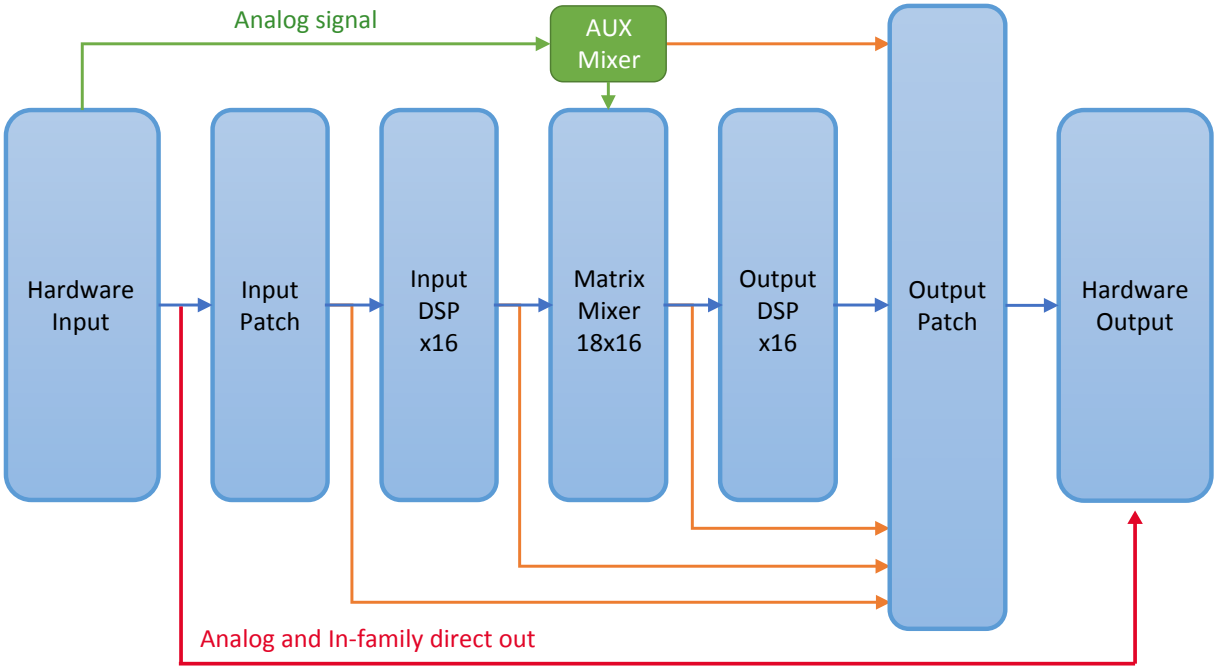
The following picture reports Newton's internal processing path. The orange lines represent the available *pick-off points*, that are:

- **After** the **input patch**
- **After** the **aux mixer**
- **After** the **input DSP**
- **After** the **matrix mixer**
- **After** the **output DSP**

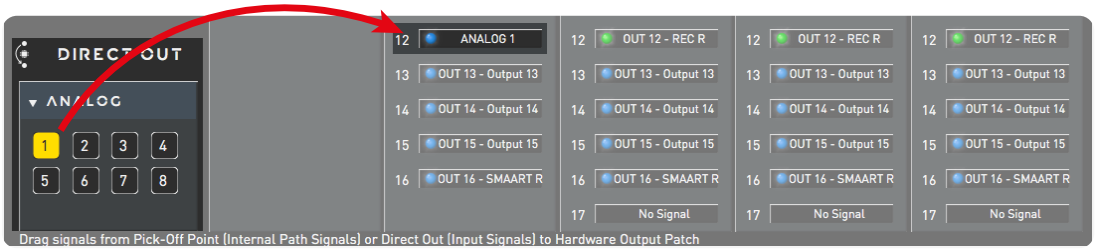
There is also the possibility to route any of the analog input sources (for Newton 16+4 and 16+8) to any of the hardware outputs (*Direct Out* section) and also to enable the *In-Family Direct Out*, as explained further.



Newton processing path, pick-off points and direct out.

ROUTING ANALOG DIRECT OUT (1-8) TO HARDWARE OUTPUT

Available only on Newton 16+4 and 16+8, this function allows to send any of the analog input to a hardware output, bypassing all the processing.



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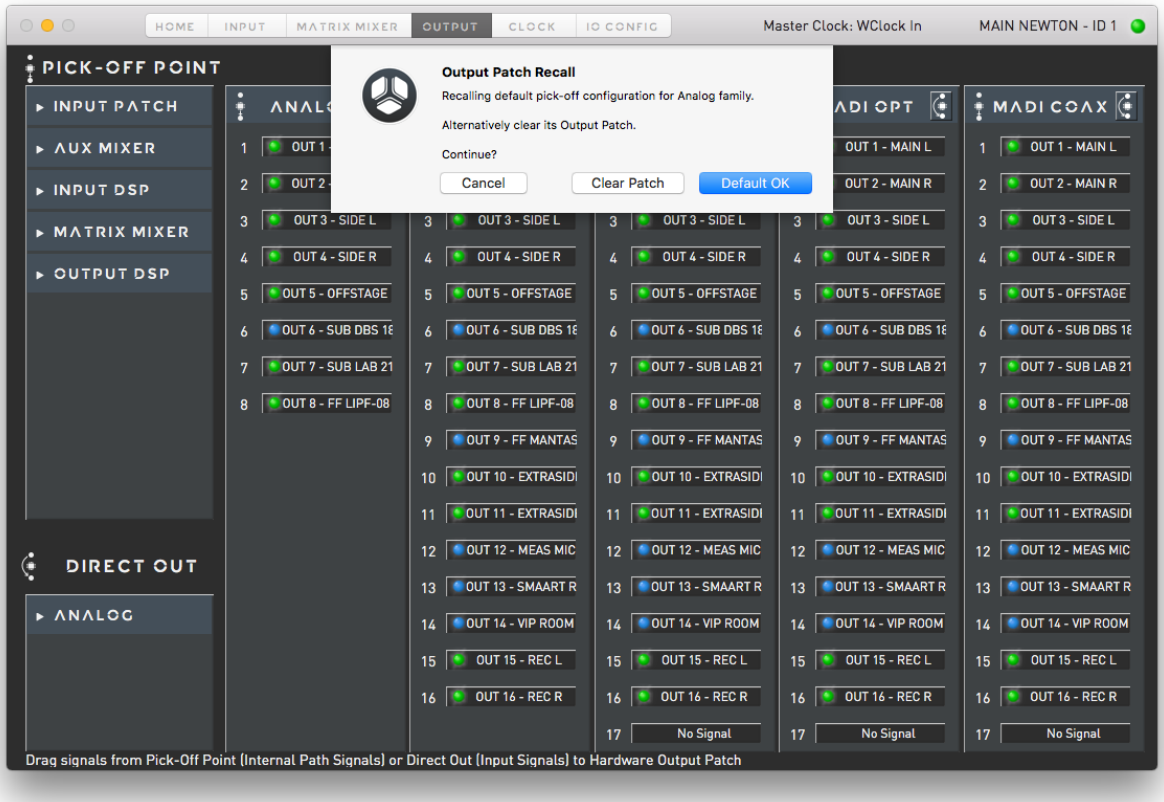
OUTPUT PATCH RECALL

Reset the output channels list as "*Clear*" (without any pick-off point) or as "*Default*" (with the Output DSP standard list). These fast setups enable the user to start from an empty list in order to choose every single pick-off point dedicated to all the hardware outputs, or to restart from the default configuration within all the dedicated Output DSP.



Example: Output patch recall for analog outputs list.

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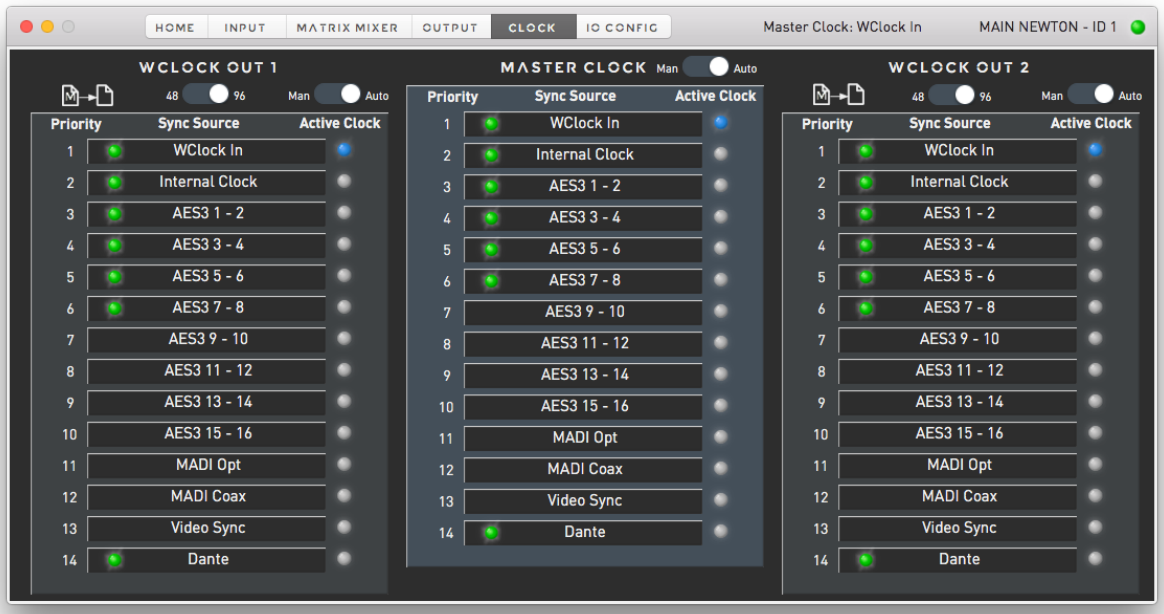
IN-FAMILY DIRECT OUT

For Madi optical, Madi coaxial, AES3 and Analog you can activate the *in-family* direct out (Madi optical on Madi optical, AES3 on AES3 and so on...), this replicates the input of a protocol to the outputs of the same protocol, regenerating the signal (no processing and no sample rate conversion) with a latency of just one sample at 96 kHz (0.01 ms) for the digital protocols.

E.g.: Newton can be used to split a digital protocol, or to regenerate and extend it to drive a longer distance.

9.4.9. CLOCK TAB



Newton's innovation consists also in the ability to manage up to 15 different clocks. 14 of these can be eligible to become the reference for Newton's Master clock. In other words, Newton can be synchronized to any valid 48k-based clock. The clock tab presents three areas: the center is for Newton's master clock, the two side areas are for the two independent Word Clock Outputs 1 & 2.

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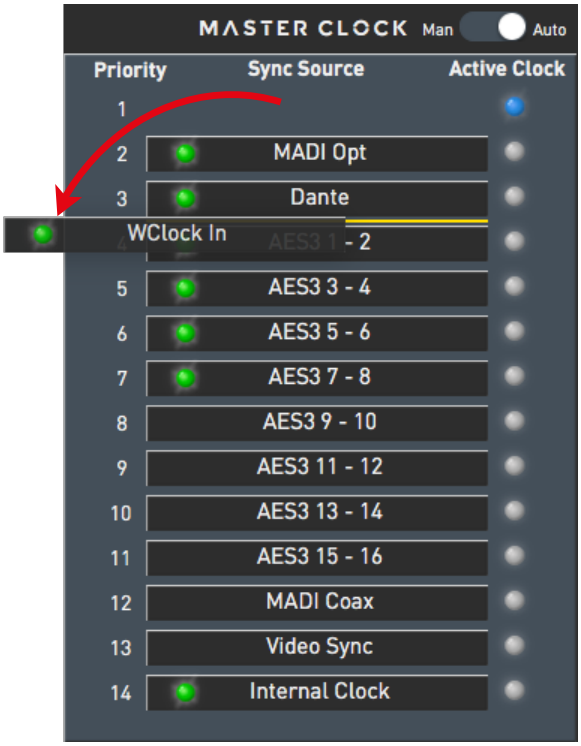
MASTER CLOCK

As in the input patch, there is a fully automatic clock source switchover feature: the available clock sources are ordered in a list. The elements at the top of the list have a higher priority. If a valid 48k-based clock source is connected, then the corresponding green dot will show up. In automatic mode the uppermost valid clock is automatically selected. In manual mode it is possible to select anyone of the valid clocks. The actual clock is represented as a blue dot on the "active clock" column. To modify the priority list just drag and drop any of the clock sources to the desired position in the list.

ⓘ In manual mode, if the selected clock becomes unavailable, then the upper available clock source will become the actual master clock.



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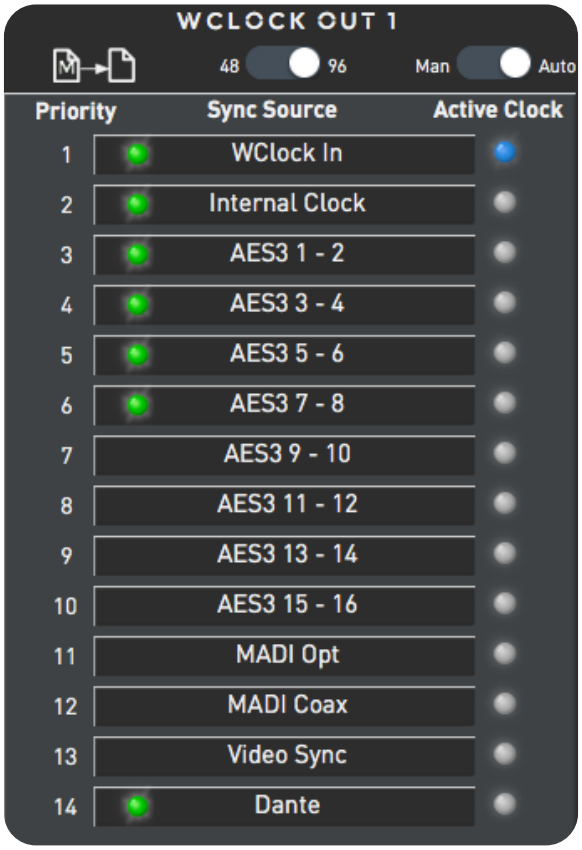
WORDCLOCK OUTPUT 1 & 2

Two completely independent Wordclock outputs are configurable in the two side lists. These two outputs are used to distribute synchronization references across different environments. Wordclock 1 & 2 are completely independent from the master clock. Wordclock output 1 & 2 are at 96 kHz by default, but both can also be downsampled from 96 kHz to 48 kHz.



Newton integrates various high-quality PLL circuits on all input protocols to reconstruct the clock also in case of excessive jitter.

A button can be used to quickly copy the settings from the Master clock to Wordclock out 1& 2.

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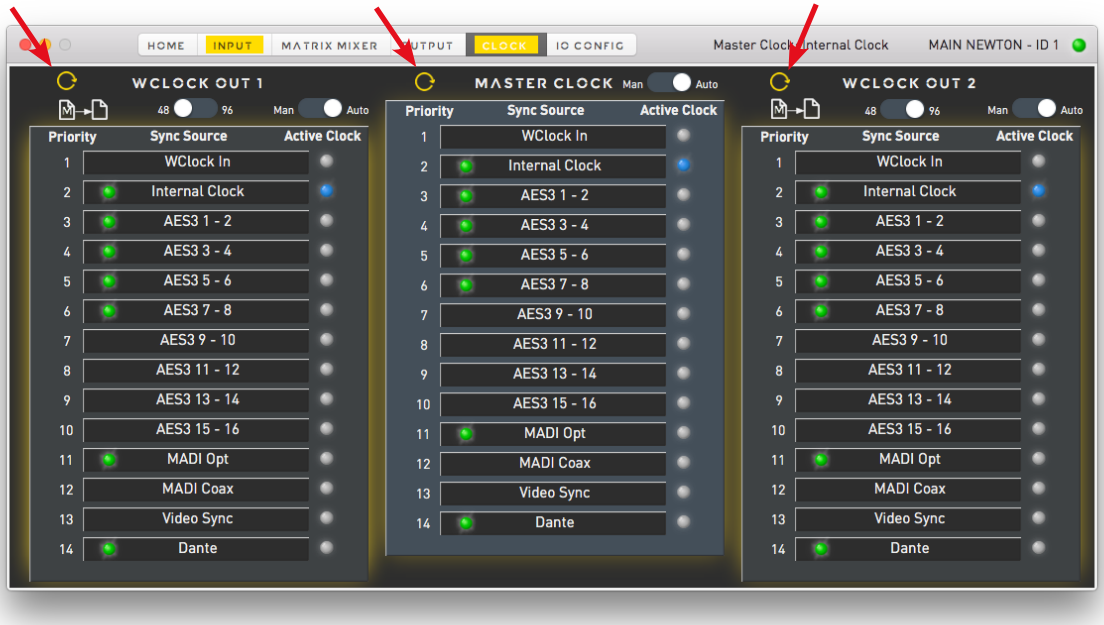
RESET CLOCK PRIORITY

Reset the priority after having restored a lost clock (the upper one in the list). Like the input highest priority reset, when the lost wordclock resumes to work, Outline Dashboard allows to reset the highest inputs priority for the Masterclock and the wordclocks with the dedicated button (yellow circle arrow). This feature helps to prevent wrong backup strategies caused by an unsteady clock (external clock).



Click on the **circle arrow** button to trig the priority up to the highest states set before. The user is able to use this further function just during the *automatic mode* backup strategy.

