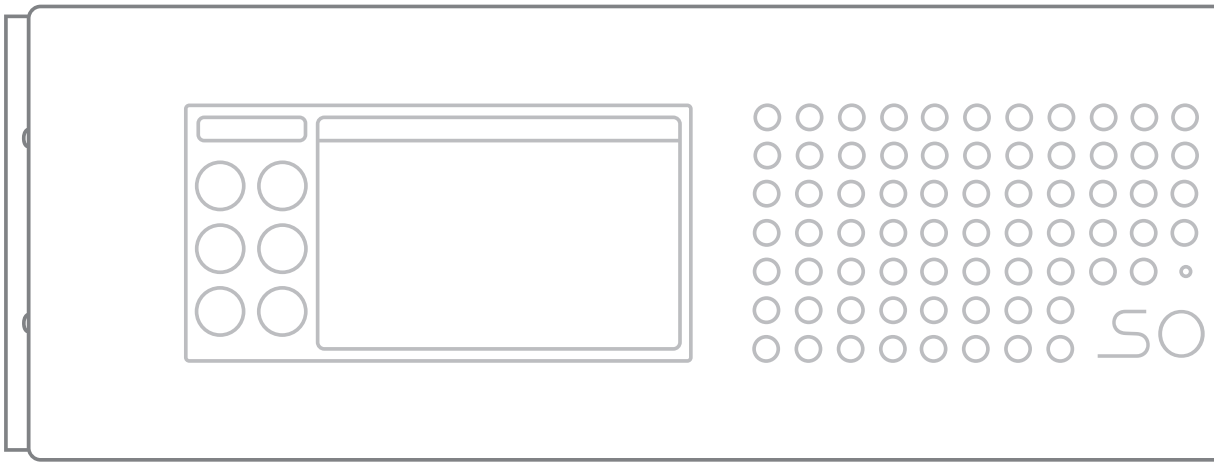
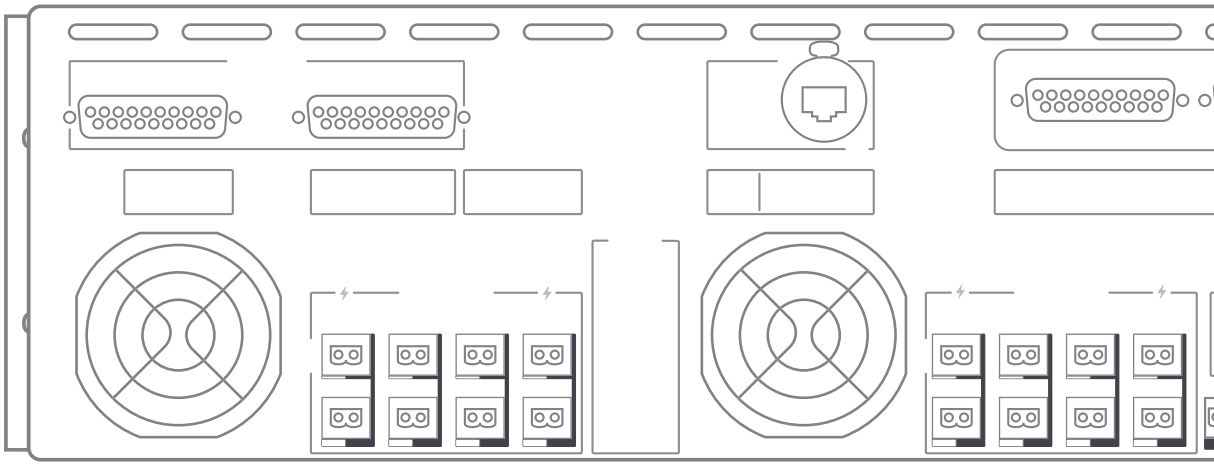
d:series amplifier

manual





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firmware version 3.0
05/2020

important safety instructions

The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the appliance.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING: To reduce the risk of fire or electrical shock, do not expose this appliance to rain or moisture.

AVIS: Risqué De Choc Electrique - Ne Pas Ouvrir

CAUTION: To reduce the risk of electrical shock, grounding of the centre pin of the power plug must be maintained.

AVIS: Cet appareil doit être raccordé à une prise secteur avec terre de protection.

SAFETY COMPONENT
(MUST BE REPLACED BY ORIGINAL PART)

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not cover any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or the grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Use only attachments/accessories specified by the manufacturer.
12. Use only with the cart, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for a long period of time.
14. Refer all servicing to qualified service personnel. 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.
15. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
16. To completely disconnect this equipment from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. The mains plug of the power supply cord shall remain readily operable.
18. No naked flame sources, such as lighted candles, should be placed on the apparatus.
19. The product should be connected to a mains socket outlet with a protective earthing connection.

important service instructions

CAUTION: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any other servicing than that contained in the manual unless you are qualified to do so. Refer all servicing to qualified service personnel.

Security regulations as stated in the EN 60065 (VDE 0860 / IEC 65) and the CSA E65 - 94 have to be obeyed when servicing the appliance.

Use of a mains separator transformer is mandatory during maintenance while the appliance is opened, needs to be operated and is connected to the mains.

Switch off the power before retrofitting any extensions, changing the mains voltage or the output voltage.

The minimum distance between parts carrying mains voltage and any accessible metal piece (metal enclosure), respectively between the mains poles has to be 3mm and needs to be minded at all times. The minimum distance between parts carrying mains voltage and any switches or breakers that are not connected to the mains (secondary parts) has to be 6 mm and needs to be minded at all times.

Replacing special components that are marked in the circuit diagram using the security symbol is only permissible when using original parts.

Altering the circuitry without prior consent or advice is not legitimate.

Any work security regulations that are applicable at the locations where the appliance is being serviced have to be strictly obeyed. This applies also to any regulations about the work place itself.

All instructions concerning the handling of MOS-circuits have to be observed.

WEEE recycling / disposal instructions

The wheelie bin symbol found on the product or in the manual indicates that this product must not be disposed of with other waste. It is in our category the manufacturer's responsibility to properly dispose of their waste electrical and electronic equipment (WEEE) at the end of its life. Due to the differences in each EU country's management of WEEE, please contact your local distributor or sonible directly. We are committed to facilitate our own electronic-waste-management system, for the free of charge return of sonible GmbH products. Arrangements are made with the dealer where you purchased the equipment from, for the returning of all unusable equipment at no cost, to the factory in Graz, for environmental protective disposal.

For recycling information contact sonible support at support@sonible.com

CE This equipment conforms to the requirements of the EMC Directive 2004/108/EC and the requirements of the Low Voltage Directive 2006/95/EC. Standards applied: EMC Emission EN55103-1, E3 EMC Immunity EN55103-2, E3, with S/N below 1% at normal operation level. Electrical Safety EN60065, Class I

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1 - welcome

Thank you for choosing sonible's d:series for your audio installation.

The d:series amplifiers are a no compromise power amplifier for high-end multichannel setups. With its clear focus on professional interfacing, audio quality and compact size, the d:series amplifiers are a perfect fit for a wide range of science, research or industry applications.

1.1 - d:series amplifiers

The d:series amplifiers are a space-saving innovative audio amplifier for high-end multichannel setups with powerful low noise preamps and the possibility of digital input integration. The various options of inputs and further features allow users to integrate it as flexibly as possible. Whether you are planning to use it for a fixed installation setup in science, research or industry, for acoustical measurements or perhaps for an installation at live events, we built the amp for durability, reliability and compatibility. We are confident that you will be pleased with the benefits and overall quality of this innovative and versatile amp.

This manual will guide you through the features and functionalities of the d:series multichannel amplifier. Read this manual carefully to become fully acquainted with the configuration options and control layers of the amp.

Please feel free to contact us and send any questions, comments and suggestions to support@sonible.com.

1.2 - main features

The d:series amplifier provides a number of features and technologies that offer maximum flexibility to realize sophisticated projects in sound reinforcement.

Compactness

Using high grade class D amplifying technology and very efficient switch mode power supplies, the d:series provides you an unique packing density. With the mid-range amplification channels packed in a 3RU housing, optional digital inputs and with a weight of approximately 20kg, the d:series amplifiers are the clear technological leaders in the market.

User interface

The d:series amplifier can conveniently be configured and monitored via a 6.5" touch screen.

Remote

When connected to a LAN, the d:series amplifier can be remote-controlled via web interface or HTTP API.

Protection

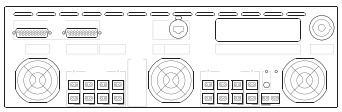
The d:series incorporates several security precautions to avoid damage of speakers and the amplifiers components.

Detailed description concerning the main features can be found in the corresponding chapters of the manual.

1.3 - products and options overview

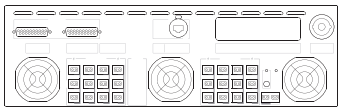
The d:series amplifier can be customized to meet your needs: Enhance the base model with its analog inputs by choosing a digital input option and adding a DSP module.

analog base units



d:16

16 channels
250W at 4Ω



d:24

24 channels
250W at 4Ω

optional digital modules

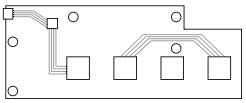
AES/EBU

S/PDIF

Dante

MADI

optional DSP module*



equalizer
delay
compressor
limiter

*only in combination with a digital module

Options overview

	options	analog	AES/EBU & S/PDIF	MADI	Dante	AES/EBU & S/PDIF + DSP	MADI + DSP	DANTE + DSP
inputs	analog inputs	16/24	16/24	16/24	16/24	16/24	16/24	16/24
	digital inputs	-	24	128	64	24	128	64
	high end DACs	✗	✓	✓	✓	✓	✓	✓
features	DSP	✗	✗	✗	✗	✓	✓	✓
	routing per channel (of digital inputs)	✗	✓	✓	✓	✓	✓	✓
	remote control via web interfave	✓	✓	✓	✓	✓	✓	✓
	touch display	✓	✓	✓	✓	✓	✓	✓

2 - startup

2.1 - unpacking and inspection

Open the packing carefully and take out the power amplifier. Inspect the power amp's enclosure for damages that might have happened during transportation. Each amplifier is examined and tested in detail before leaving the manufacturing site to ensure that it arrives in perfect condition at your place.

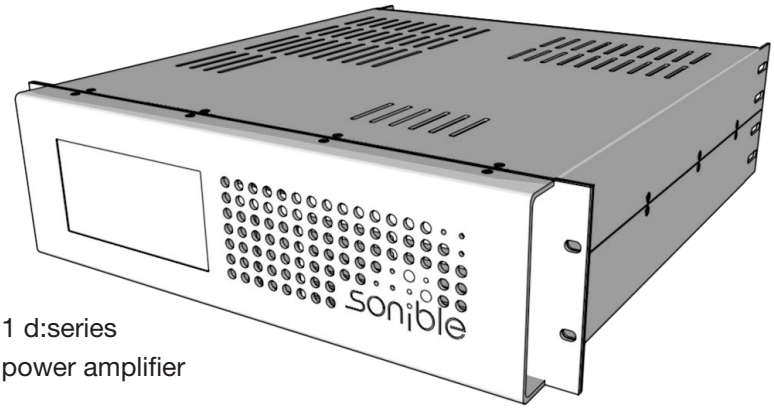
If there is any sign of damage to the power amplifier, please do not operate the unit and inform the transport company immediately. Being the addressee, you are the only person who can claim damages in transit. Keep the cardboard box and all packing materials for inspection by the transport company.

Keeping the cardboard box including all packing materials is also recommended, if the power amplifier shows no external damages. When shipping the power amp, make sure to always use its original box and packing materials. Packing the power amplifier like it was packed by the manufacturer guarantees optimum protection from transport damage.

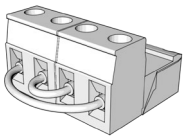
Please so not ship the power amp in any other than its original packing

2.2 - scope of delivery

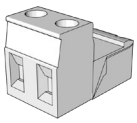
The following items are part of the package:



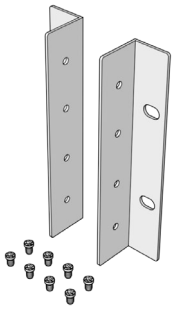
1 d:series
power amplifier



Compatible 4-pin Euroblock plug
for panic mute bypass (1pc.)

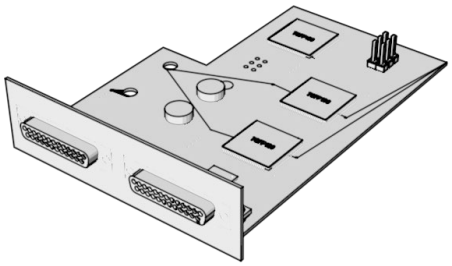


Compatible 2-pin Euroblock plugs
(d:24 - 24 pcs. / d:16 - 16 pcs.)

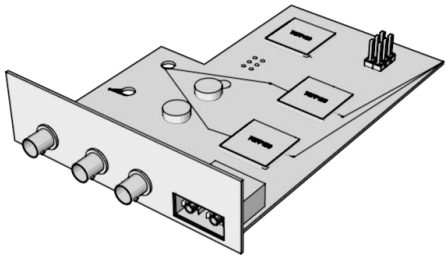


rack mount kit
(including screw set)

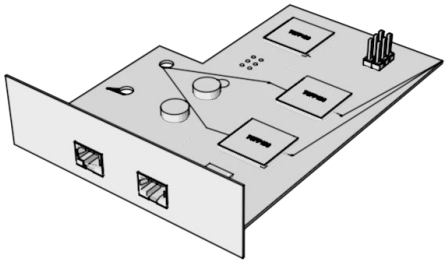
1 power cord
(powerCON 32A; specific to country)



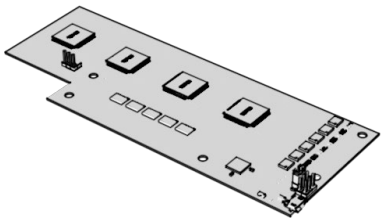
AES/EBU input card



MADI input card

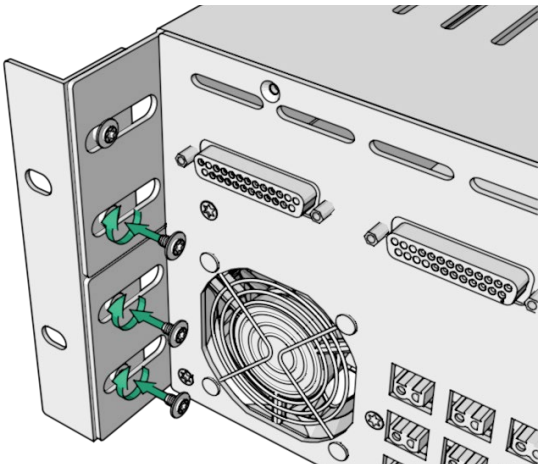


Dante input card



DSP module

2.3 - mounting



The amplifier is three rack units high (3RU) and fits into a standard EIA 19" rack or cabinet. The depth of the amplifier is 517mm (20,4"). The weight of the analog version is approximately 20 kg (44 lbs).

When mounting the d:series amplifier into a 19" rack, please use the provided rear rack-mount ears to avoid mechanical stress. To mount it into the rack, use appropriate rack mounting screws with washers.

