hifidom

User manual (English)

Product group: DSC8

Product Name: MAIN

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Foreword

Intended use

This product and its accessories are intended only for processing electrical audio signals in conjunction with a computer in dry indoor environments. The product is intended for installation in a housing in conjunction with further electronics.

The product and accessories may only be used as described in this document. Any other use, e.g. outdoors, in safety-related or medical applications, is not in accordance with the intended use and may result in damage to property or personal injury. The manufacturer hifidom accepts no liability for damage caused by improper use.

User target group

The product and this related document are intended for users who possess the following characteristics:

- A general, basic technical knowledge is available.
- The safe handling of tools, such as screwdrivers, is known.
- Knowledge of computers and operating systems is advanced.
- The user is aware of the dangers and safety regulations regarding the handling of electronics and audio technology.
- Is aware of all potential hazards and acts prudently accordingly.
- The user has read and fully understood the instructions.

If the user does not meet at least one of these requirements, then the product is not suitable for the user and the user must refrain from using the product.

Legal notices

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The following exceptions **do not** require the express written consent of the manufacturer:

- The customer prints a copy of this document.
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- The authorized dealer shall make these instructions available to his customers.
- The authorized dealer may take information from this document for his own product

description.

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The current version of this document can be found here: https://www.hifidom.com/res.php?lang=en&t=man&g=dsc8&p=main

Conventions in the document

The following formatting conventions are used in this document:

Bold

Names of product elements, commands, options, programs, processes, services, and utilities, names of user interface elements (e.g., windows, dialog boxes, buttons, fields, and menus), user interface elements that the user selects, clicks, presses, or enters

italic

Publication titles referenced in the text, highlighting (e.g., a new term), variables

Courier

System output such as error messages or script URLs, formulas, full paths, filenames, prompts, and syntax

< >

Pointed brackets represent a placeholder for user-supplied values.

[]

Square brackets represent a placeholder for values optionally provided by the user.

I

A vertical bar in angle or square brackets indicates that the user can choose between alternative inputs or values.



A tip to help the user achieve success more easily and quickly



A note that the user should also keep in mind when skimming



Hazard with a low level of risk which, if ignored, will result in injury and/or

damage to property and may even be fatal



Hazard with a medium risk which, if ignored, will result in injury and/or damage to property and may even be fatal



Hazard with a high level of risk which, if ignored, will result in serious injury and/or damage to property and may even be fatal

Product labels

With this marking, the manufacturer declares that the product complies with the applicable directives of the *European Community*, provided that it is installed and used in accordance with the manufacturer's instructions.

FC

This mark identifies communication devices that have permission to participate in the movement of goods in the USA. The permission is granted by the authority *Federal Communications Commission*. The permit also confirms the electromagnetic compatibility evice

of the device.



With this marking, the manufacturer declares that the product complies with the applicable conformity requirements of Great Britain and may thus be placed on its market. The permission also confirms the electromagnetic compatibility of the device.



The device can be damaged or destroyed by electrostatic discharge (ESD). The user is required to take appropriate protective measures during installation and use.



The product must not be disposed of in household waste, but must be taken to an appropriate collection point for reuse and recycling.



The product may only be used in dry and closed rooms.



This symbol may be attached to the packaging or electronic board, for example, in addition to the operating instructions. It indicates a hazard which, if ignored, will result in personal injury and/or damage to property.



This symbol can be attached to the packaging or electronic circuit board in addition to the operating instructions. It indicates an important fact for successful commissioning of the product.

Safety instructions

Read and understand this document and its safety instructions before using the product. Follow all instructions, otherwise failure to do so may result in property damage and/or serious or fatal injury. No work may be carried out on the product by the user other than the described manual operations.

The product may only be used by persons who have fully read and understood the contents of this document.

Observe the section **Technical Data** for safe operation of the product.

Danger of suffocation!



Never allow children to play with the packaging material of the product or accessories unsupervised! There is a risk of children getting caught in the packaging film and suffocating in it. Make sure that children cannot detach any small parts from the equipment! These parts could be swallowed and cause suffocation. In case of swallowing any parts, contact a doctor immediately!



Risk of injury!

Never allow children to use the product or accessories unsupervised!

Danger of explosion!

Do not use the product and accessories in the following situations:

- In environments subject to fire or explosion hazards
- Near easily combustible materials
- In the vicinity of flammable gases or vapors
- At extremely low or extremely high temperatures
- Near strong dust

Caution

Protect the product and accessories from destructive radiation, mechanical effects and conductive or reactive substances!



Caution

Only accessories and devices that comply with all legal requirements and are approved may be connected!

Caution



If any of the following conditions exist, immediately disconnect all cable connections to the product and accessories: The product or accessory does not function properly, exhibits a significant reduction in performance, smells burnt, emits smoke or makes unusual noises. In these cases, contact the manufacturer immediately (info@hifidom.com)!



Risk of injury!

The product and accessories may have sharp edges!



Risk of injury!

Lay the cables so that they do not become a tripping hazard.

Risk of burns!

Certain components of the product can become very hot due to the situation. Ensure that the user cannot touch the hot components by mounting them appropriately, e.g. in an enclosure. Ensure that the product is adequately ventilated.



Warning

Only connect devices that comply with the connection specifications of this product!



Warning

Only use cables that comply with the connection specifications of this product!



Warning

Never operate the product and accessories unattended!



Warning

Do not change the firmware, otherwise any warranty and liability by the manufacturer is excluded. When updating the firmware, only original firmware from the manufacturer may be used.



Warning

Do not use the product immediately after a rapid temperature change!



Important!

The product and accessories may only be used for the applications specified in the section **Intended use**.

Important!

Only use accessories recommended by hifidom! Otherwise, performance may be reduced.



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Important!

Make sure that all plugs are firmly seated in the sockets!

Storage instructions

Keep this document and the associated safety instructions for future reference. Pass on all documents and safety instructions associated with this product to subsequent users.

Waste disposal



The product must not be disposed of in household waste, but must be taken to an appropriate collection point for reuse and recycling.

The product packaging must be disposed of separately. The product packaging includes the cardboard, foam and plastic bags. The cardboard must be disposed of with the paper waste. The foam and plastic bags must be disposed of as plastic waste.



Avoid waste and reuse the packaging material for other purposes.

The foam is antistatic. Thanks to this property, the material does not become electrostatically charged, e.g. due to friction during transportation. Electrostatic charges can destroy electronics.

The plastic bag serves to protect against electrostatic discharges that can occur during shipping.

Product Vision

— " Revolutionize HiFi? With a sound card??"

Not an unusual reaction for us.

We promise nothing less than to surprise and delight you with our product vision. Let us inspire you and discover a completely new way of listening!

The trigger

In 2015, a German manufacturer completed its range of digital active loudspeakers with two floorstanding models. Each model in this product series consistently follows the same concept: digital sound sources can be connected directly to the speaker. The incoming sound is processed by a so-called *digital signal processor* (DSP for short) and then digitally amplified. In each case, an amplifier output stage drives a transducer.