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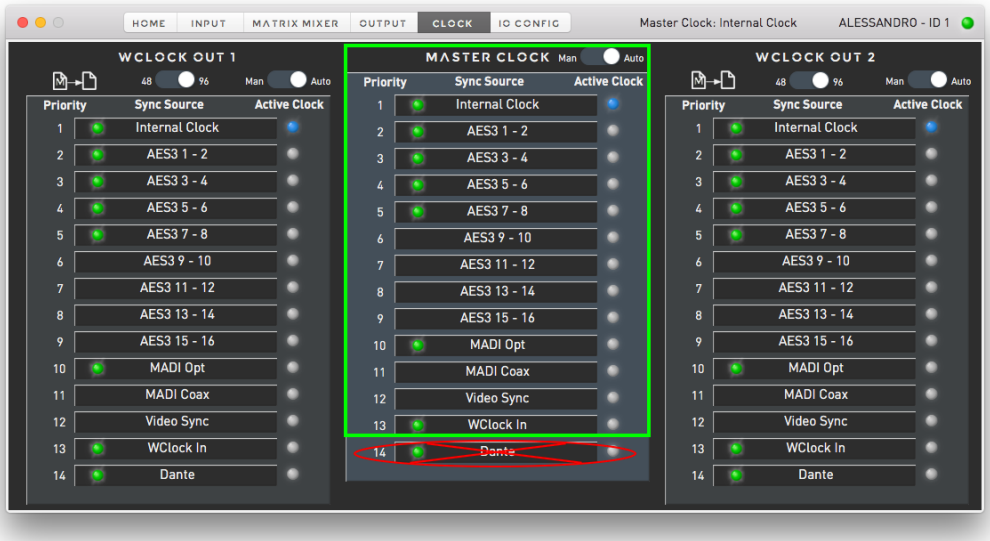
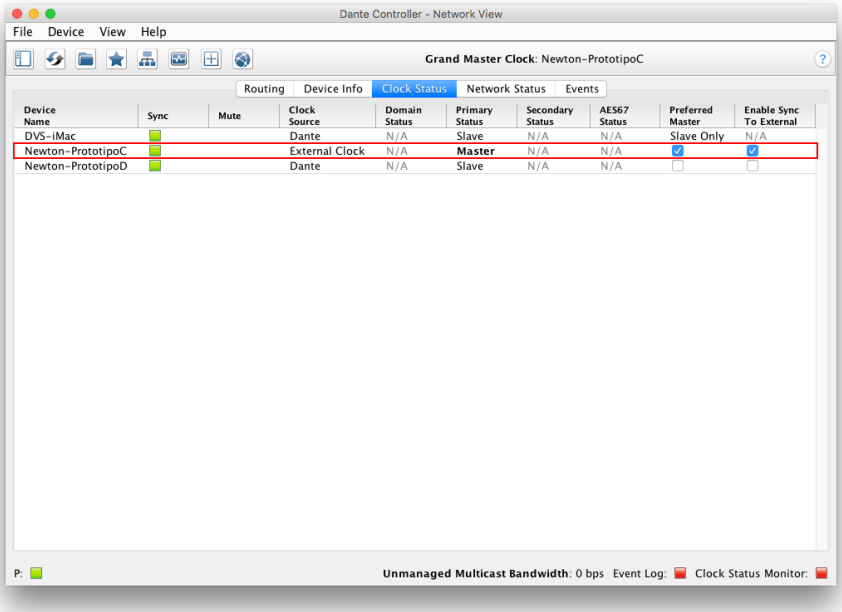
9.4.10. DANTE WORDCLOCK - NEW DANTE™ FIRMWARE UPDATE

These new releases of Newton and Dante firmware make it possible for the Master Clock selected for Newton to become the clock for the Dante network.
The following is a usage scenario according to which, as shown in point [1], having selected the desired Master Clock from the appropriate "Clock" section of the Outline Dashboard, it will be possible to have the latter as clock * of the entire Dante™ network, but only after having selected the Newton ** unit in question (from Dante Controller) as "Preferred Master" and enabled "Sync to External". (shown in point [2])
Read more to the ***Newton - Dante™ Firmware Update*** **User Guide** (outline.it).

[1]. The Master Clock selected in this section will become the clock of the entire Dante™ network. Obviously, it will be impossible to have "Dante" as the clock of the network itself (clock loop).





[2]. Select the Newton unit in question as a "Preferred Master" of the Dante network, flagging also the "Enable Sync to External" checkbox. After that, an "external clock" will be specified in the "Clock Source".

*In this case, to avoid clock loop, do not select "Dante" from "Master Clock" section of Outline Dashboard software. This will cause a device mute on Dante Controller. Otherwise, it will be necessary to select "Dante" only if the Newton unit in question is a "slave" in the Dante™ network itself (always check on Dante Controller).

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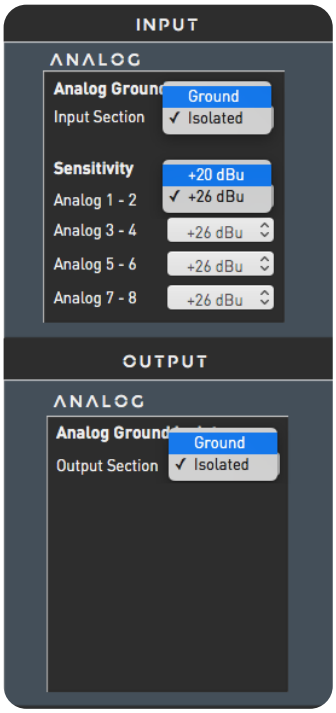
9.4.11. IO CONFIG

IO Config tab allows to monitor and modify input and output hardware parameters. The top part is referred to the input section, while the lower part is referred to the output section.

ANALOG INPUT / OUTPUT

The analog hardware input and output circuits in Newton 16+4 and Newton 16+8 employ galvanic isolation on the ADC and DAC to avoid ground loops. Galvanic isolation between the main digital board and the analog input and output boards prevents the flow of loop currents between the grounds of the input or outputs and the digital ground of the Newton (ground loop noise). The isolation allows to keep a very high quality on the ADC and DAC because the transformers are on the power supply side, not on the audio connectors. The isolation can be bypassed for input and output independently in this area by clicking on the *Isolator* section.



Newton allows also to select the analog input sensitivity between +20 and +26 dBu for pairs of channels (for a high-level signal choose + 26 dBu, for a weaker one selects + 20 dBu). From the technical point of view, the sensitivity represents the maximum level that can be accepted from the ADC.

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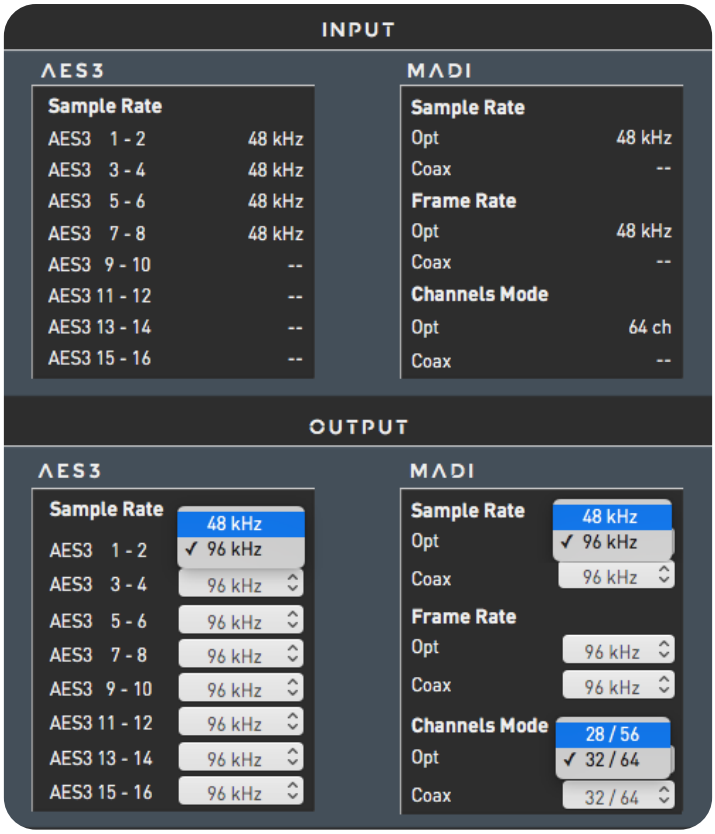
DIGITAL SIGNAL FORMAT

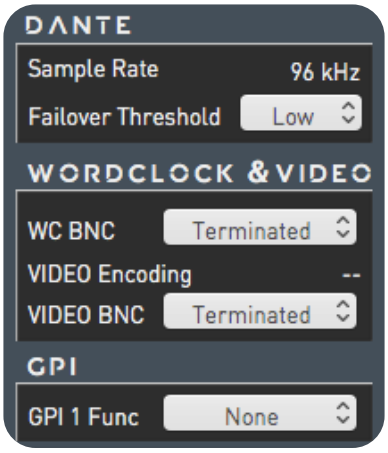
The input section reports useful details concerning the format of the incoming digital signals, including sample rates, frame rate (Madi), channel mode (Madi) and Video encoding. The output section allows to downsample AES3 and Madi digital signals. Dante sample rate is defined by Dante Controller. For Madi it is also possible to select the channel mode between 32/64 and 28/56.



The frame rate selection for Madi output is linked to Madi sample rate, i.e. for 48 kHz sample rate the frame rate is 48 k. For Madi 96 kHz the frame rate is 96.
N.B.: MADI Smux format not supported!

TERMINATIONS

A dedicated section allows to terminate the Wordclock and Video input BNC connections (75 Ω).



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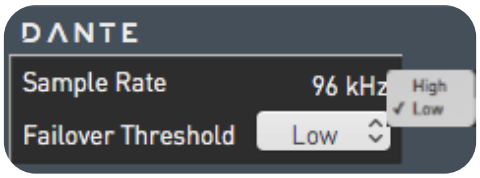
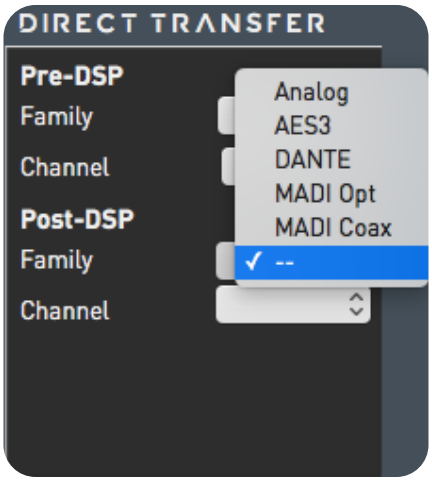
DANTE OVERVIEW



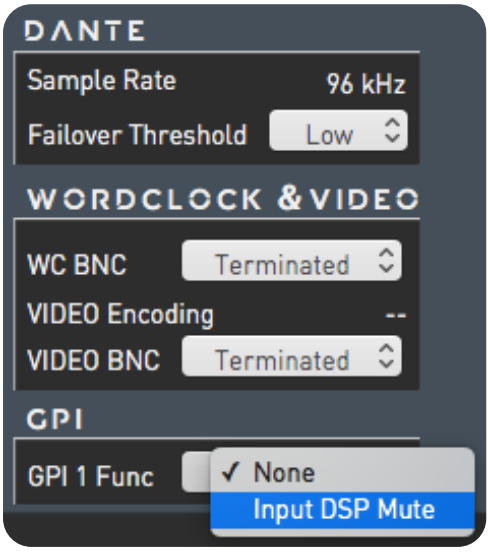
It is possible to check the Dante network sample rate, and specify the failover threshold, which can be high or low depending on the type and quality of the input signal, and will determine the behavior of the failover feature in the input patch section with regard to all Dante inputs. When set to 'High' the failover strategy will be triggered earlier than when it is set to 'Low'.

DIRECT TRANSFER



In this menu it is possible to set up the protocols (family) and the relative channels to be dedicated to the direct transfer function.

GPI



GPIO functions can be activated or de-activated through the IO config menu.

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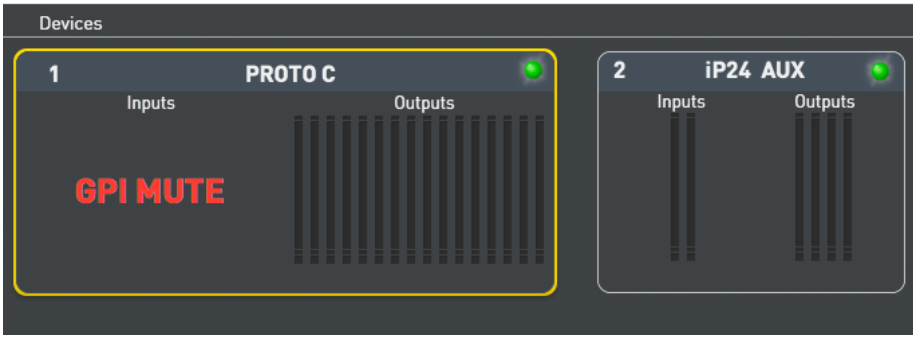
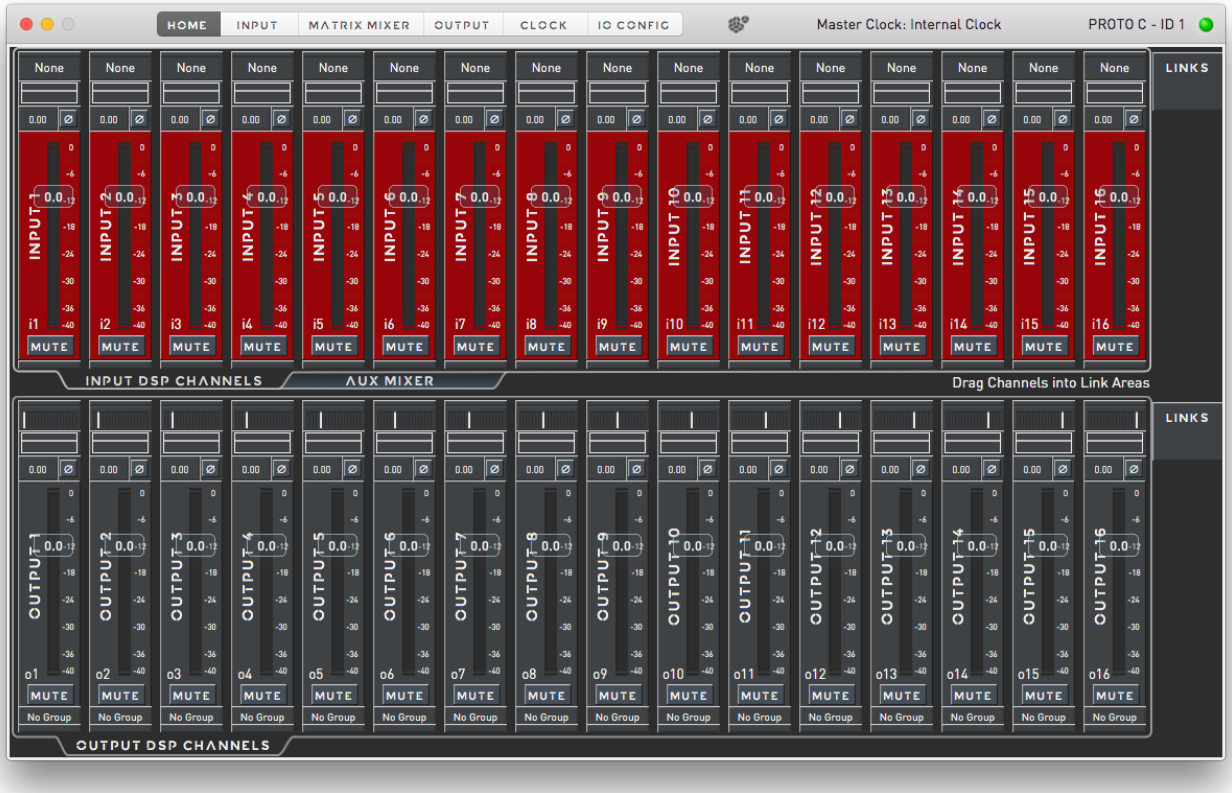
9.5. GPI "INPUT DSP MUTE"

This feature allows to mute or unmute all the Input DSP channels depending on the GPI 1 status (open / closed). Please, note that all the AUX Mixer channels and Direct Outs will not be affected by the GPI 1 status. Note also that, when GPI 1 is opened, all the input DSP parameters will return to the same values prior to the GPI 1 closing (Gain, Mute, etc...).

It is then clear that this feature is particularly suitable for emercency purposes, and so to mute all the input channels with an external hardware switch while keeping the auxiliary channels on to deliver emercency messages (emercency messages must be previously routed to the AUX Mixer).

Hereunder an example of a *GPI MUTE* shown in both the *Workspace* and the *Home Tab*.





WARNING: **D-Sub 9 GPIO connector must be plugged / unplugged ONLY with the device turned off.**
For details about the GPIO wiring please refer to chapter 15.2.

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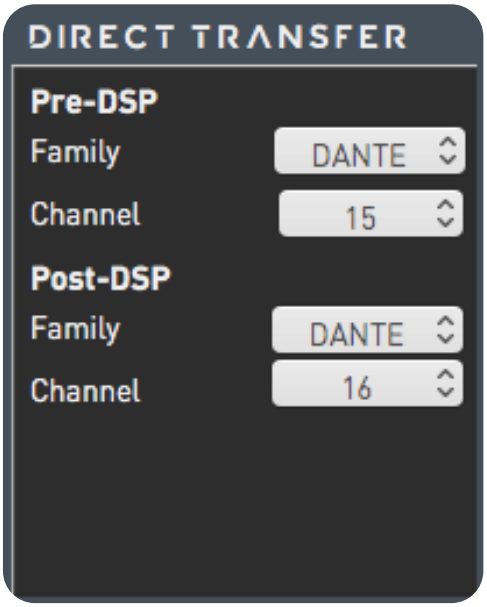
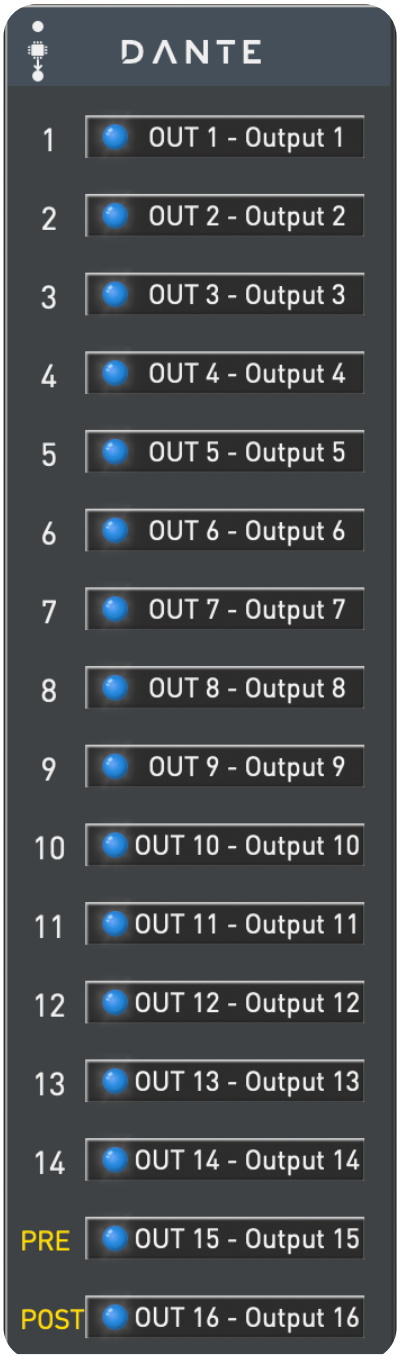
9.6. DIRECT TRANSFER

This feature provides to the user two specific pick-off points of any input or output channel (Pre-DSP and Post-DSP) suitable to analyze any EQ or phase variation applied through the related channel EQ. Before using this feature, the user must set correctly the outputs dedicated to this function (Pre-DSP and Post-DSP). Once these outputs have been chosen, to activate the direct transfer just click on the channel and then press "command+T" on your keyboard (⌘T), or right-click on top of the channel and select it from the pop-up menu.

Afterwards, in your measurement software, set up a transfer function with the Pre-DSP as your reference source and your Post-DSP as your measured source. Now any change applied to the channel's EQ window will be perfectly reported in your measurement software.