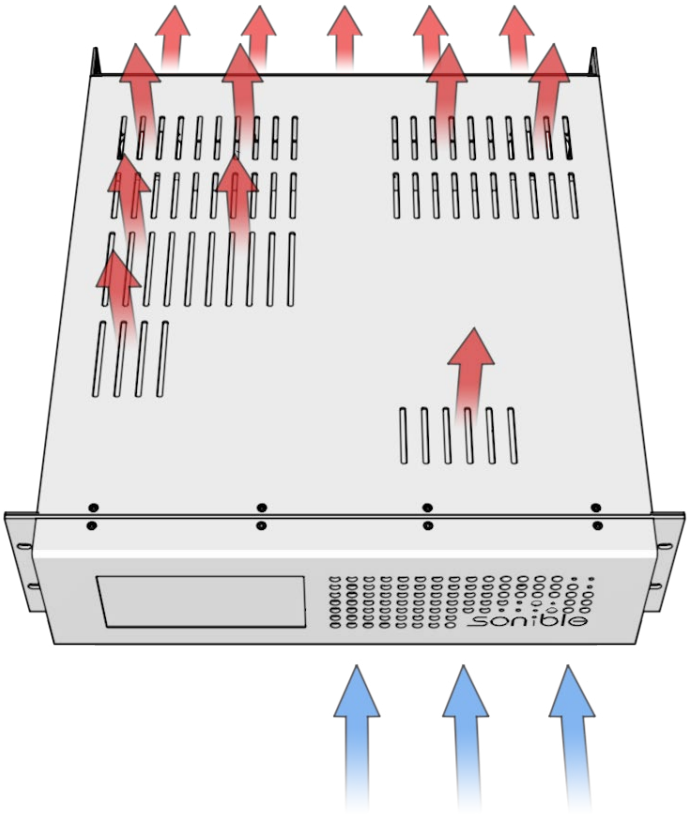
To fix the rack angles to the rack-mount ears, please use the delivered screws (M3 TX10).

2.4 - air flow and thermal management

The d:series unit is a powerful amplifier. Due to the idle loss and the heat arising under heavy working conditions, it is necessary to cool the circuits adequately. Therefore, the amp is equipped with five fans with an air flow direction ‘front-to-rear’ and additional air slots for passive convection cooling.

Therefore, it is mandatory to ensure an unrestricted airflow of the cooling system. When mounting the amplifier in a rack, it is important that cool airflow is provided at the front panel of the amplifier and warm air can be exhausted from the rear.

We highly recommend to leave 1RU space above and underneath each amplifier in the rack. If the amplifier was not maintained correctly, all necessary repairs and consequential costs will not be covered by the warranty.



Never block the ventilation louvers of the d:series amplifier! Without sufficient cooling, the amplifier will automatically enter a protection mode and shut down the power supply for the amplifier modules if necessary.

Don’t place the d:series amplifier near heat sources, like blowers, stoves or any other heat radiating devices. We also highly recommend not to place the amplifier directly above or underneath other devices in racks.

The system screen on the control surface allows you monitoring relevant temperature states of the amplifier (see chapter 5.2 ‘system screen’, page 24).

A detailed graphic of the fan curves can be found in chapter 5.6 ‘stealth screen’ (page 37).

2.5 - protection circuitries

Soft-startup

To ensure that the main fuse does not trip if one or more power amplifiers are switched on simultaneously, the amplifier is equipped with a low inrush circuitry for soft-startup of the system.

To avoid damage of system components such as speakers and the amplifiers electrical components, the d:series amplifier has got safeguard mechanisms for DC error, overcurrent and over voltage at the speaker outputs.

Overcurrent protection

To avoid the damage of the amplifier due to short circuit, the output current is limited to 15A per amplifier channel.

Per-Channel-Error protection

In case of a DC error at the amplifier outputs, the power supply of the affected amplifier channels is being shut down immediately for security reasons.

In case of defects of an amplifier module, two fine wire fuses will cut the power supply for the affected module to protect the loudspeakers.

The fuses have to be replaced by sonible. Please contact us for further information.

Overtemperature protection

The d:series amplifier is equipped with three temperature sensors to protect the electrical components in case of overtemperature. One sensor is located at the end of the cooling tunnel and the other two are located at the power supplies. If the overall temperature is reaching 90°C for any reason, the protection shuts down the power supply. The amp modules operated by the affected power supply will be shut down as well. When the normal operating temperature is reached, the power supply will be activated again.

To avoid thermal shut down, ensure enough airflow and ventilation as described in the previous section (see chapter 2.4 ‘air flow and thermal management’, page 10).

2.6 - responsibility of the user

Operating voltage

The power amplifier receives its power supply via the mains connector, which is provided as a powerCON connector.

Depending on the ordered unit, the d:series amplifier supports mains voltage with 100-120 VAC or 220-240 VAC (50-60 Hz). The power supply unit which has an impact on the mains voltage is factory-fitted and cannot be changed arbitrarily on site.

During installation, always separate the power amplifier from the mains. Connect the power amplifier only to a mains network which corresponds to the requirements.

The d:series amplifier is delivered with a prefabricated power cord. If you have to change the main plug for any reason and if you are not 100% confident of your competence to replace the mains plug, engage qualified personnel to do that job.

In case of questions concerning this matter, please contact sonible via e-mail: support@sonible.com

Grounding

Your amplifier has to be connected to a grounded socket outlet. Use balanced input connections and cabling to avoid hum and interference noise.

Dangers at the loudspeaker outputs

The d:series amplifiers are capable of producing dangerously high voltage output that is present at the output connectors. To protect yourself from electric shock, do not touch non insulated parts of the speaker cables during operation of the power amplifier.

The external wiring connected to the speaker terminals have to be installed by a qualified instructed person or ready-made leads or cords of appropriate capacity shall be used.

As the amplifier outputs produce high voltage, do not connect or disconnect speaker cables when the mains power is on. Also, attach the safety cover on the speaker terminals for safe operation and to comply with electrical product approvals.

The powerCON is a connector without breaking capacity, i.e. the powerCON must not be connected or disconnected under load or live.

Speaker system damage

The d:series power amplifiers provide high power output that might be dangerous for human beings as well as for the connected speaker systems. High output voltages can damage or even destroy the connected speaker systems, especially, when the d:series amplifier outputs are bridged by the user. Prior to connecting any loudspeakers, make sure to check the speaker system's specifications for continuous and peak power handling capacities.

Maintenance

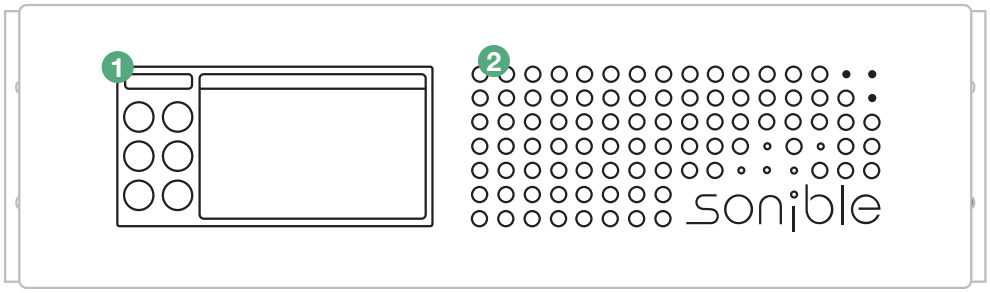
For safe and reliable operation, the dust filter of the front panel, behind the grilles, can be removed and cleaned to ensure maximum airflow through the device.

If the amplifier malfunctions due to dirty dust-filters, any required repairs or resultant drop out costs are not covered by the warranty.

A detailed instruction on maintenance work can be found in chapter 8 'maintenance & update' (page 45).

3 - overview

3.1 - front panel



1 Touch panel

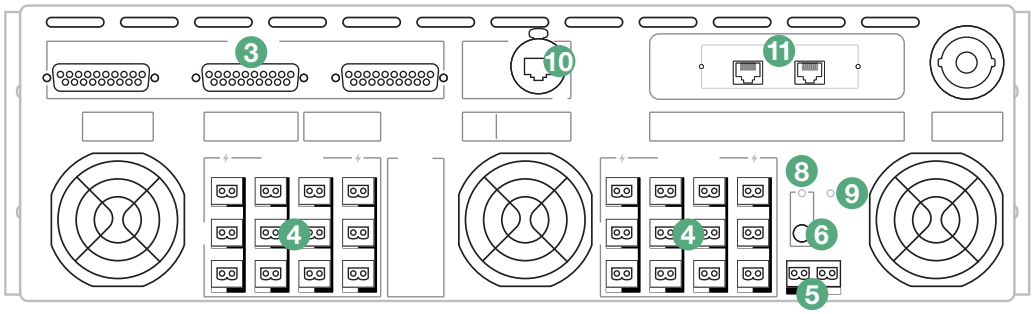
The amplifier can be configured by using the 6.5" touch display on the front panel. Besides, the display provides detailed status information (e.g. temperatures, fan speeds) as well as network configuration settings and real time level metering.

A detailed description can be found in chapter 5 ‘control surface’ (page 22).

2 Dust filter

The dust filter is located behind the front panel.

A detailed description regarding the service of the dust filter can be found in chapter 7 ‘maintenance & update’ (page 45).



3
Analog input section (DB-25 Tascam pinout)

The d:series amplifier has analog inputs in the form of three standard DB-25 sockets (eight channels each). The pinout is configured in Tascam standard configuration for analog connections.

A detailed description can be found in chapter 4.2 ‘inputs’ (page 16).

5
Panic mute switch connector

A detailed description can be found in chapter 4.6 ‘panic mute switch’ (page 21).

7
Power connector (powerCON 32A)

A detailed description can be found in chapter 4.1 ‘mains connection via powerCON’ (page 16).

8
Status LED ‘on’

The status LED ‘on’ turns green when the amps power switch is on and the amplification circuits are active.

9
Status LED ‘mute’

The panic mute LED flashes red when the panic mute function is active and all amplifier outputs are muted. It does not distinguish if the mute has been triggered by the hardware panic mute button or by the software mute.

4
Speaker output section (Euroblock)

For each channel of the speaker outputs the amplifier is equipped with a 2-pin terminal block.

A detailed description can be found in chapter 4.3 ‘outputs (euroblock)’ (page 19).

6
Power switch

The power switch is a soft-button with memory function. In case of power loss the amplifier will set the state until the device is provided with power again.

When pressing the power switch, the controller boots up and the amplification circuits will be activated. Independent to the status shown at the control surface (touchscreen), the amp modules are active until the amp is switched off again.

10
Network connection (etherCON)

Using a CAT5 cable (or higher), integrate the d:series into a TCP/IP network for remote control.

A detailed description can be found in chapter 4.5 ‘network’ (page 20).

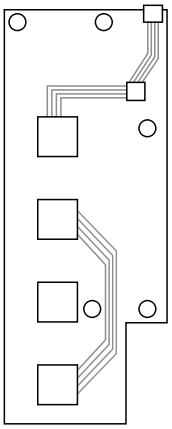
11
Digital input option slot

The optional digital input cards are available in the following formats: AES/EBU, MADI and Dante. The digital input slots are factory-fitted and cannot be changed arbitrarily.

Digital input cards can not be hot swapped

Detailed descriptions concerning the digital input slots can be found in chapter 4.2 ‘inputs’ (page 16).

3.3 - DSP option



d:series amplifiers provided with one of the digital input cards (AES/EBU, MADI or Dante) can be equipped with a DSP module which offers the following functions per (digital input) channel:

- input gain and delay
- crossover (high and low cut filters)
- 5-band channel equalizer
- dynamics (compressor, limiter)

The DSP option and it's functionalities can not be used with analog channels.

A detailed description concerning the usage can be found in chapter 5.5 'DSP menu' (page 33).

4 - connections, pinout and cabling

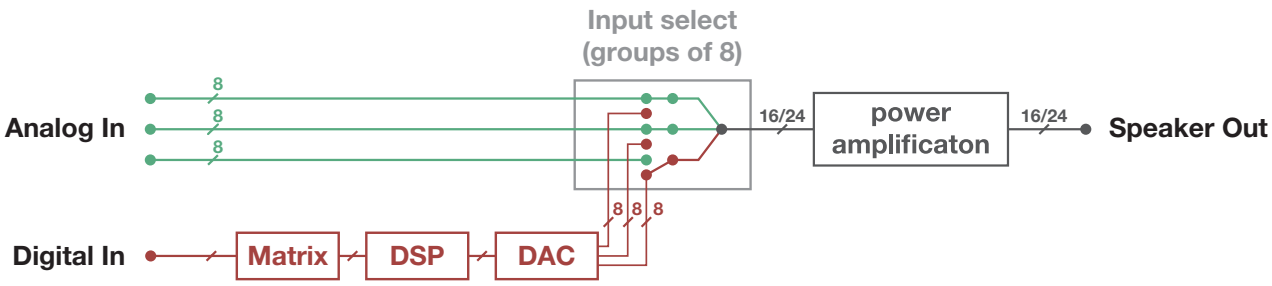
4.1 - mains connection via powerCON

The maximum current draw of the amplifier is 32A. Therefore, it is recommended to only use the original cable shipped with the amp (country-specific power cord to powerCON 32 A with minimum cable cross-section of 2,5mm2, H07RN or equal quality).

Depending on the ordered unit, the d:series amplifier supports one of the following mains voltages: **230VAC -5V; +20V or 115VAC -5V; +10 (50-60 Hz).**

4.2 - inputs

The following block diagram shows the simplified signal flow of the d:series amplifiers.

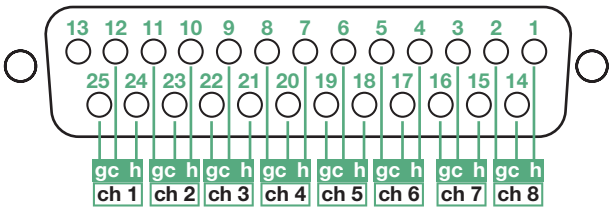


Analog Inputs (DB-25)

The DB-25 connectors located on the rear panel for analog inputs are patched in Tascam analog norm as depicted in the following illustration.

Analog input specifications

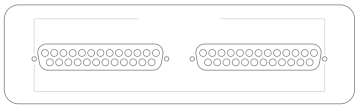
Required level for 250W:	15 dBu
Input impedance:	95kΩ
Max. input level:	15 dBu



g = ground c = cold h = hot

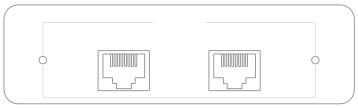
Digital inputs

Optionally, the d:series amplifier can be equipped with one of the following input cards:



AES/EBU, S/PDIF (AES3)

MADI (AES10)



Dante

Supported sample rates: 44.1, 48, 88.2 and 96 kHz.

The d:series amplifier is automatically detected as slave and assumes the sample rate transmitted by the master device.

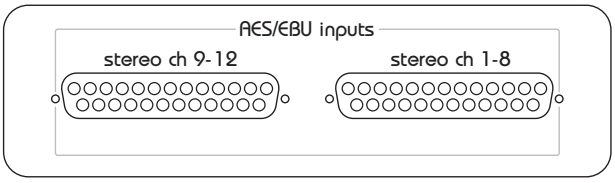
NOTE: The digital input slots are factory-fitted and cannot be changed arbitrarily or on site.

