Media Production Hub

VENICE 4U/HPE

Hardware Guide

VENICE
Hardware Guide

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Hardware Guide Version 3.2 for the VENICE Hardware Version 3.2

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DVS

Registration Form

Dear customer,

this product was developed and tested thoroughly. Unfortunately, the possibility of problems and errors can never be ruled out. To support us in helping you as fast as possible if such a case occurs, please fill in this registration form and send or fax it to the address on the right.

You may also use our online registration form which can be accessed from the following internet page: http://www.dvs.de/support/support-login.html

Customer

Name: _____

Company: _____

Contact: _____

Address: _____

_____

_____

_____

_____

Phone: _____

Fax: _____

Vendor: _____

VENICE 4U/HPE

Serial No.: _____

Remarks: _____

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Connected devices
(Brand and type of edit controller, VTR, color grading system, etc.)

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Contents

Introduction

This documentation describes how to use the hardware of VENICE, the Media Production Hub manufactured by Rohde & Schwarz DVS GmbH (in short 'DVS').

VENICE is a highly flexible server system for the capturing and playout of audio and video content. Especially designed for highly optimized, file-based broadcast workflows, it provides multiple independent channels and supports natively the most common compressed formats. With VENICE you can easily capture live content, e.g. from cameras directly, and access data for playout operations – if required both at the same time and in the format that suits your workflow best. During each operation you can control an externally connected device via RS-422 to act as a player or recorder, either in a manual or automatic (autoedit) operation mode.

The VENICE hardware uses Linux as its operating system and will be equipped with a storage capacity of several terabytes. It stores the captured material in a selectable file format (compressed or uncompressed) directly on the connected storage.

With its flexible software the VENICE server can be controlled either locally or from remote client stations in the network. With this you can place the hardware of VENICE at any location you like and still have full control over it.

The VENICE system can be delivered in two hardware variants, depending on the type of use or the performance that is required. The VENICE 4U system will be delivered with two system/metadata hard disks and 14 main storage hard disks. The VENICE HPE system will be delivered with two system/metadata hard disks and 16 main storage hard disks. Both systems come in a slim 4U chassis.

1.1 Overview

This guide informs you about the installation of the VENICE hardware, its operation as well as all connection possibilities. Furthermore, it describes maintenance tasks that you may carry out on your own.

The chapters contain the following information:

Chapter 1	Begins with a short introduction to VENICE, followed by a note regarding the audience this manual is written for and an explanation of the conventions used in this manual. Furthermore, it provides safety instructions that you must adhere to and some important notes that you should observe.
Chapter 2	This chapter gives a front and rear overview of the system detailing all items, connectors and interfaces. Additionally, it contains some further information, for example, about the digital video in- and outputs and the battery backup unit.
Chapter 3	Describes the hardware installation of the DVS system.
Chapter 4	Explains how to operate the DVS system, i.e. how to start and shut down the device.
Chapter 5	Details maintenance work, for example, in case of a hard disk, fan or power supply unit failure.
Appendix	Provides technical details and general information about the hardware of the DVS system. Furthermore, it gives hints how to resolve irregularities during operation.
Index	This chapter facilitates the search for specific terms.

1.2 Target Group

To use this manual you should have experience in handling video and computer equipment. Additionally, to use the DVS system in connection with other equipment, e.g. a camera or a VTR, you should know how to handle this equipment.

When performing maintenance tasks on the hardware of the DVS system, you must be qualified to work on, repair and test electrical equipment.

1.3 Conventions Used in this User Guide

The following typographical conventions will be used in this documentation:

• Texts preceded by this symbol describe activities that you must perform in the order indicated.
– Texts preceded by this symbol are parts of a list.

Texts preceded by this symbol are general notes intended to facilitate work and help avoid errors.

You must pay particular attention to text that follows this symbol to avoid errors and possible resulting damages thereof.

Texts following this symbol you must pay particular attention to to avoid dangers and personal injuries.

" "   Texts enclosed by quotation marks are references to other manuals, guides, chapters, or sections.

Entry   Indicates entries to be made at a command line or an output of a program on the screen

[Key]   A key on a keyboard

1.4 Safety Instructions

To use VENICE correctly please heed the following:

Please read the following safety instructions carefully before attempting any installation and/or performing any work on the VENICE hardware.

If the DVS system is not used in compliance with the safety instructions, the warranty and all resulting liability claims will be void.

General

VENICE has been built according to the applying safety regulations. To minimize the possibility of a faulty operation of the device all manuals and guides must be available at all times at the operation site. Before installing and/or using the DVS system the manuals and guides delivered with it must be read and observed.

– Use the DVS system only in apparent good technical order.
– The hardware of the DVS system works with voltages that can be hazardous to your health. Never work on the system or access its interior with the power cable(s) being plugged in. Make sure the power supply is disconnected from the components you intend to work on.
– Computer hardware contains components that are sensitive to electrostatic discharge. If you touch them without precautionary measures, they can be destroyed. Use a wrist strap connected to ground when accessing electronic parts and take care of grounding the system. Avoid touching the internal components of the DVS system whenever possible.
– Computer hardware contains components that are sensitive to changing voltages. Connecting or disconnecting the DVS system to or from peripheral hardware while any of them is switched on may damage the hardware. Switch off all peripheral hardware before connecting or disconnecting anything.
– Use, store and transport the DVS system only in compliance with the technical data laid out in section "Technical Data" on page A-5.
– If fluids or solid objects get inside the casing, the DVS system must be disconnected from the power supply immediately. Before using the DVS system again, it has to be checked by authorized service personnel.
– Only use a damp tissue without any cleaning agents to clean the casing.
– The DVS system must not be misused, abused, physically damaged, neglected, exposed to fire, water or excessive changes in the climate or temperature, or operated outside maximum rating.
– Do not perform any changes or extensions to the DVS system whatsoever.

Transportation

VENICE is a very sensitive device. Especially the hard disks of the system must be handled with great care. Therefore, observe in case of transportation:

– Handle the DVS system with great care.
– Always use the original packing or a similar structured packing for transportation as detailed in section "Packing Instructions" on page A-13.
– Avoid shocks or vibrations during transport. For longer distances it is recommended to use a lifting truck.
– Keep the DVS system as a transportation good dry.
– In the warranty period you have to keep the original packing and use it in case of transportation.

Environmental Conditions

For error-free working and a long service life VENICE needs some basic environmental conditions:

– Do not expose the DVS system to sources of heat, such as direct sunlight or a radiator.
– Do not cover or obstruct the ventilation holes of the system.
– When installing the DVS system in a rack, take care that warmed up air is conducted to the rear of the rack and properly vented away.
– Avoid areas with high humidity or dust. Best operating conditions are given in an air-conditioned site.
– Do not expose the DVS system to strong electric or magnetic fields.
– Avoid areas where the DVS system will be subject to vibrations or shocks.

1.5   Important Notes

The following provides information about warranty, a note about the conformity of the product and some other general information.

Warranty Information

This product is warranted to be free of defects in materials and workmanship for a period of one year from the date of purchase. Rohde & Schwarz DVS GmbH (in short 'DVS') extends this Limited Warranty to the original purchaser.

You have to keep the original packing and use it in case of transportation. Otherwise this warranty will be void.

In the event of a defect or failure to confirm to this Limited Warranty, DVS will repair or replace the product without charge. In order to make a claim under this Limited Warranty, the purchaser must notify DVS or their representative in writing of the product failure. In this Limited Warranty the customer must upon DVS's request return the product to the place of purchase or send the defective device to a given address for the necessary repairs to be performed. In the warranty period the customer must keep the original packing and pack the DVS product in it in case of a product return. If the customer is not satisfied with the repair, DVS will have the option to either attempt a further repair, exchange the product or refund the purchase price.

This warranty does not cover:

– Products not developed by Rohde & Schwarz DVS GmbH.
– Products not used in compliance with the safety instructions detailed in section "Safety Instructions" on page 1-4.
– Products on which warranty stickers or product serial numbers have been removed, altered or rendered illegible.
– The costs of installations, removals, transportations, or reinstallations.
– Costs for transportation damages.
– Damages caused to any other item.
– Any special, indirect or consequential damages, and damages resulting from loss of use, data or profits, or business interruption.

Declaration of Conformity

This product has been tested according to the applying national and international directives and regulations. Further information about this can be found in section "Conformity Declarations" on page A-15.

Product Disposal (B2B)

Used electrical and electronic products should not be disposed of with general household waste. At the end of its service life you may return the DVS product after appropriate prior notification to either your local distributor or DVS in Germany. DVS will then take the device free of charge to a waste disposal organization which will recycle and reuse it environmental friendly.

General Notes

Please observe the following general important notes:

VENICE has been delivered to you fully preconfigured and optimized for a real-time in- and output of video streams. Changing any of the settings (e.g. the hardware, software and/or BIOS settings) may lead to a loss of performance or may even render the system unusable. Re-configuring the system anew is in most cases a lengthy procedure. Do not change any of the settings unless you are absolutely sure of what you are doing and what the results would be.

Your DVS system has been tested thoroughly and is very reliable. However, because of the vast amount of third-party software available, its reactions on the installation of such could not be tested. The installation of third-party software may disrupt the real-time capability and/or limit the functionality of your system.

Only use the designated storage to store video and audio data. Other storage locations will be too slow for real-time operations.

Leave about 15% of the overall main storage capacity empty of data for real-time performance reasons.

Compared to other alarms sounded by the system the alarm buzzer of the power supply is relatively faint. In a loud environment it may be drowned by other noises. When operating the DVS system in a loud environment, it is recommended to check the state of the alarm LED (see section "Operation Items" on page 2-4) at regular intervals.

Overview

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This chapter provides a detailed overview of the hardware of the DVS system. The system will be shown in a front and a rear view and all its parts and connectors will be described. For explanatory reasons the section about the rear also contains some further information about the digital video in- and outputs. The chapter will be concluded with a description of the battery backup unit installed inside the system.

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2.1 Variants: VENICE 4U and VENICE HPE

The VENICE system can be delivered in two different hardware variants depending on, for example, the type of use or the performance that is required. The following variants are available:

– VENICE 4U
– VENICE HPE

The adjustments that distinguish both variants are:

– The arrangement of the system/metadata hard disks and the number of the main storage hard disks (see section "HDD LEDs" on page 2-5 and section "Hard Disk Array" on page 2-8)
– The installation of an additional RAID controller in the VENICE HPE (see section "Introduction to RAID" on page 5-2)

Apart from the differences mentioned above, the two variants are in most respects identical. Whereever required the specialities of these variants will be detailed in this document.

2.2 Overview of the Front

This section gives an overview of the front of the DVS system. After an overall overview of the front the operable front panel at the top of the system will be described first. This will be followed by descriptions of the faceplate and the hard disk array. The section will be concluded with some explanations about the DVD drive.

2.2.1 The Front of the System

This section provides an overview of the front of the system:
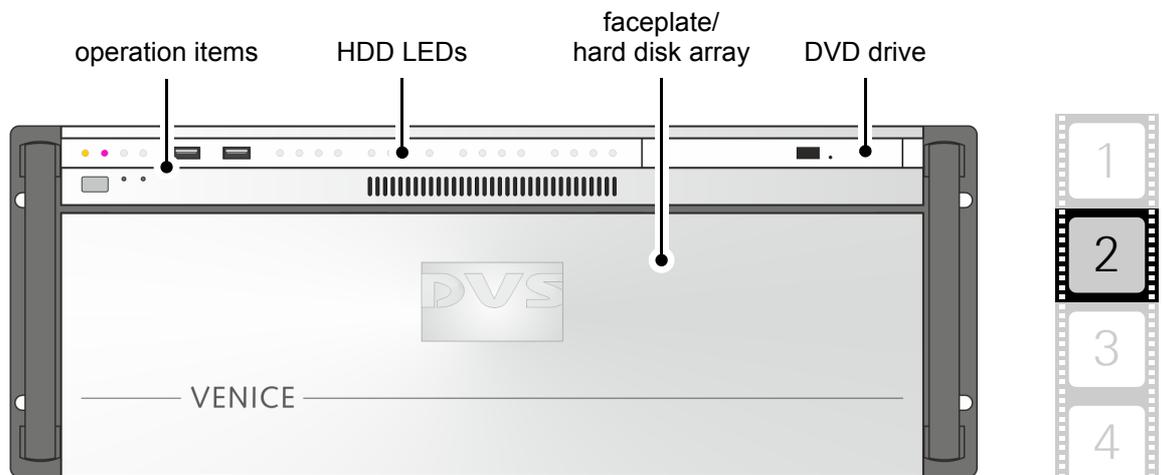
Figure 2-1: Overview of the front

operation items	With the operation items the system can be controlled (e.g. turned on or off). Additionally, they offer some LEDs that allow you to assess the state of the DVS system as well as USB connectors for an easy connectivity of additional devices such as memory sticks. Further information about the operation items can be found in section "Operation Items" on page 2-4.
HDD LEDs	The upper part of the front is equipped with LEDs that indicate the statuses (activities) of the hard disks of the hard disk array. Further information about the LEDs and their meaning can be found in section "HDD LEDs" on page 2-5.

faceplate/ hard disk array	The faceplate covers the hard disk array. If you need access to one of the hard disks, for example, to replace it, it can be lifted. The faceplate will be described in more detail in section "Faceplate" on page 2-7.
	The hard disk array contains the main storage and system/metadata hard disks which can be used to store video and audio material. All disks can be replaced easily in case of failure. The disk array is described in more detail in section "Hard Disk Array" on page 2-8.
DVD drive	The DVD drive can be used, for example, for software installations. Further information about the DVD drive can be found in section "DVD Drive" on page 2-10.