We were convinced by the concept, as we believe it offers significant advantages:

- 1. The manufacturer can optimally match the sound of the amplifier and transducer.
- 2. Phase shifts can be optimally corrected by the DSP in contrast to passive multipath systems.
- 3. The audio signal can be transmitted losslessly from a digital source, e.g. a CD player, to the digital active speakers. We also refer to this as a **fully digital sound chain**.
- 4. In contrast to an analog system, with a fully digital hi-fi system only the speakers have a significant influence on the sound reproduction. If you want better sound, simply replace the speakers with better models. It's as simple as that!

In a listening test, we were immediately completely convinced by the floorstanding speakers, and it quickly became clear that we would like to replace our veteran surround system with the digital active speakers.

The problem

As with many other manufacturers of digital active speakers, the operation of the speakers was limited to mono or stereo mode. In addition, most digital active speakers only had a single digital input, which limited the ability to connect multiple sound sources. This made it impossible to set up a fully digital sound chain and replace the existing surround system. There was simply no fully digital AV receiver that could receive and process the signals digitally from the various sound sources, control the volume centrally and distribute the digital audio signals to the active speakers.

The idea of launching our own range of all-digital AV receivers seemed unfeasible given the costs of product development, branding and marketing. There were simply too many imponderables. Still, we didn't want to give up on the project so quickly! Instead, we looked for a way to construct an all-digital AV receiver from components that were already available.

The solution

Basically, an AV receiver can be regarded as a computer with an integrated sound card, which is specialized into an AV receiver by appropriate software. Computers come in countless variations: large, small, fast, quiet or energy-saving, for example. The market for sound cards is also broad. However, we could not find a suitable model in the home or professional sector that met our requirements. Therefore, we came up with the idea of developing our own sound card that is specifically designed for this purpose.

We had the vision to develop a sound card that not only can be connected to (almost) any computer, but also has multiple digital inputs and outputs and can output at least 8 channels, which is more than enough for most living rooms. In addition, we also wanted to keep the option open to drive more than 8 channels in the future. To meet these requirements, we decided to use a modular system. The main card is a USB sound card with the basic functionality, which can be expanded with expansion cards to add additional digital connections if needed. This allows each user to customize the type and number of inputs and outputs to their individual needs. Should new digital interfaces appear on the market in the future, they can be easily retrofitted with a corresponding expansion card. In this way, the user can always keep his device up to date without having to replace the entire unit. By avoiding waste in this way, the user not only protects the environment but also saves his own money!

Of course, the appearance of the surround system also plays an important role. Therefore, it was a further requirement that the form factor of the sound card is selected so that it can not only be operated as an external sound card on the PC, but can also be installed in a free PCIe slot on the PC. A wide range of so-called **Home Theater PC** housings (**HTPC** for short) are now available on the market, offering an attractive design in the style of hi-fi equipment. With such a housing, the computer-based fully digital AV receiver can be seamlessly integrated into the existing hi-fi system.

Instead of the term **fully digital AV receivers**, we have decided to call this new class of devices **Digital Sound Controller** or **DSC** for short. We like the abbreviation **DSC** and we think that **Digital Sound Controller** describes the function of the new device more accurately. Therefore, we will speak of a **DSC** instead of a **fully digital AV receiver** in the following.

Discover new possibilities

Since the **DSC** is based on a computer, you can expand and customize the system according to your individual needs. We have put together some exciting ideas for you to stimulate your imagination. But in the end, you can decide for yourself what your **DSC** should be able to do:

• Multimedia Center

Expand the **DSC** to a Multimedia Center that can store and play back various media such as audio, video or images.

Improve surround sound

How about using a sound filter to optimize the surround sound?

• Automatic signal detection

For example, when the CD player has finished playing, the **DSC** scans all inputs. If the **DSC** finds a signal, it switches to this input. Otherwise, the **DSC** switches your system to standby mode

after a certain time.

• Home automation

At the touch of a button, the shutters are lowered, the lighting is dimmed to suit the home cinema and the volume at **DSC** is set to the desired level. Now the movie night can begin!

• Streaming services

Playing content from streaming services should be a home game on a PC, right?

• Streaming via Blutooth

Connect a Blutooth receiver to a USB port on the computer. In this way, you can also play content from your cell phone or tablet to **DSC**.

There is another way

Certainly not every user wants to completely convert their existing system to digital active speakers. A good reason for this could be, for example, that they have set up a stereo system with high-quality components and do not want to change this. In this situation, however, there is an excellent way of upgrading the cherished stereo system to a surround system with a **DSC** without having to replace any of the system's main components. A digital-to-analog converter is simply connected between the **DSC** and the amplifier or power amplifiers. If the user wants to increase the number of channels, they can simply add more digital active speakers or analog speakers, each with a power amplifier, to the system.

Commissioning

System requirements

- The computer must have at least a USB interface version 2.0 or higher.
- Further requirements for the computer hardware, such as CPU or main memory, depend on the requirements of the operating system used. These can be found in the operating instructions for the operating system.
- Typically, the sound card is supported by all modern operating systems. The following is an overview of the operating systems tested with the results:
 - Linux, Kernel 3.0 or newer (available since 2012): This operating system supports all features of the sound card and all expansion cards.
 - Windows 10, Release 1703 or newer (available since 2017): The sound card can be used immediately after connection. The installation of drivers is not required.
 Expansion cards for the sound card are only supported to a limited extent by this operating system. Output expansion cards can be connected. However, their outputs cannot be switched off. Input expansion cards are not supported.
 Further details can be found in the manual.
 - macOS 10.14 or newer (available since 2018): The sound card can be used immediately after connection. The installation of drivers is not required.
 Expansion cards for the sound card are only supported to a limited extent by this operating system. Output expansion cards can be connected. However, their outputs cannot be switched off. Input expansion cards are not supported.
 Further details can be found in the manual.

Unpacking



Do not use sharp or pointed objects to unpack the product. Also avoid deep penetration of objects into the product packaging to avoid possible damage to the product.



Please keep the packaging in case the product is transported later.

Scope of delivery



Figure 1. The sound card

Further accessories are deliberately omitted in order to avoid waste. We do not want a customer to throw unused new goods in the trash just because he has no use for the accessories. The scope of delivery only includes the sound card as shown.

Product ID

The product identification is located in the same place on the printed circuit board of all DSC8 products from hifidom:



Figure 2. The position of the product labeling

Explanations of the image markings:

- 1. Manufacturer name
- 2. Product group
- 3. Product name
- 4. Hardware version

Operating Environment



The product may only be used in dry and closed rooms.

Further information can be found in the Technical Data section.

Assembly



The device can be damaged or destroyed by electrostatic discharge (ESD). The user is required to take appropriate protective measures during installation and use.

There are two ways to attach the PCB:

In the first option, the PCB is attached using the following four mounting holes, which are colorcoded in the following figure:



Figure 3. The position of the mounting holes on the sound card

M3 screws are suitable for these mounting holes.

