Video Workstation

CLIPSTER



Hardware Guide

CLIPSTER
Hardware Guide

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Hardware Guide Version 3.0 for CLIPSTER

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Headquarters:

DVS Digital Video Systems AG
Krepenstr. 8
30165 Hannover
GERMANY

Phone:	+49-511-67807-0
Fax:	+49-511-630070
E-mail:	info@dvs.de
Internet:	http://www.dvs.de

Support:

Phone:	+49-511-67807-25
Fax:	+49-511-67807-31
E-mail:	support@dvs.de

For the Americas:

U.S. Headquarters:

DVS Digital Video, Inc.
300 East Magnolia Boulevard, Suite 102
Burbank, CA 91502
USA

Phone:	+1-818-846-3600
Fax:	+1-818-846-3648
E-mail:	info@dvsus.com
Internet:	http://www.dvsus.com

Support:

E-mail:	support@dvsus.com

Registration Form

PLEASE SEND TO:
DVS
Krepenstr. 8
30165 Hannover
GERMANY
Fax: +49-511-630070

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: _____

CLIPSTER

Serial No.: _____

Remarks: _____

_____

_____

_____

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

_____

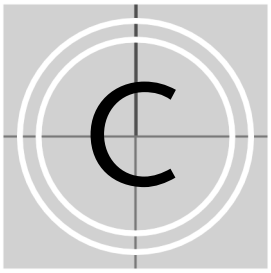
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Introduction

This documentation describes how to use the hardware of CLIPSTER, the real-time conforming and finishing system by DVS. CLIPSTER is a powerful high-resolution video workstation with enormous flexibility, especially designed to meet the demands of modern post production houses. Based on DVS's quality hardware, CLIPSTER works with uncompressed material in any resolution up to 4K in RGB 10 bit.

The video workstation stores the material in its native resolution and mode in a selectable file format directly on the connected storage, making pre-conversion or compression unnecessary. Clips of any resolution, color space or bit depth can be mixed on the timeline at will. The output resolution can be chosen freely as well and throughout the entire workflow the quality of the high-resolution footage is maintained.

Furthermore, up to 16 different channels of audio can be in- or output by CLIPSTER and all audio data can be accessed and processed with the software as easily as the video material.

CLIPSTER provides enough intrinsic power to accept material from cameras, telecines or VTRs. Uncompressed data can be input via the standard dual-link HD-SDI interface. In a studio environment, CLIPSTER connects to high-resolution cameras, enabling the capturing of footage together with an immediate viewing and editing afterwards. When integrated into a high-end post workflow, CLIPSTER handles real-time telecine transfers and all subsequent editing of the transferred material.

The CLIPSTER hardware can be delivered with various storage capacities and an upgrade of a CLIPSTER from a smaller storage capacity to a higher one is available as an optional feature. It can also be connected to a DVS-SAN providing a large amount of data storage.

The CLIPSTER video workstation can be delivered with the following options to adapt it to your special needs.

Disk-Upgrades	Contains a set of hard disks to increase the size of the storage (applicable only when some HDD shafts are empty).

Disk-Upgrade	Contains a complete set of hard disks that replace the existing ones to increase the size of the storage.
FC/SAN	Fibre Channel interface, for example, for a real-time capable connection to an external Fibre Channel disk array.
10GE	10 Gigabit Ethernet connection interface.
InfiniBand	InfiniBand connection interface.
DVI Output 16-Bit Cinevator	DVI output in 16 bit and support for the real-time film recorder/printer Cinevator.
Remote Zoom & Pan	Remote control of real-time zoom and pan operations from a third-party color grader.
Multi-Device	Enables a synchronous play-out/record of multiple DVS systems. One master device controls other devices via RS-422 for a synchronous play-out of the timeline or capturing with the Manual record/VTR task mode of the I/O Tool.
4K Workflow	Non-real-time workflow with 4K material including effects editing, cropping, as well as conforming, color correction and capturing. *For CLIPSTER 3rd Generation only:* Real-time play-out of 4K material including among others some real-time effects (e.g. zoom and pan) and non-real-time capturing.
JPEG2000 Processor	Hardware accelerated JPEG2000 compression and real-time play-out of JPEG2000 encoded material.
DCI Mastering	Complete workflow for DCI compliant delivery packages, including hardware accelerated JPEG2000 compression, AES encryption as well as MXF wrapping, and real-time play-out of JPEG2000 compressed MXF material.
3D LUT and Color Management	Three-dimensional hardware look-up table for real-time color management and film-look preview/output.
Teletext VBI 335	Enables capture and play of teletext information in line 335 of 625 lines rasters.