2.2.2 Operation Items

With the operation items at the system's front the hardware of VENICE can be controlled (e.g. turned on or off). There you can also find LEDs that allow you to assess the state of the DVS system as well as USB connectors.
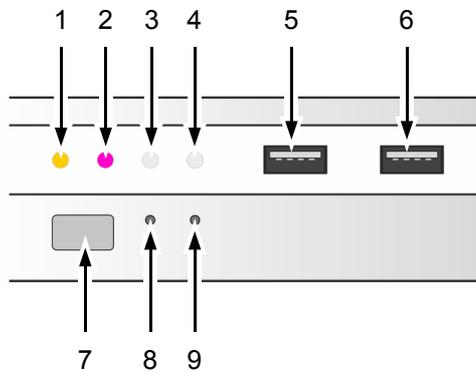
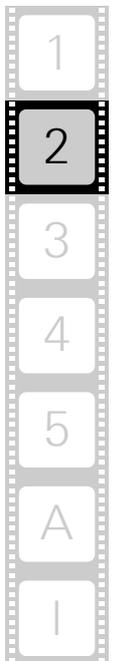*Figure 2-2: Operation items overview*

> The LEDs can be seen only when they are flashing because they are located behind the white strip and thus not visible when off.

Further information about what to do in case of an alarm can be found in section "Troubleshooting" on page A-2.

No.	Item	Explanation
1	DVD	Indicates accesses to the DVD drive.

No.	Item	Explanation
2	alarm LED	This LED indicates that a hardware malfunction has occurred.
		The system/metadata hard disks of the VENICE HPE variant are built inside the system and not connected to the alarm LED. When a disk failure occurs no visible signs will be shown. Especially for this system, it is recommended to configure an E-Mail notification to get informed when a system/metadata hard disk fails.
3, 4	LAN 1/2 LEDs	Indicate that a valid network is connected to the first/second LAN connection at the rear of the system (see section "ATX Connector Panel" on page 2-16).
5, 6	USB ports	The USB connectors (universal serial bus) at the front offer you the possibility to connect other devices such as memory sticks easily.
7	power	The power switch turns the system on or off. The respective state of the system will be indicated by the DVS logo in the middle of the faceplate (see section "Faceplate" on page 2-7).
8	reset	Resets your system and initiates a warm reboot. Use a thin, pointed object to press this button.
		Save your data before resetting the system. Otherwise data may be lost.
9	mute	In case of a hardware malfunction a system alarm turns on. By pressing this button the alarm buzzer can be switched mute. Use a thin, pointed object to press this button.
		Some alarms (e.g. the one in case of a hard disk failure) are independent of the system alarm and cannot be switched mute with the mute button.

2.2.3 HDD LEDs

The HDD LEDs show the statuses (activities) of the hard disks of the hard disk array. They can be seen only when they are flashing because they are located behind the white strip and thus not visible when off. In

the following you find a description of the HDD LEDs for the VENICE 4U and the VENICE HPE.

VENICE 4U

The following figure shows the arrangement of the LEDs on the front panel of the VENICE 4U chassis:

Figure 2-3: HDD LEDs (VENICE 4U)

Each LED represents a hard disk of the array:

Figure 2-4: HDD LEDs and the hard disk array (VENICE 4U)

Starting from the left, the first four LEDs display the accesses to the top row of hard disks (see section "Hard Disk Array" on page 2-8); the second four LEDs show the state of the bottom row of the hard disk array; the third LED group belongs to the third row (from the top), while the fourth group represents the second row.

VENICE HPE

The following figure shows the arrangement of the LEDs on the front panel of the VENICE HPE chassis:
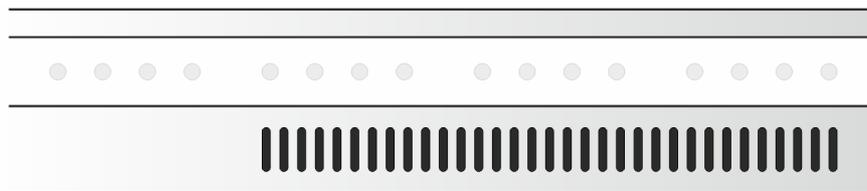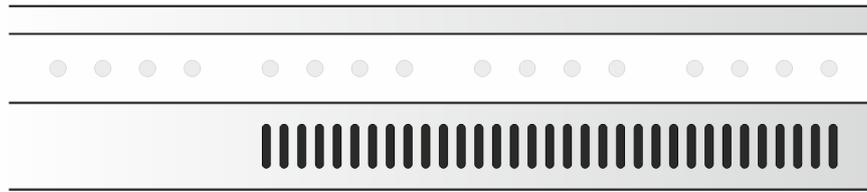
Figure 2-5: HDD LEDs (VENICE HPE)
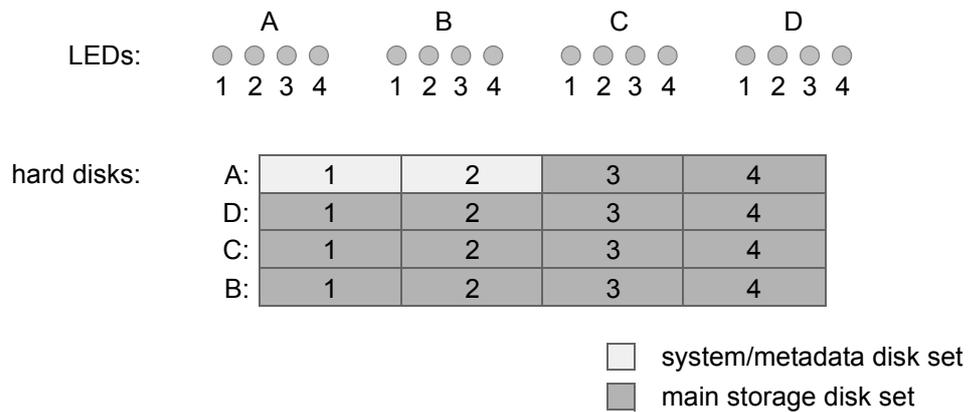
Each LED represents a hard disk of the array:
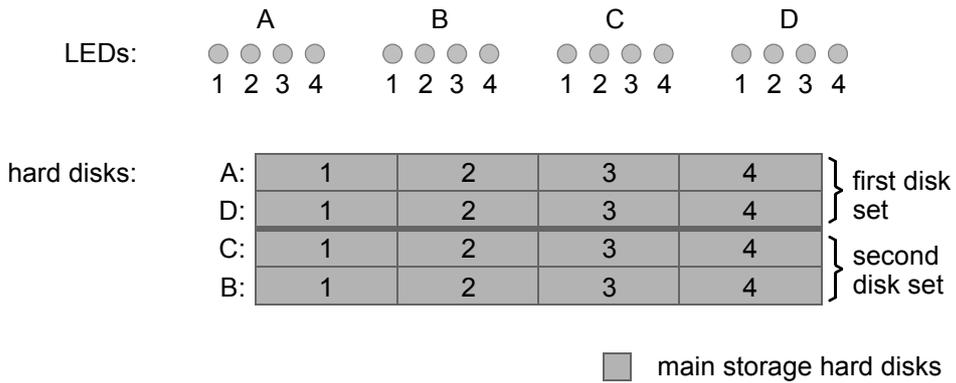
Figure 2-6: HDD LEDs and the hard disk array (VENICE HPE)

Starting from the left, the first four LEDs display the accesses to the top row of the main storage hard disks (see section "Hard Disk Array" on page 2-8); the second four LEDs show the state of the bottom row of the hard disk array; the third LED group belongs to the third row (from the top), while the fourth group represents the second row.

> **i** The system/metadata hard disks of the VENICE HPE are installed inside the system in disk carriers. The statuses (activities) of the system/metadata hard disks are not shown by the HDD LEDs.

2.2.4 Faceplate

The faceplate covers the hard disks of the hard disk array.

faceplate   backlit DVS logo
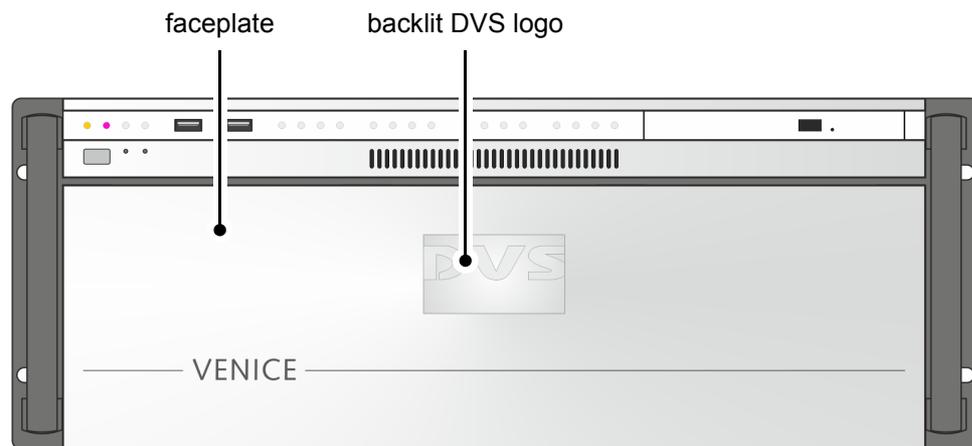
Figure 2-7: Overview of the faceplate

The faceplate is built with an integrated backlit DVS logo which indicates the state of the system, i.e. its power-on status: If the DVS logo is illuminated, the power is turned on; if not, the power is turned off.

The top side of the faceplate is hinge-fastened, while its bottom side is fixed with magnets. If you need access to one of the hard disks, for example, to replace it, you just have to lift the faceplate:
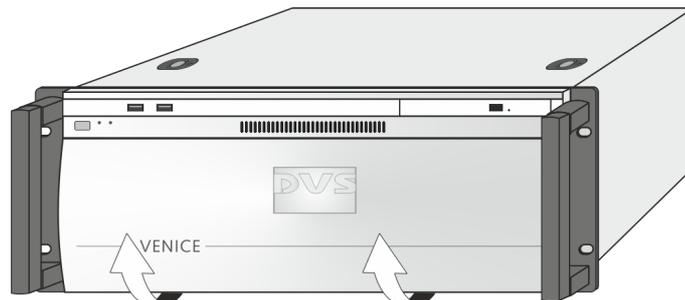
Figure 2-8: Lifting of faceplate

Then you can access the hard disks of the hard disk array (see section "Hard Disk Array" on page 2-8).

> **i** The faceplate can be removed for transport reasons (see section "Removal of the Faceplate" on page 5-21).

2.2.5 Hard Disk Array

The hard disks of the hard disk array are used to store your video and audio material. Among them you can find the main storage of the DVS system as well as the system/metadata hard disks. To prevent data loss in case a hard disk fails, it is normally RAID protected. Furthermore, the

system/metadata hard disks are protected with a battery backup unit to prevent data loss, for example, in case of a power failure.

> **ⓘ** Further information about RAID and the location of the main storage and system/metadata hard disks can be found in section "Introduction to RAID" on page 5-2. The battery backup unit is described in section "Battery Backup Unit" on page 2-21.
>
> Concerning the VENICE HPE variant the following information are valid only for the main storage hard disks. The system/metadata hard disks are installed inside the system in disk carriers.

Once the faceplate is lifted (see section "Faceplate" on page 2-7), you have access to the hard disk array:

lifted faceplate   hard disk array   hinge wire
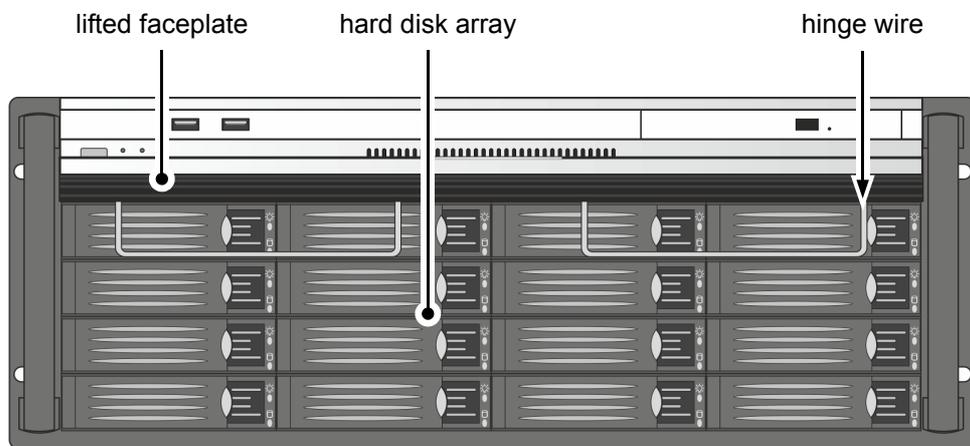
Figure 2-9: Hard disk array

> **ⓘ** The hinge wires hold the faceplate in place and allow you to lift it. For further information see section "Faceplate" on page 2-7 and section "Removal of the Faceplate" on page 5-21.

Each hard disk of the array is connected to the system with the help of a disk carrier which makes the removal of a hard disk from the system easy, for example, in the event of a failure.

disk carrier   lever   opener

LED disk power

LED disk activity

Figure 2-10: Hard disk carrier overview

> **ⓘ** Further information about how to remove and exchange a hard disk can be found in section "Hard Disk Maintenance" on page 5-2.