AES/EBU, S/PDIF (AES3)

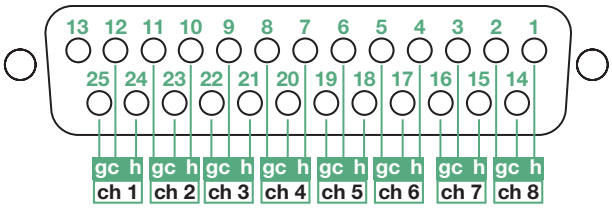
The optional AES/EBU input interface provides 16 channels (d:16 unit) or 24 channels (d:24 unit) and enables digital input signals in AES3 format via AES/EBU (or S/PDIF). The digital input interface includes high end DACs on each of the channels.

All inputs are independent and do not have to be synchronized concerning the word clock because of the built-in ASRCs (Asynchronous Sample Rate Converters) on each of the input channels.

NOTE: With the AES/EBU (S/PDIF) card there is no possibility for daisy chaining!



The pinout of the DB-25 sockets are patched in Tascam analog norm as depicted below:



g = ground c = cold h = hot

pin assignment:

stereo ch 1-8 = mono ch 1-16

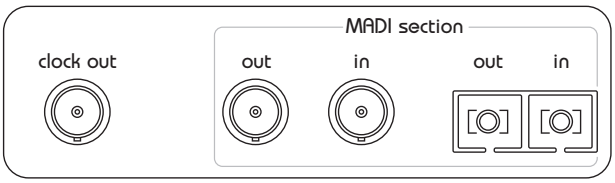
stereo ch 9-12 = mono ch 17-24
(the lower stereo channels 1-4 are in use)

MADI (AES10)

The MADI input card is providing two individual MADI inputs and outputs (BNC/coaxial and optical – one of each type). If needed, both MADI input streams can be used simultaneously and routed or mixed and merged per channel.

The MADI input option providing one BNC wordclock output, ensuring seamless syncing even in larger line-ups with other products and brands.

Note: When using the MADI input card, the clock source has to be set in the routing menu via the touch display or in the web application. The default sync setting of the amplifier is 'slave'.



MADI | Daisy chaining

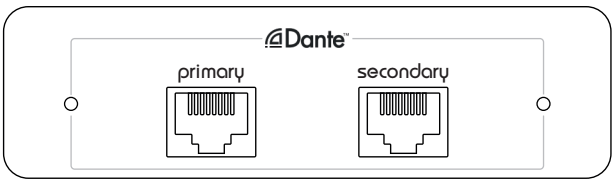
The MADI input signals on the BNC and optical connectors are directly patched to the corresponding MADI output connectors – enabling daisy chaining for several d:series amplifiers without latency.

For wiring of multiple amplifiers within a rack, suitable coaxial cables (RG59, 75 ohm) or optical wires are recommended.

Dante

Dante is a multi-channel digital media networking technology created by Audinate with near-zero latency and synchronization. By the use of the optional Dante input card the d:series amplifier provides a primary and secondary port for redundant wiring by a RJ45 connection over gigabit transmission via CAT5e or higher network cable.

Note: When using the Dante input card the sample rate is set in the Dante Controller software.



Dante | Daisy chaining

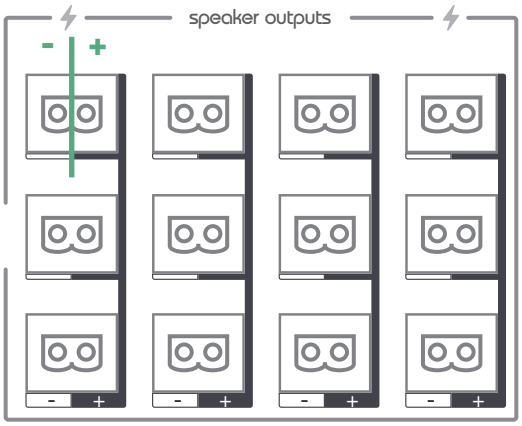
For daisy chaining the secondary port can be used. To daisy chain more than two devices we recommend to connected via Ethernet switches in star network topology. If you are using the secondary port for redundancy, the relevant devices have to be connected to a second switch.

To be able to set up the Dante network and the routing of the channels it is necessary to install the Dante Controller which is a software application provided by the company 'Audinate'. It can be downloaded at Audinate's website.

All Dante routing can be configured via 6.5" touch display as described in chapter 5.3 'routing screen' (page 28) or via the remote application (described in chapter 6 'remote control, page 38)

4.3 - outputs (euroblock)

The d:series amplifier is supplied with 2-pin Euroblock connectors for each amplified output channel. Compatible plug connectors are part of the delivery. To guarantee the operating safety and the proper function, sonible recommends to use only prebuilt or professionally built speaker cables with minimum cable cross-sections of 1.5mm².



Output specifications:

Connectors:	16x/24x Euroblock
Output impedance:	< 100 mΩ
Min. load impedance:	≥ 4 Ω (single channel)
	≥ 8 Ω (bridged)
Hi-Z/ch., unloaded:	approx. $32V_{RMS}$
DC output offset:	< 10 mV

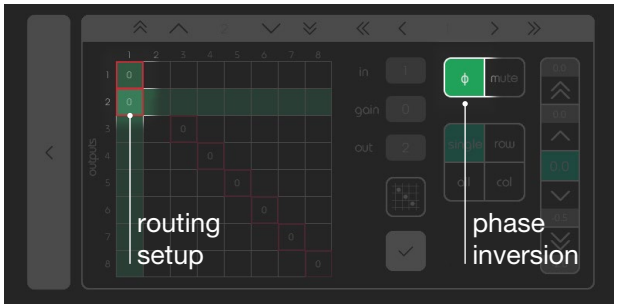
4.4 - bridging

The amplifier offers to bridge channels in pairs of two. The main benefit of bridging is a doubling of output voltage. Therefor you have to route one input signal to two amplifier channels, whereas one amplifier channel is fed by the original signal and the other channel with the phase reversed counterpart. When using digital inputs, the following steps have to be performed:

Step 1:

When using bridged mode, the same input source has to be routed to both output channels in the routing menu (e.g. input channel 1 to output channels 1+2). The second input channel has to be phase inverted in the routing sub menu of the amplifier as shown in the graphic.

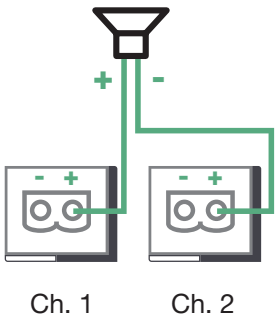
Further information about routing can be found in chapter 5.3 'routing screen' (page 28).



Step 2:

The 2-pin output speaker cable has to be connected with one pin to the plus pole of the first channel (1+) and with the second pin the plus pole of the second channel (2+) as shown in the graphic on the left.

If analog inputs are used for bridging amplifier channels you have to ensure that the input signals comply similar to the description mentioned above. That means that one amplifier channel has to be fed with the original signal, the other with the inversed counterpart. The phase inversion of the input has to be performed beyond the amplifier.



NOTE: Please be VERY careful when bridging channels! Incorrect wiring can damage the corresponding amplifier channels as well as the connected speaker. The bridged loudspeaker may not be connected to the ground under no circumstances.

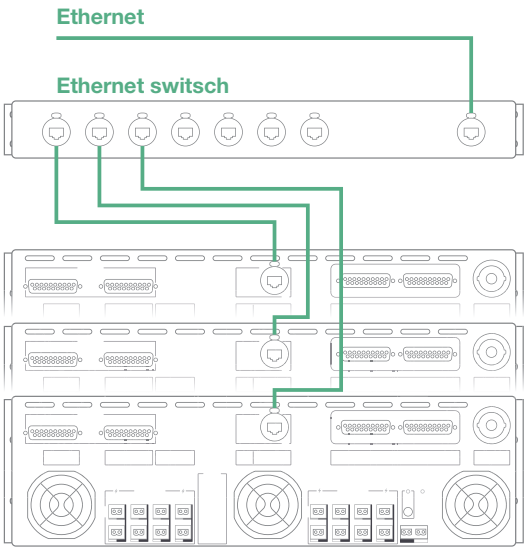
The d:series amplifier offers remote control via an Ethernet connection. To establish a connection, the remote device (e.g. Laptop) has to be wired to the ‘network’-port at the rear of the d:series amplifier.

Remote control for multiple devices:

To access a remote control for multiple amplifiers in a network a star topology via Ethernet switch is needed.

The instructions to configure the network connection via the touch screen can be found in chapter 5.4 ‘network screen’ (page 32).

A detailed description concerning the establishment of a connection between the amplifier and the remote device can be found in chapter 6.1 ‘establishing a connection’ (page 38).



Remote control via wireless connection:

The d:series amplifier can also be remote controlled via a wireless connection by using a wireless access point. To guarantee an impeccable functionality we recommend to use a wired connection. The web interface is optimized for remote control via laptop or desktop computer.

Integration in various systems

Based on the HTTP API, the d:series amplifier can be integrated in systems like Crestron, KNX, RTI, C4 or similar systems. A documentation including the specification sheet regarding the HTTP API can be found and downloaded at our website: www.sonible.com.

4.6 - panic mute switch

At the rear of the amplifier the device is equipped with a 4-pin Euroblock connector dedicated for a standard panic mute switch. The mute switch function provides d:series users with a hardware-based mute option for all amp channels to minimize any possible causes of damage in sensitive situations.

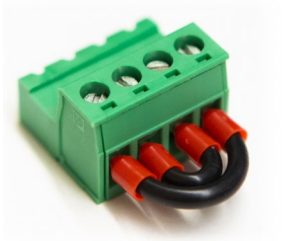
The functionality of the panic mute system is based on opening and closing a power circuit.

Closed circuit: normal operation of the device (not muted by hardware)

Open circuit: panic mute is active (the device is muted by hardware; all channels are hard muted)

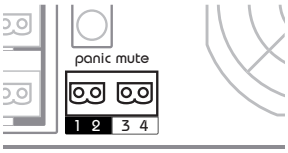
By default the d:series amplifier is supplied with a bypass connector for a closed circuit.

Function of the provided bypass connector:



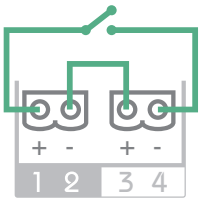
To establish a closed power circuit the positive terminal (pin 1) is connected to the negative terminal of the integrated current source (pin 4) and the negative terminal (pin 2) to the positive terminal of the integrated current source (pin 3).

Pin assignment as labeled on the connector:



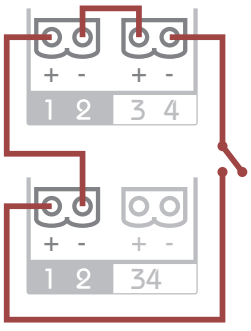
pin 1: positive terminal
pin 2: negative terminal
pin 3: positive terminal (from integrated current source)
pin 4: negative terminal (from integrated current source)

Setting up an optional panic mute switch



To use the panic mute function a switch has to be connected between the positive terminal (pin 1) and the negative terminal of the integrated current source (pin 4).

Setting up an optional panic mute switch for multiple amplifiers



Connect the desired amplifiers in series as shown in the graphic.

Because of the capacity of the integrated current source, you should not connect more than five cascaded devices. For using the panic mute function with more than five devices, we recommend using a multiple switch.

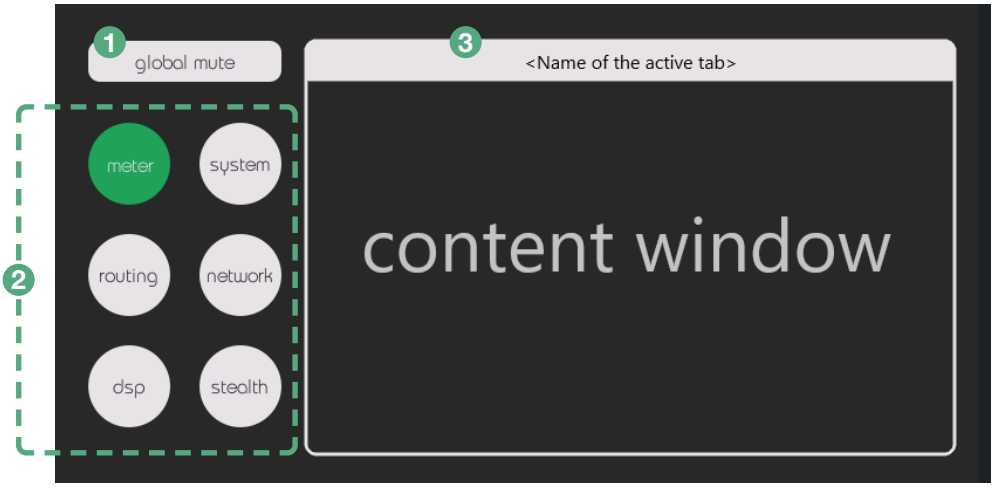
NOTE: Never apply an external voltage to the connector!

If you need further support concerning panic mute switches, please contact sonible for further information: support@sonible.com

5 - control surface

The d:series amplifier is equipped with a 6.5" touch screen at the front which allows the user to control and set up the device. It responds to pressure and therefore can be operated by a fingertip.
In this chapter you can find descriptions about the interface structure and how to operate the system.

The interface view is divided in three sections:



1

(Global) software mute

Independent of the chosen tab, you are able to access the global software mute-button at any time in the upper left corner of the screen to immediately mute all amplifier outputs. If the global mute is activated, the button changes its background color to red and the level meters in the meter tab are grayed out.

There are two ways to instantly mute all amplifier outputs. The software-based mute function ('soft mute') described above, and the hardware-based panic mute function ('panic mute') by connecting a hardware switch at the rear of the unit. Further information about establishing the hardware-based mute function can be found in chapter 4.6.

The label of the global mute button indicates which of the two mute options is currently used ('soft mute' or 'panic mute').

2

Main menu

The main menu on the left side of the screen consists of six tabs: meter, system, routing, network, DSP and stealth.