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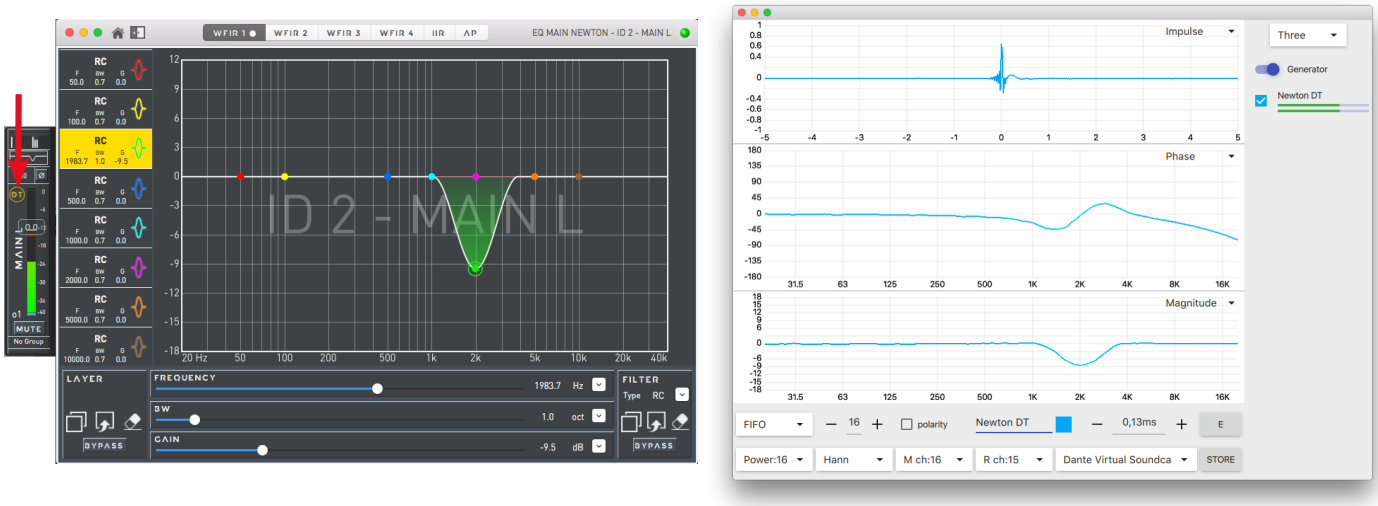

Open Sound Meter: an open source FFT analyzer software

This function is very handy whenever the DSP operation must be measured. It's also extremely easy to change the channel to be analyzed through the command+T action (speeding up the tuning and alignment process), and can be implemented with muting the channels not involved (action selectable from the Dashboard's system preferences menu).

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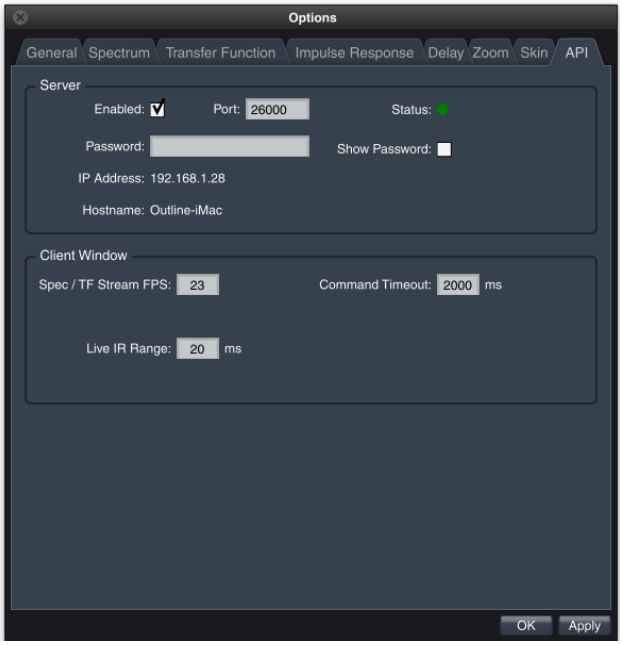
9.7. SMAART® API v8 INTEGRATION

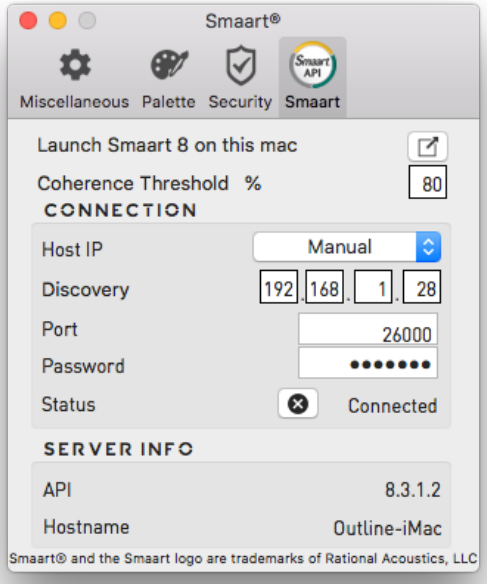
In addition to the direct transfer function, that can be implemented through any FFT analyzer software, Outline has established a collaboration with Rational Acoustics regarding the Smaart API v8 integration with Dashboard. This integration provides Smaart parameters, transfer functions and phase analysis through the Dashboard software.
Please, note that Smaart v8.3 (or higher) is required.
In order to perform the integration, please follow the next steps:

1. Run Smaart and open Options → API ;



2. Check that the server function is enabled, with an assigned port, a password (if required) and an IP address. Please note that during the network scan Dashboard will use the operating system primary interface;

3. Run Dashboard and open Preferences → Smaart ;



4. Click on the 'Host IP' list and choose your Smaart server IP, then click on the connect Status button.
In case your Smaart server does not appear in the list, you can type the Smaart server IP address, Port and Password (if required) and then click on the connect Status button;

5. In this window it is also possible to set the Smaart curve coherence threshold that will be visible in the EQ windows of the desired channels. Set the threshold as a percentage value between zero and one hundred for the coherence blanking function. Coherence blanking removes questionable data from magnitude and phase traces at any frequency where coherence does not meet or exceed the specified threshold (for further information refer to Smaart v.8 user guide - pg. 121).

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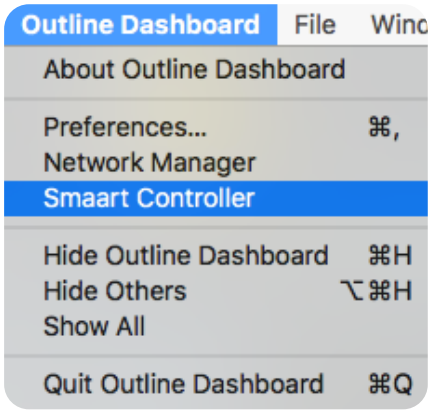
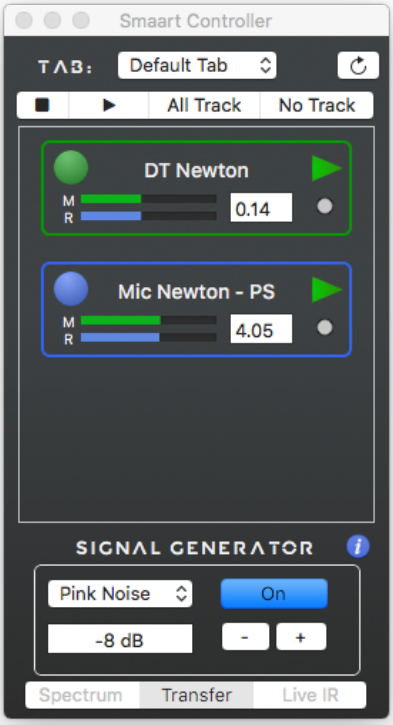
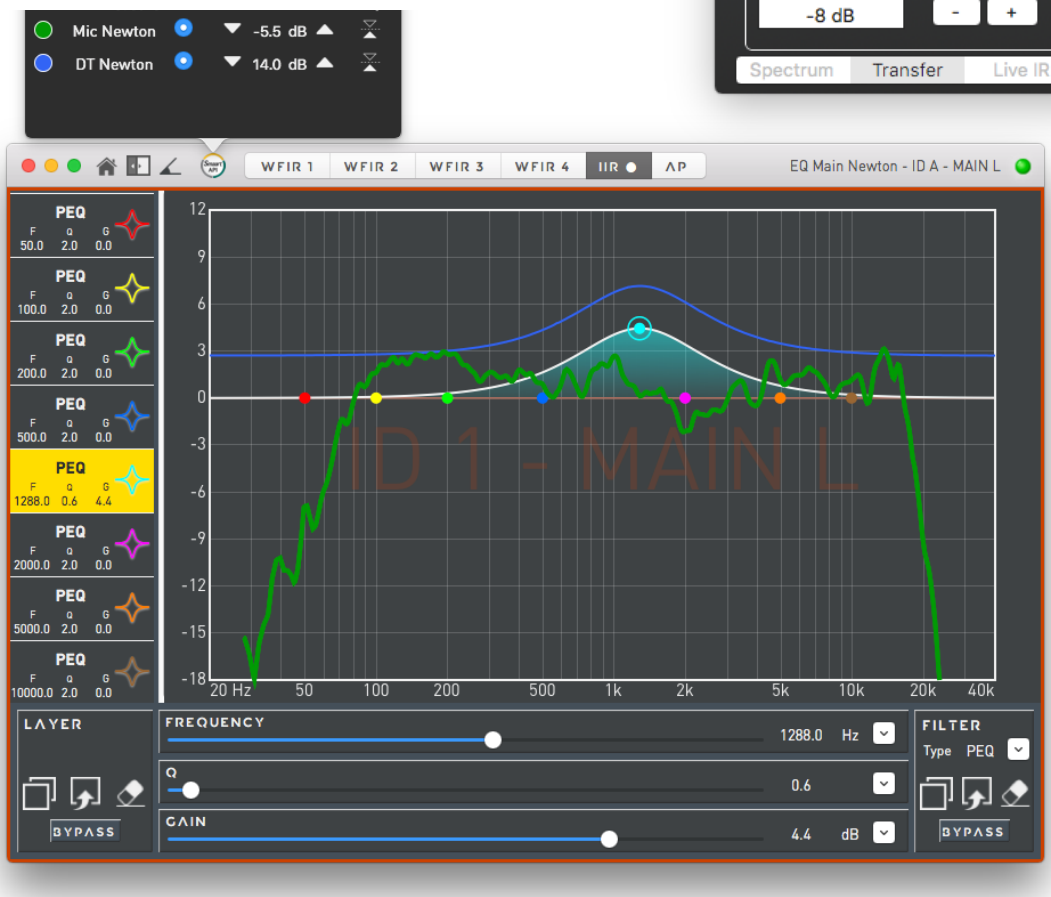


6. In the 'Outline Dashboard' menu, select 'Smaart Controller'. This window is now synchronized with the same window in Smaart.



7. From here you have the same control over Smaart in all active transfer functions, that will be visible in the desired EQ window. They are selectable from a pop-up menu, with the possibility to set an independent gain offset and to flip the curve for a more convenient view;



Example of two transfer functions of a Direct Transfer on one Newton channel and of its relative hardware output connected to a point source measured with a microphone.

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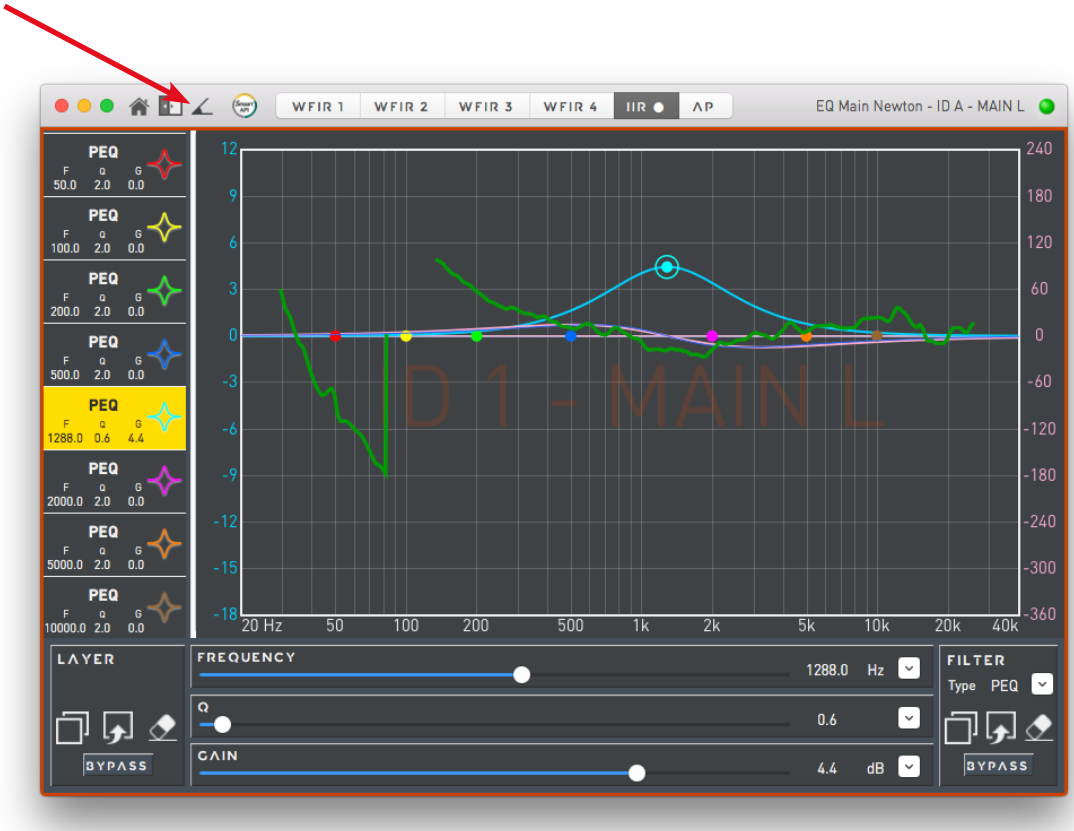
8. It is also possible to show the Smaart measured phase (only available for the IIR and All-pass filters windows). In this mode Dashboard will show exclusively the Smaart phase curve;



Example of a point-source transfer function (magnitude and phase response) with a parametric filter applied.

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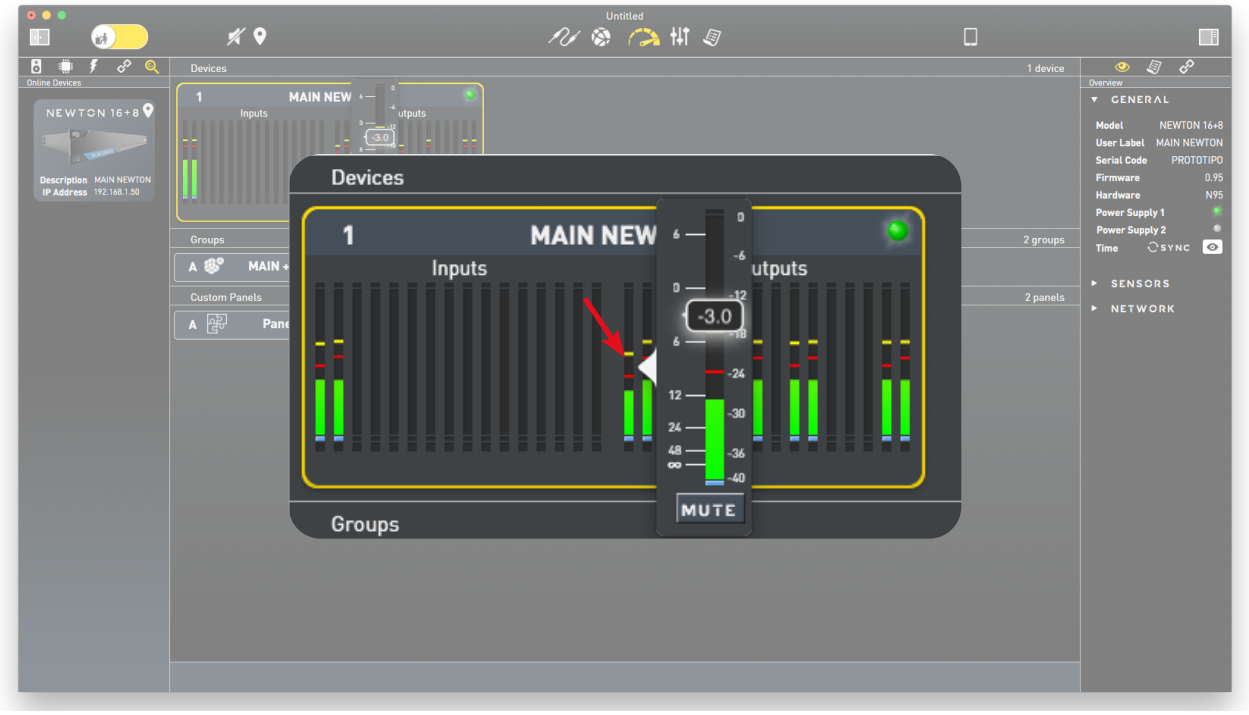
9.8. NEWTON CONTROL AND MONITORING FROM THE WORKSPACE

From the Workspace it is possible to monitor multiple Newton units. The units are automatically arranged in the available space and each one has an ID number (assigned when the unit is loaded in the workspace) and a description. The networks status of each unit is shown by the uppermost icon with the following colour code:

- Blue: Virtual
- Green: Online
- Red: Offline
- Waiting: Synchronizing

Each unit shows the real time VU meters of the 16 processed input (pre-fader) and 16 processed output (post-fader and post-mute). The Click & Trim function allows a quick control of input and output gains and mutes.