Color Correction Panel	Tactile colorist control panel in a standard or deluxe variant for CLIPSTER's primary color correction.
Special Raster Formats	Some standard and non-standard formats including 1080p /50/60 (SMPTE 372), Slow PAL 625i /24 and Eureka 1980 × 1152i /25.
Raster	Customer tailored video rasters for in- and output.
12 Bit	Support of 12- and 16-bit file formats (DPX and TIFF) for in- and output.
DDR	VTR task mode that emulates the behavior of a VTR or digital disk recorder.
Secondary Color Correction	Secondary color correction as an effect for video clips in the CLIPSTER Edit Tool.
Additional Operators	Additional editing and effects features for clips in the timeline that enhance the capability of CLIPSTER.

1.1 Overview

This guide informs you about the installation of the CLIPSTER 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 CLIPSTER, 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 about the digital video in- and outputs.
Chapter 3	Describes the hardware installation of CLIPSTER.
Chapter 4	Explains how to operate CLIPSTER, 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 CLIPSTER hardware. 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 CLIPSTER 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 CLIPSTER hardware, 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.

1.4 Safety Instructions

To use CLIPSTER correctly please heed the following:



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

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

General

CLIPSTER 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 CLIPSTER the manuals and guides delivered with CLIPSTER must be read and observed.

- Use CLIPSTER only in apparent good technical order.
- The CLIPSTER hardware 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 CLIPSTER whenever possible.
- Computer hardware contains components that are sensitive to changing voltages. Connecting or disconnecting CLIPSTER 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 CLIPSTER only in compliance with the technical data laid out in section “Technical Data” on page A-4.
- If fluids or solid objects get inside the casing, CLIPSTER must be disconnected from the power supply immediately. Before using CLIPSTER again, it has to be checked by authorized service personnel.
- Only use a damp tissue without any cleaning agents to clean the casing.
- CLIPSTER 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 CLIPSTER whatsoever.

Transportation

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

- Handle CLIPSTER with great care.
- Always use the original packing or a similar structured packing for transportation as detailed in section "Packing Instructions" on page A-15.
- Avoid shocks or vibrations during transport. For longer distances it is recommended to use a lifting truck.
- Keep CLIPSTER 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 CLIPSTER needs some basic environmental conditions:

- Do not expose CLIPSTER to sources of heat, such as direct sunlight or a radiator.
- Do not cover or obstruct the ventilation holes of the system (front as well as rear).
- 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 CLIPSTER to strong electric or magnetic fields.
- Avoid areas where CLIPSTER 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. 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 DVS Digital Video Systems AG.
- Products not used in compliance with the safety instructions detailed in section "Safety Instructions" on page 1-6.
- 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.

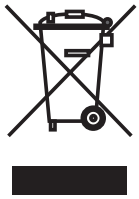
Declaration of Conformity



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-17.

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:

CLIPSTER is delivered to you fully preconfigured and optimized for a real-time in- and output of uncompressed 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.

5U chassis only: 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 CLIPSTER in a loud environment, it is recommended to check the state of the power supply units (e.g. via their LEDs, see section “Power Supply” on page 2-21) at regular intervals.



Overview

This chapter provides a detailed overview of the CLIPSTER hardware. First the different hardware variants of CLIPSTER will be explained. After this 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.

2.1 Hardware Variants of CLIPSTER

The CLIPSTER system can be delivered in different hardware variants depending on, for example, the amount of the storage that is required or the maximum possible real-time capability of the system. The following variants are available:

- 4U chassis
- 5U chassis

The specialities of these variants will be detailed in this document whenever necessary.

Additionally, DVS can deliver these variants with different rears. Your system may differ from the shown rear views in this document. However, the descriptions detail all the connectors that can be delivered: The ones not present in the shown rear view are described separately.