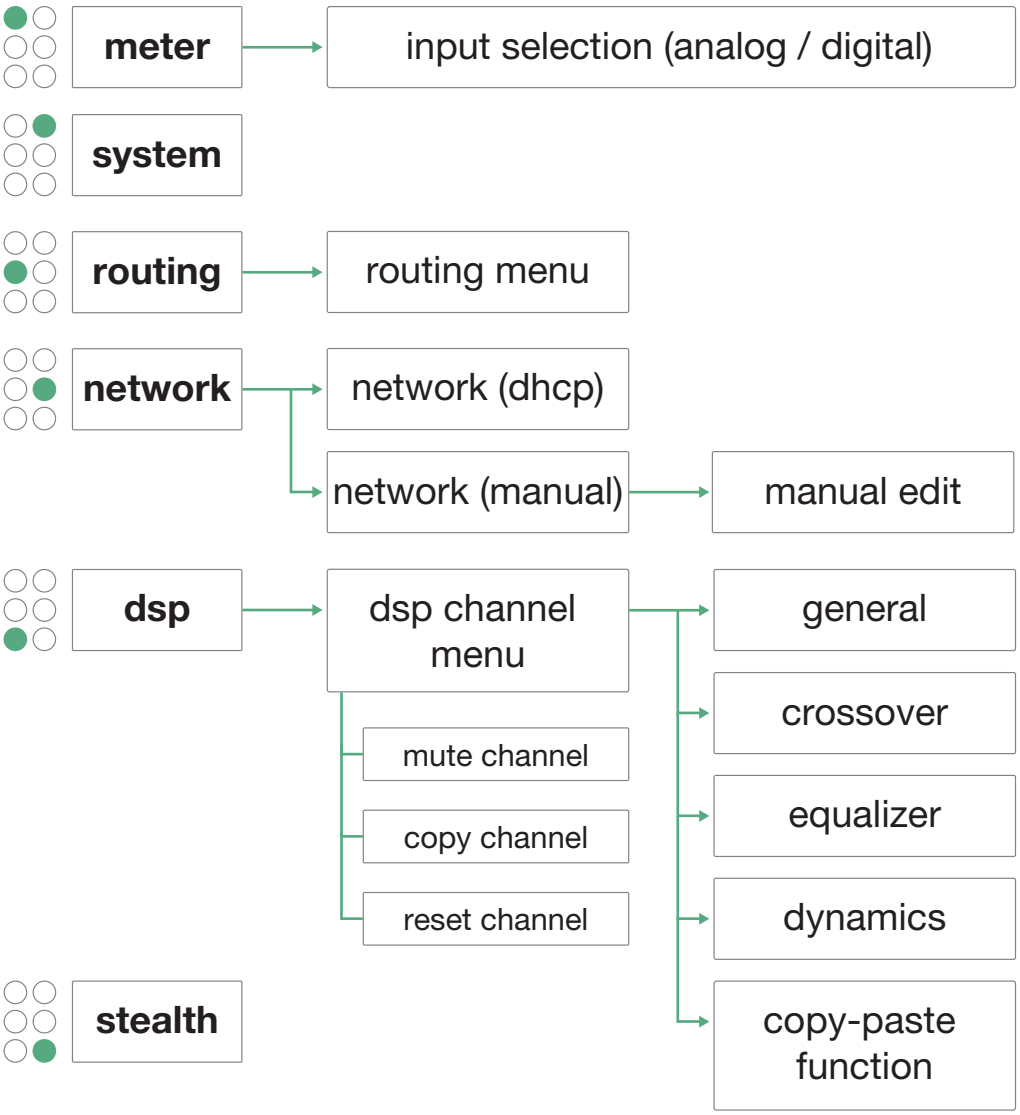
The active tab is highlighted in green.

3

Content window

On the right side of the screen the content window is placed. It changes according to the active tab. The name of the active tab is shown at the top of the window.

Menu structure of the control surface



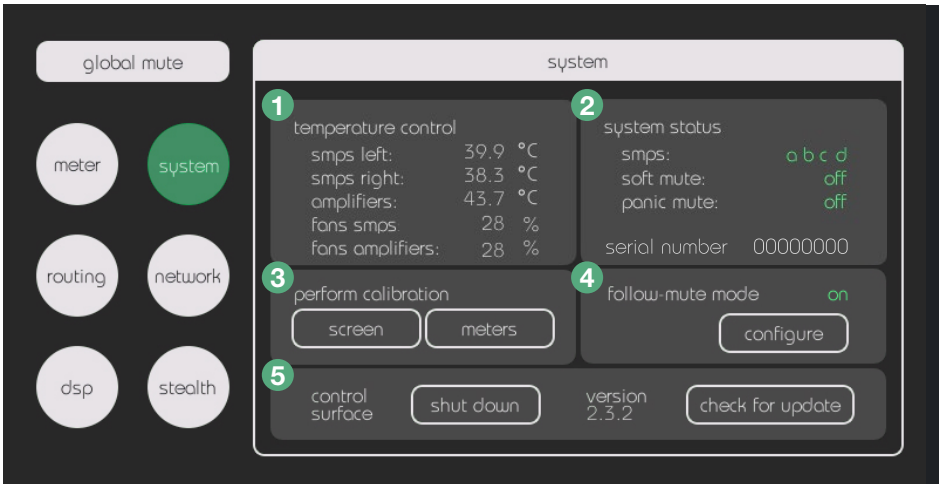
5.1 - meter screen

The meter screen shows the input meter levels. The color orange on the meters indicates a level range from -6dB to -3dB, the color red from -3dB to 0dB respectively before clipping of the outputs. Channel numbers are depicted below the corresponding level meter. There are 16 or 24 level meters shown depending on the channel number of the base unit.

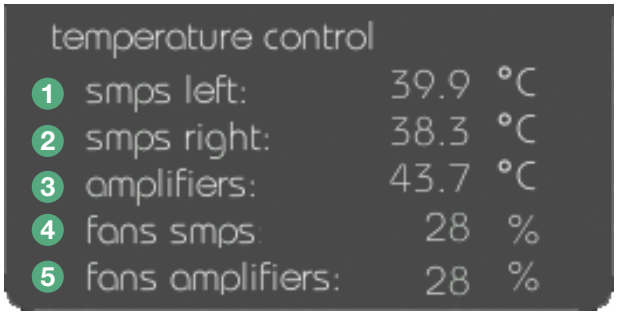
If the d:series amplifier is equipped with an optional digital input card (AES/EBU, MADI or Dante) it is possible to switch between analog and digital inputs in groups of eight by selecting the buttons above the level meters. The button is colored in green when digital inputs are selected and colored in gray when analog inputs are selected.

5.2 - system screen

The system screen is divided into five sections:



1 **temperature control**
2 **system status**
3 **perform calibration**
4 **follow-mute mode**
5 **control surface**



1 smps left

Indicates the temperature of the smps c + d in °C

The smps c + d located on the right side of the amplifier correspond to the these output channels:

d:16 - channel 9-16
d:24 - channel 13-24

2 smps right

Indicates the temperature of the smps a + b in °C

The smps a + b located on the left side of the amplifier correspond to these output channels:

d:16 - channel 1-8
d:24 - channel 1-12

3 amplifiers

Indicates the heat sink temperature of the power amplifier modules in °C

4 fans smps

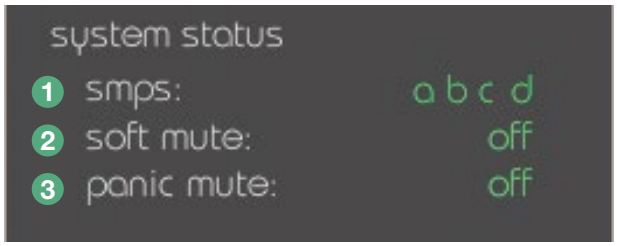
Indicates the speed of the fans located at the smps in percentage (relating to the max. fan speed)

4 fans amplifiers

Indicates the speed of the fans located at the back of the amplifier in percentage as a percentage of max. fan speed

Standard operating temperatures should be within:
smps: 20-50 °C | amplifiers: 20-75 °C

System status



1 smps [a b c d]

Indicates the operating states of the four main smps (short for 'switched-mode power supply') which are powering the amplifier modules.

If one power supply is down for any reason the corresponding letter is colored in red.

For example:
smps [a b c d] - the smps 'b' is down *(for example by a command via HTTP API)*

smps assignment (d:16)
a = amplifier module for output channels 1-4
b = amplifier module for output channels 5-8
c = amplifier module for output channels 9-12
d = amplifier module for output channels 13-16

smps assignment (d:24)
a = amplifier module for output channels 1-6
b = amplifier module for output channels 7-12
c = amplifier module for output channels 13-18
d = amplifier module for output channels 19-24

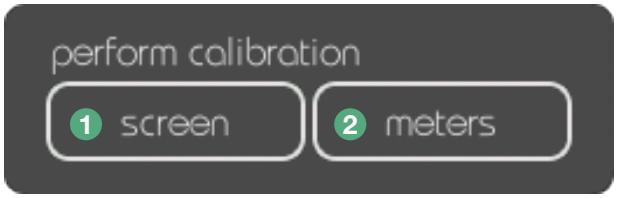
2 soft mute [off / on]

Indicates the state of the software-based global mute. If the global mute-button is set by the touch interface or the remote control, the variable changes to the state 'on'.

3 panic mute [off / on]

Indicates the state of the hardware-based global mute. If the global mute was activated by hardware ('panic switch'), the panic mute variable changes to the state 'on'.

Perform calibration



1 ‘screen’-button

The button provides the option to recalibrate the touch screen. Due to mechanical impacts or the aging of the screen its calibration references might change.

Indications for a needed recalibration are if e.g. an adjacent button is activated when you are pressing a specific button or the pressed button does not work as expected.

2 ‘meters’-button

In normal circumstances it is not necessary to recalibrate the meters over the lifespan of the amplifier. Notwithstanding it is possible to recalibrate the level meters if you identify any discrepancies of the expected levels on the display.

By selecting the meter button the recalibration procedure will be started. Please be aware that it only changes the meter levels on the display but not levels of the signal or the amplification itself!

A detailed description regarding the calibration process can be found in chapter 7 ‘maintenance & update’ (page 45).

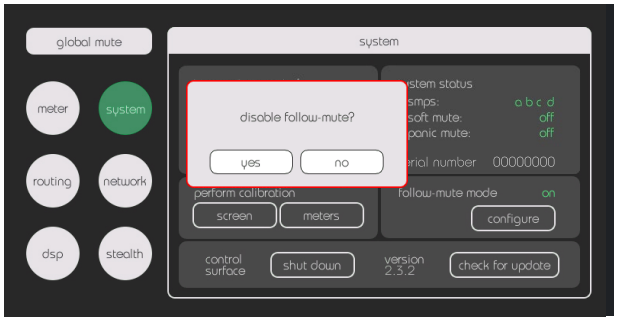
Follow mute mode

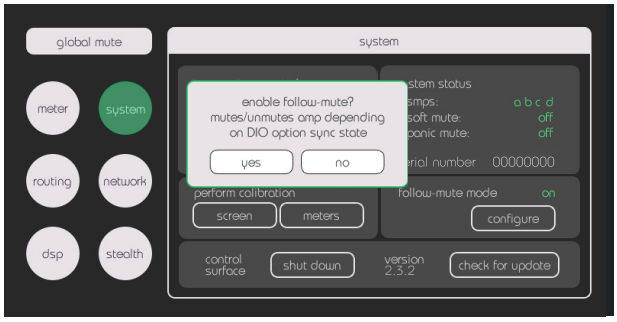
follow-mute mode [on / off]

Indicates the state of the follow-mute mode.

The follow-mute mode function mutes all amplifier channels in case of loss of the sync source on the digital input module and unmutes the channels when the sync source is available again.

By pressing the button labeled ‘configure‘ you are able to switch between on and off.





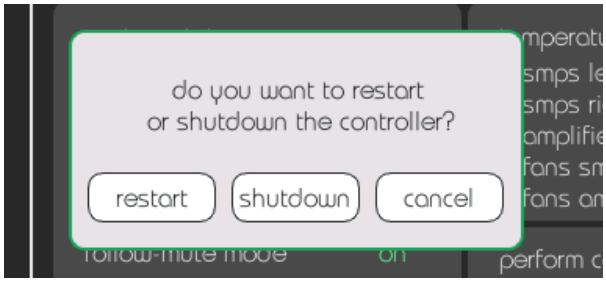
1 shut down

By selecting ‘shut down’ a pop up window will open which offers three options:

restart
By performing the restart, all channels will be muted automatically and the system will be restarted.

shutdown
Option to shut down the device to be switched off correctly.

cancel
Option to revoke your selection.



2 check for update

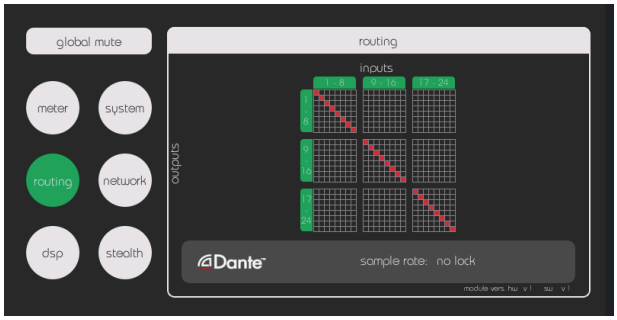
If the amplifier has an active Internet connection, you are able to check for available firmware updates for your specific device. If an update is available the button will be labeled ‘download update’.

To get sure that an Internet connection is established, please switch to the network screen (detailed description in chapter 5.4). The state ‘link up (Internet)’ colored in green indicates an existing Internet connection.

Further information regarding updating the firmware can be found in chapter 7.2 ‘Firmware update’ (page 48).

5.3 - routing screen

5.3.1 - Firmware versions higher than 3.0

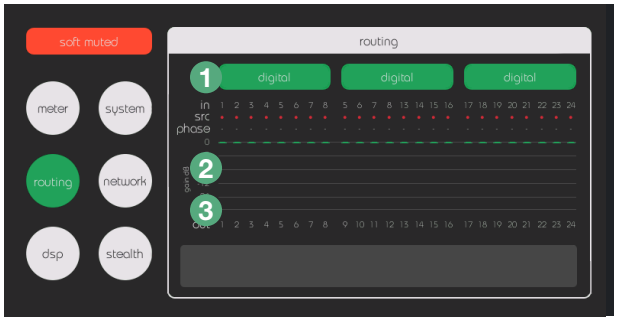


At firmware versions higher than 3.0 the routing screen displays a matrix.

For d:series amplifiers with Dante input card and firmware versions higher than 3.0 sonible provides an optional matrix mixer feature to sum multiple Dante input channels to multiple output channels.* A detailed description can be found on page 31.

**) Amplifiers with Dante input card ordered before 12/2019 have to be updated by sonible to establish the availability of the matrix mixer feature.*

5.3.2 - Firmware versions before 3.0



1 Input selection

in groups of eight (1-8, 9-16 or 17-24), which can be set to analog or digital input.

2 Channel strip overview

Channels are displayed from the top (starting with gain) to the bottom (number of the channel output).

in
number of the input channel

src
source of the input (green: coaxial input source, yellow: optical input source, red: Dante input source, gray: analog input source)

phase
phase inversion +/- ('-' indicates a phase inversion)

channel overview display
A green bar at the 0 dB line indicates that the channel is unmuted, a gray bar indicates that the corresponding channel is either muted or the input source is set to analog so that a digital input gain can't be applied on this channel.
The bar also indicates the digital input gain value set for the corresponding channel (via routing menu). In that case the bar expands itself downwards to the appropriate dB-position.
Note: On this screen no level meters are displayed.

out
number of the physical output channel

③ digital input field

depending on the actual digital input option used, the following is indicated:

AES/EBU

- Sync states of the 12 AES/EBU input pairs displayed as red (sync) or green (no sync) dots.

MADI

- sync/lock state of the optical as well as the coaxial input connection including frame information (e.g. 56ch or 64ch frame).
- clock source selection (optical/coaxial): can be switched by pressing button
  Note: The amplifier has got no input detection, therefore you have to select the clock source.
- smux: you are able to switch the sample multiplexing by a tip on the 'smux'-button to adapt the changes you have possibly made on the sending-device.
  1x: 64 Ch 24bit/48kHz (default setting) - 2x: 32Ch 24bit/96kHz

S/MUX (or 'Sample Multiplexing')

S/MUX is used to transmit high bandwidth digital audio using existing lower bandwidth technology. That means that, e.g. 24bit/96kHz instead of 24bit/48kHz is available by using demultiplexing, but the amount of audio channels will be reduced to 50 percent: *64 channels with 24bit/48kHz to 32 channels with 24bit/96kHz.*

Dante

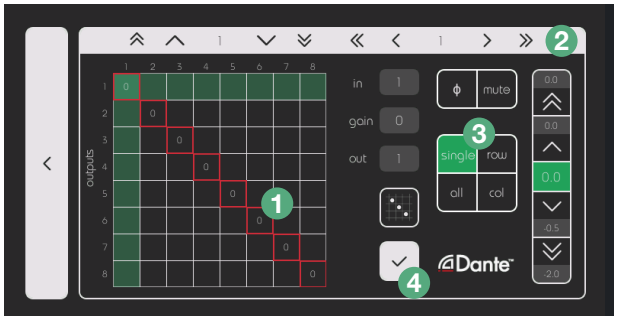
- information of sample rate and sync state.