In the second variant, a cover is mounted on the PCB (see also Accessories / Resources). This cover allows the PCB to be installed in PC housings with PCIe slots. The cover is supplied with the appropriate M2 screws. The cover is mounted on the PCB through the following mounting holes:



Figure 4. The position of the mounting holes for the bezel

Connectors, interfaces, LEDs and switches

Power supply

The sound card can be supplied with voltage from the PC via the USB port, provided that this port is also suitable for charging cell phones, for example. The supply voltage must be at least 4.5V and at most 5.5V. The manufacturers of PCs, USB hubs etc. usually adhere to these specifications of the USB standard. When the required operating voltage is reached, the LED labeled **POWER GOOD** lights up permanently. The position of this LED on the PCB is shown in the LEDs section.

The maximum power consumption of the sound card is 1.5W if no expansion card is connected, which is available as an accessory. If expansion cards are connected, the power consumption of the sound card increases, because the expansion cards are supplied with voltage by the sound card. This increase is documented in the user manual of the respective expansion card.

If the sound card cannot be powered via the USB port or an expansion card explicitly requires an external power supply, an external power supply can be connected via the ports marked **J2** or **J3**:



Figure 5. The positions of the connectors J2 and J3 for the external power supply on the printed circuit board



A power supply may only be connected to J2 or only to J3 but **never to both connections at the same time**, otherwise the power supply will be permanently

damaged. Likewise, several power supplies must not be connected to $J2 \mbox{ or } J3$ at the same time.

A DC voltage of 9 to 20V is permissible for the external voltage connections J2 or J3. The current requirement depends on the number of expansion cards connected. More than a maximum of 3A current is not supported by the voltage connections. The current requirement is calculated according to the following formula:

Power consumption / voltage = minimum current that the power supply unit must be able to deliver



Typically, the power supply should supply about 20% more current than calculated to avoid overheating the power supply.

The following example shows how to calculate the minimum current that a power supply unit must deliver. It is assumed that the power supply delivers a voltage of 12V and the sound card is operated without expansion cards. This means that the sound card has a maximum power consumption of 1.5W. This results in the following calculation:

1.5W / 12V = 0.125A

According to this calculation, the 12V power supply must be able to deliver a current of at least 0.125A. To be on the safe side, the power supply is dimensioned approx. 20% larger, in this example with at least 0.15A (or 150mA), to avoid overheating of the power supply. Of course, power supplies with higher current output are also possible.

The connection J2 is intended for the application case that the sound card is installed in a housing and is to be supplied by an external power supply unit. This connection is common for DC plug-in power supplies. The diameter of the outer contact must be 5.5mm and that of the inner contact 2.1mm. The inner contact is the positive pole and the outer contact is the negative pole.

The connection J3 is a plug-in connection, which is also used e.g. for computer fans. The pin assignment is printed on the side of the printed circuit board in addition to the contact pins. This connection is intended for the application case that the card is installed in a housing in which the power supply is also located, such as a PC housing. The card can thus be supplied with voltage internally in the housing.

USB port

The USB specification distinguishes between **USB Host** and **USB Device**: The USB Host initiates all communication, the USB Device only responds when it receives a request from the USB Host. A USB Device implements a functionality like a sound card, the USB Host controls this functionality. USB Host can be not only PCs but also TVs, game consoles and much more.

The sound card is connected via the USB port to a USB Host such as a PC. There is a USB2 Micro socket on the sound card for this purpose:



Figure 6. The position of the USB connector on the printed circuit board

In addition to the connections on the back of the PC case, many PC mainboards also have an internal USB connection in the form of a double-row pin header. There are adapters with Micro-USB connections for this pin header. This makes it possible to connect the sound card internally in the PC case to the mainboard. Such adapters are available, for example, from various trading platforms.

The sound card implements USB in protocol version 2.0 and supports the following subprotocols:

- **USB Audio Class Version 2.0*abbreviated as *UAC2**. This standard specifies how, for example, a computer controls a sound card via the USB interface.
- **Device Firmware Update Version 1.1*abbreviated as *DFU**. This standard specifies how the firmware of a USB Device is updated from USB Host. This means that the firmware of this sound card can be updated from the PC.

Digital audio outputs

Channel assignment variants

The designation of the channels largely follows the USB specification for sound cards (UAC2) section 3.13.1. 28 speaker positions or channel designations are defined in this section. The following designations have been adopted from this for the sound card:

- Front left, abbreviated as FL
- Front right, abbreviated as FL
- Front center, abbreviated as C or FC
- Low-frequency effects, abbreviated as LFE
- Rear left, abbreviated as RL
- Rear right, abbreviated as RR
- Page left, abbreviated as SL
- Page right, abbreviated as SR

These channel designations can be found on many multi-channel sound cards.

With current AV receivers, an alternative naming of the channels is used in some cases: The signals of the **RL** and **RR** channels of a sound card are reproduced on the **SL** and **SR** channels of an AV receiver, with **SL** and **SR** standing for **Surround Left** and **Surround Right** respectively. Similarly, the signals of the channels **SL** and **SR** of a sound card are reproduced on the channels **BL** and **BR** of an AV receiver. In this case, **BL** or **BR** stands for **Back Left** or **Back Right**.

The different channel designations on sound cards and AV receivers are indeed very confusing. Unfortunately, the confusion surrounding the assignment of signals to channels can be further increased by the reproducing software, as the author of the software has a different idea of the channel positions in the room. Unfortunately, we cannot solve this problem. However, we hope that you now have a better understanding of the assignment of channels and understand the channel designations correctly in the respective context.

Channel assignment

The card features 4 digital outputs as TOSLINK connections, which output the audio signals optically in accordance with the S/PDIF standard. Two uncompressed audio channels are transported per connection in << pcm,PCM>> format. This signal is interpreted as a normal stereo signal by a device connected to the digital output. This means that all commercially available devices that are compatible with the S/PDIF standard can be connected to these outputs. Digital active loudspeakers are normally connected to an output in pairs. One speaker is connected directly to the output, while the second speaker is connected to the first speaker and receives its signal via this connection. This means that normal digital active speakers can also be used to create a surround system.

The outputs of the sound card are assigned as follows:

The position of the USB connector on the printed circuit board	Channel number	Abbreviations for channel names	Channel names / Loudspeaker placement positions
J4	1/2	FL/FR	Front left/Front right
J5	3/4	C/LFE	Center/Low frequency effects

The position of the USB connector on the printed circuit board	Channel number	Abbreviations for channel names	Channel names / Loudspeaker placement positions
J6	5/6	RL/RR	Rear left/Rear right
J7	7/8	SL/SR	Side left/Side right



The channel for low-frequency effects LFE is often also used as a **subwoofer** channel.



If you want to connect more than one device to one channel, you can do this with an appropriate output expansion card.

Positioning the speakers in the room

The following illustration uses the naming of the channels for sound cards. Incidentally, the sound of many loudspeakers improves when the loudspeaker is aligned with the listening position.