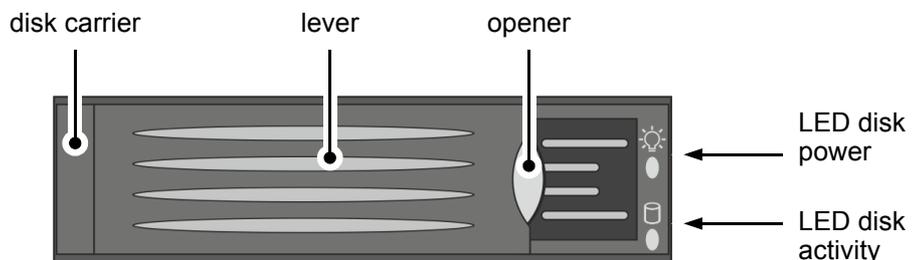|	
disk carrier	The disk carriers hold each one hard disk of the array. The hard disks are mounted to the disk carriers with several screws normally located at the sides of the carriers.
lever	Once the lever is unlatched with the opener, it can be used to pull the disk carrier and its hard disk out of the system.
opener	Unlatches the lever and with it the disk carrier.
LED disk power	Shows whether the disk of the disk carrier receives power.
LED disk activity	Indicates the status of the hard disk of the disk carrier (see also section "HDD LEDs" on page 2-5):

	off	Hard disk is idle.
	green	Hard disk is accessed.
	red	A hard disk or hard disk carrier related error has occurred.

2.2.6 DVD Drive

The system is equipped with a DVD drive which can be used for service purposes or to install additional software. It also provides burning capability.

DVD tray   DVD eject   emergency eject
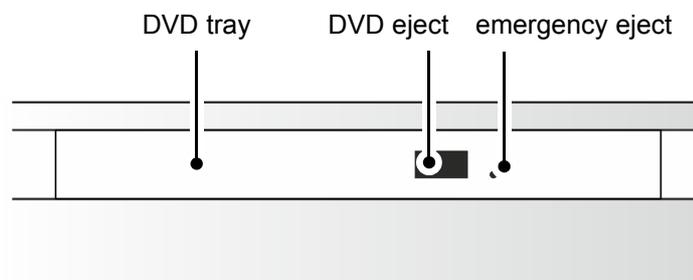
Figure 2-11: Overview of DVD drive

DVD tray	The DVD tray holds the CD or DVD.
DVD eject	Opens the DVD tray when the system is turned on.
emergency eject	You can open the DVD tray with the system cut from power: Insert a thin, pointed object into the emergency eject hole. Then the DVD tray opens.

For further information regarding the operation of the drive, please refer to the original manufacturer's documentation.

2.3   Overview of the Rear

This section describes the rear of the system. After an overall overview of the rear some explanatory details about the digital video in- and outputs are given. Next, the main connector panel will be described, followed by detailed descriptions of the ATX connector panel, the slot panel connectors and the power supply.

2.3.1 The Rear of the System

This section provides an overview of the rear of the system:
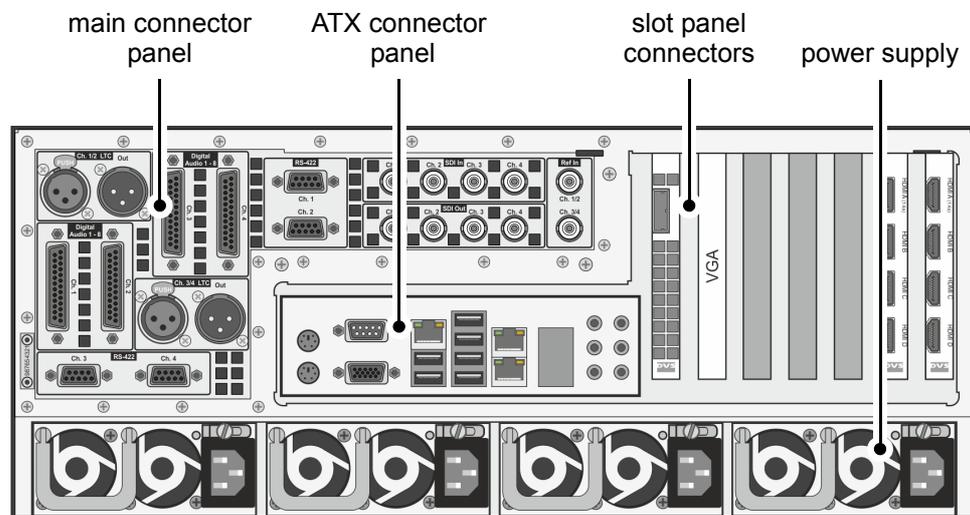
Figure 2-12: Overview of the rear

main connector panel   The main connector panel provides most of the standard in- and outputs of VENICE to give you the full functionality of the system. It holds, for example, the connectors for remote control and video I/Os. It is in more detail described in section "Main Connector Panel" on page 2-13.

ATX connector panel   On this panel you can find the standard connectors of the computer system. Further information about them can be found in section "ATX Connector Panel" on page 2-16.

slot panel connectors	The slot panel connectors of the DVS system provide, for example, video I/O panels containing video connections and the graphics card panel. Furthermore, if applicable, some additional panels may be present for internal reasons or on customer request. More details about the slot panel connectors can be found in section "Slot Panel Connectors" on page 2-17.
power supply	The redundant power supply provides the system with power. It consists of several independent power supply units: Even if one fails the others will still supply enough power to keep the system operational. Further information about the power supply can be found in section "Power Supply" on page 2-20.

2.3.2 Digital Video I/Os

This section contains some information about the digital video in- and outputs of VENICE.

i The full complement of four video channels is optionally available. In its standard variant VENICE will be delivered with two video channels.

VENICE HPE will be delivered with only two video channels as standard.

DVS usually names the input/output connectors/ports of the digital video signals alphabetically: the main video stream is then available, for instance, on port A and the secondary video stream on port B. Individual video channels on the other hand are labeled with numbers.

For YUV you normally require one link (connectors named 'A', single link). For YUVA you will need two links ('A' for YUV and 'B' for the key signal). With RGB you will always need two links ('A' and 'B', dual link).

Because VENICE provides up to four independent video channels (different video rasters and color modes), up to four SDI input ports and four SDI output ports are available. With this YUV can be transmitted by all channels independently by default. By changing the speed of the ports to 3-Gbit/s SDI, independent dual-link connections can be realized. They provide all the features of a standard dual-link connection, but require only one connector instead of two.

Video channel 1 and, if available, video channel 3 can also be switched to a standard dual-link connection. Then, the second video channels of the video channel pairs 1/2 and 3/4 (i.e. channels 2 and 4) will not be available and their SDI ports have to be used for the secondary video signal (link B).

The following tables show the signal distribution over the I/O ports for the different video rasters (color modes) when either SDTV or a 1.5-Gbit/s connection are configured for the channels, or the channels are set to 3 Gbit/s:

Table 2-1: SDI signal distribution, SDTV and 1.5-Gbit/s SDI

Video Mode	SDI In		SDI Out	
	Ch. 1/Ch. 3	Ch. 2/Ch. 4	Ch. 1/Ch. 3	Ch. 2/Ch. 4
YC_bC_r 4:2:2	Y, C_b, C_r	Y, C_b, C_r	Y, C_b, C_r	Y, C_b, C_r
YC_bC_rA 4:2:2:4	Y, C_b, C_r	A (key)	Y, C_b, C_r	A (key)
YC_bC_r 4:4:4	Y, ½ C_b, ½ C_r	½ C_b, ½ C_r	Y, ½ C_b, ½ C_r	½ C_b, ½ C_r
YC_bC_rA 4:4:4:4	Y, ½ C_b, ½ C_r	½ C_b, ½ C_r, A (key)	Y, ½ C_b, ½ C_r	½ C_b, ½ C_r, A (key)
RGB 4:4:4	G, ½ R, ½ B	½ R, ½ B	G, ½ R, ½ B	½ R, ½ B
RGBA 4:4:4:4	G, ½ R, ½ B	½ R, ½ B, A (key)	G, ½ R, ½ B	½ R, ½ B, A (key)

Table 2-2: SDI signal distribution, 3-Gbit/s SDI

Video Mode	SDI In		SDI Out	
	Ch. 1/Ch. 3	Ch. 2/Ch. 4	Ch. 1/Ch. 3	Ch. 2/Ch. 4
YC_bC_rA 4:2:2:4[1]	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)
YC_bC_r 4:4:4[1]	Y, C_b, C_r	Y, C_b, C_r	Y, C_b, C_r	Y, C_b, C_r
YC_bC_rA 4:4:4:4[1]	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)	Y, C_b, C_r, A (key)
RGB 4:4:4[1]	R, G, B	R, G, B	R, G, B	R, G, B
RGBA 4:4:4:4[1]	R, G, B, A (key)	R, G, B, A (key)	R, G, B, A (key)	R, G, B, A (key)

1) Not available for SD video rasters. For this you have to use SDTV and 1.5-Gbit/s SDI.

You can select the HDMI port(s) of VENICE by setting the output priority in the software to 'DVI' and then selecting the raster.

The first and, if available, the third HDMI port of VENICE (i.e. channels 1 and 3 named port(s) HDMI A of the slot panel connectors) are HDMI 1.4 a, providing all outputs up to 2K. When using a 2K raster on these ports, the second video channels of the video channel pairs 1/2 and 3/4 (i.e. channels 2 and 4 named port(s) HDMI C of the slot panel connectors) will not be available. The ports HDMI B and HDMI D of the slot panel connectors provide no function.

2.3.3 Main Connector Panel

The main connector panel provides the standard in- and outputs of VENICE to give you the full functionality of the system. It holds, for ex-

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ample, the connectors for remote control and the digital video in- and outputs (serial digital interface).

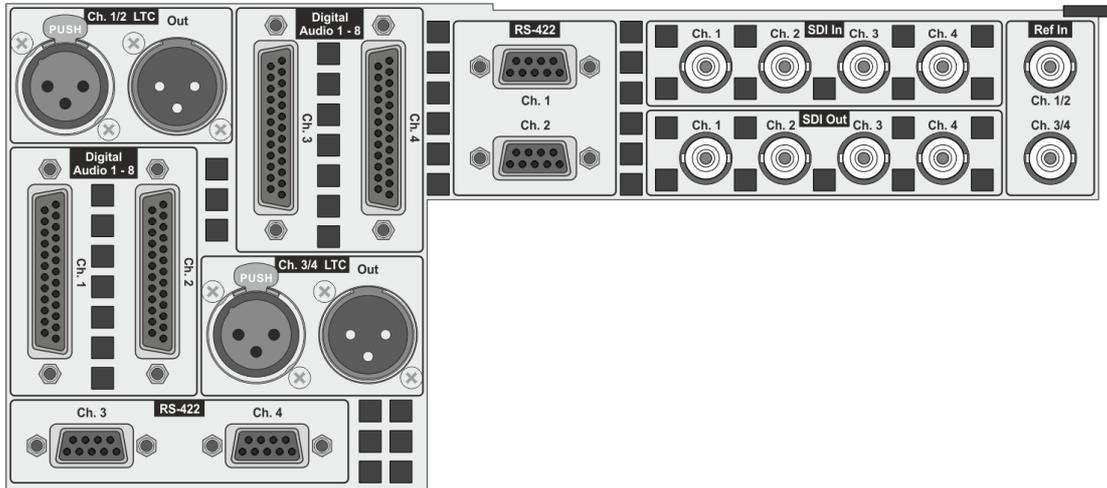> **i** Pin-outs of most connectors can be found in section "Signal In- and Outputs" on page A-10.

Figure 2-13: Main connector panel on rear

Item	Description
Ch. 1/2 LTC In	XLR connector (female) for an input of longitudinal timecode for video channels 1 and 2
Ch. 1/2 LTC Out	XLR connector (male) for an output of longitudinal timecode of video channel 1
Digital Audio 1-8 Ch. 1	DB-25 connector (female) for a balanced audio signal in- and output of the digital audio channels 1 to 8 (AES/EBU) for video channel 1; XLR connectors are available via a breakout cable
Digital Audio 1-8 Ch. 2	Same as 'Digital Audio 1-8 Ch. 1' but for video channel 2
Digital Audio 1-8 Ch. 3	Same as 'Digital Audio 1-8 Ch. 1' but for video channel 3
Digital Audio 1-8 Ch. 4	Same as 'Digital Audio 1-8 Ch. 1' but for video channel 4
Ch. 3/4 LTC In	XLR connector (female) for an input of longitudinal timecode for video channels 3 and 4
Ch. 3/4 LTC Out	XLR connector (male) for an output of longitudinal timecode of video channel 3

Item	Description
RS-422 Ch. 1	DB-9 connector (female), serial RS-422 interface for an out- or input of master/slave control signals for video channel 1; its pin-out (master or slave) will be switched by the software automatically
RS-422 Ch. 2	Same as 'RS-422 Ch. 1' but for video channel 2
RS-422 Ch. 3	Same as 'RS-422 Ch. 1' but for video channel 3
RS-422 Ch. 4	Same as 'RS-422 Ch. 1' but for video channel 4
SDI In Ch. 1	BNC connector for an input of digital video signals (serial digital interface); usually used for an input of single-link (YUV) or 3-Gbit/s (YUVA or RGB[A]) video signals for video channel 1; can also be used for dual-link modes of video channel 1 (primary video stream, port A)
SDI In Ch. 2	BNC connector for an input of digital video signals (serial digital interface); usually used for an input of single-link (YUV) or 3-Gbit/s (YUVA or RGB[A]) video signals for video channel 2; can also be used for dual-link modes of video channel 1 (secondary video stream, port B)
SDI In Ch. 3	Same as 'SDI In Ch. 1' but for video channel 3
SDI In Ch. 4	Same as 'SDI In Ch. 2' but for the video channel 4; can also be used for dual-link modes of video channel 3 (secondary video stream, port B)
SDI Out Ch. 1	BNC connector for an output of digital video signals (serial digital interface); usually used for an output of single-link (YUV) or 3-Gbit/s (YUVA or RGB[A]) video signals for video channel 1; can also be used for dual-link modes of video channel 1 (primary video stream, port A)
SDI Out Ch. 2	BNC connector for an output of digital video signals (serial digital interface); usually used for an output of single-link (YUV) or 3-Gbit/s (YUVA or RGB[A]) video signals for video channel 2; can also be used for dual-link modes of video channel 1 (secondary video stream, port B)
SDI Out Ch. 3	Same as 'SDI Out Ch. 1' but for video channel 3
SDI Out Ch. 4	Same as 'SDI Out Ch. 2' but for video channel 4; can also be used for dual-link modes of video channel 3 (secondary video stream, port B)