Only digital inputs (MADI, DANTE or AES/EBU option) can be routed individually. Analog inputs are always patched one to one. On the main routing screen, the input channels are split into groups of eight. If digital inputs are available, the buttons above the level display can be set to analog or digital. The inputs can be selected in groups of eight.

By selecting a section (1-8, 9-16 or 17-24) on the routing screen, you will get to the routing menu where you are able to:

- switch between analog and digital inputs
- route digital inputs
- attenuate the input gain value
- phase invert channels
- mute channels

NOTE: The routing screen is only available with an optional digital input card (AES/EBU, MADI or Dante).



In the routing menu you are able to route the inputs to the outputs, modify settings such as gain reduction, phase inversion and to mute a selected input channel.

NOTE: Routing options are only available with an optional digital input card.

The routing menu is consistent with all digital input cards. With a MADI input card there is an additional button to select the optical or coaxial input.

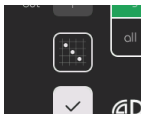
Navigation through the channels

You have got two options to navigate through the channels at the patch bay 1, either by tapping on the desired channel in the patch bar or by using the arrows on top of the routing menu 2 - single arrow for single steps, double arrow for steps of eight

Routing individual channels

1. Select the desired channel as described above
2. Select the ‘single’ button on the right 3
3. Confirm the routing by a tap on the white button with the checkmark 4 to the right of the patch bay

To route subsequent channels in the displayed grid use the sequential routing button as described below.



Sequential routing

The ‘sequential routing’-button allows for easy 1:1 sequential routing starting at the currently selected channel. All edited parameters such as phase inversion, gain reduction and the mute state will be copied to the subsequent channels too.

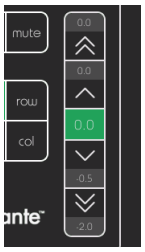
Phase inversion and channel muting

1. Select the desired channel as described above
2. Select the desired function on the right side of the screen

Note: The mute-button relates to the input of the respective channel, in contrast to the mute button in the DSP menu which relates to the output of the DSP module.

Gain reduction

1. Select the desired channel as described above



2. Use the arrows which are displayed in the bar on the right for editing the value

Read about the routing procedure via remote control chapter 6 ‘remote control’ (page 38).

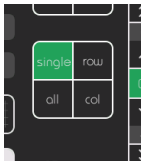
Matrix mixer – Summing of Dante input channels

The matrix mixer is available for d:series amplifiers with Dante input module and firmware versions higher than 3.0.*

This feature allows summing of arbitrary input channels to output busses. Different amounts of gain can be applied to each independent channel feeding the corresponding output bus. Each of the output busses is then connected directly to the loudspeaker output. If your amplifier is equipped with the DSP option, it is inserted into the output bus between matrix and loudspeaker.

Based on the availability of this feature you can use additional routing buttons as all, col and row (please find the description below).

**) Amplifiers with Dante input card ordered before 12/2019 have to be updated by sonible to establish the availability of the matrix mixer.*



Additional routing functions

You are able to route the displayed channels one by one with the activated ‘single’-button or by using the following functions which are available for amplifiers with Dante input card and installed matrix mixer:

all - to patch each channel input to each channel output

row - to patch channels in a row

col - to patch channels in a column

5.4 - network screen

To integrate the d:series amplifier in a local network for having remote control or rather setting up an internet connection to check the availability of firmware updates, the CAT connection has to be established as described in chapter 4.5 and the network interface has to be configured. You are able to configure the amplifier via DHCP or by manual input.

DHCP

Pressing the DHCP enables a connected DHCP server to execute all settings automatically. To renew the DHCP lease you have to select the ‘renew’-button.

The IP address is necessary information to access the remote control from your browser (see chapter 6 ‘remote control’).

Manual input

Press the ‘manual’ button to switch to manual mode. In manual mode all network configuration data has to be entered manually via the number pad located on the right of the screen.

Press the ‘edit’ button to execute the manual configuration. Select a white text box and enter values via the numeric keypad. Navigate the text boxes with the ‘tab‘ button.

The ‘del‘ button bottom left will delete values in the current text box or the previous text box if the current one is empty.

Use the ‘cancel’ button to restore the configuration you had before or press the ‘apply’ button to apply your configuration. During that request the connection state will change its color to yellow. If the request was successful, the ‘state link up (Internet)’ text will turn green – your configuration is applied and the ‘apply’ button will turn gray again.

Possible connection states are

link up (Internet) - a valid Internet connection is established

link up (no Internet) - LAN connection without Internet connectivity is established

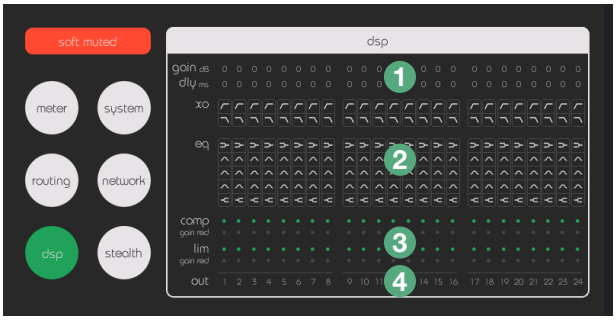
link down - no LAN connection it established (please check if the Ethernet cable is connected correctly)

checking - the checking state is shown when the amplifier is trying to establish a connection (the controller attempts to apply the network configuration)

NOTE: Currently, the amplifier only supports IPv4.

5.5 - dsp screen

The DSP menu displays an overview of all output channel parameters when the amplifier is equipped with the optional DSP feature.



1 Gain and delay parameter per channel

2 State of crossover and EQ parameters

- Edited parameters are highlighted in green
- Bypassed parameters are grayed out

4 Numbering of the corresponding output channels

a red-colored number indicates that the channel is muted

3 State of the compressor and limiter

- **comp (compressor)**

A green dot indicates that the compressor is activated, a gray dot indicates that it is bypassed

- **gain red (gain reduction):**

yellow dot indicates active gain reduction

- **lim (limiter)**

A green dot indicates that the limiter is activated, a gray dot indicates that it is off

- **gain red (gain reduction):**

red dot indicates active gain reduction

Select the desired channel strip on the display to access edited parameters in the DSP channel menu.

NOTE: The DSP screen is only available if the amplifier is equipped with the DSP option.

Silent mode should only be activated in special situations, e.g. a very silent environment for measurements. Do not set silent mode by default!

The cooling system of the amplifier has got an essential effect on its lifespan. To extend the amplifiers lifespan it is recommended to do not use 'low' and 'silent' mode permanently. Use it in sensitive situations only!

5.5.1 - dsp channel menu

The DSP channel menu provides you with an overview of all editable parameters of a selected channel.

1 mute the selected channel
when activated, the white border of the screen changes to red

Note: The mute-button in the dsp menu mutes the output of the dsp module in contrast to the mute button in the routing menu which mutes the input of the selected channel.

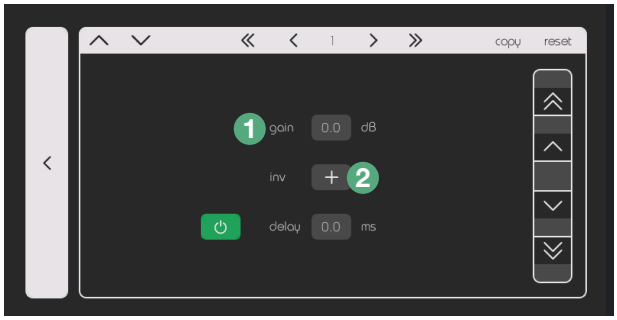
2 channel navigation
press single arrows for single steps, double arrows for steps of eight

3 copy or reset channel parameters
(further description concerning the copy-paste function can be found on page 36)

4 switch to the corresponding setting menu
general, crossover, equalizer and dynamics

5 bypass crossover, equalizer or dynamics
green button indicates activated parameter

5.5.1 - dsp general menu



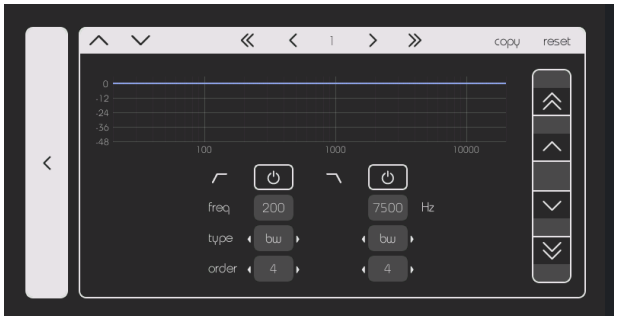
1 gain/delay
To configure the parameters, select the corresponding box. Values can be set via the arrow buttons on the right in steps of 0.1 (single arrow) and in steps of 1.0 (double arrow).
The power button bypasses the delay.

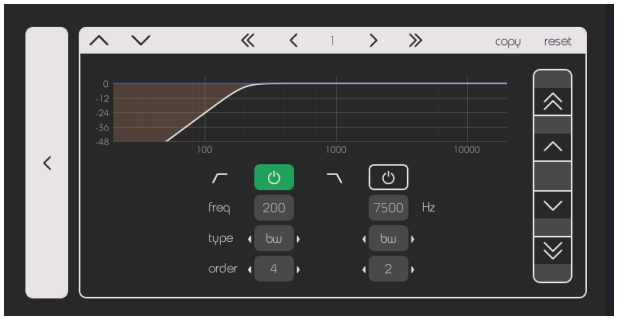
Parameter ranges
Gain: from +20dB to -24dB
Delay: up to 11,5 ms

2 phase inversion (inv)
The phase can be inverted by pressing the plus button. The button turns to green and displays a '-' when the phase is inverted.

5.5.3 - dsp crossover menu

In the crossover menu you are able to edit the following parameters: frequency, filter type and order





A green highlighted ‘power’-button indicates that edited parameters are active. If the button is not highlighted in green the parameter settings are bypassed. Select the desired box to edit the corresponding parameters. The values can be set by using the arrow buttons on the right.

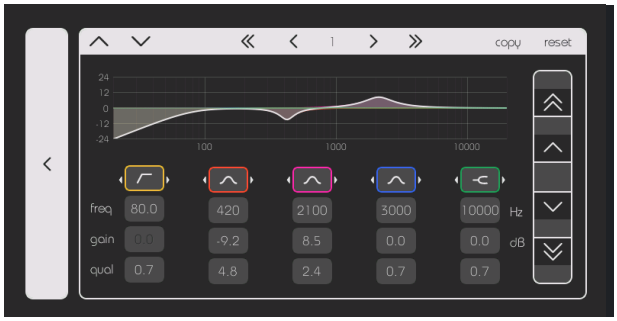
When the ‘power’-button is activated a high pass and low pass curve is displayed on the screen.

Parameters of the crossover menu

Frequency: 20-20.000 Hz
Type: bw (Butterworth), lr (Linkwitz-Riley), bes (Bessel)
Order: 1: -6 dB per octave
2: -12 dB per octave
3: -18 dB per octave
4: -24 dB per octave

5.5.4 - dsp equalizer menu

The dsp module provides a 5-band equalizer with various curve types.
Available parameters are: filter curve, frequency, gain and quality factor.



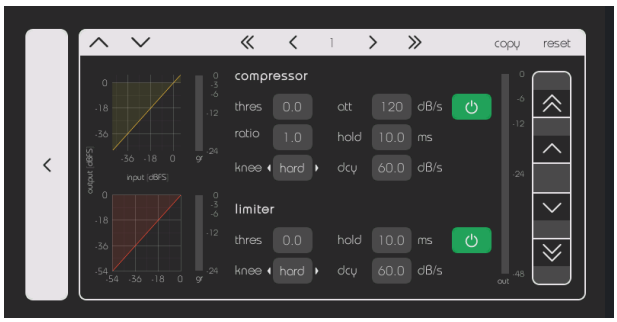
Select one of the five available filter curves by pressing on the desired band.

EQ parameters

Filter types: low shelf, high shelf, parametric, low cut, high cut
Frequencies: 20-20.000 Hz
Gain: +24dB to -24dB
Quality factor: 0.1-10

5.5.4 - dsp dynamics menu

In the dynamics menu the parameters of the compressor and the limiter can be edited.
To edit parameters, select the desired box. The values can be set via the arrow buttons on the right.
A green highlighted 'power'-button indicates that the corresponding function is activated.



Compressor parameters

Threshold:	0-90.0
Ratio:	1:1-1:100
Knee:	hard/soft
Attack:	1-1.000 dB/s
Hold:	0-2.000 ms
Decay:	1-1.000 dB/s

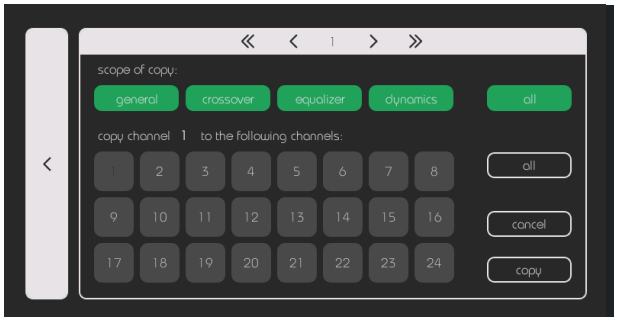
Limiter parameters

Threshold:	0-90.0
Knee:	hard/soft
Hold:	0-2.000 ms
Decay:	1-1.000 dB/s

5.5.5 - copy/paste function

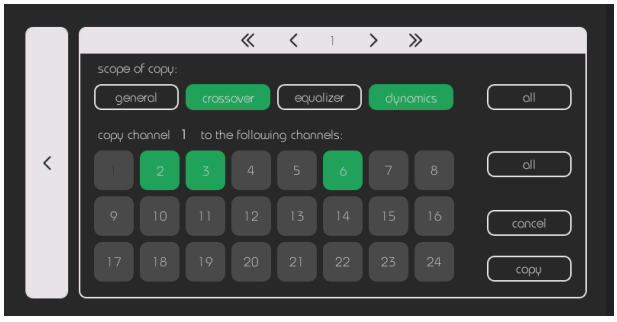
The copy-paste function is available on the top right at any time in the dsp channel menu. Use it to copy the settings of the selected channel.

In the copy function menu you are able to copy general-, crossover-, equalizer, dynamics- or all parameter settings.



Selected parameters are highlighted in green. These selected parameters can be assigned to either selecting individual or all channels. The 'cancel'-button deletes the selection.

To perform the copy-option tap on the 'copy'-button in the lower right corner.