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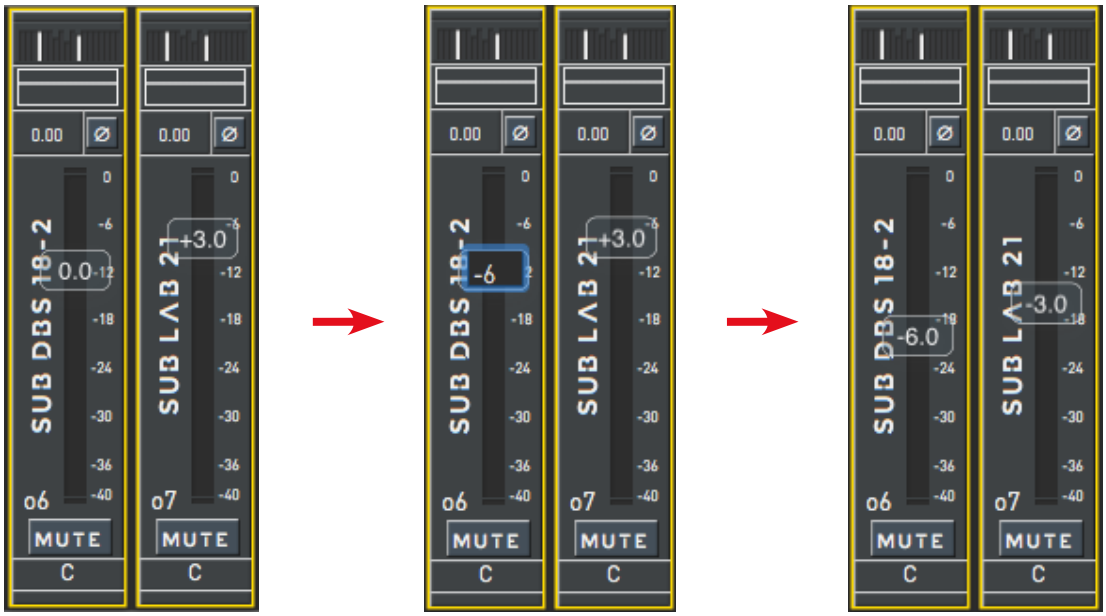
10. OUTLINE DASHBOARD | LINKING CHANNELS

10.1. TEMPORARY LINKS

Outline Dashboard allows to do temporary links (gang) between the input channels and between the output channels. To temporary link two or more channels (from the *Home* window), select with *shift* ⇧ *+ click* the desired channels and then modify the parameters of the selected channel simultaneously. **This temporary link keeps the relative differences between the channels in terms of levels and delays.** So, if you insert -6 dB to a channel that is at 0 dB, then all linked channel will have their level lowered by 6 dB. The same happens for the delays.



Mute and Polarity of the linked channels will all be deactivated or activated depending on the state of the clicked channel.

ⓘ These links are temporary and thus will be removed as soon as another channel is selected. The creation of new channel links is very fast and can be used dynamically when controlling Newton.

It is important to understand the concept behind the EQ for linked channels in order to use it correctly: when changing a filter of linked channels, the change affects just that specific filter, considering its position in the layer. This gives the user the flexibility to apply the same EQ to multiple channels and also to apply a single filter to channels with different EQs.

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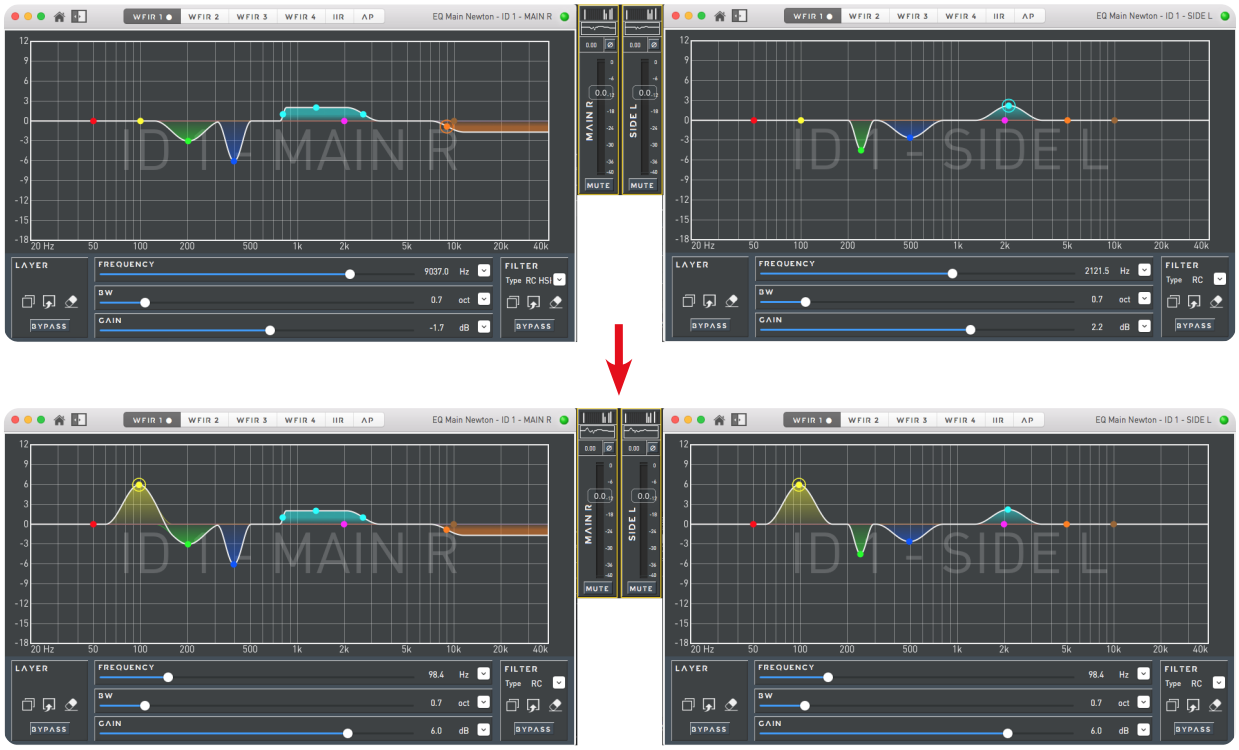
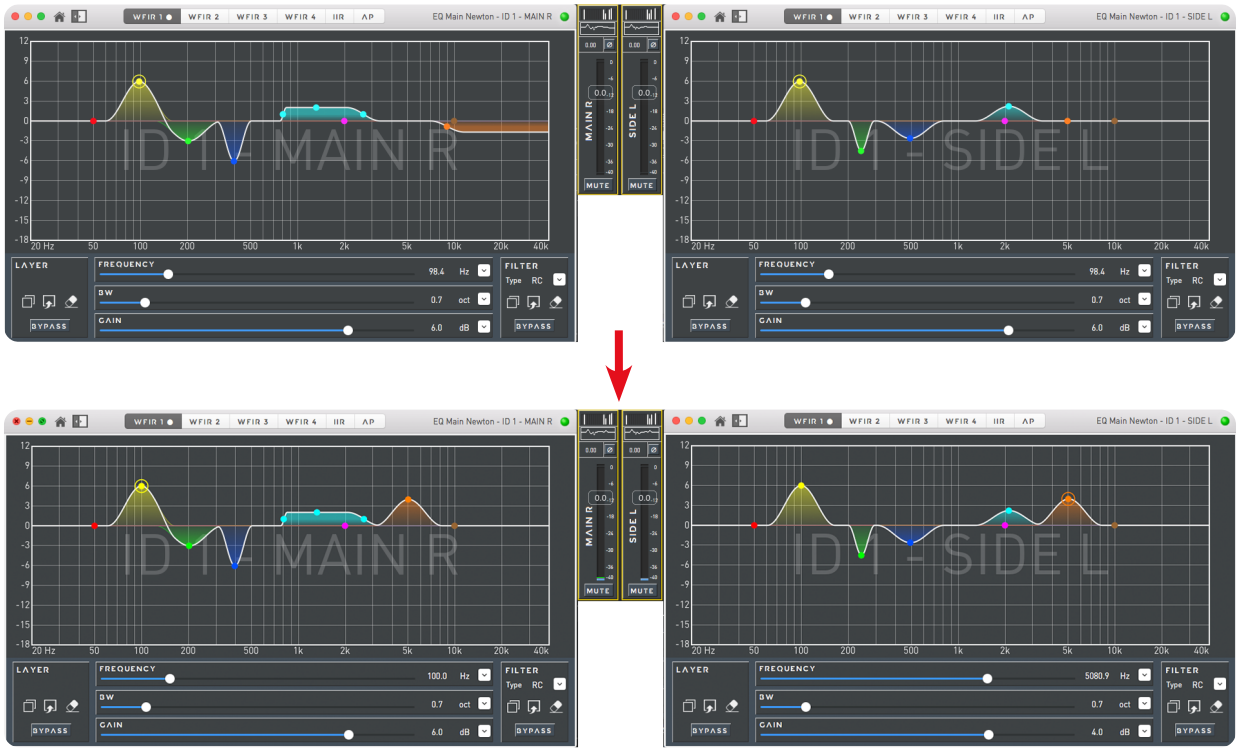
E.g. if the linked channels have different EQ setting, changing one filter only affects the corresponding filter of the other channel(s), as shown here below.



If the filter is already used in other linked channels, then the new settings will overwrite these filters (see the orange filter in the next pictures).



Tips: in order to immediately set two linked channels to the same settings just copy and paste the actual layer on itself.

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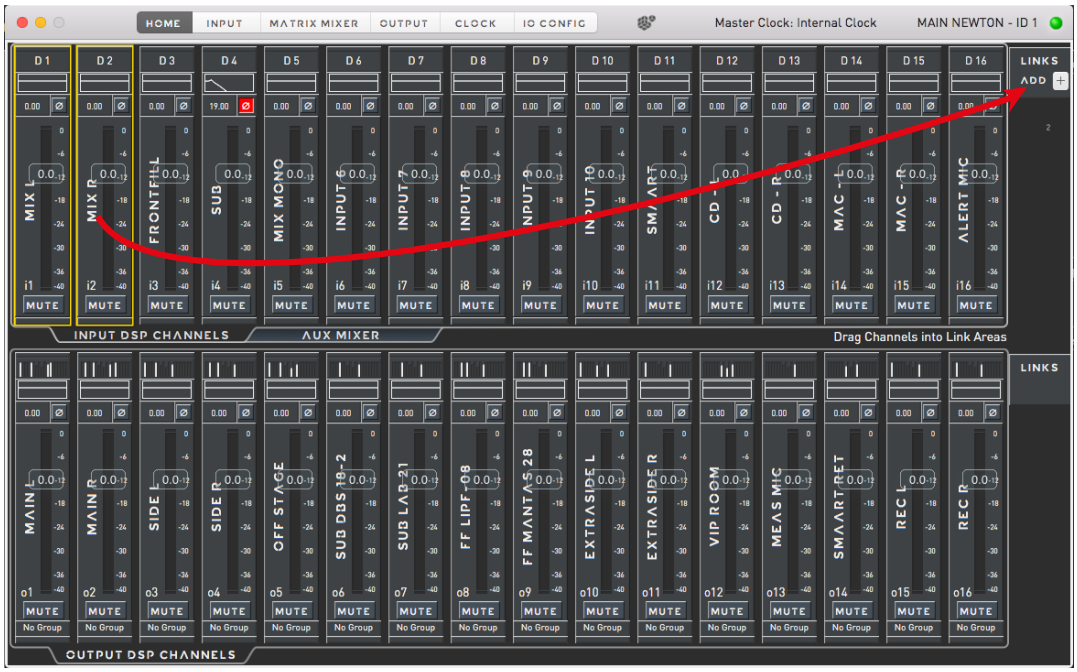
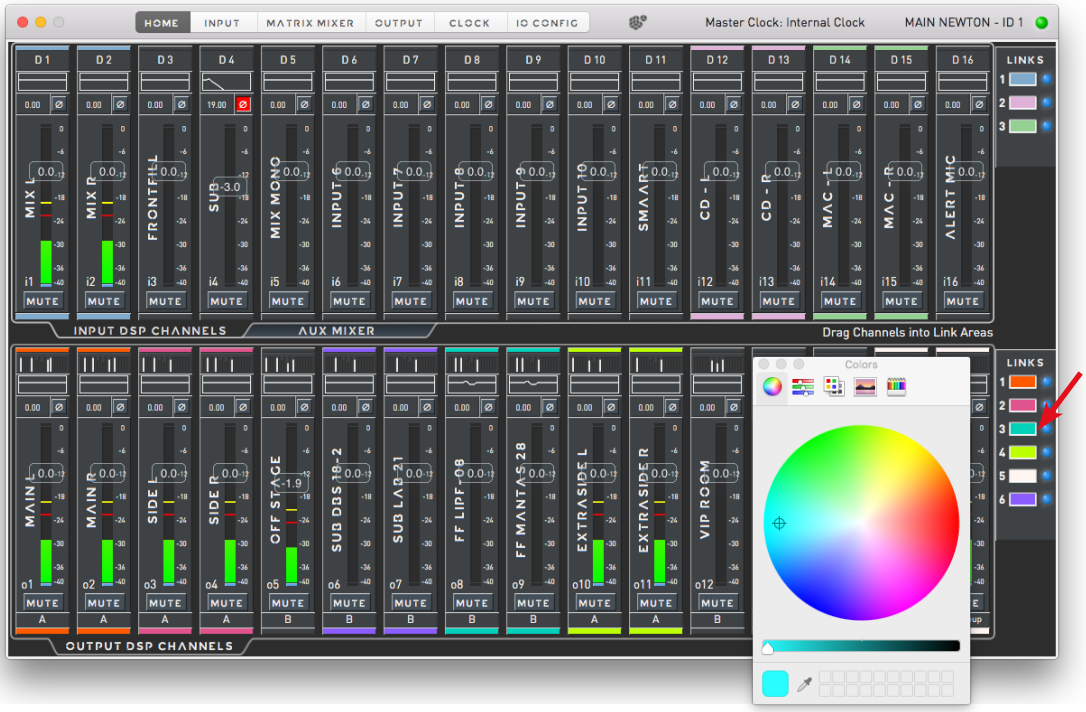
10.2. PERMANENT LINKS

Outline Dashboard also allows to create permanent links (link grouping) between the input channels and between the output channels. To permanently link one or more channels (from the *Home* window), drag and drop the selected one(s) to the grouping links area. If dragged elements are more than one, the dragging icon will show the number of involved channels.



These Outline Dashboard features allow users to have more control when changing several parameters simultaneously (gain, mute, polarity, delay, EQ) for all the channels assigned to a links group. In order to recognize all the 8 links groups, choose different colors by clicking on the coloured box.



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Change all the parameters (gain, polarity, delay, mute/unmute, EQ) the same way as the temporary links. It is possible to mix permanent and temporary links together. The permanent ones will always work simultaneously. To temporary bypass the permanent links group, click on the blue light on the right bar of the permanent link area. The colours at both ends of a channel strip indicate the links group the channel makes part of. The bypassed links are coloured in grey.

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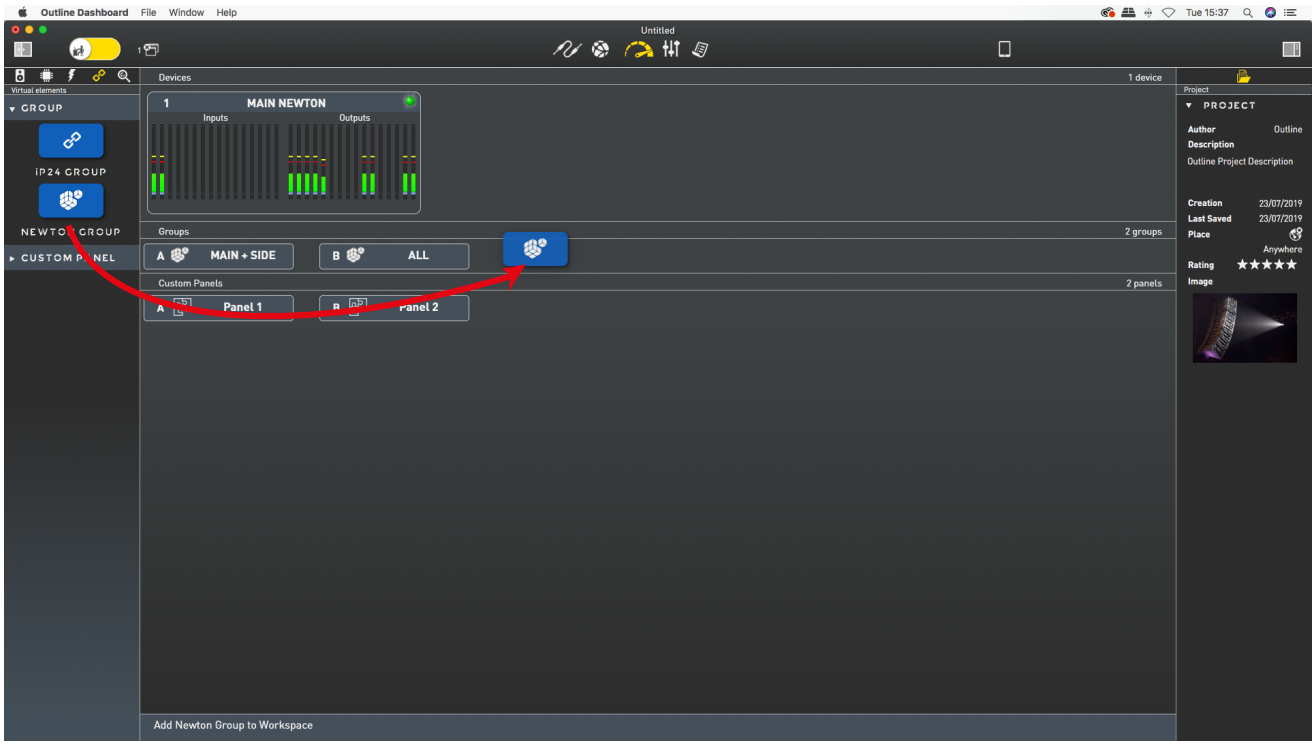
11. OUTLINE DASHBOARD | OUTPUT GROUPS

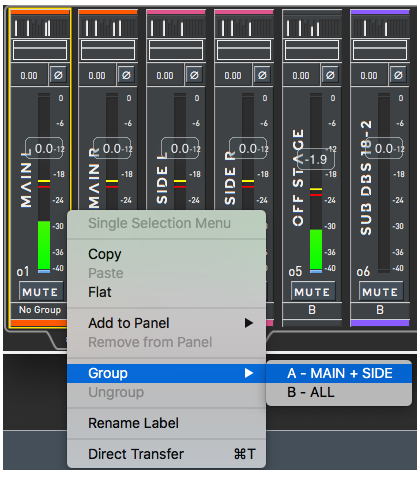
Another important feature of Newton is the possibility to have simultaneous control of multiple outputs using Groups. The settings made on the groups affects the settings of each single channel in the group, working as an additional layer since each group has its own EQ, delay, polarity, level and mute. Each single channel can belong up to four groups.

11.1. ADDING A NEW GROUP

In order to add a group to the workspace drag and drop a *Newton Group* to the *Workspace* from the *Library* or double click on the group in the *Library*. The groups will occupy a dedicated part in the *Workspace*, just below the units. Click on a single group to see the details in the inspector (on the right) and to change its name.



In order to assign a channel to a group, right click on an output channel on the *Home* tab, select "Group", then choose the desired group. Repeat this procedure for each additional channel.