For a system with 8 channels, the following arrangement of speakers in the room is recommended:



Figure 7. The positions of the speakers in a room with 8 channels with the listening position on the sofa

With 6 channels, the following positioning of the speakers in the room is recommended:



Figure 8. The positions of the speakers in a room with 6 channels with the listening position on the sofa

Analog audio outputs

In addition to the digital outputs, the audio signals are output analog via two RCA jacks, so that a total of two audio channels can be output analog.



For high quality analog signal output, it is recommended to connect to a high quality digital to analog converter to the corresponding digital output and use the analog output of the converter.

The switch marked **SW1** on the PCB allows switching between two possible configurations for the analog audio outputs:



Figure 9. The positions of the SW1 switch on the printed circuit board; the figure shows the switch in the lever position 2

The respective position of the switch lever configures the output of the following channels:

Lever position SW1	Description of the switch position	Output channel on white RCA connector	Output channel on red RCA connector
1	Switch lever is aligned to the white RCA connector	Front left (FL)	Front right (FR)
2	Switch lever is aligned to the red RCA connector	Center (C)	Low frequency effects (LFE)

Table 2. Channel assignment of the analog outputs

The shift lever can be shifted during operation.



The channel for low-frequency effects (LFE) is sometimes also controlled by software on the PC as a subwoofer channel.

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For a satellite/subwoofer speaker system, the software on the PC must control the corresponding channels itself. Such a speaker system **cannot** be configured on the sound card itself.

The analog connector may only be connected to an amplifier with a compatible input. If the connector is connected directly to a transducer, for example, then the sound card will be damaged by overload.



If the analog output is not used for its intended purpose, the manufacturer is no longer liable!

The motivation to provide two analog outputs in addition to the digital outputs is to keep the technical hurdles for certain use cases as low as possible. Some scenarios are described below. However, the possibilities are not limited to the following examples:

If, for example, no device with a digital S/PDIF input is available for output, the **front left** and **front right** channels can be output via the analog output in switch position 1 (see also section **Channel**

assignment of the analog outputs). In this way, for example, a stereo signal can be output analog. The other channels are not mixed into the output. Alternatively, this output can be used, for example, to drive the active subwoofer of a satellite/subwoofer speaker system if the satellite speakers are only intended for high and midrange reproduction.

Since most active subwoofers only have an analog input, the subwoofer cannot be connected to a digital output of the sound card. For this purpose, a digital-to-analog converter must be connected between the digital output of the sound card and the analog input of the subwoofer. If such a converter is not available, the **center** and **low-frequency effects (LFE)** channels can be output analog through switch position 2. The subwoofer can then be connected to the red RCA output for the **low-frequency effects (LFE)** channel.

LEDs

Position and meaning

The LED labeled **POWER GOOD** lights up continuously when the required operating voltage is present via the USB port or the external ports J2 or J3.



Figure 10. The position of the LED **POWER GOOD** on the printed circuit board

The LED labeled **D3** is lit continuously when the digital outputs are active and a signal is output during playback:



Figure 11. The position of the LED that indicates whether the digital outputs are enabled or not

The digital outputs can be activated or deactivated via the control elements.

The LED labeled **D10** is lit continuously when the analog outputs are active and a signal is output during playback:



Figure 12. The position of the LED that indicates whether the analog outputs are enabled or not

The analog outputs can be activated or deactivated via the control elements.

There are other LEDs on the sound card. However, the meaning of these LEDs is not relevant for the operation of the sound card. They are therefore not explained further.

Blinking pattern

If a Firmware Update is performed on the sound card, then the LEDs of the outputs flash for the duration of the Firmware Update. The position description of the LEDs can be found in the **Position and meaning** section.

You can look up the meaning of the flashing patterns for the expansion cards in the user manual of the respective expansion card.

Switch

There are two switches on the sound card, labeled **SW1** and **SW2** on the circuit board.

The switch SW1 toggles the channel assignment for the analog outputs. The details are described in the table **Channel assignment of the analog outputs** in the section **Analog audio outputs**. The position of the switch is also shown in this section.

The switch SW2 configures which controls of the sound card are made available to the USB Host such as a PC. More details are described here in section **Controls**. The position of the switch is also shown in this section.

Interfaces for expansion cards

Input and output expansion cards can be connected to the sound card via appropriate connectors. For more information on expansion cards, see the Accessories / Resources section.

Connector for the input expansion cards

The connector for the input expansion cards is located here on the circuit board of the sound card **DSC8 MAIN**:



Figure 13. The position of the connector for the input expansion cards

The sound card is connected to the expansion card by a ribbon cable:



Figure 14. Ribbon cable for daisy chaining with expansion cards

The connector and the cable are protected against reverse polarity. Due to the lug on the connector and the notch in the connector, the ribbon cable can only be pushed into the connector in one way:



Figure 15. Reverse polarity protection on ribbon cable and connector



Do not use force when connecting, otherwise the plug connection will be damaged.

On the sound card, the ribbon cable is plugged into the connector labeled **Input**.

For the expansion card, the other end of the ribbon cable is plugged into the connector labeled **Connect to main input or daisy chain port of previous input card**.

If another input expansion card is to be connected to the input expansion card, another ribbon cable is plugged into the still free connector of the first expansion card labeled **Daisy chain port for the next input card**.

For the next card, the other end of the ribbon cable is plugged into the connector labeled **Connect to main input or daisy chain port of previous input card**. This daisy chain can be extended up to 6 expansion cards.



The connections of input and output expansion cards must not be interchanged. Also the input and output expansion cards must not be mixed in the interlinking. The company hifidom is not liable for damages caused by a faulty connection of the expansion cards!

Connector for the output expansion cards

The connector for the input expansion cards is located here on the circuit board of the sound card **DSC8 MAIN**:



Figure 16. The position of the connector for the output expansion cards

The sound card is connected to the expansion card by a ribbon cable:



Figure 17. Ribbon cable for daisy chaining with expansion cards

The connector and the cable are protected against reverse polarity. Due to the lug on the connector and the notch in the connector, the ribbon cable can only be pushed into the connector in one way:



Figure 18. Reverse polarity protection on ribbon cable and connector



Do not use force when connecting, otherwise the plug connection will be damaged.

On the sound card, the ribbon cable is plugged into the connector labeled **Output**.

For the expansion card, the other end of the ribbon cable is plugged into the connector labeled **Connect to main output or daisy chain port of previous output card**.

If another output expansion card is to be connected to the output expansion card, another ribbon cable is plugged into the still free connector of the first expansion card labeled **Daisy chain port for the next output card**.

For the next card, the other end of the ribbon cable is plugged into the connector labeled **Connect to main output or daisy chain port of previous output card**. This daisy chain can be extended up to 6 expansion cards.



The connections of input and output expansion cards must not be interchanged. Also the input and output expansion cards must not be mixed in the interlinking. The company hifidom is not liable for damages caused by a faulty connection of the expansion cards!