Example of copying a channel:
To copy the crossover and dynamic parameters from channel 1 to channel 2, 3 and 6 follow the description below:

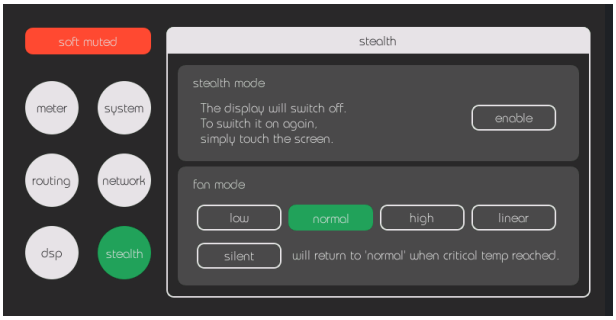
1. Choose channel 1 by using the arrow buttons
2. select crossover and dynamics
3. select channels 2, 3 and 6
4. select the 'copy'-button
5. Confirm the copying process

(Note: general and equalizer parameters will not be overwritten in the selected channels 2, 3 and 6)

5.5.6 - reset channel settings

The reset function is available on the top right in the dsp channel menu.

5.6 - stealth screen



Stealth mode

The d:series amplifier offers an option to switch off the display. For example, in case of usage in the dark, where the display light would disturb the environment. Select the ‘enable’-button on the right to switch off. It can be activated by pressing anywhere on the screen.

Note: If the screen is not touched for a certain time, it will be dimmed automatically.

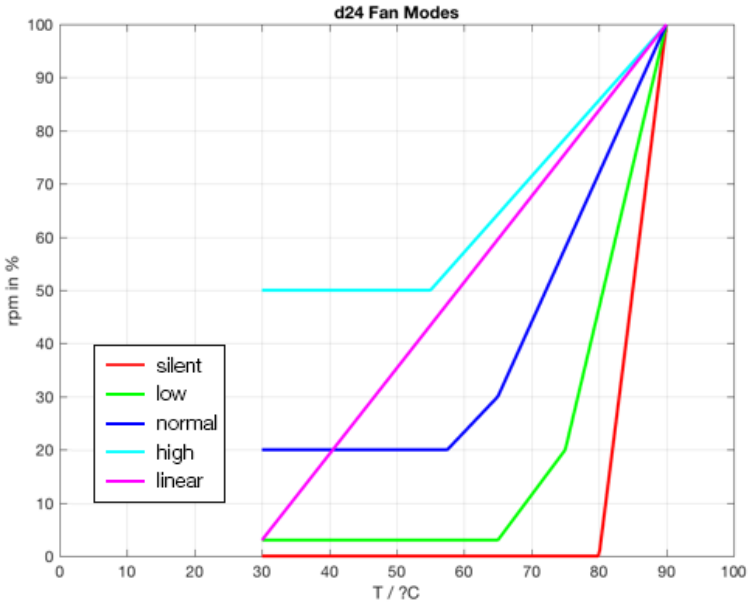
Fan mode

The d:series amplifier provides five different fan modes: low, normal, high, linear, silent. By default, the fan mode at startup of the amplifier is set to ‘normal’. Selected other modes are just activated until the device is shut down.

low, normal, high
The fan modes ‘low’, ‘normal’ and ‘high’ enable static fan speeds until the temperature exceeds a predefined limit. If the predefined limit is reached, the fan speed will be ramped up according to the measured temperature. A detailed performance information can be found in the graphic below.

linear
By selecting the linear fan mode, the fan speed will be set according to the measured temperature.

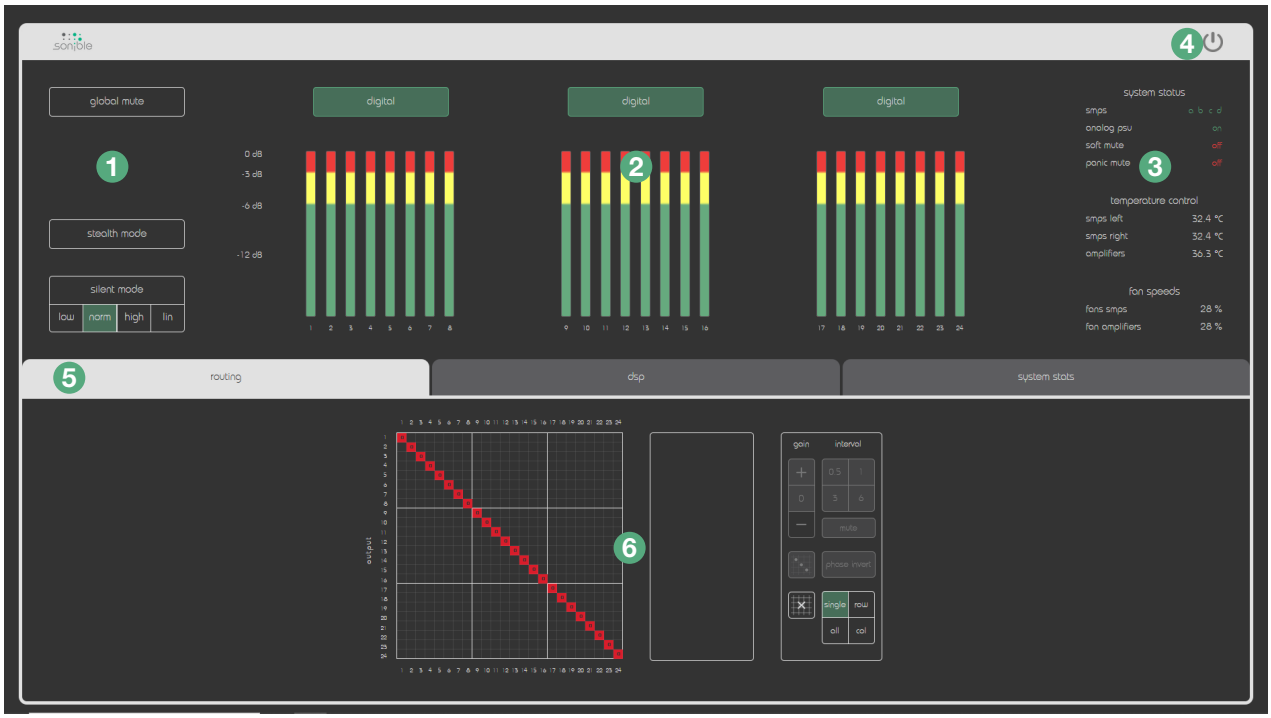
silent
In silent mode, the fans slow down to minimize ventilation noise.
In case the amplifier heats up to a predefined maximum temperature (as shown in the graphic below), the fans accelerate to cool the circuits down to normal working conditions.



6 - remote control

The remote control provides you with various control functions via web browser in an established network as described in chapter 5.4.

Functions as routing and dsp screen are only available for d:series amplifiers provided with the corresponding module – routing with optional digital input card, dsp with optional dsp module.



1 Options
global mute, stealth mode, fan modes

These settings are described in chapter 5.6 ‘stealth screen’.

2 Meter display
incl. input selection in group of eight

You are able to switch between analog and digital inputs (when digital input card is equipped) by a mouse click on the button above the meter display.

3 System status display
overall amp health, temperature control, fan speeds

4 Shutdown button

5 Control tabs
(routing, dsp, system stats)

6 Menu corresponding to the control tabs

6.1 - establishing a network connection

To access all available control functions via web browser you have to establish a valid network connection. The web interface can be accessed from any device connected to the same network by entering the IP address of the amplifier into the address bar of your web browser.

The network connection has to be configured via the network menu on the control surface (touch screen). A detailed description can be found in chapter 5.4.

NOTE: Your browser needs to support HTML5 and correspond to the current state.
The web interface is optimized for remote control via laptop and desktop computers. sonible can’t guarantee the impeccable functionality via mobile devices as tablets and smartphones.

6.2 - remote control of more than one amplifier

To control more than one d:series amplifier, you simply have to open multiple tabs in your web browser and enter the respective IP addresses of the desired devices.

Please note, that each device needs a unique IP address. It is ensured by configuration via DHCP as described in chapter 5.4.

6.3 - control tabs

By a mouse click on the control tabs you are able to switch between three control options:

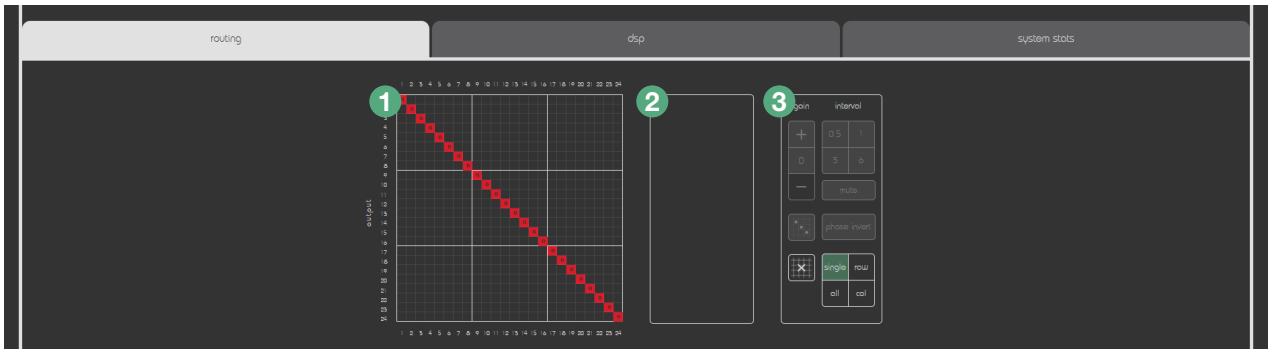
- routing (only available with digital input card)
- dsp (only available with dsp module)
- system stats

6.3.1 - routing tab

Selecting the ‘routing’ tab opens an overview of the current routing settings and parameters.

The routing tab corresponds to the routing screen of the amplifiers touch display. All parameters can be set via touch display and remote control.

When you are moving the mouse over the patch grid the two green bars give you orientation and information about the current position concerning the input channel on the y-axis and the output channel on the x-axis. Gray bars indicate the currently selected channel.



1 Routing matrix
number of inputs depends on the input card

- The color of the routing squares depends on the supplied digital input card. Muted channels are colored in gray.
- The displayed number in the routing square indicates the present gain value of the channel
- Gray bars indicate the currently selected channel

2 Information and parameters concerning the optional digital input card

- **Dante:** shows the present state of the Dante connection including sample rate
- **MADI:** MADI clock source (optical/coaxial) and smux multiplier (1x/2x), respectively state of the present sample rate, madi optical state, madi coaxial state
- **AES/EBU**

③ Parameter section

In this section you are able to edit parameters for a selected channel:

- gain: +/- (attenuation; no positive gain possible)
- interval: increment of the '+/-' buttons (0.5, 1, 3, 6)
- channel mute
- sequential routing
- phase invert
- clear routing-button: deletes all routing settings of all channels
  Note: all routed channels and all edited parameters will be cleared!

- single/all/row/col-buttons:
  single: to patch individual channels by a double-click in the routing matrix
  all: to patch each channel input to each channel output by a double-click in the routing matrix
  row: to patch channels in a row by a double-click in the routing matrix
  col: to patch channels in a col by a double-click in the routing matrix

Individual routing

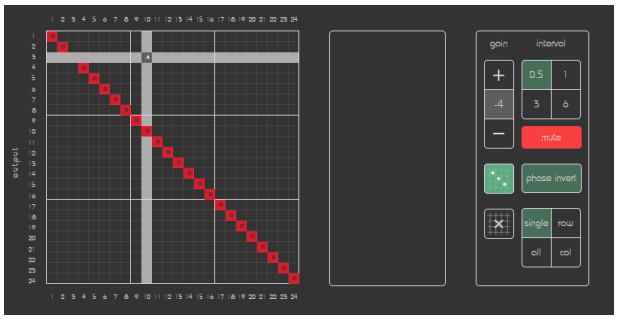
To route individual channels select the 'single'-button in the parameter section on the right and route the desired channel by a double-click with the mouse in the routing matrix.
By a single-click on a routed channel, the gray overlaid side menu ('parameter section') is activated to edit various parameters.

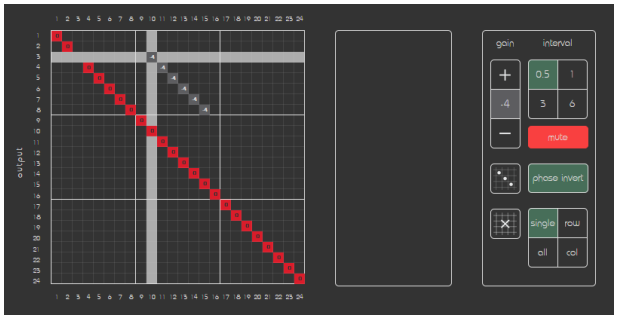
Sequential routing

To the left of the phase invert-button in the side menu you can find the 'sequential routing'-button. The button allows you to assign a 1:1 routing for the ensuing channels in the corresponding section.

All edited parameters such as phase inversion, gain reduction and the mute state will be copied to the ensuing channels as well.

In the following example the input of input channel 10 is routed to output channel 7. By a click on the 'sequential routing'-button the ensuing channels are routed 1:1, the gain trim of '-4' and the phase inversion is copied as well.





Matrix mixer – Summing of Dante input channels

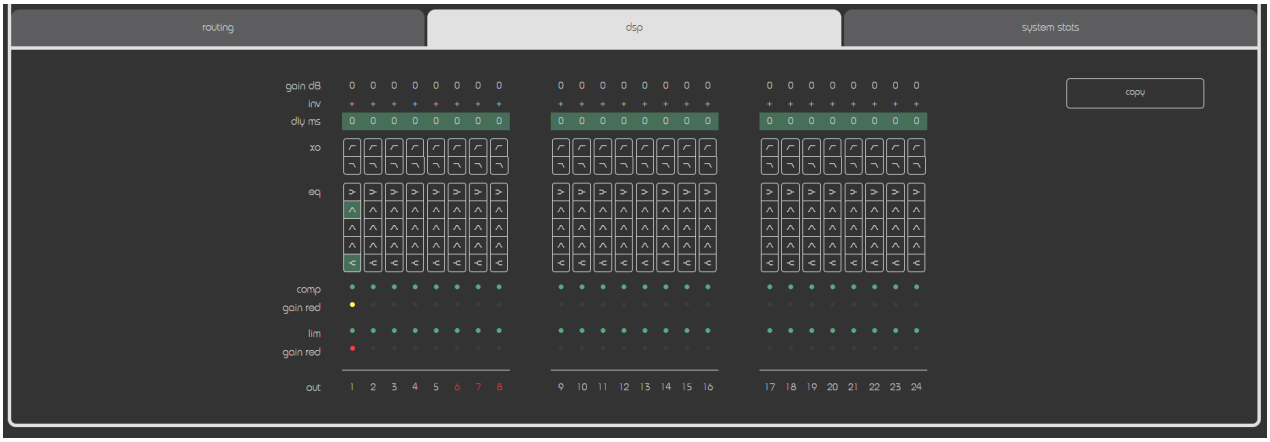
The matrix mixer is available for d:series amplifiers with Dante input module and firmware versions higher than 3.0.*

This feature allows summing of arbitrary input channels to output busses. Different amounts of gain can be applied to each independent channel feeding the corresponding output bus. Each of the output busses is then connected directly to the loudspeaker output. If your amplifier is equipped with the DSP option, it is inserted into the output bus between matrix and loudspeaker. Based on the availability of this feature you can use additional routing buttons as all, col and row to route more than one channel per mouse-click.

**) Amplifiers with Dante input card ordered before 12/2019 have to be updated by sonible to establish the availability of the matrix mixer.*

Selecting the dsp tab opens an overview of the settings and parameters which can be edited with the optional included dsp module.