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Item	Description
Ref In Ch. 1/2	BNC connector for the reference input for channels 1 and 2
Ref In Ch. 3/4	Same as 'Ref In Ch. 1/2' but for video channels 3 and 4

2.3.4 ATX Connector Panel

The ATX connector panel on the rear of the DVS system holds the connectors of the computer system. It provides the following connections:
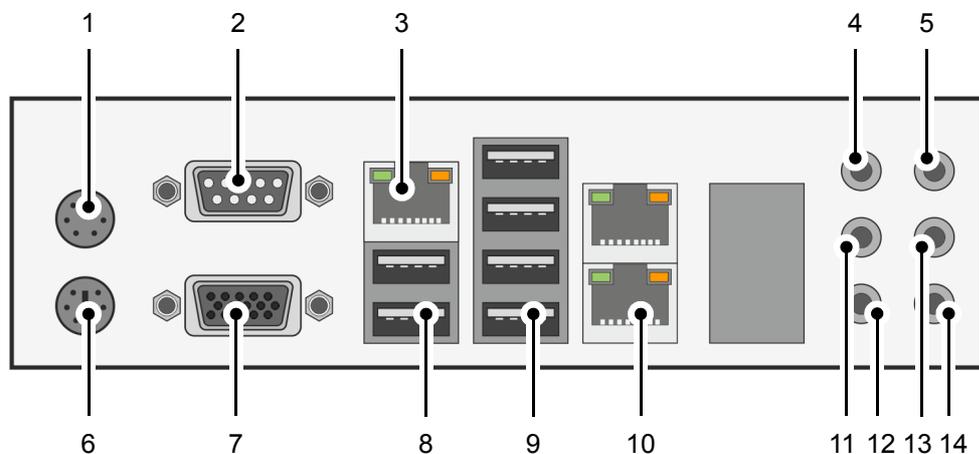

Figure 2-14: ATX connector panel on rear

No.	Item	Explanation
1	mouse	PS/2 connector to connect a mouse to the system
2	COM port	RS-232 connector for the connection of serial interface devices
3	IPMI	Dedicated LAN port for IPMI 2.0 (Intelligent Platform Management Interface) providing KVM (Keyboard, Video, Mouse redirection) as well; for further information see the documentation(s) of the original manufacturer(s)
4	CEN/LFE	Connector for center out and subwoofer speakers
5	line in	Connector to input audio signals
6	keyboard	PS/2 connector to connect a keyboard to the system

No.	Item	Explanation
7	VGA	DB-15 connector (female) to connect a monitor; normally with an extra graphics card installed, this connector will not be operational; however, it can be used in combination with IPMI/KVM for system management; if you want to use this port, please contact DVS directly in case of setup questions
8, 9	USB ports	These USB connectors (universal serial bus) offer you the possibility to connect other devices to your system
10	LAN (1000 Mb)	Gigabit Ethernet (1000 Base-T) connection ports to connect the system to a network
11	back surround	Connector for rear surround speakers
12	side surround	Connector for middle surround speakers
13	front	Connector to output audio signals (line out), e.g. for front speakers or headphones
14	mike	Connector to input low-level audio signals

> **i** The audio ports on this panel are not used by the VENICE software. The Spycer software, however, uses them.

2.3.5 Slot Panel Connectors

VENICE provides on its slot panel connector area various connections, such as the graphics card panel and video I/O panels. Furthermore, if applicable, some additional panels may be present for internal reasons or on customer request.
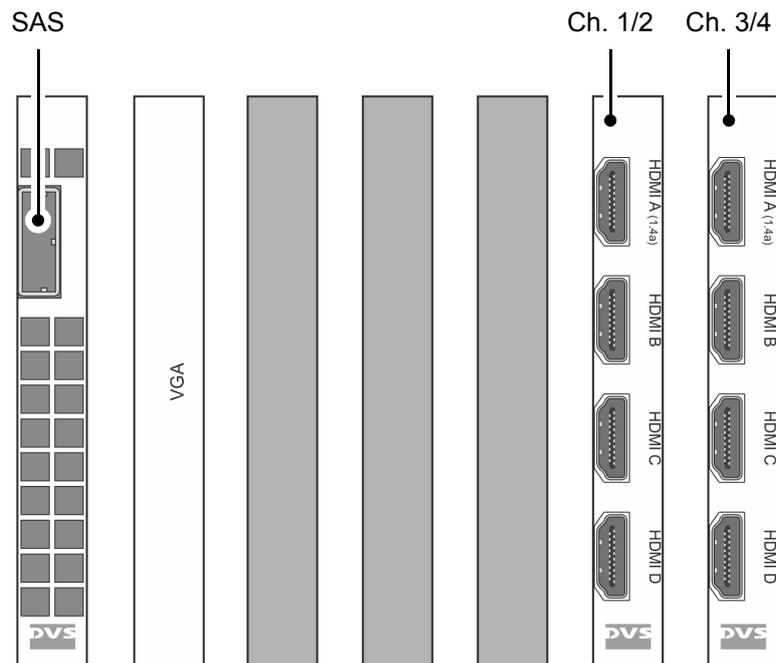
Figure 2-15: Slot panels on rear (4 channels)

The full complement of four video channels is optionally available. In its standard variant VENICE will be delivered with two video channels. VENICE HPE will be delivered with only two video channels as standard.

The layout of the slot panel area on your system may differ from the figure above: The position of the individual slot panels may vary and additional panels may be installed for internal reasons or on customer request.

SAS

The SAS (serial attached SCSI) connector is an external mini-SAS (SFF-8088) connector that can be used to connect external storages. An external storage connected to this port can even be configured to provide RAID protection.

Data transfers on this port may interfere with the real-time capability of VENICE. It is recommended to use it only at times when no real-time performance is required.

VGA

The VGA panel is the panel of the graphics card. The monitor for the VENICE software has to be connected here. For further information about the graphics card, please refer to the original manufacturer's documentation included in the delivery of the DVS system.

HDMI Panel

The HDMI panel of VENICE provides the high-definition multimedia interfaces (HDMI connectors) for an output of digital audio and video signals.
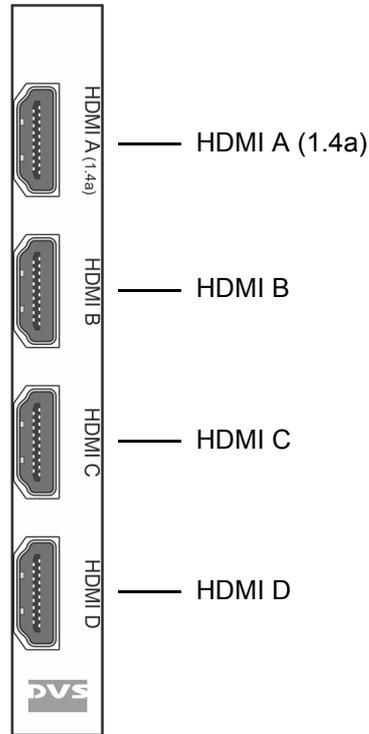

Figure 2-16: HDMI panel

> ℹ To connect to DVI ports an HDMI-to-DVI adapter has to be used.
>
> Pin-outs of the HDMI connectors can be found in section "Signal In- and Outputs" on page A-10.

In detail this panel provides the following:

Item	Description
HDMI A (1.4 a)	A HDMI 1.4 a connector for an output of digital audio and video signals up to a resolution of 2K for video channels 1 and 3; at a resolution of 2K these channels use the resources of the HDMI C port, whereby it is not available at that time
HDMI B	Not available
HDMI C	A HDMI 1.3 connector for an output of digital audio and video signals for video channels 2 and 4; this port is not available when HDMI A is operating in HDMI 1.4 a mode
HDMI D	Not available

2.3.6 Power Supply

The redundant power supply provides the system with power. It consists of several independent power supply units: Even if one fails the others will still offer enough power to keep the system working.

⚠️ The system can be operated with one power supply unit out of order. However, if another one fails, a continued operation of the system cannot be guaranteed. Therefore, it is recommended to change a failed power supply unit immediately (see section "Power Supply Maintenance" on page 5-14).

ℹ️ The state of the power supply units can be easily checked either with their LEDs as explained below or with the general alarm LED (see section "Operation Items" on page 2-4).

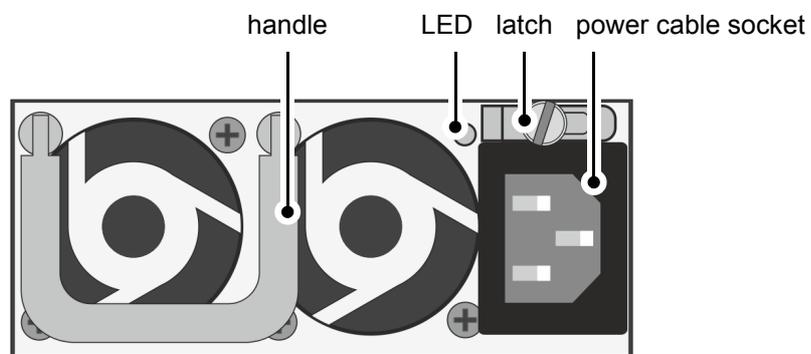The following provides an overview of one of the power supply units:

Figure 2-17: Overview of power supply unit

handle	With the handle of the power supply unit you can pull the unit out of the power supply once it is unlocked with the latch.
LED	The LED indicates the state of the power supply unit:

	green	Operating normally
	off	Standby mode
	off (alarm LED on)	Disconnected from power or malfunction

latch	The latch of a power supply unit locks it in the power supply. With it the unit can be unlocked and pulled out of the power supply with the help of the handle.
power cable socket	The socket where the power cable has to be plugged in to provide the system with power.

2.4 Battery Backup Unit

To prevent data loss especially for the metadata, the system/metadata hard disks (see section "Introduction to RAID" on page 5-2) are protected by a battery backup unit. If the system's operation gets interrupted, for example, in case of a power failure, it will provide power to the cache of the connected RAID controller, so that buffered data will not get lost. Once the operation of the system is restored, the cached data will be written to the hard disks.

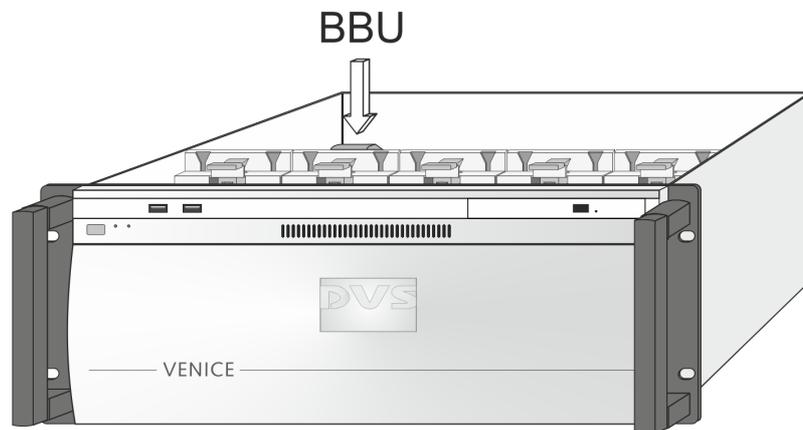The battery backup unit is located inside the casing of the DVS system, fastened to an air duct:

Figure 2-18: Location of battery backup unit inside the system

The battery backup unit is a rechargeable battery that will be charged automatically when the system is turned on.

Installation

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This chapter describes the installation procedure of the VENICE hardware. The system must be installed properly before you can start working with it.

To install the hardware of VENICE perform the following:

- Unpack the DVS system and its accessories.

  ⓘ Check your delivery and compare it with the delivery note included in the package on an extra sheet of paper. In case of missing items, please contact your local vendor or DVS immediately.

  ⚠ To make warranty claims you have to keep the original packing and use it in case of a return transportation.

- Place the DVS system on a firm, flat surface within reach of a power outlet or mount it in a rack. For good air circulation and cooling make sure the ventilation holes are not covered.

- Connect at least the following computer peripherals:
  - Mouse,
  - keyboard and
  - a monitor that is operable at a resolution of at least 1280 × 1024 pixels (default manufacturing setting).

- Connect any other peripheral computer and video equipment. For an overview of the panels and connectors at the system's rear see section "Overview of the Rear" on page 2-11.

- Connect the power cable(s) to the system.

The VENICE hardware is now properly installed and you can switch on the system as described in section "Starting the System" on page 4-1.

  ⓘ After installing the hardware the DVS system has to be set up first before it can be used. How to perform the initial setup is in detail described in the software documentation delivered with the system.

Operation

This chapter describes how to operate the VENICE hardware, i.e. it is explained how to start the system and how to shut it down. For both procedures you have to use the power switch of the operation items at the front of the system.
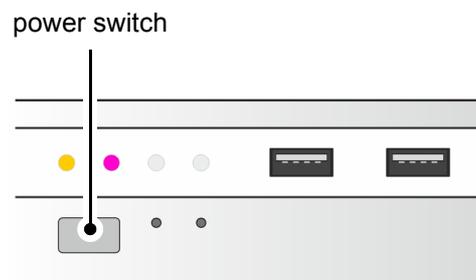
power switch

Figure 4-1: The power switch

> ℹ️ All other items necessary for a correct operation of the VENICE hardware, such as the LEDs or the reset button, are described in chapter "Overview" on page 2-1.