Connector for "Master Clock Out"

The connector labeled **Master Clock Out** is intended for synchronizing the clocks with another sound card yet to be developed by the company hifidom. If possible, the sound cards are connected in parallel to the PC, which allows the number of output channels to be increased without the sound output of the two sound cards drifting apart. The software on the PC must be able to control the sound cards in parallel.



Figure 19. The position of the Master Clock Out connector

Audio functions

The audio functions of the sound card can only be used if the connected USB host (e.g. a PC) supports them. Typically, all modern PC operating systems support the USB specification UAC2. This means that no additional drivers for the sound card need to be installed and the sound card is immediately ready for use after connection to the PC. This feature is also referred to as **Plug and Play**.



Check the manual for the USB Host or, if applicable, the operating system manual to determine whether and to what extent USB sound cards are supported.

Controls

The sound card can be operated in 2 modes, which are set with the switch **SW2**:



Figure 20. The position of the switch **SW2** on the printed circuit board; the figure shows the switch lever in the position **Full-Featured Mode**.

The selected mode influences which operating elements are available to the USB Host. The control elements will be presented in detail later. The switch SW2 can be used to select between the following modes:

• Full-Featured Mode: On the circuit board, this switch lever position is labeled Full Mode. In

Full-Featured Mode all controls of the sound card are available to the user, provided that the USB Host also supports all of them. According to current knowledge (March 2023), this mode can currently only be used in conjunction with Linux[®], since the corresponding USB driver at Linux[®] sufficiently implements the UAC2 specification.

• **Compability Mode**: This switch position is labeled **Compability Mode**. For operating systems such as Windows[®] or macOS[®], only a few functions are supported by the UAC2 specification (as of March 2023). To be able to use the sound card under these operating systems as well, the sound card must be set to **Compability Mode** via the switch **SW2**.

a

The toggling of the switch SW2 and thus the change of mode will only take effect when the sound card is reconnected to the USB Host. If the sound card is powered by an external power supply, then the USB connection and the power supply must be briefly interrupted at **the same time**. This will cause the LED **POWER GOOD** to go out briefly, which is also what this process is intended to achieve.



Please refer to the user manual of your USB host or operating system to see how the controls (usually also called mixer, sound control or just volume) are displayed. In most cases only a slider for volume is displayed.

When using Linux[®], a so-called **sound server** such as **PulseAudio** or **PipeWire** is typically installed. These **sound servers** do **not** display the controls of the audio hardware. The volume controls of these sound servers are purely software-based and therefore do not change the corresponding control element on the sound card. The sound servers do not communicate directly with the audio hardware but only with an abstraction layer called **ALSA** (Advanced Linux Sound Architecture). With **ALSA** a unified programming interface is available that allows a program, such as a sound server, to control any sound card supported by **ALSA** without having to worry about the specific implementation details for the particular audio hardware. Of course, it is also possible to output audio directly via **ALSA** using a program. However, the sound servers offer some comfort functions that are not available at **ALSA** or can only be configured with some effort.

At **ALSA** the states of the control elements can be displayed and also changed with the following command:

alsamixer -c DSC8

A character-based user interface is displayed, which looks like this:



Figure 21. The controls displayed at Linux[®] with the command `alsamixer`; in this example, an input expansion card is connected.

If you want to read or change a control element at **ALSA** by a shell script then the program `amixer` is perfectly suitable for this purpose. The operating instructions for this program will be shown to you with the command `man amixer`.

The sound card has the following controls:

Volume control over all channels

This control is available in both **Full-Featured Mode** and **Compability Mode**. The element controls the volume across all channels during playback. At Linux[®] this control is sometimes also shown as **Volume 1** or **Volume,1**.

Mute switch across all channels

This control element is available in both **Full-Featured Mode** and **Compability Mode**. The element mutes all channels when switched on.

Additional volume control per channel

This control is only available in **Full-Featured Mode**. Normally, these controls are always fully turned up. They are only intended to correct the volume of a channel if it is perceived as too loud at the listening position.

Additional mute switch per channel

This control is only available in **Full-Featured Mode**. Normally, this switch is always off. When switched on, the corresponding channel is muted.

"Onboard DAC"-Switch

This control element is only available in **Full-Featured Mode**. This element can be used to deactivate or activate the analog outputs. If the analog outputs are activated, the corresponding status LED lights up permanently.

"Onboard Optical Out"-Switch

This control element is only available at **Full-Featured Mode**. This element can be used to deactivate or activate the digital outputs. If the digital outputs are activated, the corresponding status LED lights up permanently.

"Input Capture Source"-Selection

This control element is only available in **Full-Featured Mode** and if at least one input expansion card is connected. The inputs of all input expansion cards are listed in the selection list. Exactly one input can be selected from this list, whose signal is made available to the USB Host as a recording data stream.

"Input Clock"-Display

This control element is only available in **Full-Featured Mode** and when at least one input expansion card is connected. This element cannot be changed by the user. The element shows at which sample rate the signal is present at the selected input. If no signal is present, then **No Signal** is displayed.



At Linux[®], **Clock Source** is added to the name **Input Clock**, resulting in the name **Input Clock Clock Source**. The manufacturer hifidom has no influence on this name adjustment.

"Input Mismatch"-Display

This control element is only available in **Full-Featured Mode** and when at least one input expansion card is connected. This element cannot be changed by the user. The element typically shows the state **off**. Only if the USB Host has started a recording and the sample rate is different from the rate at which the recording was started, then this element is displayed as **on**. If the sample rate changes back to the rate at which the recording was started, then the state of this element changes back to **off**.

"Output Clock"-Selection

This control is available in **Full-Featured Mode** and when at least one input expansion card is connected. During playback, the user can choose between two clocks:

- Onboard Crystalwith this selection, the output of audio signals is clocked by a precise oscillator on the sound card . This mode should be selected by default.
- Input Sourcewith this selection, the clocking of the outputs is synchronized with the clocking of the input. This mode should only be selected if the input signal is to be processed

by the USB Host (e.g. a PC) and then output again. The synchronization of input and output prevents interference in the output.

The sample rates of input and output must both be integer divisible by 44100Hz or 48000Hz so that the clocks can be synchronized. If, for example, the recording at the input is clocked with 44100Hz and the playback at the output with 48000Hz, input and output cannot be synchronized. Audible glitches occur at the output, because less data arrives at the input than should be played back at the output.

If, for example, a sample rate of 96000Hz is configured at the input and output, then the output can be synchronized with the input. The clocks can even be synchronized if signals with a sample rate of 48000Hz or 192000Hz arrive at the output instead of the 96000Hz, since these sample rates, like the rate of 96000Hz at the input, are divisible by 48000Hz as an integer. However, the output at USB Host must then be interpolated by corresponding software, so that no glitches occur during playback due to the halving or doubling of the sample rate.