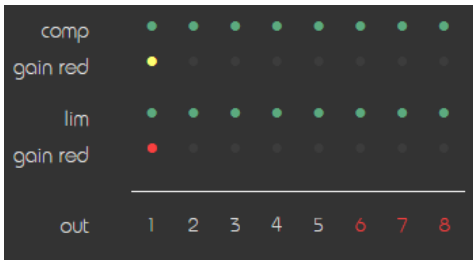
The dsp tab corresponds to the dsp menu of the amplifiers touch display. All parameters can be set via touch display and remote control.



DSP overview tab

As depicted in the graphic the dsp tab displays all channel strips from the top (starting with gain) to the bottom (number of the channel output):

gain dB:	displays the numeric value of the gain in dB
inv:	displays the state of the phase inversion as ‘+’ or ‘-’ (‘-’ indicates a phase inversion)
dly ms:	delay - displays the numeric value of the delay in ms
xo:	crossover – an activated crossover is labeled in green
eq:	equalizer – activated and edited EQ bands are labeled in green
comp:	compressor - a green dot indicates that the compressor is activated, a gray dot indicates that the compressor is deactivated.
gain red:	gain reduction - the gray dot turns to yellow in case of current gain reduction
lim:	limiter - a green dot indicates that the limiter is activated, a gray dot indicates that the limiter is deactivated.
gain red:	gain reduction - the gray dot turns to red in case of current gain reduction
out:	output - number of the output channel. A red number indicates the channel is muted.

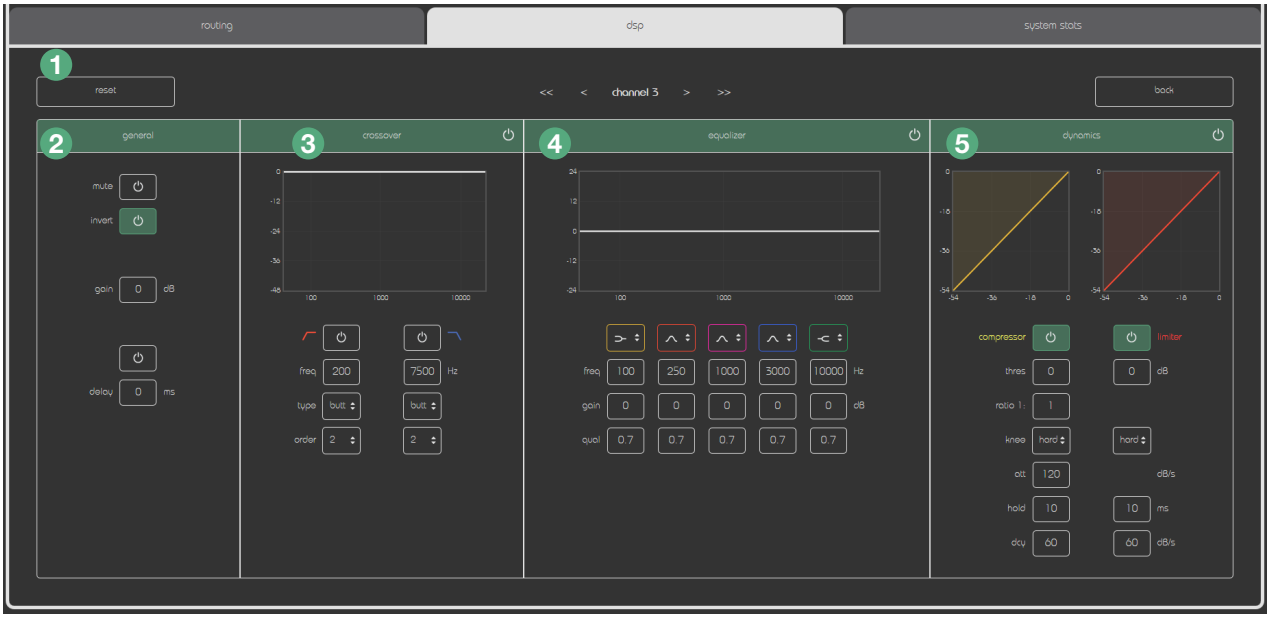


Darkened sections indicate that those functions are deactivated in the respective channel strip.

A click on the copy-button on the right of the DSP overview opens the copy-paste function which can be used as described further down on page 36.

6.3.3 - dsp channel menu

To edit a channel, click on the desired channel strip in the dsp overview tab.
All functions are switched on by standard and can be bypassed by a click on the green bar on top of the desired section.



1 header sections
reset-button: resets all channel parameters
channel navigation: displays the selected channel including arrows for navigation
back-button: to go back to the dsp overview tab

2 general section
mute-button: on/off
invert-button: on/off
gain: enter values from -24 dB to +20 dB
delay-button: on/off
delay time: enter values from 0 to 11.5 ms

3 crossover section

on/off-button:	turn low- or high-cut on or off
Frequency:	20-20.000 Hz
Type:	bw (Butterworth), lr (Linkwitz-Riley), bes (Bessel)
Order:	1: -6 dB per octave 2: -12 dB per octave 3: -18 dB per octave 4: -24 dB per octave

4 equalizer section

Filter types:	low shelf, high shelf, parametric, low cut, high cut
Frequencies:	20-20.000Hz
Gain:	+24dB to -24dB
Quality factor:	0.1-10

5 dynamics section
(split in compressor and limiter)

Compressor

Threshold:	0-90.0
Ratio:	1:1-1:100
Knee:	hard/soft
Attack:	1-1.000 dB/s
Hold:	0-2.000 ms

Limiter

Threshold:	0-90.0
Knee:	hard/soft
Hold:	0-2.000 ms
Decay:	1-1.000 dB/s

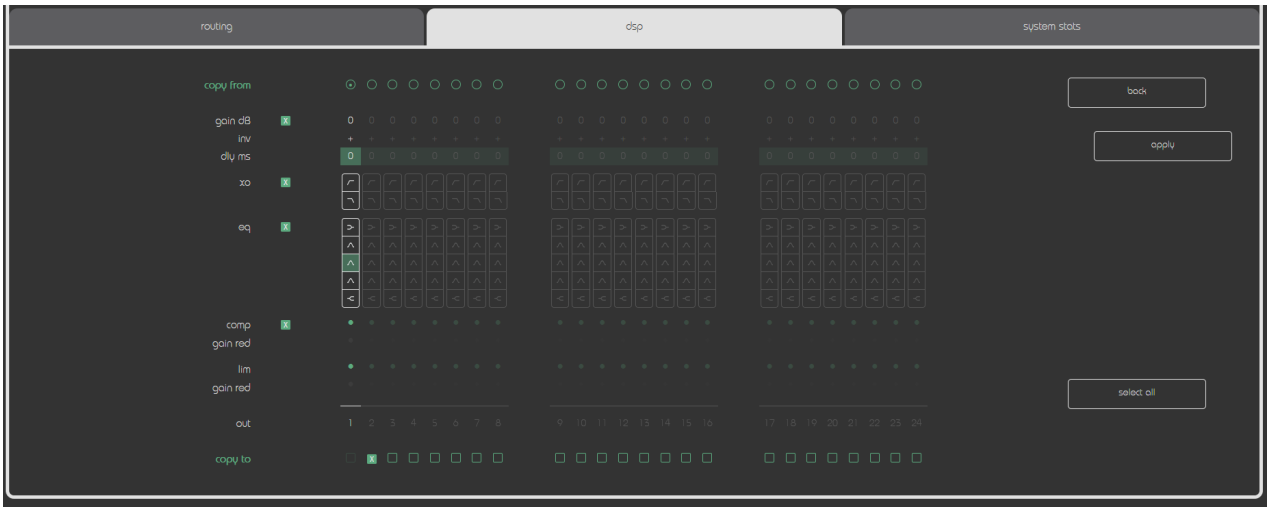
Editing numeric values

There are two ways to edit numeric values such as gain, frequency, delay, threshold etc.

1. By a mouse-click in the desired field and through entering the value via keyboard.
2. When moving the mouse cursor over the input field a bidirectional arrow appears. Edit the value by dragging and moving on the y-axis

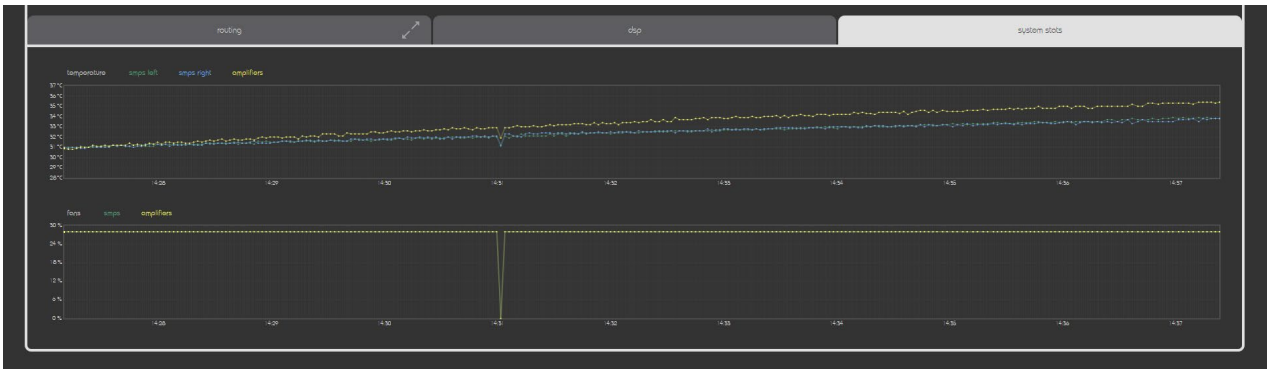
6.3.4 - Copy-paste function (via web interface)

To open the copy-paste screen, click on the copy-button in the dsp overview tab.



Copy a channel:

1. Select the source channel on the top
2. Select the desired parameters on the left
3. Select the target channel at the bottom - copy settings from one channel to all other by pressing ‘select all‘
4. Click on the button ‘apply’ to process



Selecting the system stats tab opens a window displaying relevant system states on a timeline concerning:

x-axis = timeline | **y-axis** = temperature development in °C (upper graph); fan status in % (lower graph)

Standard operating temperatures should be within: **smps** 20-50 °C / **amplifiers** 20-75 °C

7 - maintenance & update

7.1 - maintenance and care

Cleaning the touch screen

We recommend using a dry microfiber cloth to clean the touch screen

Wipe the screen with moderate pressure! Never spray a cleaning agent or any other liquid directly on the screen as it could penetrate the device!

Cleaning the dust filter

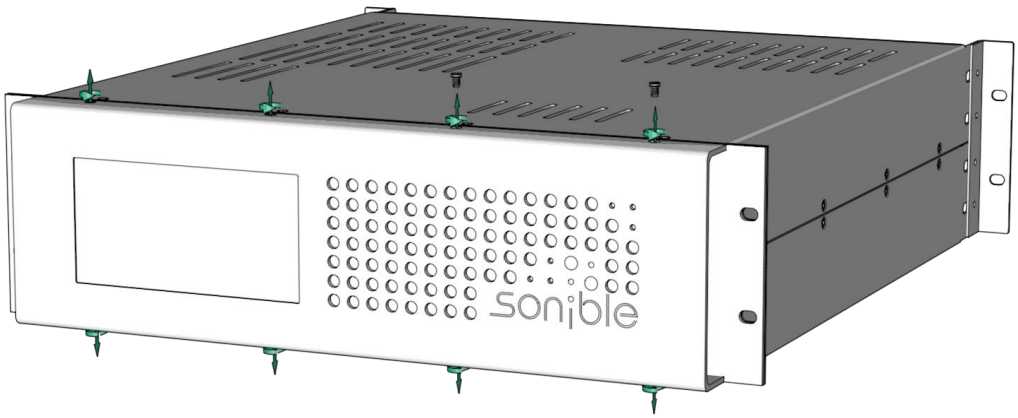
For safe and reliable operation, the dust filter of the front panel behind the grilles should be removed and cleaned regularly to ensure maximum airflow through the device.

To clean the dust filter, the panel can be removed by unscrewing eight M3 TX10 screws on the top and the bottom of the panel. If you would like to completely replace the filter, you additionally have to remove the display by unfastening the four M3 TX10 screws.

Please be very careful with the FPC cable when removing the display! Please use original filter sets provided by sonible.

Note: If the dust filter is not maintained there will be safety risks. There is also a risk that the unit will malfunction since it is dependent on constant airflow from front to rear. If the dust filters are not clean and the unit malfunctions, any resultant problems will not be covered by the warranty.

Feel free to contact sonible by email at: **support@sonible.com**



If the amplifier malfunctions due to dirty dust-filters, any required repairs or resultant drop out costs are not covered by the warranty.

If you like to replace the dust filter, please use original filter sets provided by sonible.

Perform screen calibration

Due to mechanical impacts or the aging of the screen, its calibration references might change. Indications for a recalibration are e.g. an adjacent button being activated when you are pressing a specific button or the pressed button does not work.

Use the option ‘screen’ on the system screen to recalibrate it. For the calibration procedure you will need a pointed item like a pen. Please be sure that you have it prepared to be able to do the calibration.

The screen calibration procedure consists of several steps:

1. Select the ‘screen’-button on the system screen to start the procedure
2. Start the calibration by selecting ‘OK’ in the message box that will pop up
3. After selecting the “OK”-Button the calibration can be proceeded. Please use a pointed item to tap on the rectangles that will show up in all four corners and finally in the middle of the touch display.
4. Finally, you have to confirm the successful calibration procedure in a message box. In case you are not confirming by selecting the ‘yes’-button, the calibration will restart after five seconds.

Perform meter calibration

In normal circumstances it is not necessary to recalibrate the meter screen over the lifespan period of the amplifier. In case of any discrepancy of the expected meter level on the display, the meter calibration option can be selected in the system screen of the touch display.

Preparation before the calibration:

- To calibrate the meter screen, it is necessary to send a 1 kHz sine with -6dBFS on all channels.
- Be sure the channels of the amplifier are routed 1:1 and there’s no gain reduction enabled

To be safe, please route the input channel 1 to the output channel 1 and set the gain attenuation on ‘0’. Afterwards select the sequential processing on channel 1 to assign a 1:1 routing for the ensuing channels. All parameters such as phase inversion, gain reduction and the mute state are copied to the ensuing channels as well!

- All meter levels are post DSP. Reset all edited parameters in the dsp channel menu of all channels. The easiest way to do that is to reset the channel 1 via the dsp screen. Then you are able to copy the channel 1 to all other channels of the amplifier. The procedure is as follows:

    1. Selecting ‘copy’ in the top section of the dsp channel menu opens the copy-paste function. This function menu offers to choose the scope of copy (general, crossover, equalizer, dynamics or all).
    2. Select ‘all’ (Selected parameters are highlighted in green.)
    3. Select all channels by pressing the ‘all’-button on the right side of the channel numbers.
    4. Select the ‘copy’-button in the lower right corner.
    5. You have prepared the amplifier for meter screen calibration

The meter screen calibration procedure consists of several steps:

1. Select meter calibration in the system screen of the touch screen.
2. Confirm the calibration process in the pop up window
3. Send a 1 kHz sine with -6dBFS on all channels of the amplifier.
4. Confirm the calibration process in a second pop up window to start the meter calibration
5. After a successful calibration process a pop up message will show up to inform you that the process was successful.

7.2 - firmware update

To perform a firmware update or to check the availability of a new firmware version, the d:series amplifier has to be connected to the Internet. Please select the ‘system’-button on the left side of the touch display.