4.1 Starting the System

After a proper installation of the system (see chapter "Installation" on page 3-1) you may start the DVS system at any time.

To start the system perform the following:

• Press the power switch briefly to turn on the system.

The system will be started and the DVS logo in the middle of the faceplate lights up. As with any standard computer after initial booting, the system begins to load the installed operating system. When the operating system has finished its loading, you can begin to work with the DVS system right away.

4.2 Shutting Down the System

There are several possibilities to shut down the DVS system. All depend on whether the operating system is already loaded, frozen or not completely loaded. Please act accordingly.

To shut down the system perform the following according to the state of the system's operating system:

> After a shut-down wait at least ten seconds before starting the system again. This time is needed to safely erase all memory banks of the system.

With the operating system fully loaded

If the operating system is up and running, there are two ways to shut down your system:

1. Turn the system off by shutting down the operating system the usual way.

The operating system will then save your personal settings and once it has ended, the system will turn off.

2. Alternatively, you can initiate a fast shut down by pressing the power switch briefly.

> The fast shut down may not save all your system data and personal settings before the system turns off.

Some settings will be saved and afterwards the system turns off.

With the operating system frozen or not completely loaded

If the operating system is not responding anymore or not completely loaded, perform the following:

> This procedure can cause corrupted system data. However, the system should be sufficiently protected against this by the journaling file system and the battery backup unit (see section "Battery Backup Unit" on page 2-21).

• Shut down the system by pressing the power switch until the system turns off.

The system will then shut down immediately.

Maintenance

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This chapter explains the maintenance work that you can perform on your own. For each work a detailed procedure description is given. If you experience trouble with the system that cannot be resolved with the work described here or in section "Troubleshooting" on page A-2, please contact your local vendor or DVS directly.

5.1 Hard Disk Maintenance

This section deals with the possible event of a hard disk failure. First, some introductory information about RAID are provided. After that follow descriptions how to act when a hard disk fails.

5.1.1 Introduction to RAID

In a system where huge amounts of data are processed, large storage capacities combined with high data throughputs are mandatory. To provide both at the same time it is common practice in the area of video and digital film to configure several hard disks together into a stripe set or RAID. The IT world has defined several 'levels' of RAID, most of them providing some kind of data protection.

The RAID feature makes the DVS system tolerant of disk failures. Even with a broken disk operations can still be continued and, once the failed disk has been replaced, the missing data can be recovered easily. The data protection is provided by a RAID controller installed inside the system which independently administers the data protection for the sets of hard disks connected to it. The system/metadata hard disks of the VENICE system for example, are protected by RAID 1, meaning by a mirroring of the data between two disks. If one of the hard disks fails, the missing data can be restored with the mirrored information stored on the other disk.

The main storage consists of several hard disks that are protected by a RAID level that ensures best performance and protection. With this, the data can be e.g. striped across hard disks during write procedures. At the same time the information necessary to rebuild a failed hard disk (parity information) is generated and written across the disks as well. RAID protection ensures that one or more disks of a disk set can fail and your data will still be recoverable due to the information stored on the other disks. Different RAID levels mean a different number of maximum disk fails and differences in storage capacity. Especially server systems make use of higher RAID levels because, particularly with larger disk capacities, the recovery of a single disk can take a long time and the failure of a second disk in the meantime is not unlikely anymore. The following table details the differences between the two variants VENICE 4U and VENICE HPE:

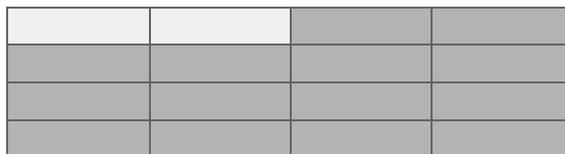|	VENICE 4U	VENICE HPE
RAID controllers installed in the system	one RAID controller	two RAID controllers
system/metadata configuration:		
system/metadata	two hard disks	two hard disks

	VENICE 4U	VENICE HPE
No. of disk sets of system/metadata	1 × 2 hard disks	1 × 2 hard disks
RAID protection of system/metadata	RAID 1	RAID 1
max. no. of disk failures per disk set	one disk	one disk
	⚠️ If the second system/metadata hard disk fails in the meantime, the data will be unrecoverable.	
data protection method	mirroring (connected to one RAID controller)	mirroring (connected to one RAID controller)
main storage configuration:		
main storage	14 hard disks	16 hard disks
No. of disk sets of main storage	1 × 14 hard disks	2 × 8 hard disks
RAID protection of main storage	RAID 6	RAID 5
max. no. of disk failures per disk set	two disks	one disk
	⚠️ If the second main storage disk per disk set (VENICE HPE) or third main storage disk per disk set (VENICE 4U) fails in the meantime, the data will be unrecoverable.	
data rescue method	parity information written twice (dual parity)	parity information written once

With the available RAID feature the DVS system can withstand disk failures without losing data or access to data.

The following figures show a representation of the hard disk arrays of the DVS systems (see also section "Hard Disk Array" on page 2-8). They indicate the locations of the disk sets (RAID packs) in the hard disk arrays:

hard disks:

☐ system/metadata disk set
■ main storage disk set
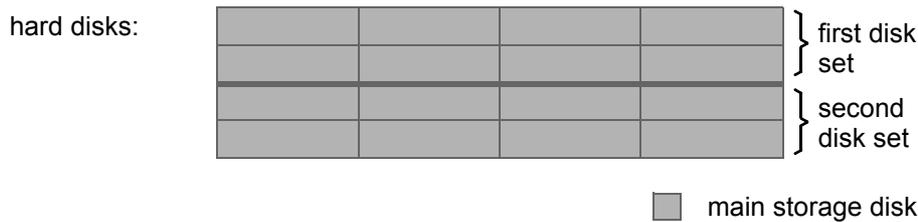
Figure 5-1: Disk sets (RAID packs) of the VENICE 4U

hard disks:

first disk set

second disk set

main storage disk set

Figure 5-2: Disk sets (RAID packs) of the VENICE HPE

> **i** The system/metadata hard disks of the VENICE HPE are installed inside the system in disk carriers.

5.1.2 Identifying a Broken Hard Disk

In case of an alarm or when suspecting a worn hard disk, you have to identify the broken hard disk first in order to replace it.

> **i** An alarm can be caused by a number of reasons. Please refer to section "Troubleshooting" on page A-2 first for further details about what to do in case of an alarm.

If a hard disk fails, the alarm will be sounded by a RAID controller. It cannot be switched mute with the mute button of the operation items. It can be turned off either with the RAID software manager or by replacing the broken hard disk.

In some cases you will see further, e.g. visible signs in the event of a hard disk failure which are described below.

Data accesses to the hard disk array are still possible because any missing data will be recalculated from the parity information stored on the other hard disk(s). This can limit the overall performance and real-time operations may no longer be possible.

> **i** Contrary to the VENICE 4U system, on the VENICE HPE no other e.g. visible signs will be shown in case of the failure of a system/metadata hard disk. It is recommended to configure an E-Mail notification to get informed when a system/metadata hard disk fails.

In case of a storage hard disk failure in the VENICE HPE you will see other, e.g. visible signs as described in this subsection.

The information about how to replace a hard disk in section "Replacing a Hard Disk" on page 5-5 are valid only for the hard disks of the main storage of the VENICE HPE variant. For the VENICE 4U the information still apply to all hard disks.

Replace the failed disk as soon as possible. If you do not re-place a broken disk in time and another disk fails in the mean-time, your data may be unrecoverable.

Before replacing a hard disk you have to gather the log files of the RAID controller. If you know how to do this, you may pro-ceed on your own. If not, please contact the DVS service de-partment first.

In most cases you can find the broken disk by simply observing the LEDs of the disk array (see section "Hard Disk Array" on page 2-8). While performing continuous accesses to the data, it will be the one:

– no longer blinking (either continuously on or off),
– irregularly blinking compared to the other hard disks of the same disk set, or
– showing a hard disk or disk carrier related error (see section "Hard Disk Array" on page 2-8).

Once the broken disk has been identified, you can replace it as de-scribed in section "Replacing a Hard Disk" on page 5-5.

Replacing the wrong hard disk, i.e. a good one instead of the broken one, may result in a total loss of data.

If you are unsure about having detected the correct hard disk, please contact the DVS service department.

5.1.3 Replacing a Hard Disk

As soon as the broken hard disk has been identified (see section "Iden-tifying a Broken Hard Disk" on page 5-4), it can be replaced easily. The replacement of a broken hard disk can be divided into three steps:

1. Removing the hard disk from the system.
2. Replacing the hard disk.
3. Reassembling it into the system.

All steps are explained in the following.

Before replacing a hard disk you have to gather the log files of the RAID controller. If you know how to do this, you may pro-ceed on your own. If not, please contact the DVS service de-partment first.

Step 1: Removing the Hard Disk

The hard disks that are accessible at the front of the system are connected to the system with the help of disk carriers. They can be removed easily, even when the system is running (hot-swappable).

> **i** For an overview of a disk carrier as well as further information about it see section "Hard Disk Array" on page 2-8.
>
> The system/metadata hard disks of the VENICE HPE are installed inside the system in disk carriers. In case of a failure please contact the DVS service department.

To remove a hard disk from the system perform the following:

• If appropriate, stop all accesses to the hard disk array of your system, for example, by exiting the video system software and severing the network connections.

• Lift the faceplate of the system (see section "Faceplate" on page 2-7).

• Then, unlatch the disk carrier of the defective hard disk by pressing the opener of the disk carrier (1).

This will cause the lever to come out of the disk carrier so that it protrudes from the rest of the disk carriers.

• Take the lever and turn it in its hinge (2) until it cannot be moved further:
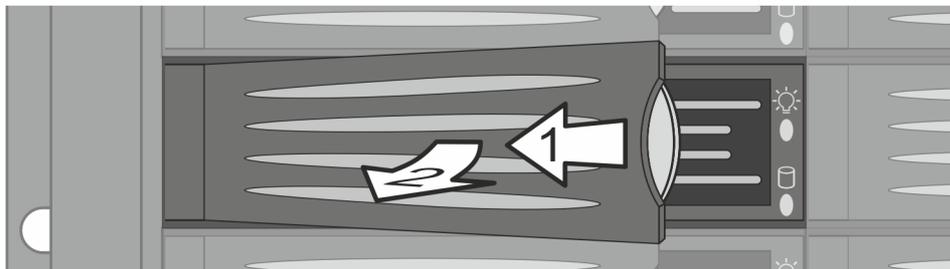
Figure 5-3: Pulling out the lever

This takes the hard disk installed in the disk carrier out of the system's interfaces inside.

• Once the interface connections inside the system are severed, you can pull the disk carrier out of the system.

Now the hard disk is removed from the system and it has to be replaced in the next step.

Step 2: Replacing the Hard Disk

To replace the hard disk do the following:

⚠️ Significant environmental changes, for example, altitude, voltage, temperature, shock, vibration, etc., can damage a hard disk. Therefore, handle hard disks with great care.

• Unscrew the screws that fix the hard disk to the disk carrier.

• Exchange the broken disk with a new one and assemble it in the disk carrier with the screws.

ℹ️ It is best to use the same brand and type of hard disk again. Otherwise a loss of performance might occur.

After that the hard disk is replaced and the disk carrier with the new disk has to be reassembled in the system.

Step 3: Reassembling the Hard Disk

After replacing the hard disk, the disk carrier with the new disk has to be reassembled in the system. For this perform the following:

• Slide the disk carrier back into its shaft at the disk array.

• Push the disk carrier completely back into the shaft by applying pressure to the disk carrier directly (i.e. do not use the lever to push the carrier). Move it until you feel the resistance of the hard disk interface inside the system and until the lever retracts by itself from the pushing.

⚠️ It is important that you do not use the lever to insert the disk carrier. Apply an even pressure only to the carrier directly until the lever moves back by itself.

• Then simply close the lever until it snaps back in place which as a result will slide the carrier completely back in.

ℹ️ The disk carrier of the replaced disk should be level with the others of the array.

Once the faceplate of the DVS system is back in place, the replacement of the hard disk is finished. After several minutes the replaced hard disk will be automatically recognized by the system. Then the rebuild of the data will be initiated on its own. When the system has finished the rebuild, the DVS system will be fully operational again.

⚠️ During a rebuild real-time processes may not be possible. It is recommended to restrict accesses to the hard disk array until the rebuild is finished.

A rebuild takes several hours. It is strongly recommended to avoid accesses to the disk array during this time, otherwise it may take considerably longer.

5.2 Opening and Closing the Casing

Some tasks described in this manual require an opening of the system's casing and the closing of it afterwards once the intended work is finished. Both tasks will be explained in this section.

5.2.1 Opening the Casing

To open the casing of the DVS system perform the following:

The system you are working on operates with voltages that can be hazardous to your health. Never work on the system or access its interior with the power cable(s) being plugged in. Make sure the power supply is disconnected from the components you intend to work on.

The system must be operated only with the chassis' cover installed to ensure proper cooling.