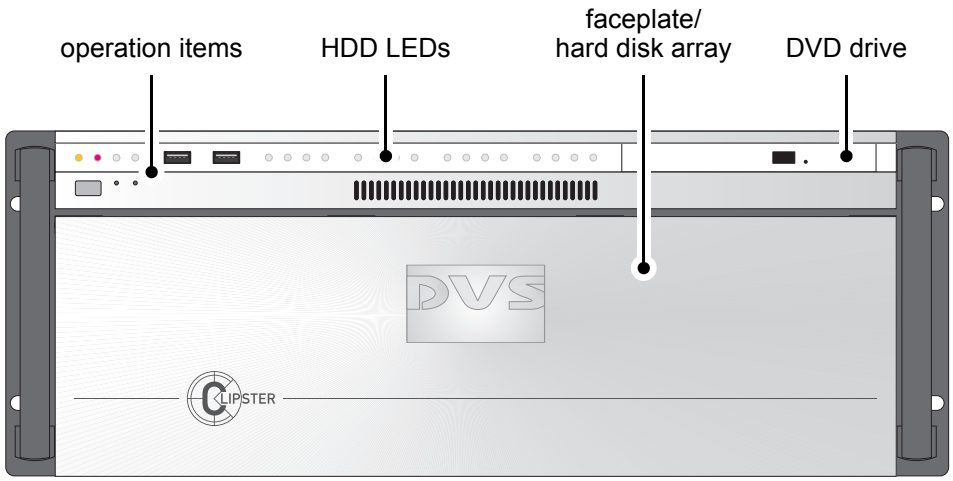
2.2 Overview of the Front

This section gives an overview of the front of CLIPSTER. 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:

4U chassis:



5U chassis:

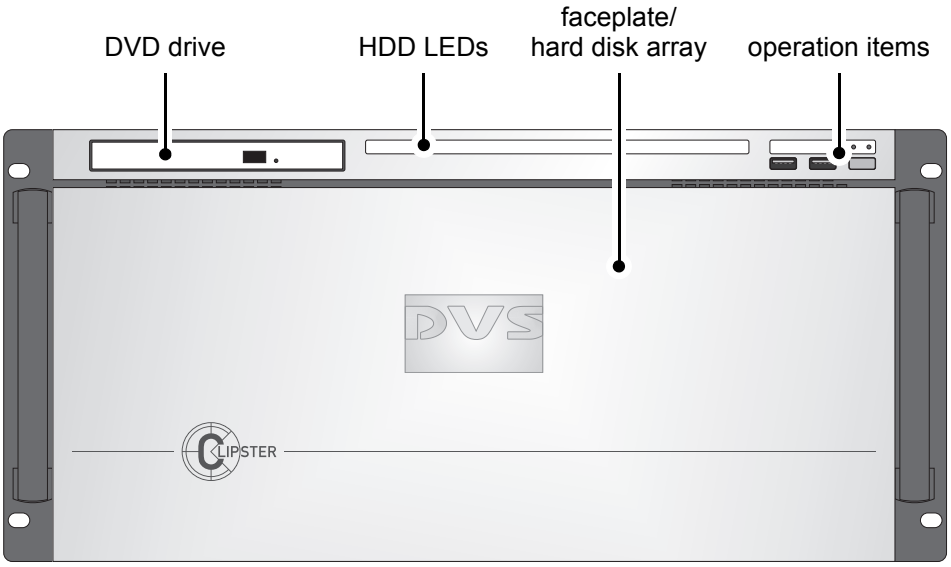


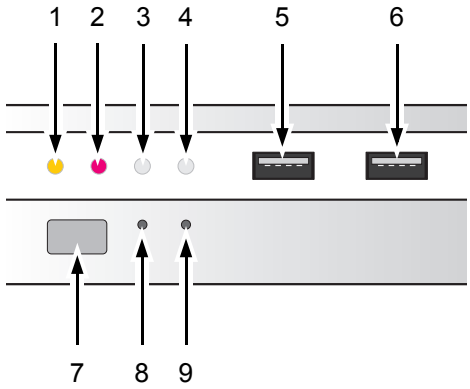
Figure 2-1: Overview of the fronts

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 CLIPSTER as well as USB connectors for an easy connectivity to 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 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 2-9.

2.2.2 Operation Items

With the operation items at the system's front the hardware of CLIPSTER can be controlled (e.g. turned on or off). There you can also find LEDs that allow you to assess the state of the system as well as USB connectors.