If the input and output clocks cannot be synchronized due to incompatible sample rates, then the sound card automatically switches back to the fallback clock during playback, i.e. to the oscillator on the sound card. If the sound card recognizes that the clocks of input and output can be synchronized again, e.g. because the sample rate at the input has changed, then it automatically switches from the fallback clock back to the clock of the input. The automatic switching of the clock always leads to a glitch in the playback and should therefore be avoided if possible.

G

At Linux[®], **Clock Source** is added to the name **Output Clock**, resulting in the name **Output Clock Clock Source**. The manufacturer hifidom has no influence on this name adjustment.

"Output Clock Fallback"-Display

This control is only available in **Full-Featured Mode** and when at least one input expansion card is connected. The display only toggles between **on** and **off** and cannot be changed by the user. By default, the state **off** is displayed. Only if the **Output Clock** control is configured to **Input Source** and the sound card at the output has automatically switched to the fallback clock, then the **on** state is displayed. The function of the fallback clock is described in detail in the section **Output Clock**.

"Output Card n"-Switch

This control element is only available in **Full-Featured Mode**. In the name of this element, **n** is replaced by a number between 1 and 6. This element is only displayed if one or more output expansion cards have been connected to the sound card. So, for the first expansion card, the control element is called **Output Card 1**. For each additional expansion card connected, the number increases accordingly. With this control element the outputs of an expansion card can be activated or deactivated. If the element is switched on, the output via the expansion card is activated.



A separate volume control per output expansion card is not provided. The volume control affects all cards equally.

Playback

The sound card can process samples with 16 and 24 bits. The following sample rates are supported: 44100Hz, 48000Hz, 88200Hz, 96000Hz, 176400Hz, 192000Hz.

The sound card plays back audio signals with 8 channels.



Not all USB Hosts (such as some TVs or game consoles) support 8-channel output via USB. Therefore, 8-channel playback via this sound card is not possible with these devices. Likewise, stereo playback with 2 channels is not possible, even if the sound card is operated in **Compability Mode**.



Not every device that you connect to the sound card's digital ports supports all the sample rates that the sound card can output. The operating instructions of the connected device provide information about which sample rates are supported. You may need to set a fixed or maximum sample rate on the USB Host (or operating system) during playback so that the connected device can play the audio signal.

A

The assignments between channel number and name described in the **Assignment of the digital outputs** table are transmitted to the PC via USB. It is the task of the USB driver of an operating system and the audio software to control the channels correctly. The company hifidom is not responsible for a faulty channel output. The correct contact for this is the respective software manufacturer!



At PulseAudio and PipeWire, the digital outputs are incorrectly displayed as analog outputs at Linux[®] (as of March 2023). The sound card tells the operating system via USB that the outputs output a digital signal. The manufacturer hifidom is not responsible for this incorrect display.

Recording

The recording function is only available at **Full-Featured Mode**. In addition, at least one input expansion card must be connected to the sound card. The sound card can process samples with 16 and 24 bits. The following sample rates are supported: 44100Hz, 48000Hz, 88200Hz, 96000Hz, 176400Hz, 192000Hz.

If the sample rate at the source changes during recording, the signal in the recording data stream is muted. Accordingly, the control element **Input Mismatch** is switched to **on**. Muting is canceled again when the sample rate at the source returns to the value at which recording was started. Accordingly, the control element **Input Mismatch** is then switched to **off**.



Compressed signals such as Dolby Digital[®] or DTS[®] can also be transported via the inputs in the PCM data stream. These compressed signals are not decoded by the sound card, but are transmitted unchanged to USB Host. For playback, the recorded signal must first be decoded by the USB Host.

Firmware Update

According to the current state of knowledge (as of March 2023), the firmware of the sound card can only be updated under Linux[®], because only with this operating system the sound card can be operated in **Full-Featured Mode**.

The program dfu-util can be used to update the firmware. This program may still have to be installed (e.g. at Ubuntu[®] with apt install dfu-util). With the command dfu-util the firmware of the sound card as well as the firmware of expansion cards can be updated via USB. If the firmware of an expansion card is specified in the command, **all** corresponding expansion cards will be updated. The process of updating the firmware is performed by the following command:

sudo dfu-util -D <Firmware File>

Instead of the placeholder <**Firmware File**> the name of the firmware file is specified. Only one Firmware file can be specified. After the successful update, the sound card restarts automatically.

For the duration of the Firmware Update the LEDs for the digital and analog output flash. The position description of the LEDs can be found in the **Position and meaning** section.



It should only update the Firmware if it is necessary (e.g. to fix a troublesome error).



The Update process must not be interrupted by a power interruption or premature termination of the software, otherwise there is a risk that the sound card will not work or will not work properly.



The manufacturer hifidom excludes the warranty in case of improper firmware update.

Loading the firmware from the sound card memory to the hard disk is not supported.

Accessories / Resources

PCIe slot bracket

A slot bracket is available as an optional accessory for the card, with which the card can be installed in the PCIe slot of a PC.



Figure 22. The mounted PCIe slot bracket in use

You can find more information about the product here:

https://www.hifidom.com/res.php?lang=en&t=accessories&g=dsc8&p=main&goto=bracket

With an appropriate adapter and a USB cable, you can even connect the sound card internally in the PC case to the Mainboard:



Figure 23. Different views of the USB3 adapter for the Mainboard

Further product information can be found here:

https://www.hifidom.com/res.php?lang=en&t=accessories&g=dsc8&p=main&goto=usb3-adapter

You can of course find both items in our Shop. In order to use the adapter, the Mainboard must be equipped with a USB3 connector. This is available on many Mainboards.

Fiber optics

A light guide for the sound card is available as an optional accessory. The light guide can be used to guide the light from the LED POWER GOOD through a housing to the outside, for example.



Figure 24. The light guide is shown from different perspectives and in use.

Further product information can be found here:

https://www.hifidom.com/res.php?lang=en&t=accessories&g=dsc8&p=main&goto=lightpipe

The light guide is pressed into the circuit board with **little** force. If the resistance when pressing in is too great, the cylinders of the light guide can be carefully reduced in circumference with a sharp blade, e.g. from a pair of scissors.



Do not use too much force when pressing in, otherwise the sound card will be damaged and will no longer function.



No adhesive may be applied to the light guide from above, as this may change the optical properties and the light will no longer be guided out to the front.



The optical fiber loses its optical properties when the surface of the optical fiber is processed.

Expansion cards

The range of expansion cards is constantly growing. Find out more about the current range here:

https://www.hifidom.com/res.php?lang=en&t=ext&g=dsc8

Downloads

You can find an overview of all downloads for the map here:

https://www.hifidom.com/res.php?lang=en&t=downloads&g=dsc8&p=main

Here we provide you with various resources that may be useful for your project. For example, you will find a 3D model of the map in this section. Of course, there is much more to discover here, as we are constantly expanding this section.