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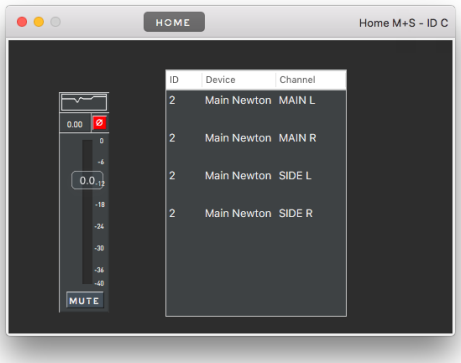
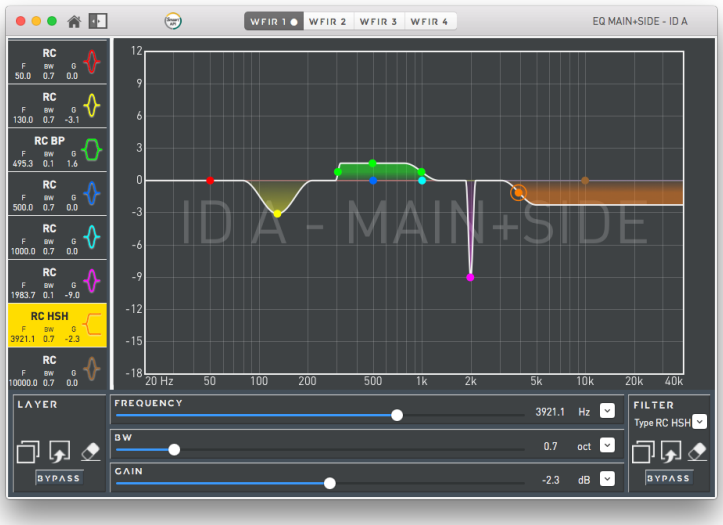
From the workspace select a group to have a preview of the assigned channels in yellow. You can find the same information in the *Inspector*: a list under the group's name shows the assigned channels.

11.2. EDIT GROUP PARAMETERS

Double click on a group to see its details. The window that will pop up has a channel strip with an overview of the group's settings. The available parameters are: EQ with 4 WFIR layers, delay, polarity, level and mute/unmute. The channel strip works like the Newton's input and output channels in the *Home* tab.

Double click on the EQ section to open the EQ window and edit the parameters.





11.3. CHECKING GROUP SETTINGS FROM NEWTON'S HOME TAB

The settings made on the groups are overlapped to the settings made on the single channels. If there are any group changing the overall channel response, the corresponding channel strips in the *Home* tab becomes dark yellow. This colour is applied to the EQ if there is any change in the groups EQ, is applied to the delay if there is any change in the groups delay, and so on for the remaining parameters.

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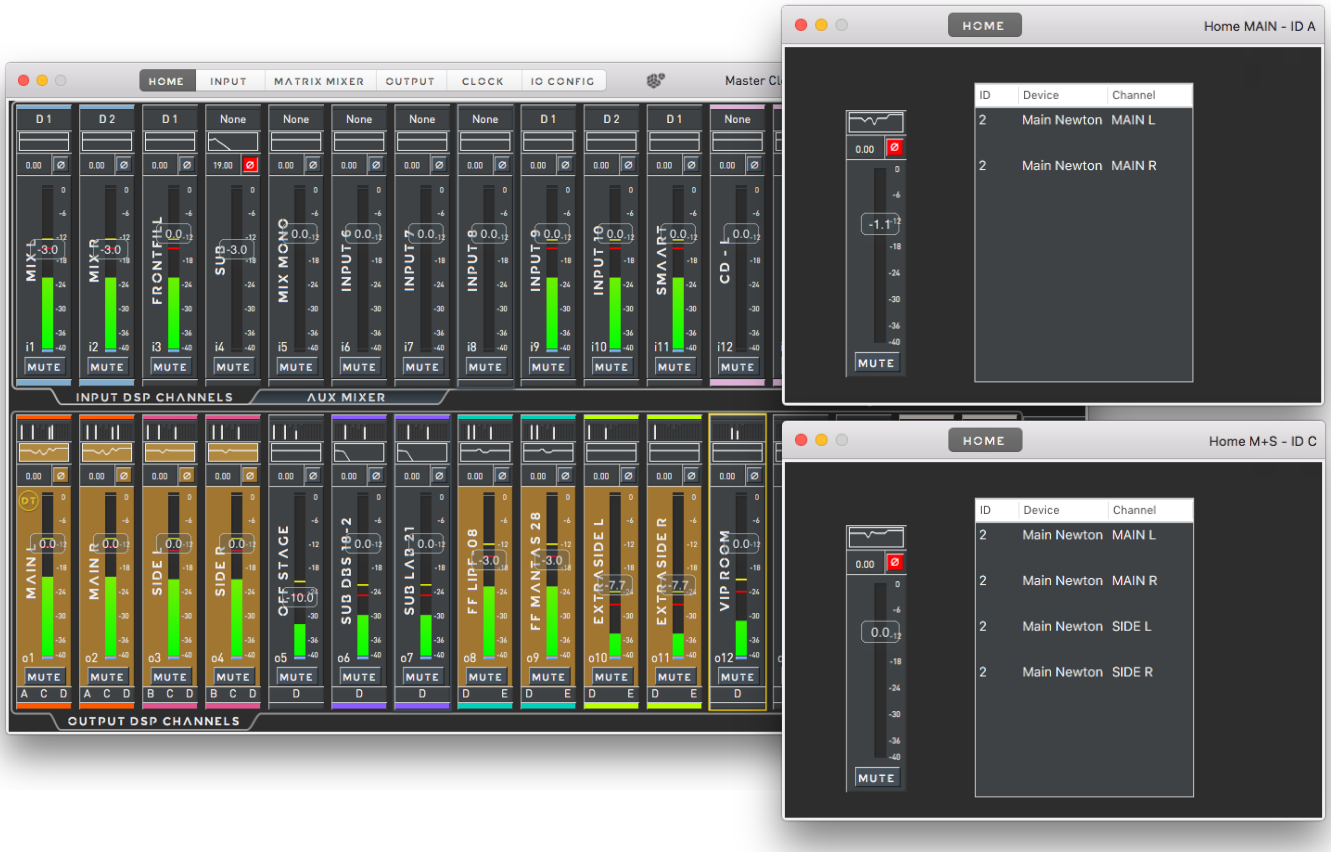
The following image shows a Newton with a group named "Main" connected to output channels 1 and 2, a group named "Side" connected to output channels 3 and 4 and a group named "M + S" connected to output channels 1, 2 ,3 and 4.

It is possible to see the corresponding colour changes in the *Home* tab.



This feature is useful to see changes made by the groups.
In order to see the total amount of delay or level actually acting on the channel, it is possible to toggle the groups values. Using this option, it is possible to see the absolute level and delay for each single channel (that is the result of the single channel setting plus groups settings).

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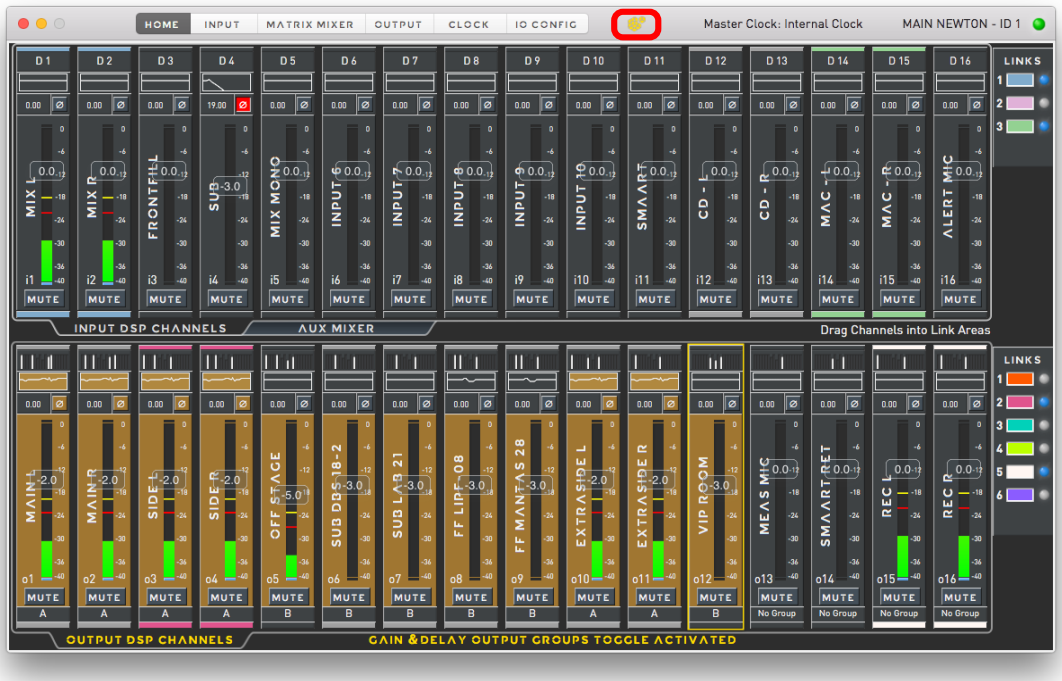
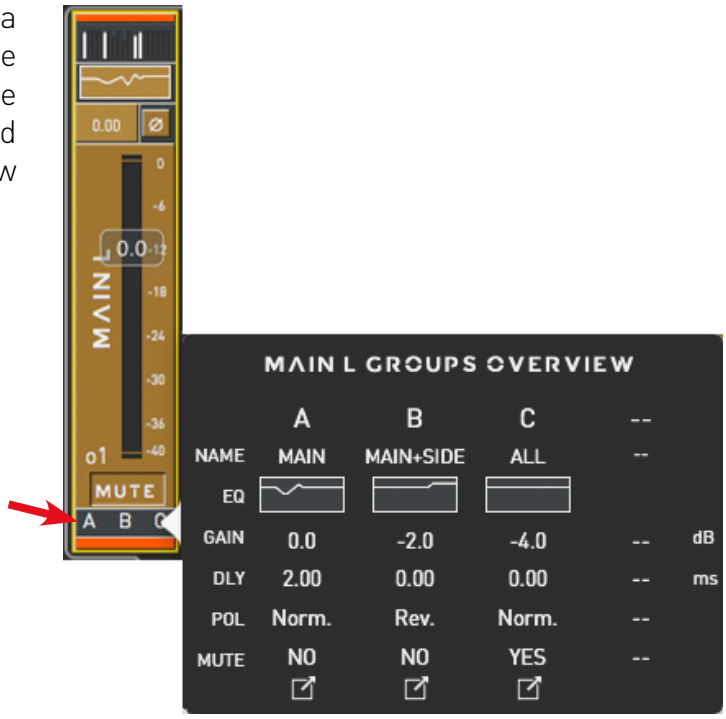


While the groups toggle view is activated, it is not possible to change level and delay values. Filters, polarity and mute/unmute remain available.

11.4. GROUPS OVERVIEW

At the bottom of the output channel strips, a groups overview will indicate which groups the related channel is part of (represented by the group letters). Further details are available and can be shown by clicking on the groups overview area.



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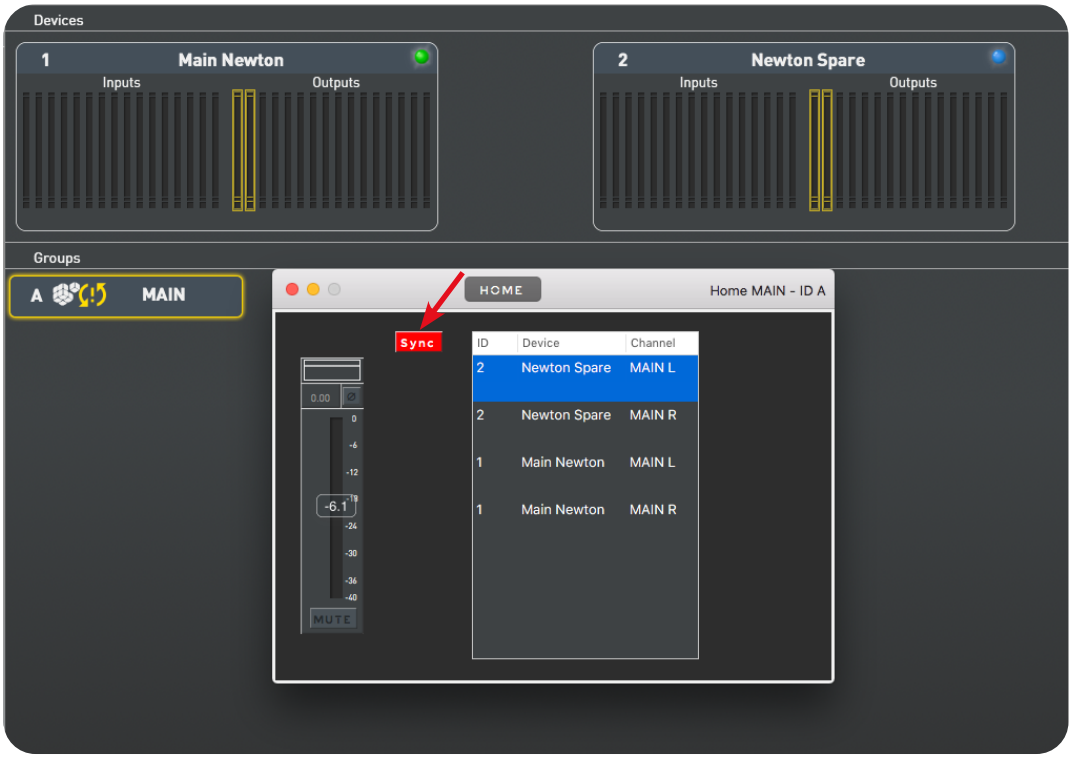
11.5. NOT ALIGNED GROUPS

It might happen that a group is showing a non-alignment status. If this happens, before being able to use the group, a synchronization must be done, as explained below.

The groups in the workspace that are not aligned show an exclamation mark with a double arrow. If this happens, open the group window and click on the channels in the list, you will note that the master fader is showing different settings depending on the selected channel. The "Sync" button will align the group to the settings that are shown on the channel strip.



11.6. REMOVING A CHANNEL FROM A GROUP

To remove a channel from a group, right click on the channel from the Home tab and select "Ungroup". An alternative way to remove a channel from a group is by using the two-fingers as shown below.

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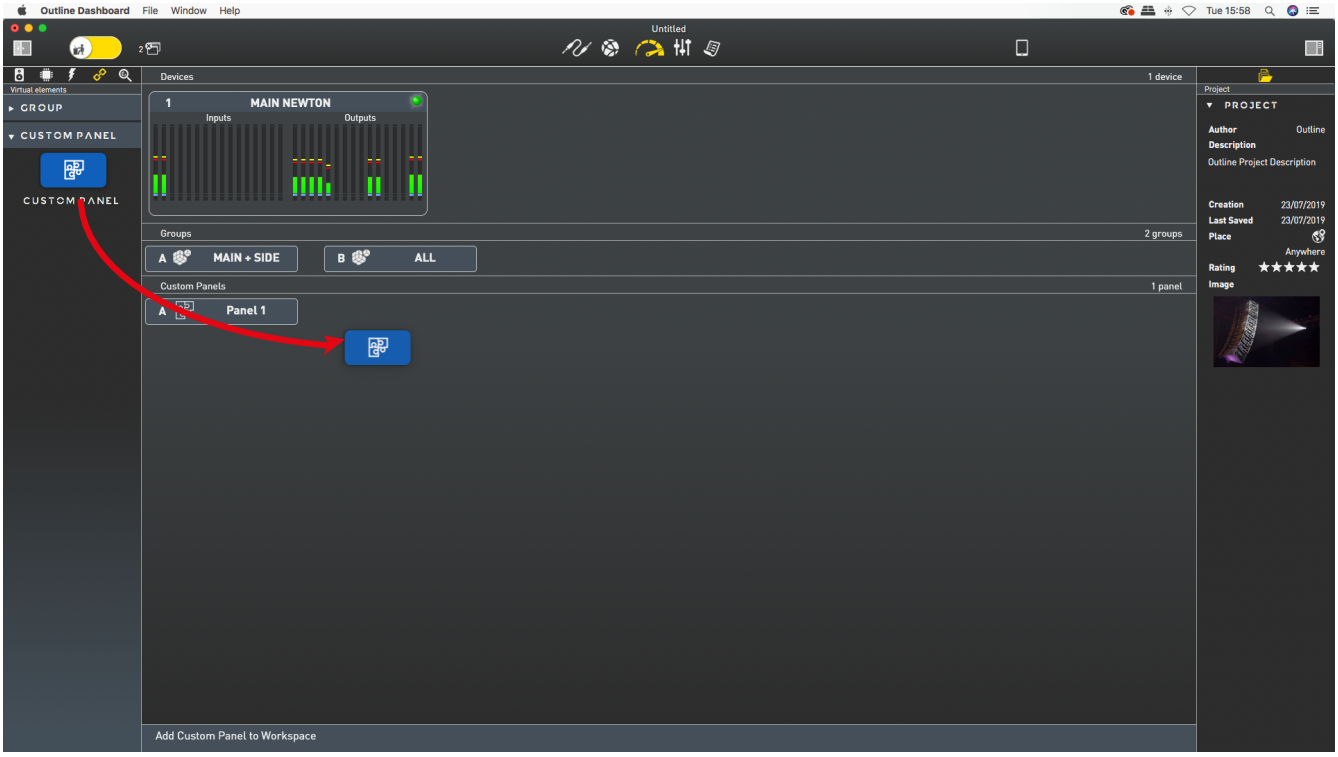
12. OUTLINE DASHBOARD | CUSTOM PANELS

Custom panels are tools to create custom windows with a selection of faders from different devices and groups. The target of these panels is to create a tailor-made control experience, allowing the users to create their own interface.

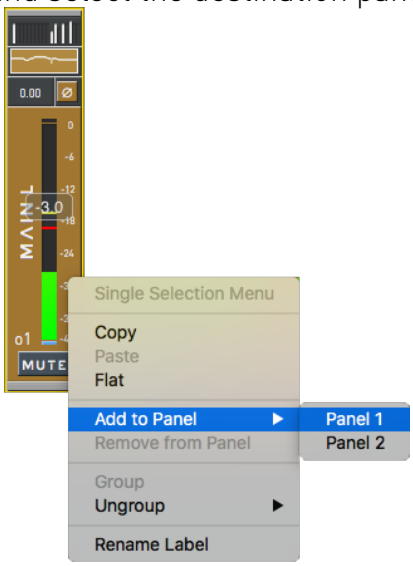
12.1. ADDING A CUSTOM PANEL TO THE WORKSPACE

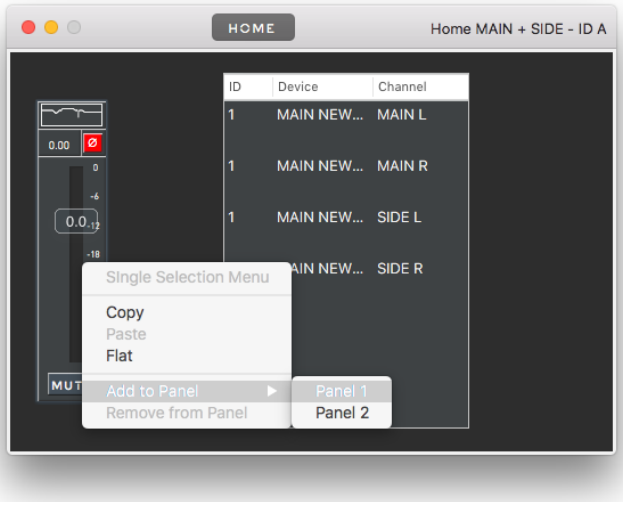
To use custom panels, drag & drop from the *Library* to the *Workspace* or double click on the custom panel from the *Library*. By selecting it, the *Inspector* shows its details and it is also possible to rename it.