- Shut down the system as described in section "Shutting Down the System" on page 4-2.
- Disconnect all power cords from the system.
- Press the two buttons at the top of the system (1) and move the cover towards the rear of the system (2).
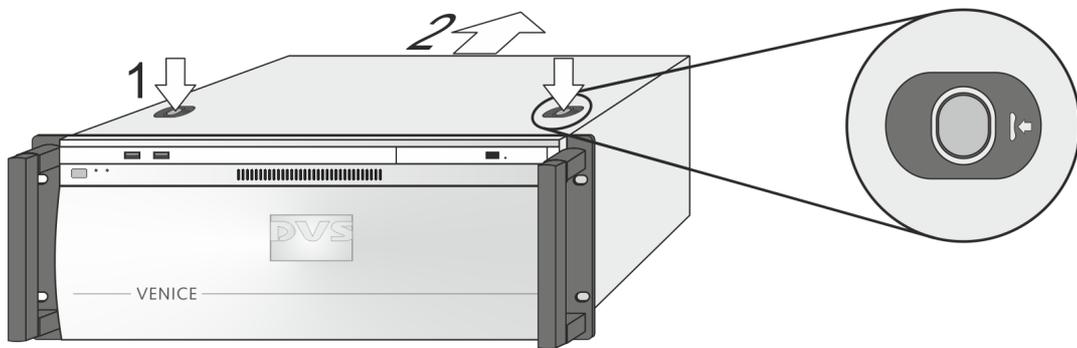
Figure 5-4: Removal of the cover of the casing

Once the cover is slid backward, it can be taken off the system.

5.2.2 Closing the Casing

After finishing your task at hand you have to close the casing of the DVS system again. For this perform the following:

- Simply put the cover back on and slide it into place until it locks.
- Afterwards reconnect the power cords.

With this the task of closing the casing is finished and you can turn the system back on at any time.

5.3 Fan Maintenance

To cool the many hard disks installed in the system as well as the other electronic parts (e.g. the motherboard), the system is equipped with several fans that can be exchanged in case of a failure easily. This section describes what to do if a fan failure takes place.

When a fan failure occurs, you will be notified by a lit alarm LED and the sounding of an alarm buzzer of the system. The alarm can be switched mute with the mute button at the front of the system (see section "Operation Items" on page 2-4). Then you have to do the following to exchange the failed fan:

An alarm can be caused by a number of reasons. Please refer to section "Troubleshooting" on page A-2 first for further details about what to do in case of an alarm.

The system you are working on operates with voltages that can be hazardous to your health. Never work on the system or access its interior with the power cable(s) being plugged in. Make sure the power supply is disconnected from the components you intend to work on.

Maintenance inside the system should only be performed by personnel qualified for handling and testing electrical equipment.

Computer hardware contains components that are sensitive to electrostatic discharge. If you touch them without precautionary measures, they can be destroyed. Use a wrist strap connected to ground when accessing electronic parts and take care of grounding the system. Avoid touching the internal components of the computer system.

• Open the casing of the system as described in section "Opening the Casing" on page 5-8.

With the casing of the system open, you can now test the fans. For this you have to plug in the power supply again.

Testing the fans is possible only with an opened casing and the power turned back on.

Once the power cables are plugged in again do not touch anything else than the external power cords or the power switch at the front of the system. Under no circumstances reach inside the system.

After testing the fans switch off the power and disconnect the power cables immediately.

- Reconnect the power cords.

- Press the power switch to turn on the system.

- Observe the fans and memorize the failed one (the fan not revolving is the broken one).

- Press the power switch until the system turns off.

- After this disconnect the power cables once again.

With the broken fan identified you can replace it. For this perform the following:

- Press the latch of the respective fan module towards the front of the system (1).

- With the locking mechanism released pull the fan module up and out of the system (2).
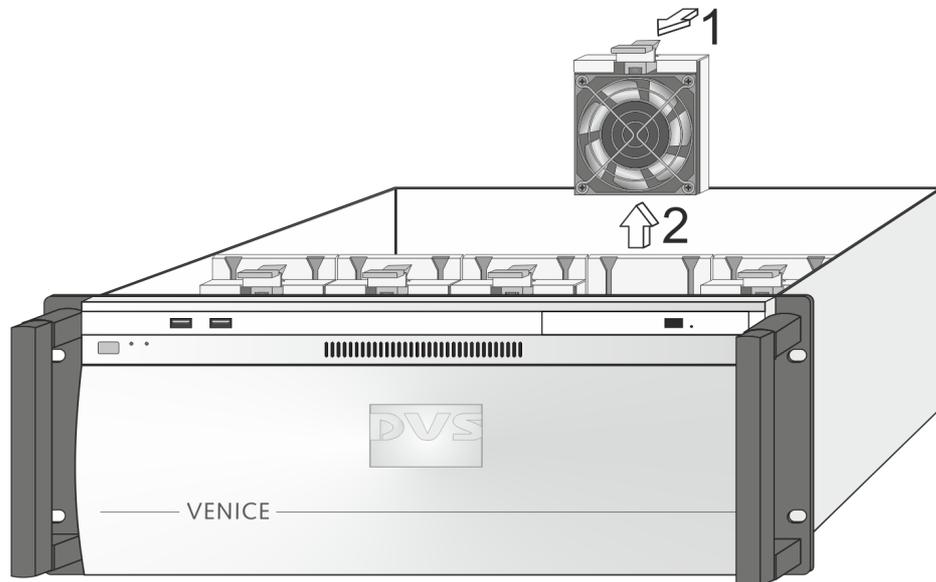
Figure 5-5: Removal of fan module

This will sever the connection of the fan to the system.

- Unscrew the finger protection grille from the broken fan and afterwards screw off the fan from the fan bracket.

- Replace the broken fan with a new one and reassemble the fan module: Screw the fan to the fan bracket and afterwards the finger protection grille to the fan.

> ⚠ Only use original manufacturer spare parts. Other spare parts might damage your system.

- Re-insert the repaired fan module into the system.

> ℹ See to it that the fan module plugs properly into the system's fan interface and that, when completely inserted, the locking mechanism snaps back into its locked position.

- Next close the casing of the system as described in section "Closing the Casing" on page 5-8.

With the last step finished you have successfully replaced the defective fan module. Once the system is turned on, no alarm should be sounded anymore.

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5.4 Controller Maintenance

During the service life of the DVS system you may have to exchange a RAID controller (see section "Introduction to RAID" on page 5-2). It may be indicated, for example, if a disk set (RAID pack) cannot be accessed anymore. This section describes how to exchange a RAID controller.

⚠ Before exchanging a RAID controller contact the DVS service department.

⚠ The system you are working on operates with voltages that can be hazardous to your health. Never work on the system or access its interior with the power cable(s) being plugged in. Make sure the power supply is disconnected from the components you intend to work on.

Maintenance inside the system should only be performed by personnel qualified for handling and testing electrical equipment.

⚠ Computer hardware contains components that are sensitive to electrostatic discharge. If you touch them without precautionary measures, they can be destroyed. Use a wrist strap connected to ground when accessing electronic parts and take care of grounding the system. Avoid touching the internal components of the computer system.

- Identify the controller or disk set that causes the problem, for example, by consulting the RAID software manager.

- Then, open the casing of the system as described in section "Opening the Casing" on page 5-8.

ℹ To reach the RAID controllers you may have to remove an air duct which is fastened to the system with several screws.

- On the defective controller memorize the order of the cables that are connected to it. To make this easy the cables are numbered.

- Disconnect the cables connected to the controller.

- Remove the defective controller from the system and in its place install a new one.

⚠ Only use original manufacturer spare parts. Other spare parts might damage your system.

The controller must have the same firmware installed as the other controllers.

- Connect the cables to the controller again in the same manner as they were on the old controller.

- Next close the casing of the system as described in section "Closing the Casing" on page 5-8.

With the last step finished you have successfully replaced the defective RAID controller. Now, you have to integrate the new controller in the existing configuration:

- Turn on the system as described in section "Starting the System" on page 4-1.

After the initial booting you will see something like the following on the screen:

```
Following foreign Arrays are found:
Array#<x>-RAID-<y>

Press <Enter> to accept the current configuration
Press <CTRL-A> to enter RAID Configuration Utility
Press <CTRL-H> to Pause Configuration Messages
(Default is not to accept if no valid key pressed in 30
seconds)
```

- Press [Enter] on the keyboard to accept the configuration detected by the system:

```
<Enter> pressed: The current configuration is accepted
```

After this the newly installed RAID controller automatically initiates a verify of the connected hard disks which may take some time. When finished, the system will continue its booting procedure until the operating system is fully loaded. You may then continue your work with the system.
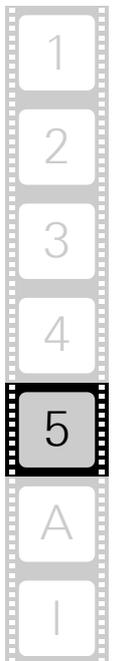
5.5 Power Supply Maintenance

The redundant power supply provides the system with power. It is a reliable and enduring part of the system because it consists of several independent power supply units: Even if one fails the others will still offer enough power to keep the system working.

⚠ The system can be operated with one power supply unit out of order. However, if another one fails, a continued operation of the system cannot be guaranteed. Therefore, it is recommended to change a failed power supply unit immediately.

When a power supply unit failure occurs, you will be notified by a lit alarm LED and the sounding of an alarm buzzer of the system. The alarm can be switched mute with the mute button at the front of the system (see section "Operation Items" on page 2-4).

ℹ An alarm can be caused by a number of reasons. Please refer to section "Troubleshooting" on page A-2 first for further details about what to do in case of an alarm.

Compared to other alarms sounded by the system the alarm buzzer of the power supply is relatively faint. In a loud environment it may be drowned by other noises. When operating the DVS system in a loud environment, it is recommended to check the state of the alarm LED (see section "Operation Items" on page 2-4) at regular intervals.

Each power supply unit in the DVS system is hot-swappable, so you can safely replace it with the system running. Follow these steps to replace a power supply unit:

ℹ For an overview of a power supply unit see section "Power Supply" on page 2-20.

- Take a look at the power supply at the rear of the system and examine the LEDs of the units. The LED of the malfunctioning power supply unit should be extinguished.

- Next unplug the power cord from this power supply unit.

- Unscrew the security screw of the latch.

- Take the handle of the respective unit and press the unit's latch to the left to unlock it.

- Then pull the unit at its handle out of the power supply.

⚠ Do not reach inside the system when removing a power supply unit or when the unit is out of the system.

- Change the power supply unit against a new and operable one.

- Slide the new unit into the power supply until it clicks into place.

  ⚠ Only use original manufacturer spare parts. Other spare parts might damage your system.

  ℹ When completely inserted please observe that the latch is truly in place and locking the unit.

- Tighten the security screw of the latch again.

- Connect the power source (power cord) to the newly installed power supply unit.

- After that check the LED indicating the status of the power supply unit: If it is lit up in green, the unit is working properly.

With this the power supply unit has been replaced successfully.

5.6 Backup or Recovery of the System Disk

The DVS system provides internally a USB flash drive that can be used to back up or restore the operating system on the system hard disk. With it you can, for example, set the system disk back to its manufacturing state. Once selected as a boot device, it will launch a Live Linux which in turn will either back up or restore the system hard disk. The following sections describe how to create a backup image or perform a recovery of the system disk.

5.6.1 Creating a Backup Image of the System Disk

The following describes the steps to make a backup image of the system hard disk and save it to the internal USB flash drive:

Do not execute any commands if you are not sure about the correct source and target device. For example, selecting the wrong source device could lead to a full storage space and a termination of the process.

To complete the loading of the DVS Rescue environment some user entries are required. For this follow the instructions given on the screen.

The loading of the environment and the recovery process itself will both try to initialize hardware that may not be present on your system. Any error messages displayed during loading/initialization, e.g. Failed or Warning, can be disregarded. The recovery process should work nonetheless.

The storage space on the USB is limited. The number of backup images that can be stored on the drive, besides the DVS recovery image ex factory available, depends on the size of the image files. If the process fails, the storage drive may be full. However, an already created image can be overwritten when assigning the same name to it.

- If appropriate, disconnect all Fibre Channel cables and all externally connected storage devices from the system.

- Turn on or restart the DVS system and at the indicated moment during start-up press [F11] on your keyboard to enter the boot menu.

- Once the boot menu is displayed on the screen, select the internally installed USB flash drive as the boot device and then press [Enter] on your keyboard.

With this the target device has been selected. The system will now boot from the internal USB and you will see a window on the screen where you can select the DVS Rescue environment for loading:

- Select `DVS Rescue` and press [Enter] on your keyboard.

  [i] If you do not perform any action, `DVS Rescue` will be loaded automatically after 30 seconds.

Once the loading has finished, you will see the DVS Rescue script with its options on the screen. Your display should look similar to the following:

```
--- DVS Rescue ---

1 - Backup on internal USB device
2 - Restore from internal USB device
3 - Reboot the system
4 - Poweroff the system

0 - Exit

Enter selection:
```

- To make a backup image of your system disk and save it to the internal USB, press [1] and then [Enter] on your keyboard.

Afterwards a list of possible source devices will be detailed on the screen. In a VENICE, the system device normally will be 'sda', but on special systems it may also be 'sdb', 'sdc', etc. Pay attention to the display on the screen. The correct system disk should be the one named `VENICE_system`. For example, if your display shows:

```
[0:0:0:0] disk Adaptec VENICE_system V1.0/dev/sda,
```

or a similar line, the respective system disk should be 'sda'.

[i] Ex factory the DVS system will be delivered with 'sda' as the default system disk. If other configurations have been made later or on customer request, this may be different.

[!] Continue with the following steps only, when you are able to identify the correct source device.

- Enter the name of the system disk in the designated line. Just type in `sda` (in other cases `sdb` or `sdc`) and press [Enter] on your keyboard.

The system will now ask you to enter the image name for the backup image to be saved to the USB. By entering the name of an already existing backup image you can overwrite it.

- Type in the name of the image you want to save to the USB for a later recovery. To confirm your entry press [Enter] on your keyboard.

The system will ask you to confirm your selection and whether you want to continue:

- To start the backup process type in `y` for 'yes' and press [Enter] on your keyboard.

    | **i** | To abort the process at this point enter `n` for 'no' and press [Enter] on your keyboard. You will be redirected to the DVS Rescue script. |

    After starting the process its termination is not possible anymore.