Technical Data

External dimensions

106mm x 70mm

Weight

approx. 50g

Permissible ambient conditions

at 5 % to 95 % relative humidity (non-condensing) 0 °C to +45 °C (operation) -30 °C to +70 °C (storage)

Power consumption without expansion cards

maximum 1.5W

Power supply for the sound card via USB

4.5V to 5.5V

Power supply via external power source

9V to 20V

USB version

2 or higher

USB connection

USB Micro

Maximum permissible USB cable length

< 3m

Supported USB specifications

UAC2 (protocol for sound card), DFU (protocol for firmware update)

Number of audio channels

8

Supported sample rates

44100Hz, 48000Hz, 88200Hz, 96000Hz, 176400Hz, 192000Hz

Supported sample widths

16Bit and 24Bit

Digital outputs

4 TOSLINK connections. The connections support the maximum sample rate of 192000Hz. The connections are assigned as follows: FL/FR, C/LFE, RL/RR, SL/SR.

Digital output format

S/PDIF compatible. The audio signal is output as an uncompressed PCM data stream with 2 audio channels per connection.

Analog outputs

2 RCA connections for analog output of 2 audio channels. A switch can be used to select whether the channels FL/FR or C/LFE should be output.

Maximum cable length for analog outputs

< 3m

Expansion cards

maximum of 6 DSC8 extension cards per input and output

Manufacturer information & declarations

Company	hifidom Inh. Dieter Steinwedel
Address	Konrad-Adenauer-Str. 20 30823 Garbsen Germany
Web site	https://www.hifidom.com
email	info@hifidom.com
Telephone number	+49 (0) 5137 - 14 72 660
*WEEE-Number	38732311

Warranty and liability exclusions

The national regulations apply to the warranty. The warranty does not apply if one of the following conditions applies:

- The product has been repaired, modified or altered unless such repair, modification or alteration has been authorized in writing by the manufacturer.
- The serial number on the product is missing or no longer fully legible.
- The date of purchase cannot be supported by an invoice.

Declarations of Conformity

The product complies with the essential requirements of the following European Community directives: 2014/35/EU, 2011/65/EU, 2009/125/EU. The product is intended for use in the EU, Switzerland and Norway. The complete CE declaration for this product can be found here: https://www.hifidom.com/res.php?lang=en&t=ce&g=dsc8&p=main

This product complies with the essential requirements of the following directives in the United Kingdom: 2014/35/EU, 2011/65/EU, 2009/125/EU. The complete UKCA statement for this product can be found here: https://www.hifidom.com/res.php?lang=en&t=ukca&g=dsc8&p=main

Troubleshooting

The LED POWER GOOD does not light up or only lights up weakly

There may be insufficient or no voltage or power being supplied to the sound card. Please check:

- Is the USB cable correctly connected to the sound card? Use a different USB cable if necessary.
- Can the USB Host serve as a power supply? Is the USB Host supplying sufficient power? Refer to the operating instructions of the USB Host. Further information can also be found in the **Power supply** section. If in doubt, connect an external power supply. The technical requirements are described in the **Power supply** section.
- Is an expansion card connected that requires an external power supply? For this, check the respective operating instructions of the expansion cards. If necessary, connect an external power supply. The technical requirements are described in the **Power supply** section.
- If present, is the external power supply correctly connected?
- Is the external power supply switched on, if you can switch it on and off?
- Does the external power supply deliver energy?

No sound card is detected

This can have various causes:

- The sound card is not or not sufficiently supplied with voltage. If the POWER GOOD LED does not light up or lights up dimly, follow the instructions in the **The LED** *POWER GOOD* **does not light up or only lights up weakly** section.
- The USB cable is not plugged in correctly.
- The USB cable is incompatible, i.e. the cable is only suitable for charging devices but not for data transfer. If necessary, use another cable that you know is suitable for data transmission.
- Possibly the USB Host (or the operating system) does not support a sound card. Check in the corresponding operating instructions whether the USB Host or the operating system supports USB sound cards with protocol UAC2.
- The sound card supports only 8-channel sound output. If the USB Host does not support 8channel output, then the sound card will not be shown as connected by the USB Host.

Playback does not start

This can have several causes:

- A software error at USB Host has caused an invalid operating state. Disconnect the USB connection to the sound card for a short time so that the sound card is recognized again USB Host. If necessary, the USB host must even be switched off once and then on again.
- A software error in the sound card has caused an invalid operating state. Disconnect the sound card from any power source so that the LED **POWER GOOD** goes out temporarily.
- Playback was started with an invalid configuration. Check whether you can adjust the playback configuration at USB Host. If so, test alternative configurations.

The audio channels are reversed during playback

The sound card transfers the channel assignment to the USB host via the USB protocol. However, we have found in tests that not every USB host or operating system adopts this assignment correctly.

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With Linux[®] we know (as of March 2023) that the channels are output differently if, for example, the sound is played back via ALSA or a sound server such as Pulse Audio or PipeWire. With ALSA the channels are played back correctly. With PulseAudio or PipeWire, the channels C/LFE and RL/RR are swapped. If the sound is only played back via the sound server, you can simply swap the cables at the digital connections accordingly. If you want to use ALSA and the sound server at the same time, the channel assignment must be adjusted in the configuration file for the sound server. You can read more about this in the Sound Server operating instructions.

No sound is heard during playback

This can have several causes:

- Check if the output device is correctly connected to the outputs.
- Check if the output device is turned on, if you can turn it on and off.
- Make sure that the output device works properly with other input devices.
- Check if the output has started at USB Host.
- Check if the volume on the sound card is set high enough. Note that you can also set an additional volume control per channel in addition to the main volume control in Full-Featured Mode. The volume control per channel is typically always set to maximum volume.
- Check if the output on the sound card is muted. Note that you can also set an additional mute switch per channel in **Full-Featured Mode** to the main mute switch. This should typically always be switched off.
- If there are multiple inputs on the output device, check that the cable is connected to the correct input from the output device.
- If there are several inputs on the output device, check whether the correct input is selected on the output device.
- If the volume can be adjusted or the output can be muted on the output device, check these settings on the output device.

There is audible glitches during playback

Please check:

- Play the media on another playback device. If you also hear interference with this device, then the media is damaged and the error cannot be corrected.
- Possibly the USB Host (e.g. the PC) does not control the sound card correctly or its working power is not suitable for playback via the sound card. Check if the problem persists if you connect the sound card to another USB Host or use other software for playback.
- If the glitches can be heard only through the digital outputs, then it may be due to the following reasons:
 - $\,\circ\,$ The optical cable may be too long. Test playback with a shorter cable.

- The light guide in the optical cable may be damaged. Test playback with another cable that you know will work properly.
- The device receiving the digital signals does not support the sample rate of the playback or does not support it without errors. If necessary, check the operating instructions of the receiving device.
- If the glitches can be heard only through the analog outputs, then it may be due to the following reasons:
 - Interference signals may couple through the cable connected to the analog outputs. Use a shorter cable. It may also help to route the cable differently.
 - Interference signals from other electronics couple into the outputs of the sound card. Increase the distance to other electronics, e.g. by using a longer USB cable or shielding electronics with a suitable metal housing.