12.2. ASSIGN CHANNEL STRIPS TO A CUSTOM PANEL

To add a channel strip to a custom panel, right click on the channel strip (device or group), select "Add to Panel" and select the destination panel





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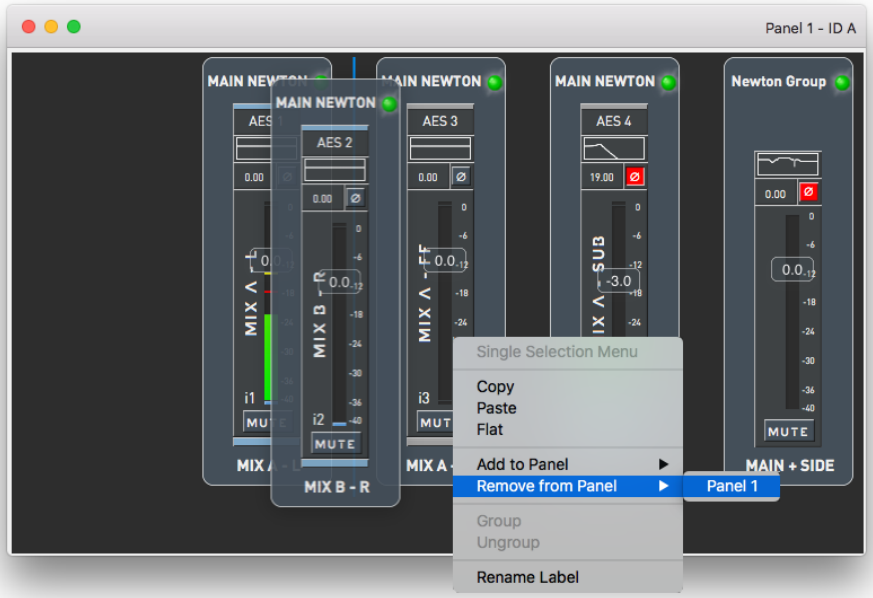
Clicking on a panel in the Workspace will show all channels and groups assigned to it (in yellow). The same channel strip can belong to more than one panel.

12.3. EDITING CUSTOM PANELS

You can change faders' order using the drag and drop. You can copy, paste and flat channel settings, add the selected channel to other panel(s) and remove it from current panel using the right click.



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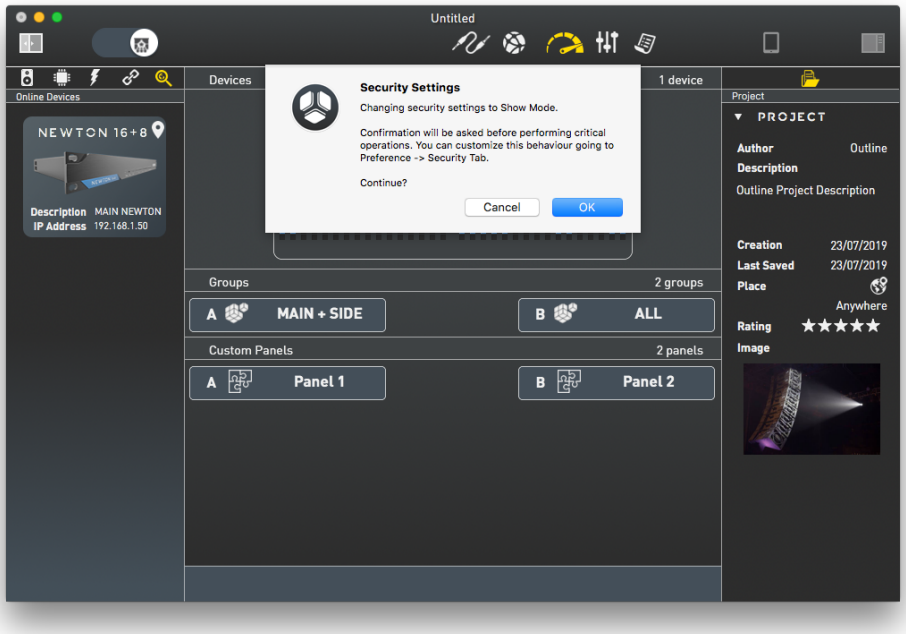
13. OUTLINE DASHBOARD | TIPS AND TRICKS

13.1. SHOW MODE / DESIGN MODE

Outline Dashboard has a safe mode that can be used during show time to prevent any accidental changes. This mode can be activated from the main window.



The different options related to the show mode can be edited in *Outline Dashboard* preferences.

13.2. USING MAC GESTURES FOR EASY WINDOWS HANDLING

Outline Dashboard allows the use of many native Mac gestures that are useful to quickly navigate between its windows. E.g. if there are many windows open in *Outline Dashboard*, we can see all these windows simply by using Mac's *Mission Control*.

It is also possible to arrange the windows in virtual desktops: from the mission control drag and drop the windows to the desired virtual desktops then switch between them.

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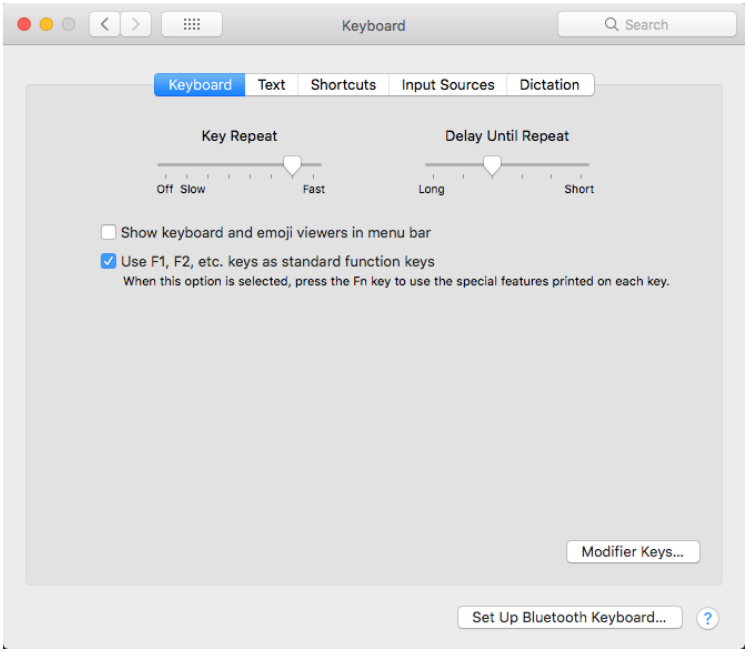
13.3. WORKING WITH MULTIPLE DEVICES AND WINDOWS

When using multiple devices there are some shortcuts that facilitate the navigation between them. To quickly open different devices, press option (⌥) + F1, F2, F3... F12 that correspond to device n°1, 2, 3... 12. In other words, press ⌥ + F1 to open device #1, press ⌥ + F2 to open device #2... The device ID is shown in the workspace

⚠ This shortcut will close all other device windows.

ⓘ This function is available after setting up the system preferences of your Mac: in keyboard control panel (flag on "Use F1, F2.. etc.")



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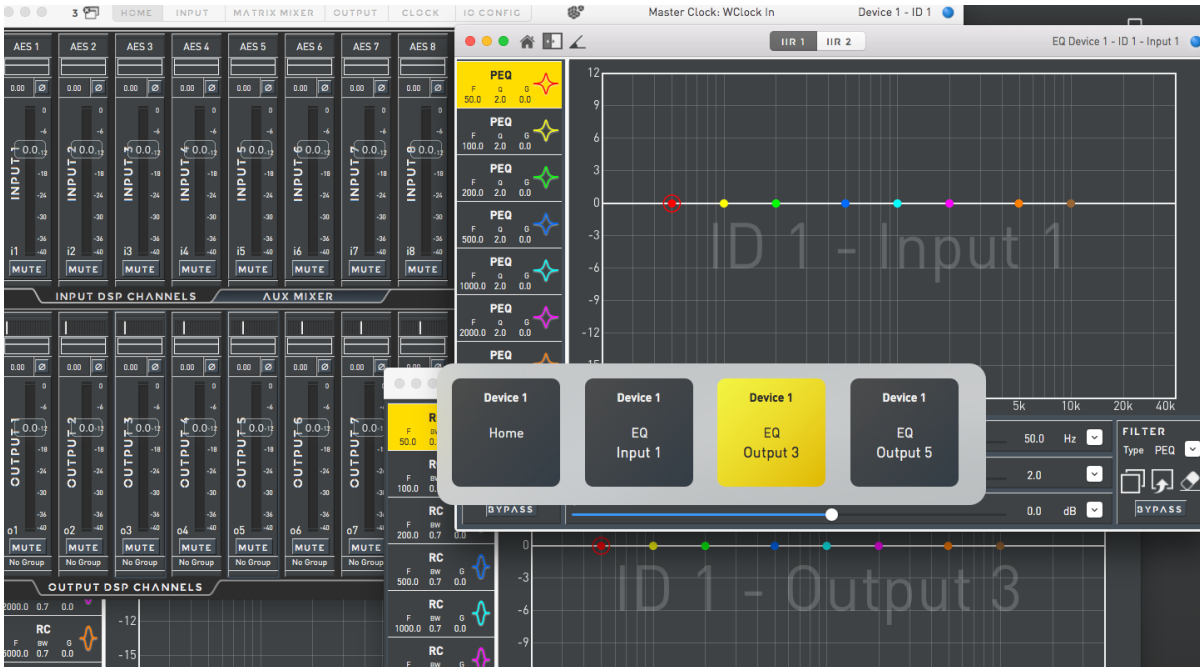
When two or more device windows are open, you can switch between them with option (⌥) + TAB (⇥).

To switch between the open windows (i.e. EQ windows) of a device use control (^) + TAB (⇥).



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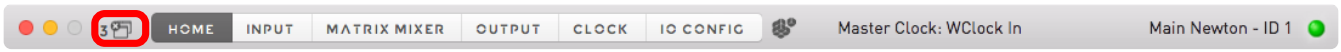
An easy way to remember the above shortcuts is to consider that on Mac the keys command (⌘), option (⌥) and control (^) are next to each other and that:

- command (⌘) + TAB (⇥) is used to switch between the opened applications;
- option (⌥) + TAB (⇥) is used to switch between the active devices' windows;
- control (^) + TAB (⇥) is used to switch between the active windows of the same device.

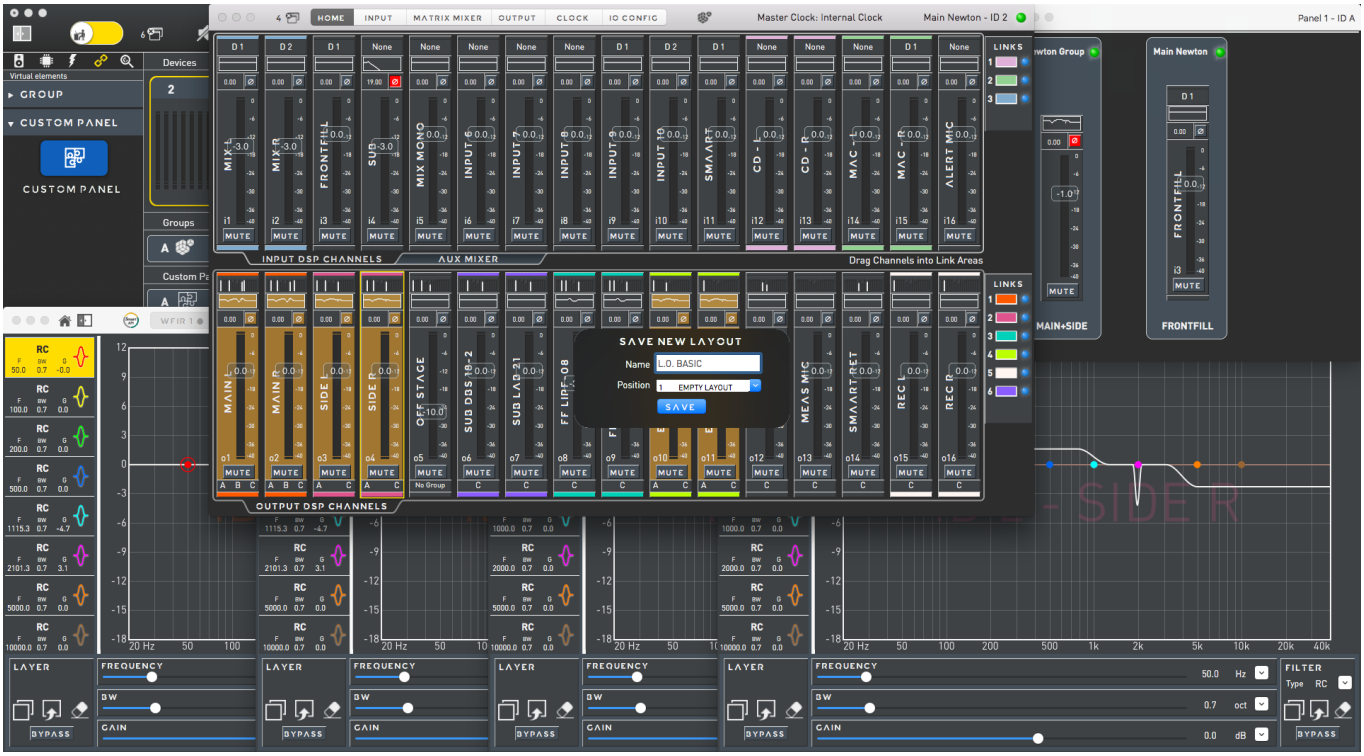
In the device main window, the number of sub-windows opened is reported in the top left corner. Click on that button to close all the windows.



In *Outline Dashboard* the total number of windows opened is shown in the top bar. Click on that button to close all the windows.

13.4. WORKING WITH MULTIPLE DEVICES AND WINDOWS

Layouts are used to create custom views and windows arrangements that can be recall by the users. To save a layout use *command* ⌘ *+ L*.



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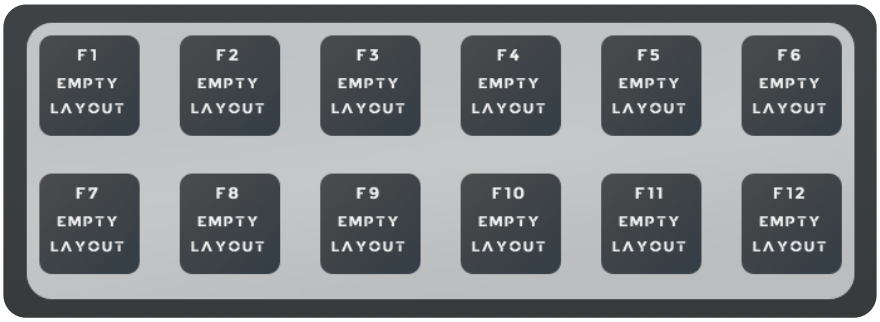
You can type the name of the Layout and you can decide the Layout number. You can save up to 12 Layouts. To recall a Layout, press the spacebar of your keyboard, wait for the window of the layouts to popup and then click on the function keys (F1, F2, ..., F12) to recall the saved layout



13.5. OTHER SHORTCUTS

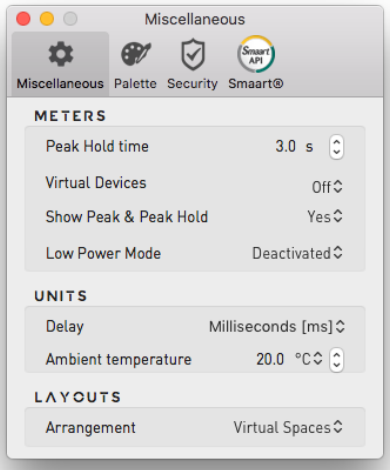
Like in most OS programs, you can:

- open a new project with command (⌘) + N
- open a saved project with command (⌘) + O
- save current project with command (⌘) + S
- save as similar project from current one with shift (⇧) + command (⌘) + S
- close a device windows with command (⌘) + W
- open system preferences with command (⌘) + ,
- open the selection menu with space-bar when a channel is selected;
- insert fader value with enter when a channel is selected;

13.6. OUTLINE DASHBOARD PREFERENCES

The software preferences are divided into four main areas, as described below.

13.6.1. MISCELLANEOUS



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- Meters:

- Peak hold time: VU meters peak hold time constant. Default value is 3 s;
- Virtual devices: enables the demo VU meters mode for virtual devices;
- Show Peak & Peak Hold: shall be enabled by default to prevent any clipping;
- Low Power Mode: VU meters in low power mode are not animated but consume less power.

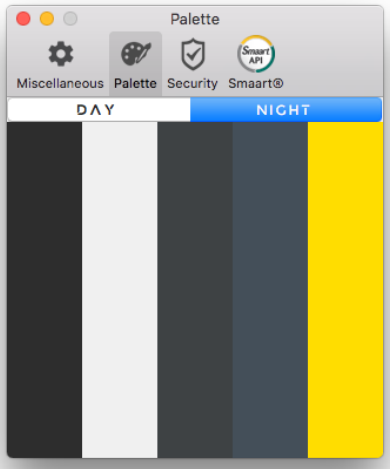
- Units:

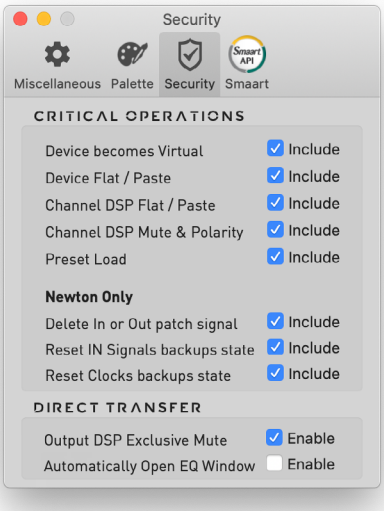
- Delay: delay can be expressed in milliseconds, samples, meters and feet;
- Ambient Temperature: used to calculate the ratio between the delay in milliseconds and in meters or feet, the air temperature can be expressed in °C or °F.