The program will now start the backup process. Its progress will be indicated on the screen.

| **i** | The backup process may take some time. |

If during the process the screen turns black, press [Space] to get it back again.

When the system has finished the backup process, you will be notified about this. Then after pressing [Enter] on your keyboard, you will be redirected to the DVS Rescue script once more where you can choose, for example, 'reboot' or 'poweroff' to restart or turn off the system.

5.6.2 Restoring the System Disk

The following describes the steps to make a recovery of the system hard disk:

| **!** | Do not execute any commands if you are not sure about the correct source and target device. For example, selecting the wrong target device can lead to a total loss of data. |

| **i** | To complete the loading of the `DVS Rescue` environment some user entries are required. For this follow the instructions given on the screen. |

The loading of the environment and the recovery process itself will both try to initialize hardware that may not be present on your system. Any error messages displayed during loading/initialization, e.g. `Failed` or `Warning`, can be disregarded. The recovery process should work nonetheless.

Please contact the DVS service department if you are not sure whether you are able to identify the correct target device.

- If appropriate, disconnect all Fibre Channel cables and all externally connected storage devices from the system.

- Turn on or restart the DVS system and at the indicated moment during start-up press [F11] on your keyboard to enter the boot menu.

- Once the boot menu is displayed on the screen, select the internally installed USB flash drive as the boot device and then press [Enter] on your keyboard.

The system will now boot from the internal USB and you will see a window on the screen where you can select the DVS Rescue environment for loading:

• Select DVS Rescue and press [Enter] on your keyboard.

> If you do not perform any action, DVS Rescue will be loaded automatically after 30 seconds.

Once the loading has finished, you will see the DVS Rescue script with its options on the screen. Your display should look similar to the following:

```
--- DVS Rescue ---

1 - Backup on internal USB device
2 - Restore from internal USB device
3 - Reboot the system
4 - Poweroff the system

0 - Exit

Enter selection:
```

• To restore your system disk from the internal USB, press [2] and then [Enter] on your keyboard.

Afterwards a list of possible target devices will be detailed on the screen. In a VENICE, the system device normally will be 'sda', but on special systems it may also be 'sdb', 'sdc', etc. Pay attention to the display on the screen. The correct system disk should be the one named VENICE_system. For example, if your display shows:

```
[0:0:0:0] disk Adaptec VENICE_system V1.0 /dev/sda,
```

or a similar line, the respective system disk should be 'sda'.

> Ex factory the DVS system will be delivered with 'sda' as the default system disk. If other configurations have been made later or on customer request, this may be different.

> Continue with the following steps only, when you are able to identify the correct target device.
>
> A recovery will overwrite all your data.

The system will ask you to enter the system device.

• Enter the name of the system disk in the designated line. Just type in sda (in other cases sdb or sdc) and press [Enter] on your keyboard.

A further list of possible source images will be detailed on the screen. If there is only the DVS recovery image on the USB flash drive, this one will be listed. If there are several images, all will be displayed.

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- Select the image you want to use for the recovery by pressing the arrow keys on your keyboard. Normally, it provides the serial number of the DVS system in its name. To confirm your choice press [Enter] on your keyboard.

The system will ask you to confirm your selection and whether you want to continue:

- To start the recovery process type in y for 'yes' and press [Enter] on your keyboard.

> **i** To abort the process at this point enter n for 'no' and press [Enter] on your keyboard. You will be redirected to the DVS Rescue script.
>
> After starting the process its termination is not possible anymore.

The program will now start the recovery process. Its progress will be indicated on the screen.

> **i** The recovery process may take some time.
>
> If during the process the screen turns black, press [Space] to get it back again.

When the system has finished the recovery process, you will be notified about this. Then after pressing [Enter] on your keyboard, you will be redirected to the DVS Rescue script once more where you can choose, for example, 'reboot' or 'poweroff' to restart or turn off the system. The next time the DVS system is started, it will load the restored operating system.

5.7 Removal of the Faceplate

The faceplate of the system can be removed, for example, for trans-ports. For this perform the following:

⚠️ The system must be operated only with the faceplate installed to ensure electromagnetic compatibility.

- Lift the faceplate of the system (see section "Faceplate" on page 2-7).

Beneath it you will see a cable with a jack connection that supplies the DVS logo of the faceplate with power.

- Unplug the jack connection.

- Next hold tight the faceplate and remove the hinge wires as indi-cated in the following figure:
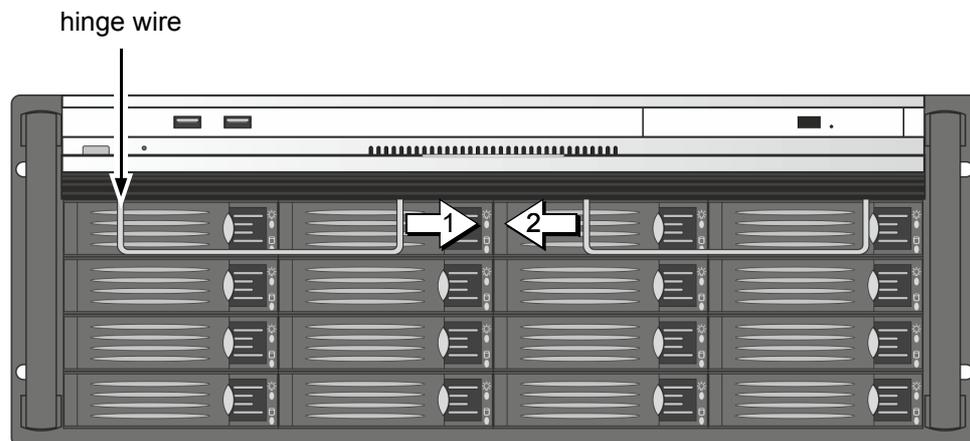
Figure 5-6: Removing the hinge wires

Afterwards the faceplate can be taken off.

ℹ️ To reassemble the faceplate reverse the above steps.

Appendix
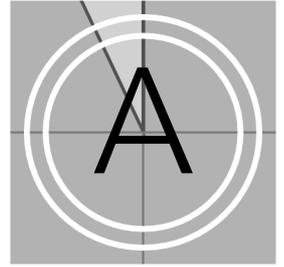
This chapter first gives some hints how to resolve irregularities during operation. After that technical data and general information about the DVS system are provided.

A.1 Troubleshooting

The table below lists some errors that may occur during the operation of the DVS system and details how to resolve them. The information in it are valid for both, the VENICE 4U and the VENICE HPE variant. Information concerning only either one or the other variant are indicated as such. If you experience trouble that cannot be resolved with the solutions described here or in chapter "Maintenance" on page 5-1, please contact your local vendor or DVS directly.

Error	Cause	Solution
Accesses to the main storage are slow. *AND/OR* Drops occurred during playout/capture.	The data storage is too full.	It is recommended to use only 85% of the overall hard disk capacity to ensure real-time capability. If the storage is too full, delete some of your data.
	Configurations of the system have been altered.	Contact the DVS service department.
	One or more hard disks of the hard disk array are worn.	Try to identify the worn disk and replace it as described in section "Hard Disk Maintenance" on page 5-2.
	A RAID controller is defective.	If you can rule out the above mentioned causes, a RAID controller may be defective. Before attempting to exchange a RAID controller (see section "Controller Maintenance" on page 5-12) contact the DVS service department.
An alarm is sounded and the alarm LED is lit. The alarm can be switched mute with the mute button.	One of the power supply units has been disconnected from power during operation.	Check the LEDs of the power supply units. If one is extinguished, this unit may be disconnected from power. Examine the power cord of the unit. See to it that it is in good technical order, correctly plugged in at both ends and that the mains current is operating properly.
	One of the power supply units has failed.	Check the LEDs of the power supply units. If one is extinguished and you can rule out the above mentioned cause, a power supply unit has failed. Replace the broken unit as described in section "Power Supply Maintenance" on page 5-14.

Error	Cause	Solution
	A fan has failed.	Check the LEDs of the power supply units. If all are green, shut down the system (see section "Shutting Down the System" on page 4-2) and check whether a fan has failed (see section "Fan Maintenance" on page 5-9). If necessary, replace the broken module as described in the same section.
	The system is over-heated.	If you can rule out the above mentioned causes, the alarm must be due to overheating. See to it that the ambient temperature at the front of the system does not exceed the operating temperature specified in section "Technical Data" on page A-5. If the temperature is within the range, check the ventilation holes of the system and free them from all obstructions (e.g. dust). In case the problem persists, contact the DVS service department.
An alarm is sounded and the alarm LED is off. The alarm cannot be switched mute with the mute button. *OR* At start-up the system is not able to initialize a disk set.	A hard disk or a hard disk carrier got loose/jammed (e.g. after transport) or is not mounted correctly.	Shut down the system as described in section "Shutting Down the System" on page 4-2. Then perform the following: Pull all disk carriers partially out of the chassis and afterwards install them again. See to it that they are pulled out and reassembled correctly as described in section "Replacing a Hard Disk" on page 5-5. After that start the system again.
	A hard disk of the hard disk array is defective.	Replace the defective disk as explained in section "Hard Disk Maintenance" on page 5-2.
	A RAID controller is defective.	If you can rule out the above mentioned causes, a RAID controller may be defective. Before attempting to exchange a RAID controller (see section "Controller Maintenance" on page 5-12) contact the DVS service department.

If using the VENICE HPE variant:

Error	Cause	Solution
An alarm is sounded and the alarm LED is off. The alarm cannot be switched mute with the mute button.	A system/metadata hard disk is defective.	Please contact the DVS service department.
	i	The system/metadata hard disks of the VENICE HPE are installed inside the system in disk carriers. No visible signs will be shown in case of a hard disk failure. Especially for this system, it is recommended to configure an E-mail notification to get informed about a hardware malfunction.

A.2 Technical Data

This section provides technical data of VENICE.

ℹ️ When installing the DVS system in a rack, take care that warmed up air is conducted to the rear of the rack and properly vented away.

A.2.1 General Technical Data

The general technical data of VENICE are as follows:

Weight	approx. 45 kg
Environment (also during transport)	No exposure to heat
	No exposure to strong electric or magnetic fields
	No vibrations/shocks allowed
Operating temperature	Maximum: 10 - 30 °C (50 - 86 °F) Optimum: 15 - 25 °C (59 - 77 °F)
Storage temperature	0 - 50 °C (32 - 122 °F)
Humidity	10 - 80%, non-condensing at all times
Air	Dust-free
Power consumption	max. 3000 W (primary)
AC power	100 - 120 VAC, 220 - 240 VAC

A.2.2 Dimensions

The following figure shows the dimensions of the DVS system. The drawing already includes some space for connectors and plugs that can protrude from the rear ('plug safety' (*l* minus *j*), usually plus 150 mm). However, this amount of space depends on the type of connectors used.
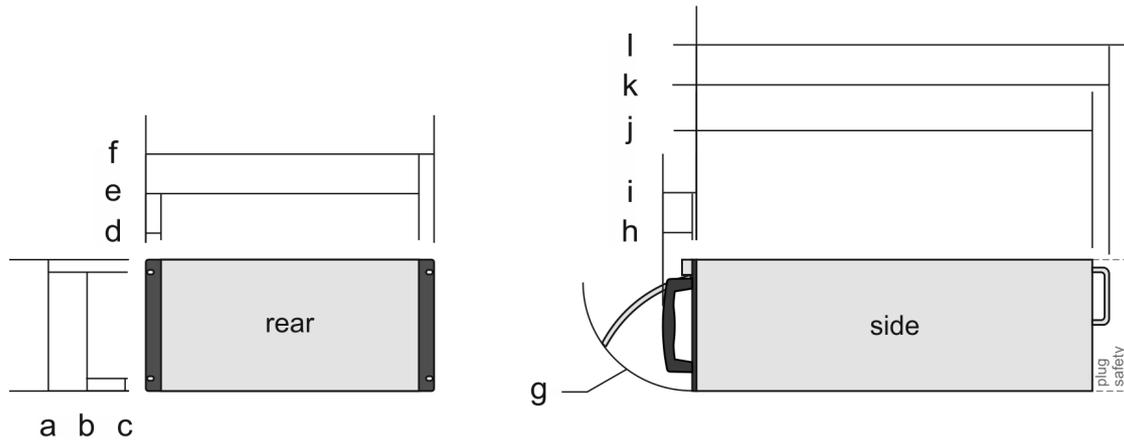
Figure A-1: Measured dimensions

a	176 mm	g	142 mm
b	139 mm	h	50 mm
c	37 mm	i	58 mm
d	25 mm	j	655 mm
e	455 mm	k	687 mm
f	480 mm	l	805 mm

A.3 Hardware Specifications

The following table shows the hardware specifications of VENICE as they are available for each video channel pair (ch. 1/2 or ch. 3/4).

Table A-1: VENICE specifications per video channel pair

Video	**Input**	**Output**
HDMI 1.4a		1 HDMI
HDMI 1.3		1 HDMI
Serial digital 4:2:2 8/10 bit (single link)	2 streams via 2 BNC	2 streams via 2 BNC
Serial digital 4:4:4 8/10/12 bit (dual link)[1]	1 stream via 2 BNC	1 stream via 2 BNC
Serial digital 4:4:4 8/10/12 bit (3 Gbit/s)	2 streams via 2 BNC	2 streams via 2 BNC
Reference	**Input**	**Output**
Analog reference genlock	1 BNC	
Audio	**Input**	**Output**
Embedded audio, 16 digital channels (mono)	1 BNC per stream (via Video In)	1 BNC per stream (via Video Out)
AES/EBU, 8 digital channels (mono)	1 DB-25 (XLR via breakout cable)	1 DB-25 (XLR via breakout cable)
Timecode	**Input**	**Output**
Longitudinal (LTC)	1 XLR female	1 XLR male[1]
Vertical (VITC)	1 BNC per stream (via Video In)	1 BNC per stream (via Video Out)
Data and Control Interfaces	**Input**	**Output**
Serial RS-422	2 DB-9 female (pin-out will be switched by the software)	

Table A-1: VENICE specifications per video channel pair (cont.)