4U chassis:



5U chassis:

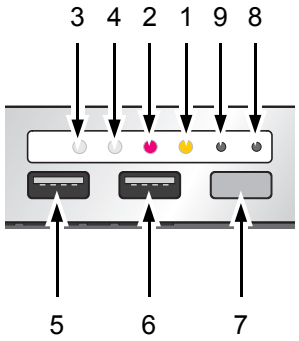


Figure 2-2: Operation items overview

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	system HDD	Indicates accesses to the system hard disk (e.g. during the loading of the operating system).
2	alarm LED	This LED indicates that a hardware malfunction occurred.
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 2-17).

No.	Item	Explanation
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.

4U Chassis

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

4U chassis:

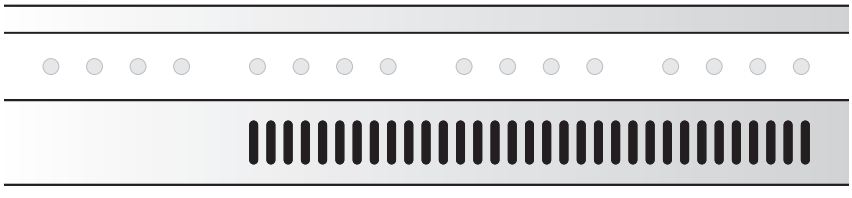
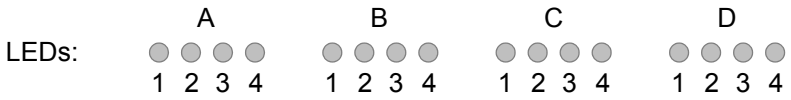


Figure 2-3: HDD LEDs on 4U chassis

Each LED represents a hard disk of the array:



hard disks:

A:	1	2	3	4
D:	1	2	3	4
C:	1	2	3	4
B:	1	2	3	4

Figure 2-4: HDD LEDs and the hard disk array

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 belong to the third row (from the top), while the fourth group represents the second row.

5U Chassis

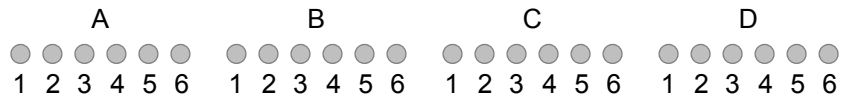
The following figure shows the arrangement of the LEDs on the front panel of the 5U chassis:

5U chassis:



Figure 2-5: HDD LEDs on 5U chassis

Each LED represents a hard disk of the array:



hard disks:

A	B	C	D
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6

Figure 2-6: HDD LEDs and the hard disk array

Starting from the left, the first six LEDs display the accesses to hard disks in the very left column of the array (see section “Hard Disk Array” on

page 2-8), the second six LEDs show the state of the hard disks of the second column, and so on.

2.2.4 Faceplate

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

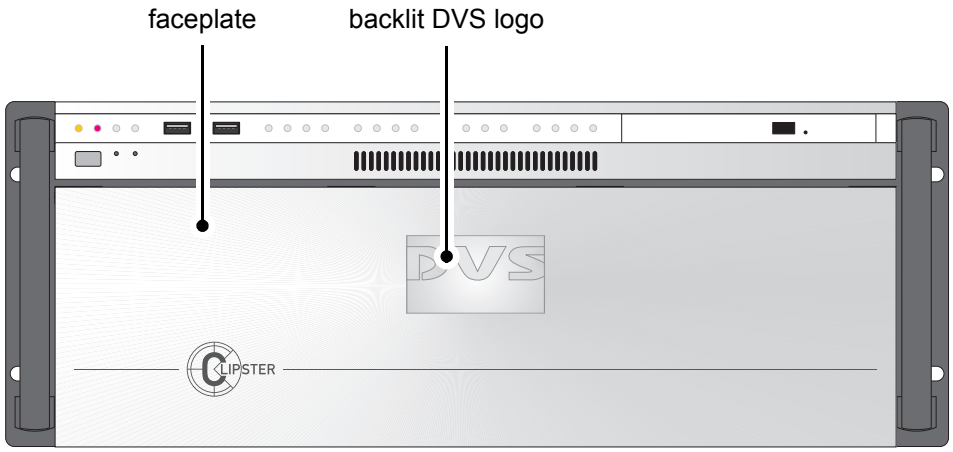


Figure 2-7: Overview of the faceplate

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:

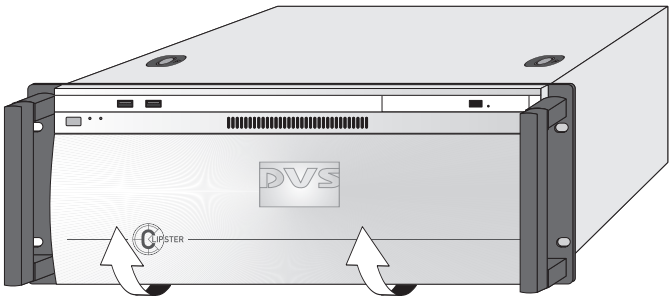


Figure 2-8: Lifting of faceplate

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

The faceplate can be removed for transport reasons (see section “Removal of the Faceplate” on page 5-12).

2.2.5 Hard Disk Array

The hard disks of the hard disk array are used to store your video and audio material. It is the main storage of CLIPSTER. To prevent data loss in case a hard disk fails, it is normally RAID protected.

Further information about RAID can be found in section "Introduction to RAID" on page 5-2.

The system hard disk is not among the hard disks of the hard disk array. It is installed inside the system and not accessible from the outside.

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

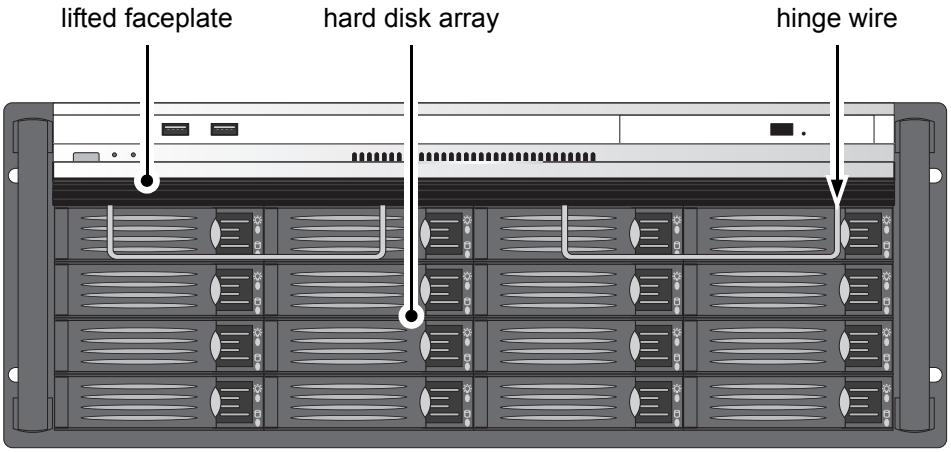


Figure 2-9: Hard disk array

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 5-12.

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.

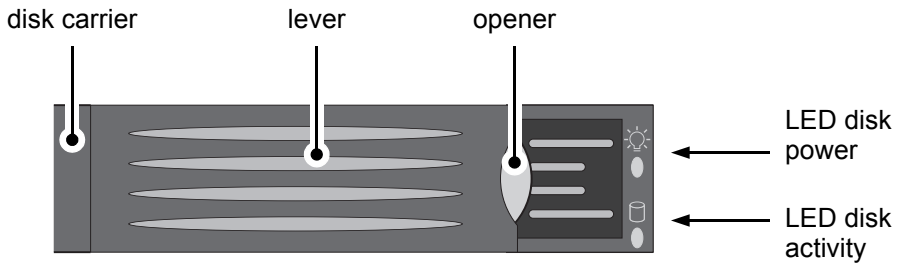


Figure 2-10: Hard disk carrier overview

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 unlocked with the opener, it can be used to pull the disk carrier and its hard disk out of the system.
opener	Unlocks 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.

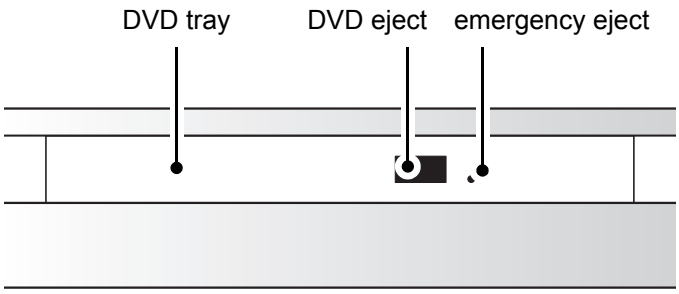


Figure 2-11: Overview of DVD drive

Depending on the type of drive delivered to you, the DVD drive may also provide burning capability.