- Layouts:

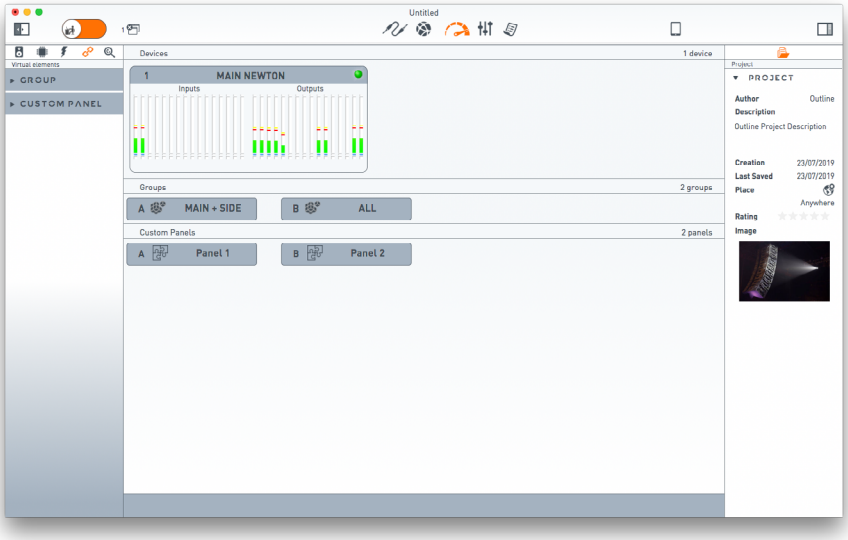
- Arrangement: the windows arrangement requires a different selection when using multiple screens. Set this option to "Multiple screens" when working with more than one monitor; set this option to "Virtual Spaces" when working with a single monitor and virtual spaces are used.

13.6.2. PALETTE AND SECURITY





Two software colour themes are available for an improved readability under the sun or in poor lighting conditions. A few seconds are required when changing the colour code. Security includes a series of options allows to include or exclude some actions in *Show mode* and muting channels about the DT.



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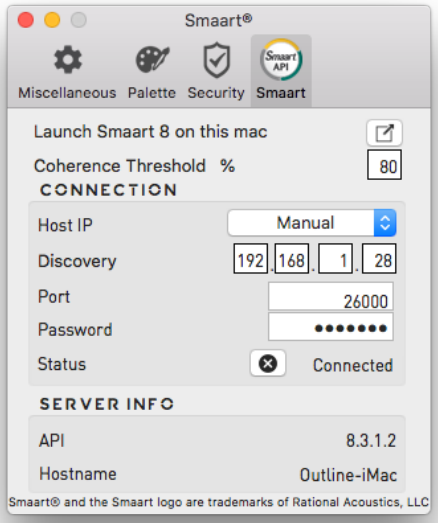
13.6.3. SMAART



- Launch Smaart 8 on this mac: command to launch Smaart 8 from this window;
- Coherence Threshold: below wich Dashboard will not show the data of the Smaart curves;

- Connection:

- Host IP: choose between "manual" or IP addresses referring to available Smaart API servers;
- Discovery: type the Smaart API server IP address on manual mode (discovery mode will show the IP address automatically).
- Port: used to insert the port number;
- Password: if a password has been entered in the Smaart API server it must be written here;

- Server Info:

- API Server version;
- Hostname.

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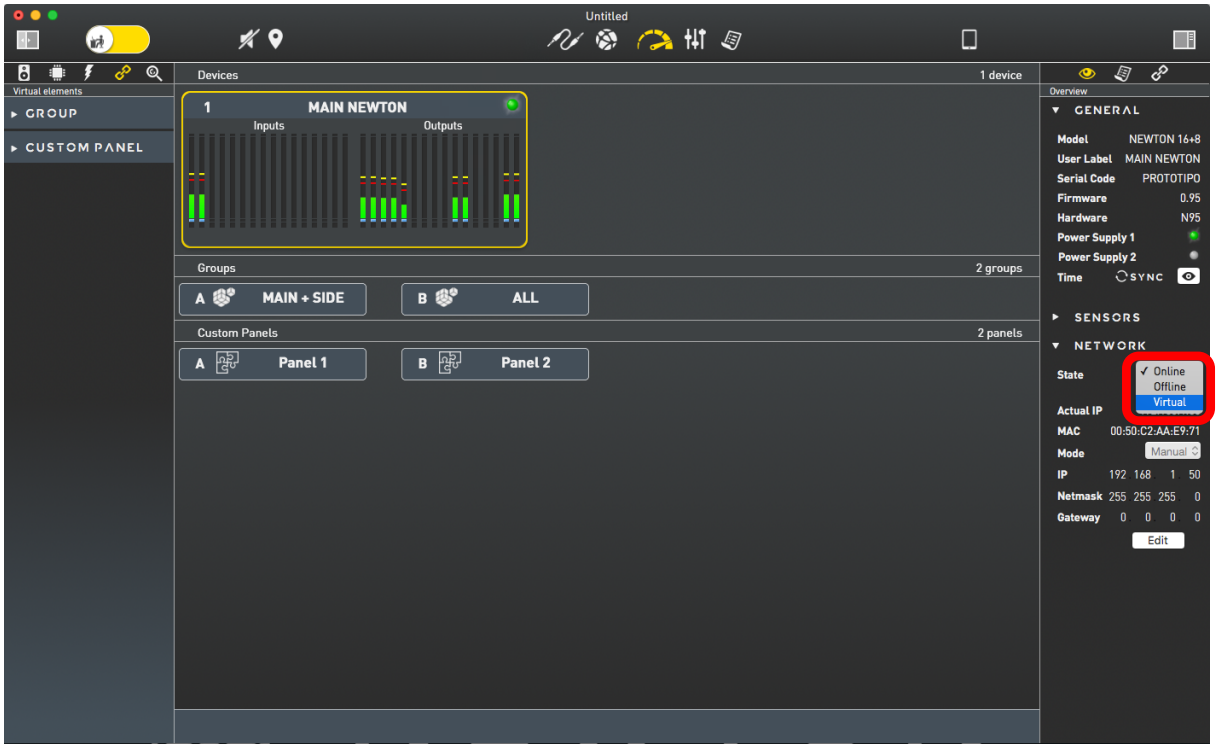
13.6.4. USING A PROJECT TO APPLY THE SETTINGS TO A REAL UNIT

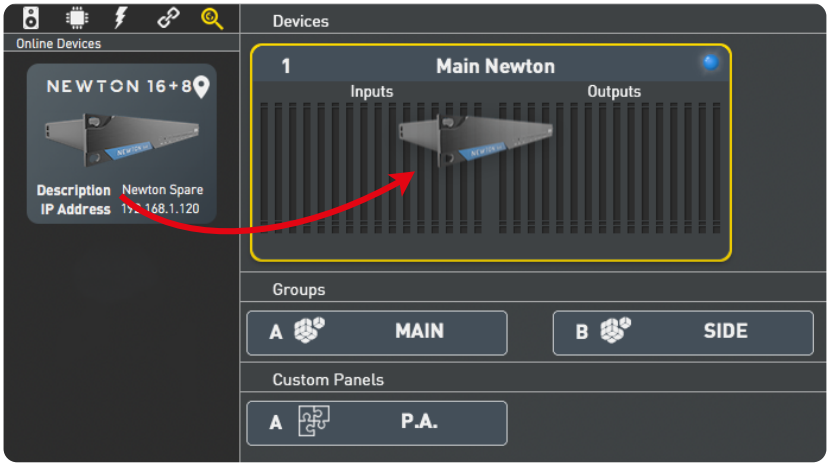
At the time of writing this manual, every time a device is connected and associated to a project, *Outline Dashboard* always reads the parameters from it and overwrites any existing project setting. The same happens when an offline device becomes online again, thus overwriting any change made during the offline status.

In order to apply the project settings to a real unit, there is a quick workaround:

1. Disconnect your Control PC from the network;
2. Open the project in *Outline Dashboard*;
3. Change the Network status of all units to "virtual" from the *Inspector*;



4. Connect your control PC to the network;
5. Scan for online devices;
6. Drag and drop the online unit(s) on top of the virtual one(s), so that the virtual settings will over write the device settings.



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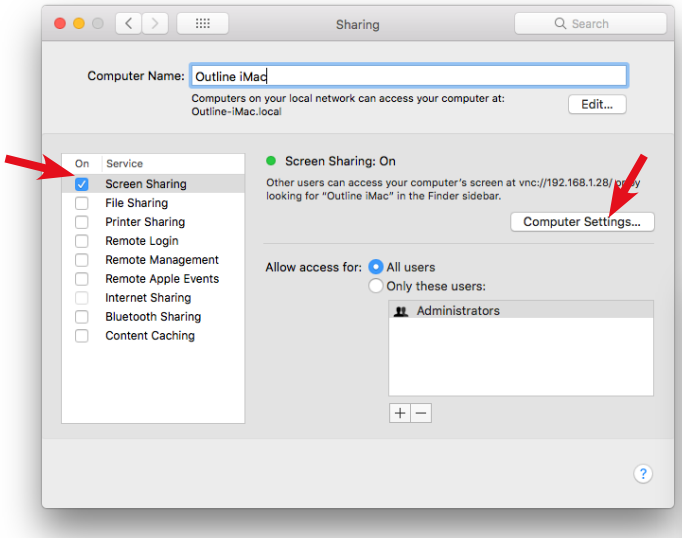
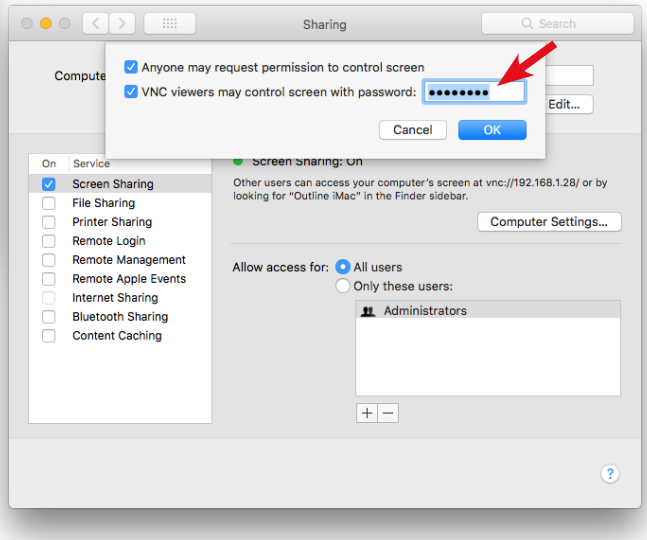
14. OUTLINE DASHBOARD | TABLET MODE

There are several ways to operate the Outline Dashboard software through a generic tablet (either an iPad or a Windows or Android tablet). At the time of writing this manual, due to a more reliable and fluent connection we do suggest to use a VNC connection between the Mac running the Outline Dashboard software and the tablet.

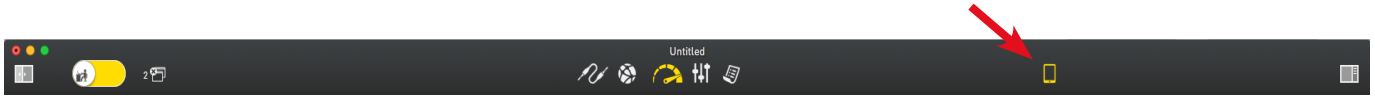
Below you will find an example on how to connect the tablet to the Mac running Outline Dashboard software through a VNC connection.



1. Go to "Sharing" into the system preferences of Mac;
2. Enable "Screen Sharing" flag;
3. Set up the "computer settings" enabling the first flag for the connection and second one if you prefer to have a password access.



Making sure both the tablet and the Mac share the same network, it will be only necessary to add the Mac IP address into your VNC client app on your tablet to start the remote network connection.
Once the connection is established, the Tablet Mode can be activated (by clicking on top of its relative icon shown hereunder). Basically, this feature provides an alternative way to interact with those parameters and gestures that were requiring operations hardly executable with a tablet (e.g. right-click, shift+click, etc...)



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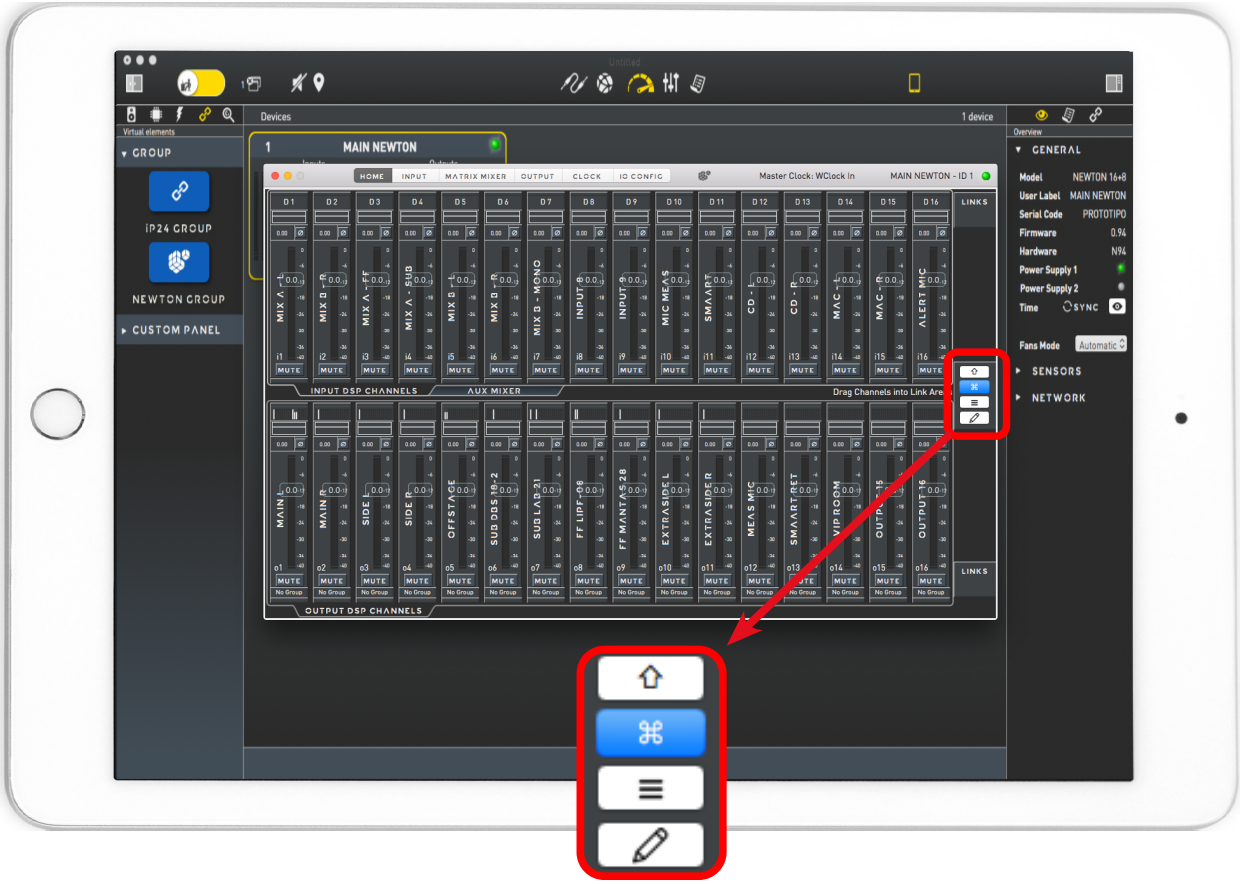

In other words, when the keyboard is not available, Tablet Mode provides some essential buttons that will keep the interaction with the software fast and fluent: shift (⇧) and command (⌘) keep the same functionality, while the addition of the menu button and the edit button provides a faster way to open the Selection Menu and to add the desire fader gain value, respectively.

As for the Matrix Mixer window, in substitution of the 'space-bar', the Tablet Mode adds the 'Activate button'.

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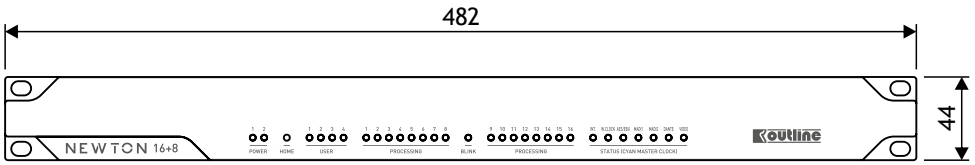
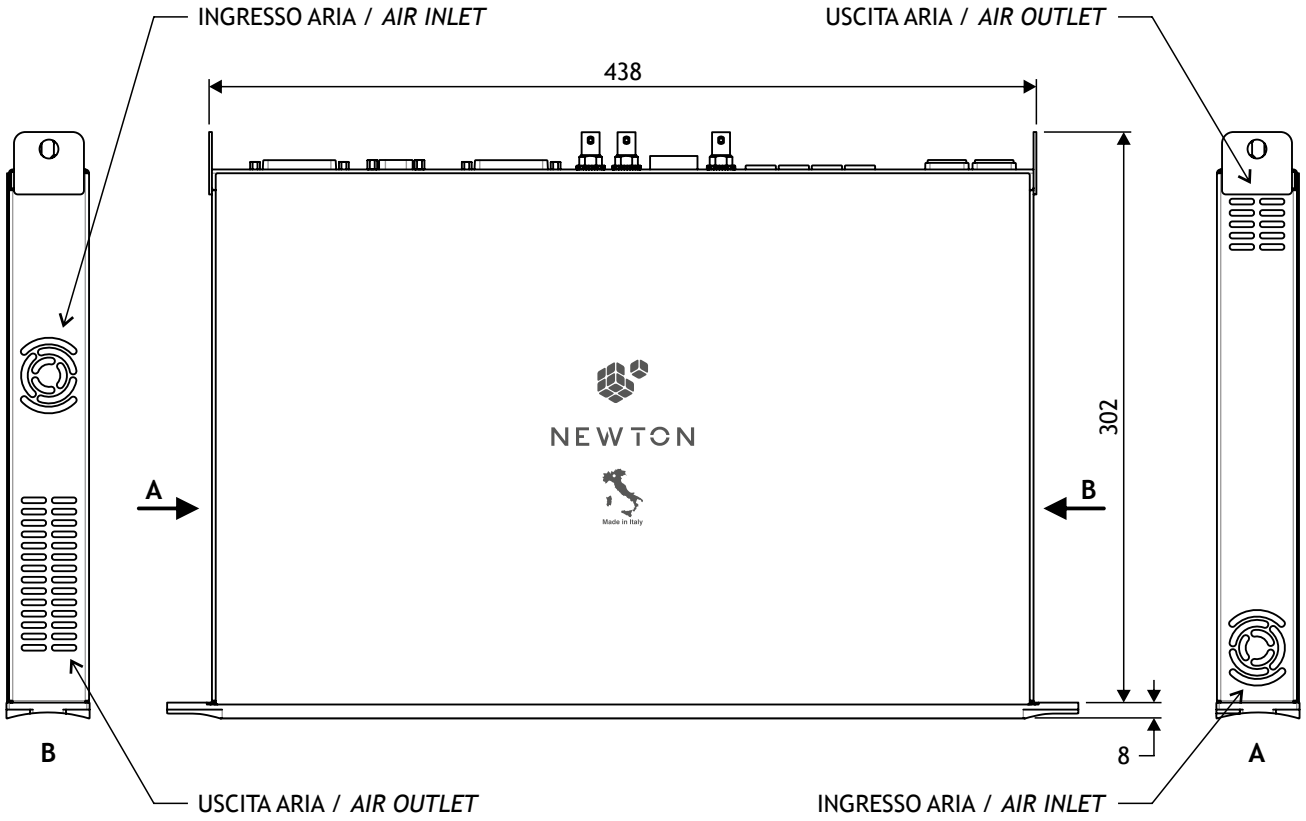
15. HARDWARE DETAILS