The LEDs of the outputs flash

The LEDs of the outputs only blink when a firmware update has been performed. After the update, the sound card normally restarts automatically. If the sound card update has been performed and the sound card remains in the flashing state, then briefly switch off the sound card power so that the LED **POWER GOOD** temporarily goes out.

Glossary

Active loudspeaker

Active speakers do not require external amplifiers, but can be connected directly to a sound source, such as a CD player, because amplifiers are already built into the speakers.

ALSA

Is the abbreviation for <u>Advanced Linux Sound Architecture</u>. With ALSA a unified programming interface is available at Linux[®], whereby a program or sound server can control any sound card supported by ALSA without the software having to provide a specific implementation for the respective audio hardware.

AV receiver

AV stands for <u>A</u>udio and <u>V</u>ideo. AV receivers are multi-channel amplifiers with an integrated audio receiver. Both audio and video sources can be connected to the AV receiver.

BL

Is the abbreviation for **<u>Back Left</u>**. In some contexts it is used synonymously with << rl*,RL*>> . It describes the speaker position: rear left.

BR

Is the abbreviation for **<u>Back Right</u>**. In some contexts it is used synonymously with << rr*,RR*>> . It describes the speaker position: rear right.

С

Is the abbreviation for **<u>Center</u>**. It describes the speaker position: (front) center.

RCA

A coaxial connector in the audio field

Digital/analog converter

So these converters convert digital to analog audio signals.

DFU

Is the abbreviation for **Device Firmware Update**.

Device Firmware Update

Also abbreviated as **DFU**. This standard specifies how the firmware of a USB device, e.g. a sound card, is updated from a USB host.

Digital active speakers

For us to call a powered speaker digital, it must meet the following criteria:

- 1. The active speakers have a digital input for connection to the sound card.
- 2. Signal processing takes place digitally in the active loudspeakers.
- 3. Each transducer of the active speaker is directly connected to its own (digital) amplifier.

4. The speaker does not noise at high volumes.

Digital Sound Controller

We understand this to mean a device with digital inputs and outputs. Here, it is possible to select at DSC from which input the signals are to be output via the outputs and at what volume. In addition, the DSC can have other functions, such as room sound correction.

Digital Sound Processor

A Digital Sound Processor is a specialized IC optimized for processing audio signals. Typically, audio filters or effects are implemented with a DSP.

DSC

Is the abbreviation for <u>Digital Sound Controller</u>.

DSP

Is the abbreviation for $\underline{\mathbf{D}}$ igital $\underline{\mathbf{S}}$ ound $\underline{\mathbf{P}}$ rocessor.

Firmware

Firmware is the software that runs on the microprocessor of an electronic device, such as a sound card.

FL

Is the abbreviation for **<u>F</u>ront <u>L</u>eft**. It describes the speaker position: front left.

FR

Is the abbreviation for **<u>F</u>ront <u>Right</u>**. It describes the speaker position: front right.

HiFi

Is the abbreviation for **<u>H</u>igh <u>F</u>idelity**.

coaxial

Describes the geometrical arrangement of conductors. In a coaxial connection or conductor, the center conductor is shielded by a surrounding (or coaxial) conductor.

Sound chain

In a sound chain, several devices are connected to each other for the reproduction of sound. A conventional sound chain consists, for example, of a CD player, amplifier and loudspeakers.

LED

Is the abbreviation for **Light Emitting Diode**. It is an electronic component that emits light when a voltage is applied.

LFE

Is the abbreviation for Low Frequency Effects.

Low Frequency Effects

This channel is primarily intended to reproduce sound effects in the low frequency range. The speaker position in the listening room is usually on the side of the front speakers.

Multimedia Center

A device that can store and play back various media, such as audio, video, or images.

PC

Is the abbreviation for **<u>P</u>ersonal <u>C</u>omputer**.

РСМ

Is the abbreviation for <u>**Puls-Code-Modulation**</u>. It is a process in which a time- and valuecontinuous analog signal is converted into a time- and value-discrete digital signal. This process is called digitization. The digitized values are called <u>samples</u>. The analog signal is sampled at a fixed <u>sample frequency</u>.

Plug and Play

Devices marked with **Plug and Play** can typically be connected to the **PC** during operation and are immediately ready for use without the user having to install any drivers.

PipeWire

A sound server for Linux[®].

PulseAudio

A sound server for Linux[®].

RL

Is the abbreviation for **<u>Rear</u> <u>Left</u>**. It describes the speaker position: rear left. This term is typically only used for sound cards but not for AV-Receivern.

RR

Is the abbreviation for **<u>Rear</u>** <u>**Right**</u>. It describes the speaker position: rear right. This term is typically only used for sound cards but not for AV-Receivern.

Sample

The single, digitized measured value that results from the digitization of an analog audio signal.

Sample frequency

Synonym for sample rate

Sample rate

The **sample rate** specifies the rate per second at which an analog audio signal is sampled and the measured value is converted to a digital value with each sample.

SL

In the context of sound cards, the abbreviation is used for <u>Side Left</u>. It describes the speaker position: to the left of the listening position. At AV-Receivern, the abbreviation stands for <u>Surround Left</u>. Here, the speaker is placed behind the listening position on the left.

Sound Server

A sound server at Linux[®] does not communicate directly with the audio hardware, but only with an abstraction layer **ALSA**. Sound servers offer some comfort functions that are not available at

ALSA or can only be configured with effort.

S/PDIF

S/PDIF is an interface for the digital transmission of audio signals by electrical or optical means.

SR

In the context of sound cards, the abbreviation is used for <u>Side Right</u>. It describes the speaker position: to the right of the listening position. At AV-Receivern, the abbreviation stands for <u>Surround Right</u>. Here, the speaker is placed behind the listening position on the right.

Subwoofer

A subwoofer is a loudspeaker that reproduces low-frequency audio signals up to typically a maximum of 120Hz. The subwoofer typically complements (satellite) speakers that cannot reproduce low-frequency audio signals due to their design.

TOSLINK

TOSLINK is a connection system for fiber optic cables. At **TOSLINK**, data is therefore transmitted optically. Therefore, electromagnetic interference signals do not affect data transmission.

UAC2

Is the abbreviation for USB Audio Class Version 2.0.

USB

Is the abbreviation for <u>Universal Serial Bus</u>. This standard specifies a bit-serial data transmission system for connecting a computer with external devices. Thereby <u>Plug and Play</u> is an essential feature of this standard.

USB Audio Class Version 2.0

Also abbreviated as **UAC2**. This standard specifies the protocol for how a USB Host drives a USB sound card.

USB Device

The USB specification distinguishes between **USB Host** and **USB Device**. The USB Host initiates all communication. The USB Device only responds when it receives a request from the USB Host. A USB Device implements a functionality, like a sound card, the USB Host controls this functionality. USB Hosts can be not only PCs, but also TVs, game consoles and much more.

USB Host

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Fully digital sound chain

A fully digital sound chain is created if only fully digital devices are used in the sound chain and these are connected to digital active loudspeakers.

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