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:

DVS provides CLIPSTER systems with different rears. Your system may differ from the shown rear views in the following. However, the descriptions detail the connectors available on all systems even if not present in the figures.

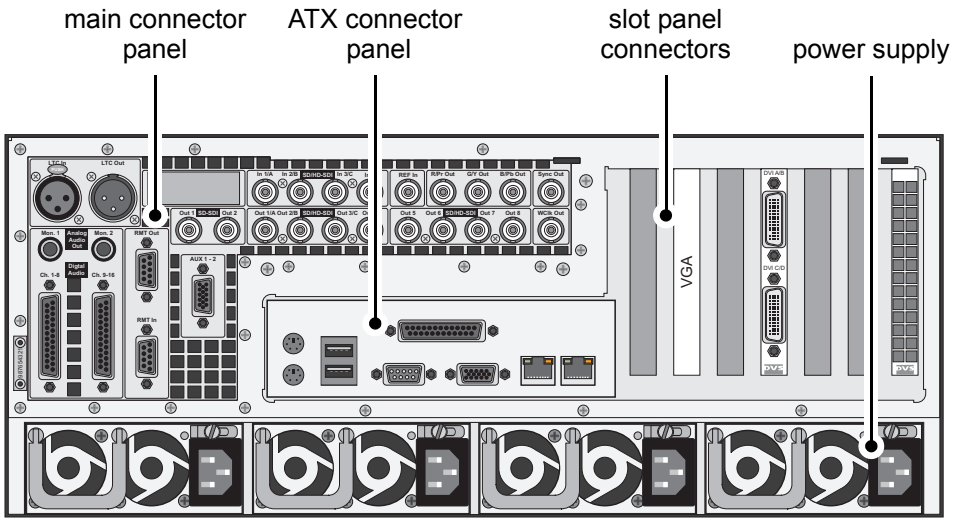


Figure 2-12: Overview of the rear

main connector panel — The main connector panel provides most of the standard in- and outputs of CLIPSTER to give you the full functionality of the system. It holds, for example, the connectors for remote control and the video I/Os. It is in more detail described in section "Main Connector Panel" on page 2-14.

ATX connector panel — On this panel you can find the standard connectors of the computer system. It is described in more detail in section "ATX Connector Panel" on page 2-17.

slot panel connectors	The slot panel connectors of CLIPSTER provide, for example, the video I/O panel containing video connections and the graphic 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 2-18.
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 2-21.

2.3.2 Digital Video I/Os

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

Generally DVS names the input/output channels (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. However, because some systems offer more channels providing sometimes different functions, the labeling of the ports can be supplemented by numbers (e.g. '1/A', '2/B', etc.). To simplify matters whenever feasible the main video ports (ports A) may be labeled without an alphabetical or numeric structuring.

For YUV you will usually use one channel (the main video ports, mostly labeled 'A', single link). For YUVA you will need two channels ('A' for YUV and 'B' for the key signal). With RGB you will always need two channels ('A' and 'B', dual link).

On CLIPSTER the input ports can be switched in software between port A and port C in single-link video modes, and ports A/B and C/4 in dual-link modes. With this you can directly connect two input sources to the system and no extra source switch is required.

During an output the ports C and 4 (dual link; in single link port C only) mirror the output of the channels A/B. The SD-only ports provide at all times a (down-converted) output in YUV SD. Additionally, these signal outputs (ports C, 4 and SD-only) can be provided with customizable information superimposed on the image ('burn-in' feature, e.g. with timecode, keycode, comments, etc.). All other output channels, i.e. no. 5 to 8, are available during an output in special rasters only (e.g. special 4K rasters, tiling of 4K image to quad HD-SDI).

For an output CLIPSTER also supports the 3-Gbit/s SDI which provides all features of a standard dual-link connection, but requires only one connector instead of two. It can be enabled via the software.