15.1. MOUNTING DIMENSIONS





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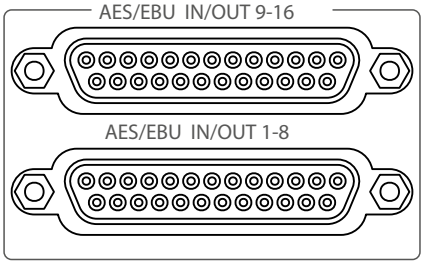
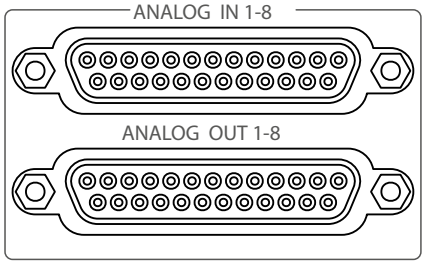
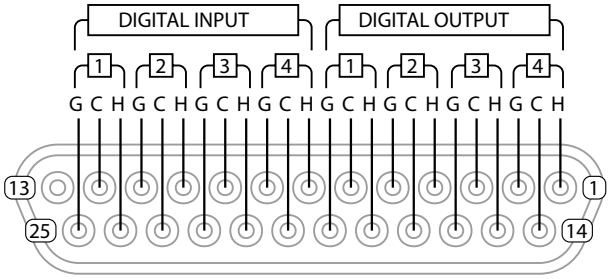
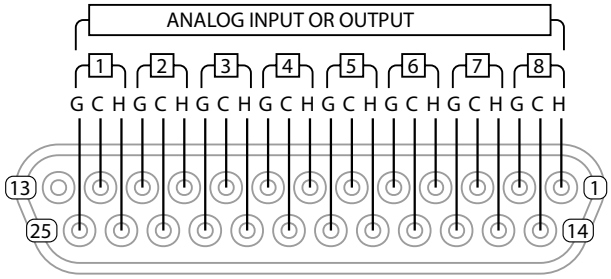
15.2. WIRING PINOUT DIAGRAMS

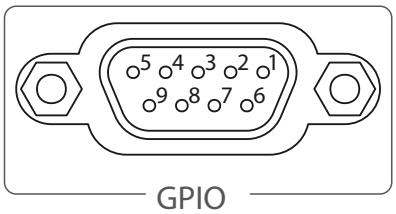
Wiring pinout diagram of DB25 for input and output of digital and analog signals (connections by TASCAM® standard) and GPIO.

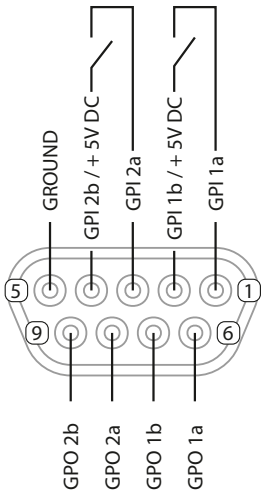












The system is able to sense an external free contact between pins 1-2 (GPI1a-GPI1b) and between pins 3-4 (GPI2a-GPI2b). Please note that GPI pins may only be used with the external switches between the pins, as shown in the figure.
IT IS NECESSARY TO CONNECT IT WHEN THE DEVICE IS TURNED OFF.

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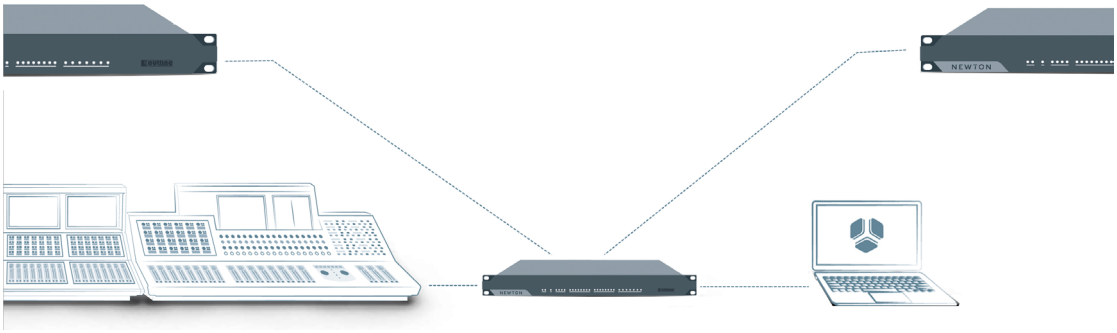
A: DANTE CONFIGURATION

Newton offers four different ethernet ports configurations, selectable form Dante Controller.

- Full Switched: the default configuration, in which each of the four Ethernet ports can be used to control Newton via *Outline Dashboard*, Dante Controller, as well as to send and receive the Dante audio stream, through the same cable connection. In this configuration all ports are communicating with each other.

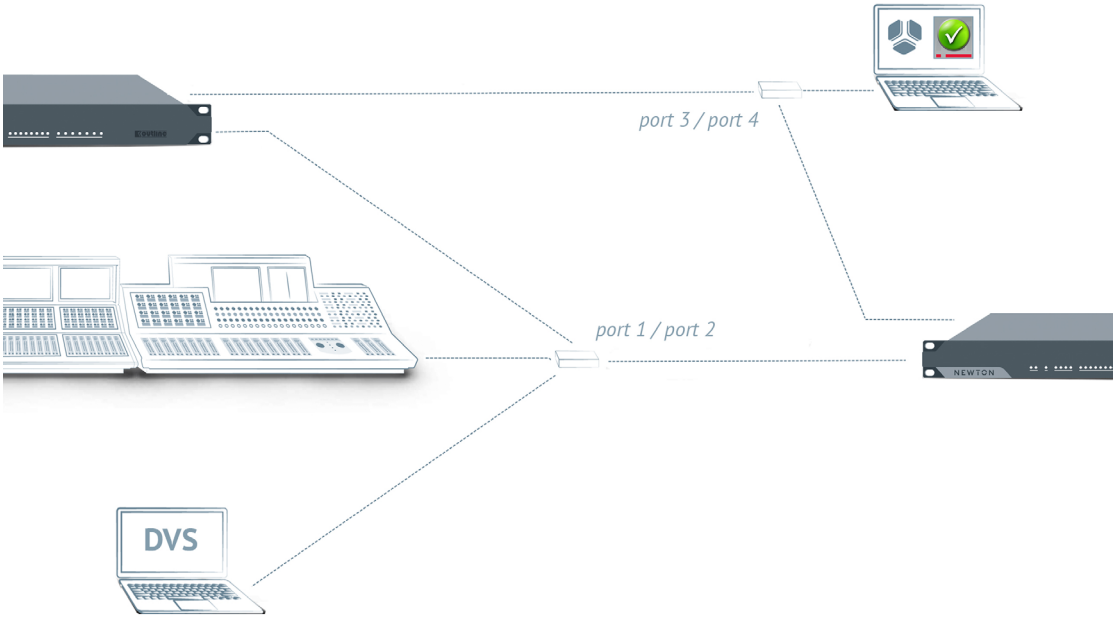
The following picture reports an example of how a Newton can be used to connect different devices without the need of an external switch.



- Switched: in this mode, it is possible to fully use Dante audio stream only on port 1 and port 2, while still controlling both Newton and Dante from each of the 4 Ethernet ports. This setting allows to have no data overload on port 3 and port 4, especially in case of 100 Mbps external devices.

ⓘ In *Switched* configuration, all ports are under the same VLAN with the only difference that port 3 and port 4 have the Dante audio stream multicast traffic blocked.

ⓘ In *Switched* configuration, Dante controller is available on ports 3 & 4 only if there is an active connection on ports 1 or 2.



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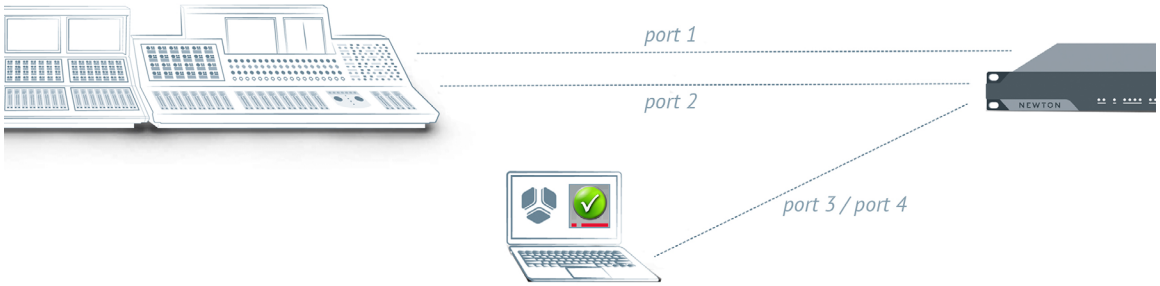
- Redundant: Dante audio stream uses only port 1 and port 2 in redundant mode (i.e. port 2 is exclusively dedicated to Dante secondary network). It is possible to control both Newton and Dante from ports 1, 3, and 4.

ⓘ In *Redundant* configuration, ports 1, 3, and 4 are under the same VLAN with the only difference that port 3 and port 4 have the Dante audio stream multicast traffic blocked.

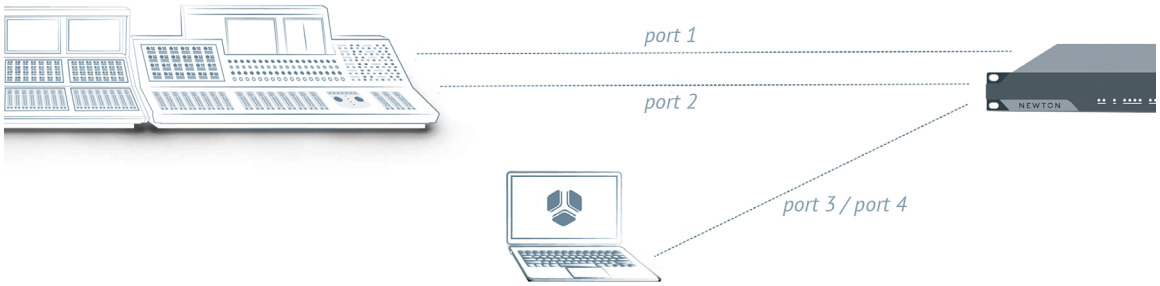
ⓘ In *Redundant* configuration, Dante controller is available on ports 3 & 4 only if there is an active connection on ports 1 or 2.



- Isolated Redundancy: Dante audio stream uses only port 1 and port 2 in redundant mode (i.e. port 2 is exclusively dedicated to Dante secondary network). It is possible to control Newton from ports 3 and 4, but not Dante.

ⓘ In *Isolated Redundancy* configuration, there are three different VLANs. Ports 3 and 4 are under the same VLAN.

ⓘ In *Isolated Redundancy* configuration, Dante controller is available on port 1 only.



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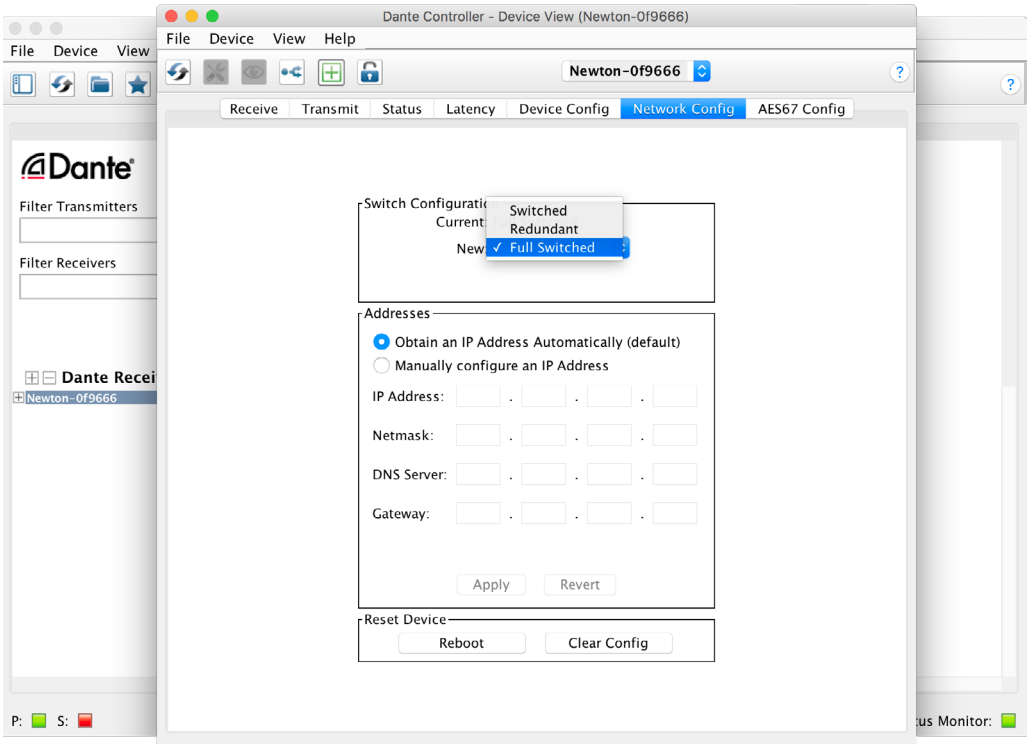
Newton's switch configurations can be selected from Dante Controller: open Dante Controller software, click on "Device view" (⌘ + D) and go to "Network Config". After changing to a different configuration, a Newton power cycle is required.



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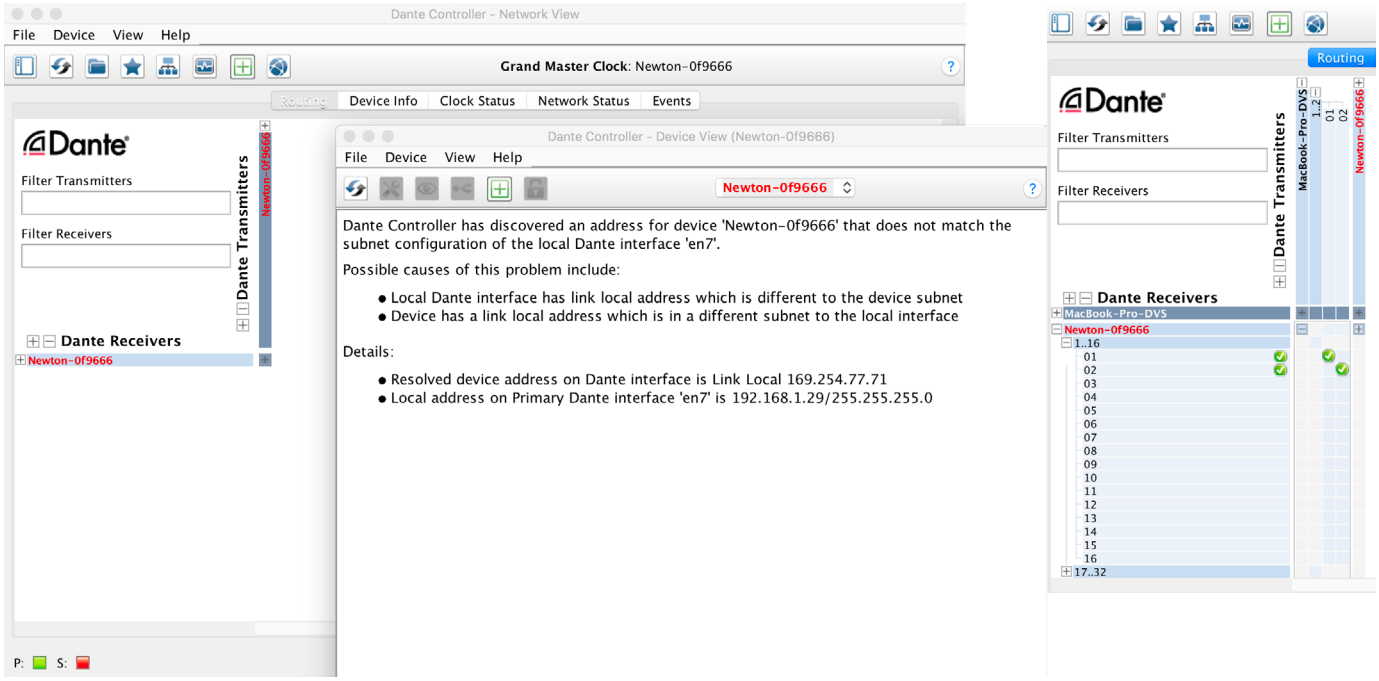
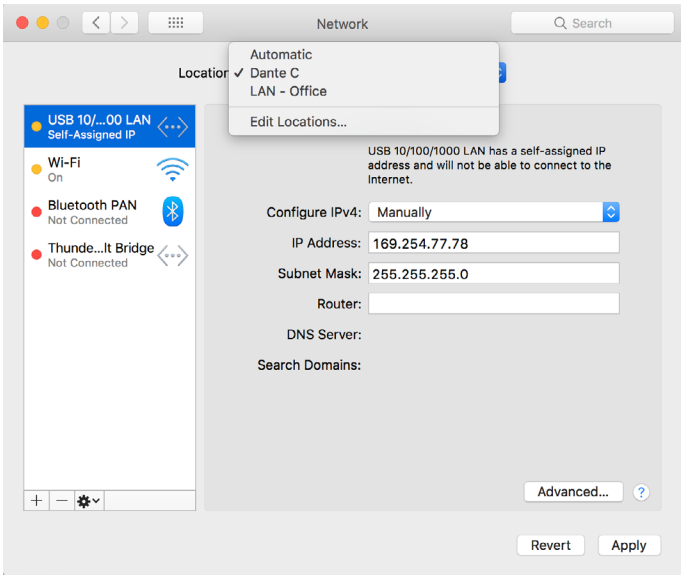
DANTE CONTROLLER TROUBLESHOOTING

In case the connection between the control PC and Newton's Dante board is not working, it might be that there is an IP addressing issue. In this case, Dante Controller will show a window similar to the following screenshot.



This window is giving some important details. i.e. the above screenshot reports that the device and the control PC are on two different subnets (in the example above the Dante board is in the autoIP range, that is 169.254.x.y, while the computer is probably in manual IP mode). Therefore, it is required to match the two subnets by changing the configuration on the PC. Once it's possible to communicate with the Newton's Dante board, it will be possible to assign to it a manual IP address, in case DHCP server is not available.

It is recommended to create and use different "Locations" (IP different presets) depending on the needs:



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