Data Formats	
Color Modes	YC_bC_r 4:2:2 YC_bC_rA 4:2:2:4 RGB 4:4:4 RGBA 4:4:4:4
Storage Format	Compressed or uncompressed YUV 4:2:2 YUVA 4:2:2:4 RGB 4:4:4 RGBA 4:4:4:4 all in 8/10 bit, user selectable
Internal Processing	Color space conversion Frame repetition Real-time scaler Input raster detection
Audio Formats	48 kHz, 16/24/32 bit

1) Available for the first video channel only.

A.4 Video Rasters

The following table shows some of the supported video rasters. All frequencies indicate the frame rate.

> Some rasters are available as optional features only.
>
> The availability of rasters depends on the selected file format and/or codec.

Table A-2: Supported video rasters

Raster	Total lines per frame	x size	y size	Aspect ratio
525i /29.97 (NTSC)	525	720	486	4:3
625i /25 (PAL)	625	720	576	4:3
720p /23.976/24/25/29.97/30 /50/59.94/60	750	1280	720	16:9
1080i /23.976/24/25/29.97/30	1125	1920	1080	16:9
1080p[1] /23.976/24/25/29.97/30 /47.952/48/50/59.94/60	1125	1920	1080	16:9
1080psF /23.976/24/25/29.97 /30	1125	1920	1080	16:9
2048p /23.976/24/25	1125	2048	1080	2:1
2048psF /23.976/24/25	1125	2048	1080	2:1
2048psF /23.976/24/25	1600	2048	1556	4:3

1) Frequencies greater 30 Hz are available on the HDMI output only.

A.5 Signal In- and Outputs

This section provides pin-out information about some of the connectors provided by the VENICE system.

High-Definition Multimedia Interface (HDMI Connector)
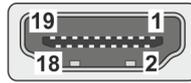
(external view;
female on interface, male on cable)

Pin No.	Signal	Pin No.	Signal
1	TMDS Data 2	11	TMDS CLK GND
2	TMDS Data 2 GND	12	/TMDS CLK
3	/TMDS Data 2	13	CEC
4	TMDS Data 1	14	– (reserved)
5	TMDS Data 1 GND	15	SCL
6	/TMDS Data 1	16	SDA
7	TMDS Data 0	17	DDC CEC GND
8	TMDS Data 0 GND	18	+5V
9	/TMDS Data 0	19	Hot Plug Detect
10	TMDS CLK		

Digital Audio (25-Pin D-Sub Connector)
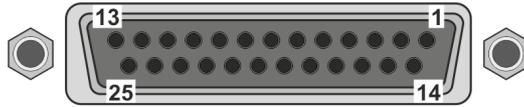
(external view;
female on interface, male on cable)

Table A-3: Digital Audio 1-8

Pin No.	Signal	Pin No.	Signal
1	Audio OUT CH 7/8	14	/Audio OUT CH 7/8
2	GND	15	Audio OUT CH 5/6
3	/Audio OUT CH 5/6	16	GND
4	Audio OUT CH 3/4	17	/Audio OUT CH 3/4
5	GND	18	Audio OUT CH 1/2
6	/Audio OUT CH 1/2	19	GND
7	Audio IN CH 7/8	20	/Audio IN CH 7/8
8	GND	21	Audio IN CH 5/6
9	/Audio IN CH 5/6	22	GND
10	Audio IN CH 3/4	23	/Audio IN CH 3/4
11	GND	24	Audio IN CH 1/2
12	/Audio IN CH 1/2	25	GND
13	–		

RS-422 In and RS-422 Out (9-Pin D-Sub Connector)
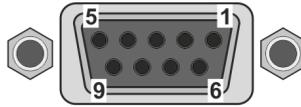
(external view;
female on interface, male on cable)

RS-422 In		RS-422 Out	
Pin No.	**Signal**	**Pin No.**	**Signal**
1	–	1	–
2	/TX_D_CON	2	/RX_C_CON
3	RX_D_CON	3	TX_C_CON
4	GND	4	GND
5	–	5	–
6	GND	6	GND
7	TX_D_CON	7	RX_C_CON
8	/RX_D_CON	8	/TX_C_CON
9	–	9	–

These connectors will be switched between 'RS-422 In' and 'RS-422 Out' by the software automatically depending on the selected operation mode.

For RS-422 control DVS systems support the standard industrial 9-pin protocol.

A.6 Packing Instructions

The following describes the best way to pack a DVS system.

Keep the original packing and use it in case of transportation. Otherwise the warranty will be void.

In any other case, if you do not have the original packing anymore, use a similar structured packing for transportation. DVS cannot be held liable for damages due to transportation.

Fragile. Avoid shocks or vibrations. For longer distances use a lifting truck.

Keep dry.

Figure 1:	*Figure 2:*
Wrap video system in foil:	Pack video system in box A with foam:

Figure 3: Pack accessories: Box A	*Figure 4:* Close box A: Box A
Figure 5: Pack box A in box B with foam: Box A Box B	*Figure 6:* Close box B: Box B
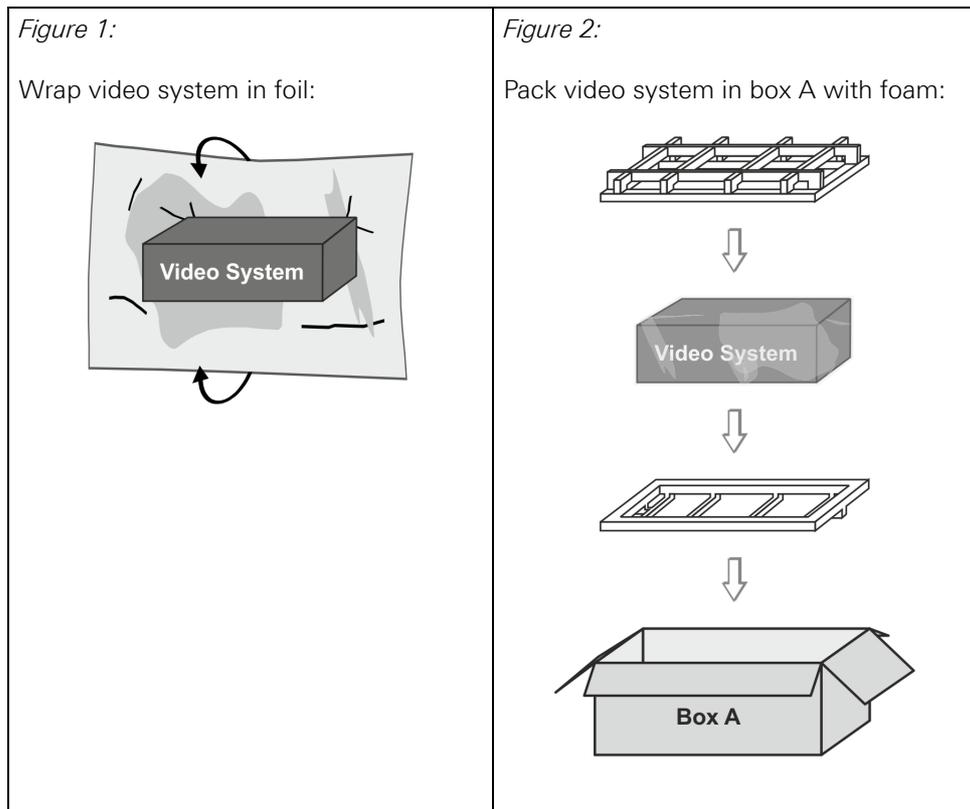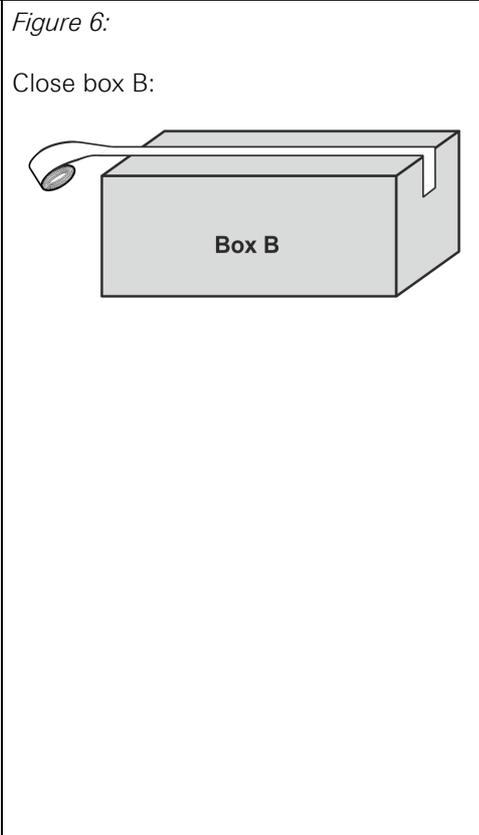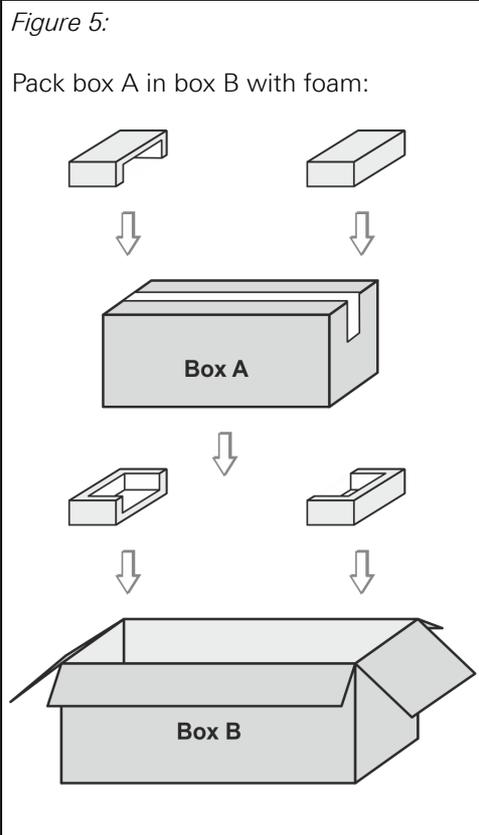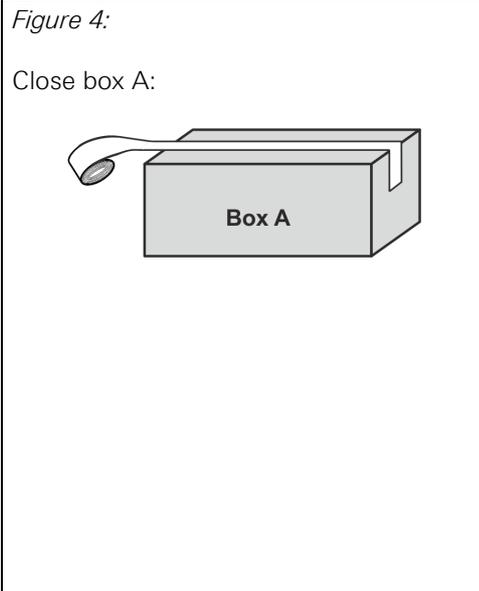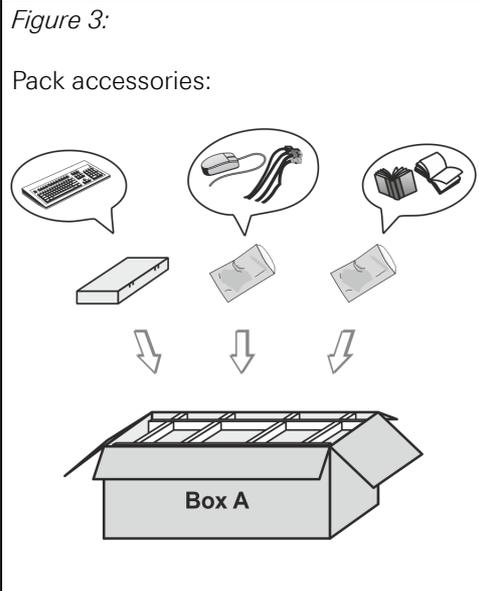
A.7 Conformity Declarations

VENICE has been tested according to the applying national and international directives and regulations. The following states further information about the compliances and conformities.

A.7.1 RoHS Compliance

The EU directive 2002/95/EC 'Restriction of Hazardous Substances (RoHS)' prohibits the use of certain substances in electrical and electronic equipment. The VENICE devices are manufactured in compliance with this directive.

A.7.2 EC Declaration of Conformity (CE Marking)

Rohde & Schwarz DVS GmbH herewith declares that the following product(s) according to the provisions of the mentioned EC Directives – including their relevant revisions at the time of this declaration – is (are) in conformity with the detailed standards or other normative documents:

VENICE	EC Directives: – EMC Directive 2004/108/EC – Low-Voltage Directive 2006/95/EC
	Applied Harmonized Standards: – EN 55022 – EN 55024 – IEC 61000-3-2 – IEC 61000-3-3 – IEC 61000-4-2 – IEC 61000-4-3 – IEC 61000-4-4 – IEC 61000-4-5 – IEC 61000-4-6 – IEC 61000-4-8 – IEC 61000-4-11

A.7.3 FCC Compliance Statement

Rohde & Schwarz DVS GmbH herewith declares that the following equipment has been tested according to the applying valid FCC regulations:

– VENICE

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: Connecting this device to peripheral devices that do not comply with Class A requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception. The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

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