The tables below show the signal distribution over the SDI (serial digital interface) in- and output ports for the different color modes:

Table 2-1: SDI signal distribution during input

Video Mode	SD/HD-SDI			
	In 1/A[1, 2]	In 2/B[2]	In 3/C[1, 2]	In 4[2]
YC_bC_r 4:2:2	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)

1) In single-link modes software switchable between port A and port C.
2) In dual-link modes software switchable between ports A/B and C/4.

Table 2-2: SDI signal distribution during output

Video Mode	SD/HD-SDI[1]				SD-SDI	
	Out 1/A[2]	Out 2/B	Out 3/C[3]	Out 4[3]	Out 1[4]	Out 2[5]
YC_bC_r 4:2:2	Y, C_b, C_r	–	Y, C_b, C_r	–	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)
YC_bC_rA 4:2:2:4	Y, C_b, C_r	A (key)	Y, C_b, C_r	A (key)	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)
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	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)
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)	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)
RGB 4:4:4	G, ½ R, ½ B	½ R, ½ B	G, ½ R, ½ B	½ R, ½ B	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)
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)	Y, C_b, C_r (SD)	Y, C_b, C_r (SD)

1) Ports 5 to 8 available in special rasters only (quad HD-SDI).
2) Software switchable to 3-Gbit connection. Port B provides then a mirror (3 Gbit) of port A.
3) Ports C and 4 are a mirror of A and B with additional customizable information (if enabled).
4) With additional customizable information (if enabled)
5) Always a mirror of SD-SDI Out 1.

2.3.3 Main Connector Panel

The main connector panel provides the standard in- and outputs of CLIPSTER to give you the full functionality of the system. It holds, for example, the connectors for remote control and the digital video in- and outputs (serial digital interface).

DVS provides CLIPSTER systems with different rears. Your system may differ from the shown rear view in the following. However, the descriptions detail the connectors available on all systems even if not present in the figures.

Pin-outs of most connectors can be found in section “Signal In- and Outputs” on page A-9.

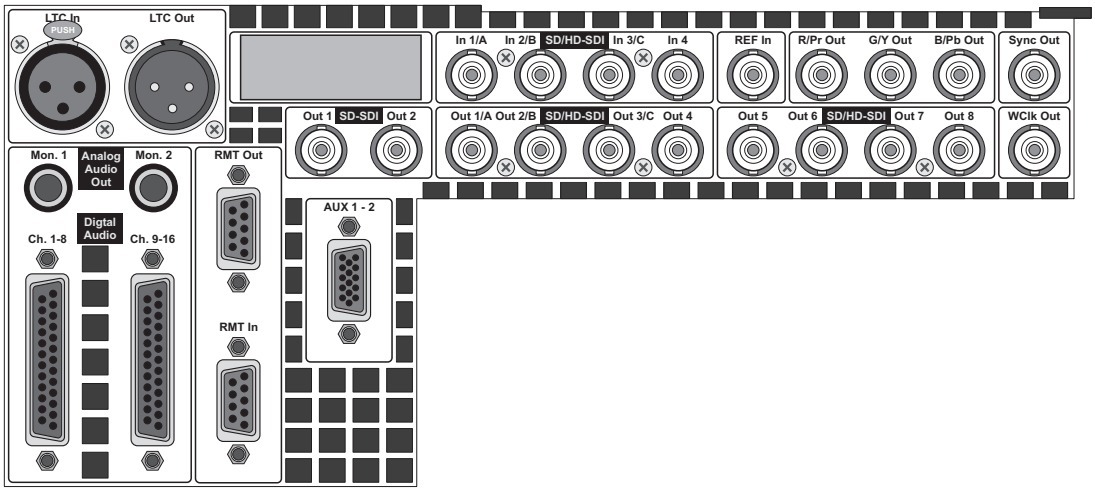


Figure 2-13: Main connector panel on rear

Item	Description
LTC In	XLR connector (female) for an input of longitudinal timecode
LTC Out	XLR connector (male) for an output of longitudinal timecode
Analog Audio Out Mon. 1	First 6.3 mm (¼") unbalanced analog stereo headphone jack to monitor the audio output of CLIPSTER
Analog Audio Out Mon. 2	Second 6.3 mm (¼") unbalanced analog stereo headphone jack to monitor the audio output of CLIPSTER
Digital Audio Ch. 1-8	DB-25 connector (female) for a balanced audio signal in- and output of the digital audio channels 1 to 8 (AES/EBU); XLR connectors are available via a breakout cable