To perform the firmware update, the following steps have to be done:

1. Select the button ‘check for update’ at the bottom of the system screen

2. If a newer firmware version is available for the device, the button changes to ‘download update’. Select the button to perform the downloading process.

3. Check the state of the download in the progress bar.

4. After the download select the ‘install now’-button for starting the update. Now a pop up window appears for an additional confirmation of the update procedure. Please select ‘Yes’ to start the update or ‘Cancel’ to abort.

5. During the update procedure and to reboot of the device, the screen turns white for a moment (not more than one minute).

6. After the successful update a pop up window appears on the display which confirms the update and also shows you the actual firmware version of your d:series amplifier.

Do never unplug the power supply of the amplifier during the updating process!

8 - frequently asked questions

Can analog signals be routed individually?
At this stage, analog signals cannot be gained. The analog channels are routed directly (one by one) to the respective outputs. Only digital inputs (with MADI, DANTE or AES/EBU option) can be routed individually.

Can analog signals be gained?
No.

Can output channels be bridged?
Basically yes. In any case: be VERY CAREFUL and follow the instructions of the manual carefully to avoid damages of the amplifier and/or connected loudspeakers.

Can d:series amplifiers be controlled by external systems like Crestron, KNX or similar systems?
Yes. At the support page on our website (www.sonible.com) you are able to find further information concerning the system integration.

Are ELA applications supported?
Yes. You can use the d:series amplifiers for ELA/100V applications without the need of any additional gear. Please be careful not to go below the minimum load of 4Ω!

Are d:series amplifiers 115VAC/60Hz compatible?
In the basic configuration, d:series amplifiers can NOT be run on 115VAC. There is a built-to-order option available that allows d:series amplifiers to be run with such input voltages. Please keep in mind that the output power ratings and power consumptions differ slightly between the two configurations. If you need more information on that topic, please contact support@sonible.com

Are the DIOs (digital input options) 'hot swappable'?
No. The additional hardware options have to be installed directly by sonible.

Is the MADI option 56ch and 64ch frames capable?
The MADI option card can handle both madi frames (with or without varispeed).

Do I need an external input clock for the MADI option?
No, the MADI option regenerates its internal clock from the incoming MADI stream.

Can multiple d:series amplifiers be daisy chained??
Yes – without any restrictions!

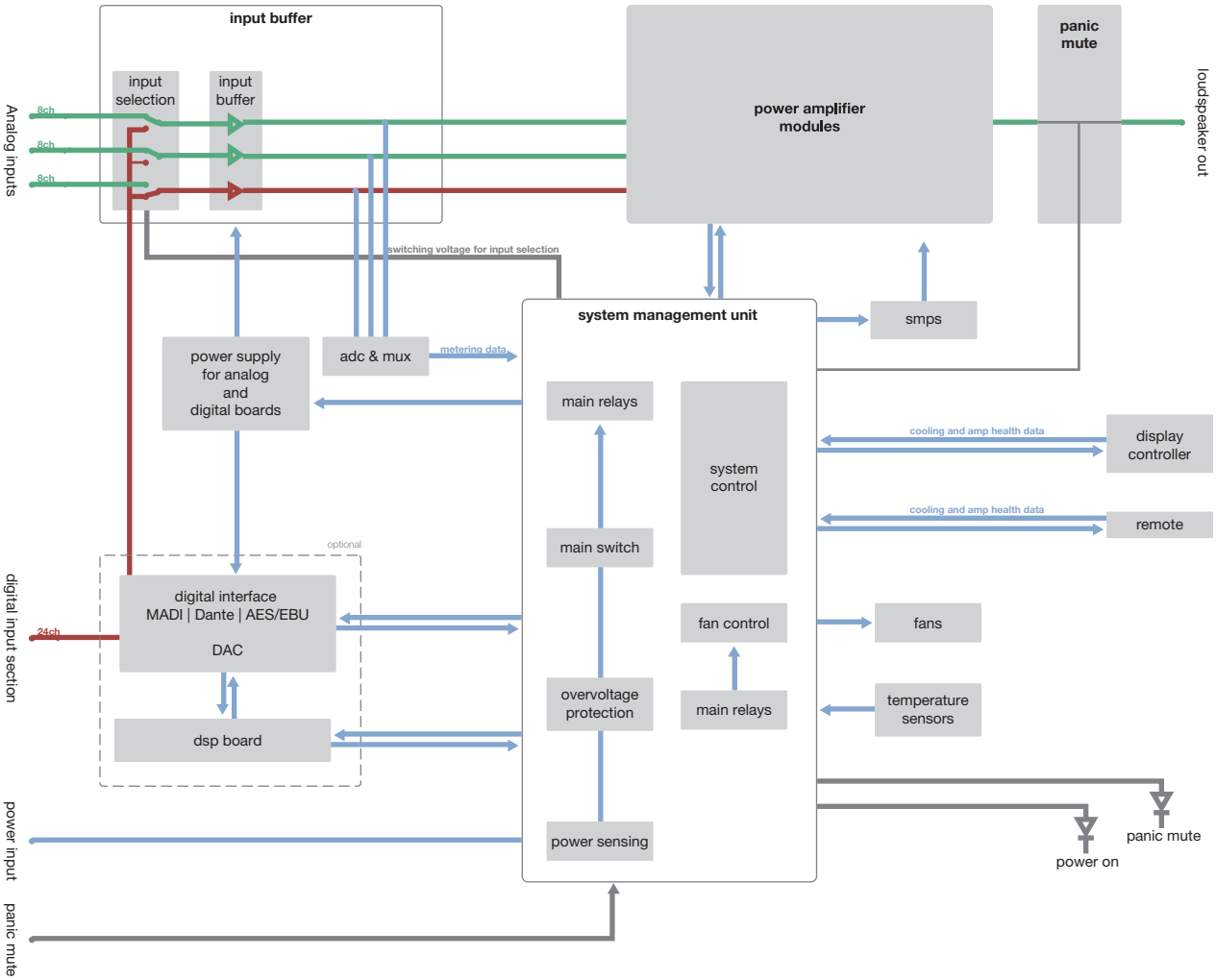
Will daisy chaining cause timing problems?
No. Each point of relaying only causes a deterministic delay of 160nsec or 0,000768 samples (@96kHz).

What clock is provided at the clock output of the MADI option?
The clock output provides the internal reference clock signal.

How can I choose between coax and optical MADI inputs?
You can select the input via the graphical user interface.

Does the amplifier support remote control via tablet or smart phone?
The web interface is optimized for remote control via laptop and desktop computers. sonible can't guarantee impeccable functionality via mobile devices such as tablets and smart phones.

9 - signal flow



10 - technical specifications

10.1 - data sheet

Power - RMS output power (1 kHz sine, 15dBu)

	Load	Power	THD+N
Single channel	4Ω	250W	<= 0.05%
	8Ω	125W	<= 0.04%
bridged	8Ω	495W	<= 0.04%
	16Ω	250W	<= 0.07%

AC mains

Voltage	230VAC -5V; +20V 115VAC -5V; +10V
Frequency	50/60Hz
Connector	powerCON 32 A by Neutrik
Soft start	Yes
Ext.over-current release	20A (B20/C16)
Typ. Inrush current	<= 36A (<0.25ms)

Idle losses

Idle power	< 270W
Standby	< 2.5W

Performance

Frequency response	-3dB @ 10Hz -2dB @ 50kHz
Phase response	±25° (20Hz-20kHz)
Voltage gain	17dB ± 0.5dB
Power bandwidth	10Hz-55kHz
SNR	> 112dB
Inter channel crosstalk	< 64dB
Typ. THD (10Hz-30kHz)	
15dBu	<= 0.05%
0dBu	< 0.01%
-20dBu	0.03%

Analog inputs

Connectors	**d:16** 2x DB-25 (Tascam analog norm) **d:24** 3x DB-25 (Tascam analog norm)
Required level for 250W	15dBu
Input impedance	95kΩ
Max. input level	15dBu

Digital Inputs

Supported sample rates: 44.1 kHz, 48kHz, 88.2kHz, 96kHz

Optional MADI input card (AES10)

optical MADI in/out	1x optical SC Connector in/out (multimode)
coaxial MADI in/out	1x BNC in 1x BNC out
wordclock	1x wordclock out

Optional Dante input card

primary/secondary connector	2x RJ45

Optional AES/EBU input card (AES3)

AES/EBU, S/PDIF	2x DB-25 (Tascam analog norm) 16+8 ch. ASRC

Outputs

Connectors	16x 2-pin Euroblock (d:16) 24x 2-pin Euroblock (d:24)
Output impedance	< 100mΩ
Min. load impedance	≥ 4Ω (single channel) ≥ 8Ω (bridged)
Hi-Z per ch, unloaded	approx. 32V_{rms}
DC output offset	< 10mV

Protection

DC output error	yes, per channel*)
Over-current protection	yes*)
Over-voltage main protection	yes

*) *d:16: each channel affects a respective group of four output channels (1-4, 5-8, 9-12, 13-16)*
d:24: each channel affects a respective group of six output channels (1-6, 7-12, 13-18, 19-24)

Further connectors & switches

Ethernet	etherCON by Neutrik
Panic mute connector	4-pin Euroblock (cascadable)
Power on/off	momentary switch (configurable)

User interface

Touch display	resistive, 6.5"
Network control	web interface, HTTP API

DSP available per channel:

Gain	+/- 20dB
Delay	<= 11.5ms
Phase inversion	

Crossover filters	low cut, high cut (Linkwitz-Riley, Bessel or Butterworth; up to 4th order)
Parametric equalizer	5-band (bell, cuts, shelves)
Compressor/limiter	incl. soft knee

Cooling

Type	active, front-to-rear
Fans	5; temperature controlled (adjustable via presets)
Environmental temp. range	10°C-30°C (50°F-86°F)
Recommended clearance	1RU above & below

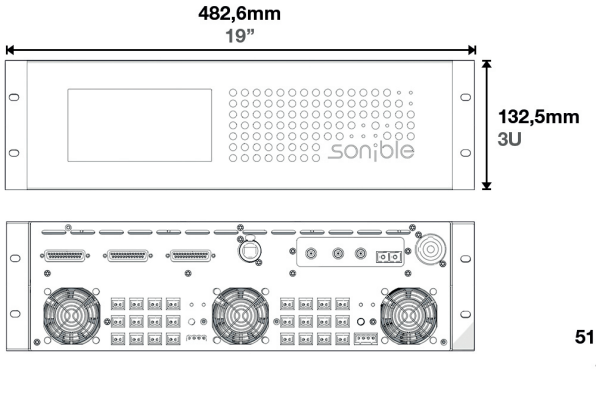
Fusing

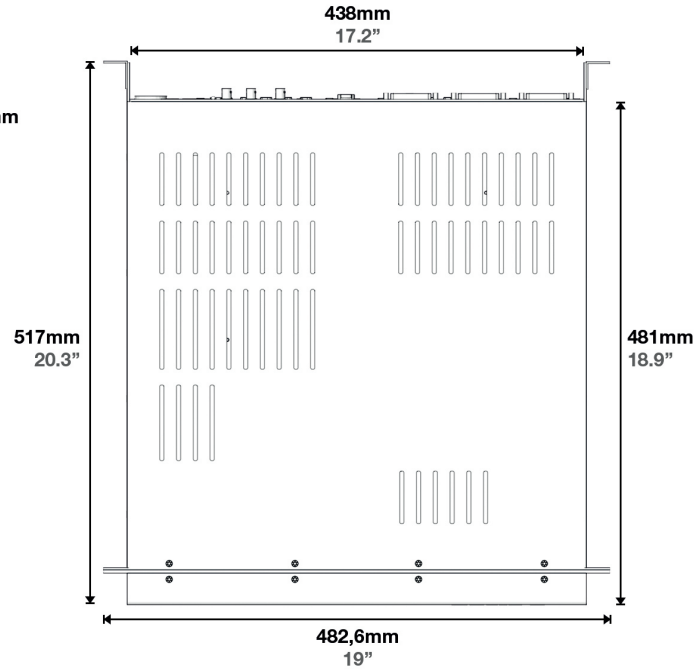
Internal fuses	4x SMPS, 1x analog PSU, (1x digital board)

Dimensions & weight

W x H x D	482,6 mm (19") x 132,5 (3RU) x 517 mm (20,4")
Weight	approx. 20 kg (44 lbs) the weight depends on the configuration

10.2 - mechanics and dimensions





11 - declaration of conformity

11.1 - CE Declaration of Conformity

The product d:16/d:24 by sonible was tested by an independent test laboratory and found to comply with the limits of the European Council Directive on the approximation of the laws of the member states relating to the following standards:

EN 61000-6-3:2007/A1:2011 Radiated RF emission test
EN 61000-6-1:2007 Immunity against radiated RF disturbances
EN 61000-6-1:2007 Immunity against electrostatic discharges (ESD)
EN 2006/95/EG Low Voltage

11.2 - RoHS

This device has been soldered lead free and all of its internal components comply to the European RoHS directive.

11.3 - WEEE / Note on Disposal

Following the European directive RL2002/96/EG (WEEE – Directive on Waste Electrical and Electronic Equipment) this product has to be recycled at the end of its lifetime. Never dispose this product in an inadequate manner, e.g. general trash, but use appropriate collection stations for electronic waste.
In case where no appropriate disposal is possible, you may also return this device in a prepaid shipment to sonible.

12 - warranty

General

This product is manufactured by sonible, and it is warranted to be free from any defects caused by components or factory workmanship, under normal use and service, for a period of two (2) years from date of purchase from an authorized sonible dealer. Keep the original invoice that states the purchase/ delivery date at a safe place. Liability claims are accepted solely, when the original and valid invoice is presented by the original owner of the product.

If the product fails to perform as specified during the warranty period, sonible will undertake to repair, or at its option, replace this product at no charge to its owner, provided the unit is returned undamaged, shipping prepaid, to an authorized service facility or to the factory.
This warranty shall be null and void if the product is subjected to:

- Repair work or alteration by a person other than those authorized by sonible
- Mechanical damage including shipping accidents
- war, civil insurrection, misuse, abuse, operation with incorrect AC voltage
- incorrect connections or accessories
- operation with faulty associated equipment
- exposure to inclement weather conditions.

Damage due to normal wear and tear is not covered by the warranty. Units on which the serial number has been removed or defaced will not be eligible for warranty service.

sonible shall not be responsible for any incidental or consequential damages. sonible's' responsibility is limited to the product itself. sonible takes no responsibility for any loss due to cancellation of any events, or rent of replacement equipment or costs due to a third party's or customer's loss of profit, or any other indirect cost or losses however incurred.

sonible reserves the right to make changes or improvements in design or manufacturing without assuming any obligation to change or improve products previously manufactured.
This warranty is exclusive, and no other warranty is expressed or implied. This warranty does not affect the customer's statutory rights.

International warranties

Please contact your supplier or distributor for this information, as rights and disclaimers may vary from country to country.

13 - legal disclaimer

Technical specifications and appearances are subject to change without notice and accuracy is not guaranteed. sonible accepts no liability for any loss which may be suffered by any person who relies either wholly or in part upon any description, photograph or statement contained herein.

Colors and specifications may vary slightly from product to product. Distributors and dealers are not agents of sonible and have absolutely no authority to bind sonible by any express or implied undertaking or representation.

For further information please visit www.sonible.com or contact us by email: support@sonible.com.

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