Item	Description
Digital Audio Ch. 9-16	DB-25 connector (female) for a balanced audio signal in- and output of the digital audio channels 9 to 16 (AES/EBU); XLR connectors are available via a breakout cable
RMT Out	DB-9 connector (female), serial RS-422 interface for an output of master control signals
RMT In	DB-9 connector (female), serial RS-422 interface for an input of slave control signals
AUX 1-2	DB-15 (HD) connector (female), serial RS-422 interface for auxiliary data (e.g. mixer control); a breakout cable to two DB-9 connectors will be included in the delivery
SD-SDI Out 1	BNC connector for an output of digital SD video signals (serial digital interface); (down-converted) output of YUV in single-link; can provide burnt-in information via software
SD-SDI Out 2	BNC connector for an output of digital SD video signals (serial digital interface); mirror of SD-SDI Out 1
SD/HD-SDI In 1/A	BNC connector for an input of digital video signals (serial digital interface, port A); either input of YUV in single-link or first stream of YUVA/RGB[A] in dual-link mode; ports A/B can be switched to ports C/4 (dual link, with single link between ports A and C only) in the software
SD/HD-SDI In 2/B	BNC connector for an input of digital video signals (serial digital interface, port B); input of the second stream of YUVA or RGB[A] in dual-link mode; ports A/B can be switched to ports C/4 (dual link) in the software
SD/HD-SDI In 3/C	BNC connector for an alternative input of digital video signals (serial digital interface, port C); either input of YUV in single-link or first stream of YUVA/RGB[A] in dual-link mode; ports A/B can be switched to ports C/4 (dual link, with single link between ports A and C only) in the software
SD/HD-SDI In 4	BNC connector for an alternative input of digital video signals (serial digital interface); input of the second stream of YUVA or RGB[A] in dual-link mode; ports A/B can be switched to ports C/4 (dual link) in the software

Item	Description
REF In	BNC connector for a synchronization of video signals, i.e. the reference input; input of horizontal or composite sync depending on software settings
R/Pr Out	BNC connector for an analog output of red in RGB or chroma (R – Y) in YUV
G/Y Out	BNC connector for an analog output of green in RGB or luma (Y) in YUV
B/Pb Out	BNC connector for an analog output of blue in RGB or chroma (B – Y) in YUV
Sync Out	BNC connector for a synchronization of video signals (bilevel as well as trilevel); output of composite sync (S)
SD/HD-SDI Out 1/A	BNC connector for an output of digital video signals (serial digital interface, port A); either output of YUV in single-link or first stream of YUVA/RGB[A] in dual-link mode; it can be configured to 3-Gbit/s SDI in the software
SD/HD-SDI Out 2/B	BNC connector for an output of digital video signals (serial digital interface, port B); output of the second stream of YUVA or RGB[A] in dual-link mode; with 3-Gbit/s SDI this port provides a mirror of port A
SD/HD-SDI Out 3/C	BNC connector for an alternative output of digital video signals (serial digital interface, port C); this port mirrors the output of port A; can provide burnt-in information via software
SD/HD-SDI Out 4	BNC connector for an alternative output of digital video signals (serial digital interface); this port mirrors the output of port B in dual-link modes; can provide burnt-in information via software
SD/HD-SDI Out 5 - 8	BNC connectors for an output of digital video signals in special rasters (quad HD-SDI); used, for example, in special 4K rasters for a tiling of the image to four separate dual-link HD-SDIs
WClk Out	BNC connector for a wordclock signal output; used for the synchronization of external audio equipment

The following connectors may be available on other hardware variants. Depending on the variant, they either replace one or more of the connectors mentioned above or be available in addition:

Table 2-3: Replacing or additional connectors on other hardware variants

Item	Description
AUX 1	DB-9 connector (female), first serial RS-422 interface for auxiliary data (e.g. mixer control)
AUX 2	DB-9 connector (female), second serial RS-422 interface for auxiliary data
DVI In	Reserved for future use
SATA	External SATA (eSATA) connectors to connect, for example, external storages; internally employed as SATA, meaning you may have to use shorter cables (< 1 m)
SD/HD-SDI In 5 - 8	Reserved for future use

2.3.4 ATX Connector Panel

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

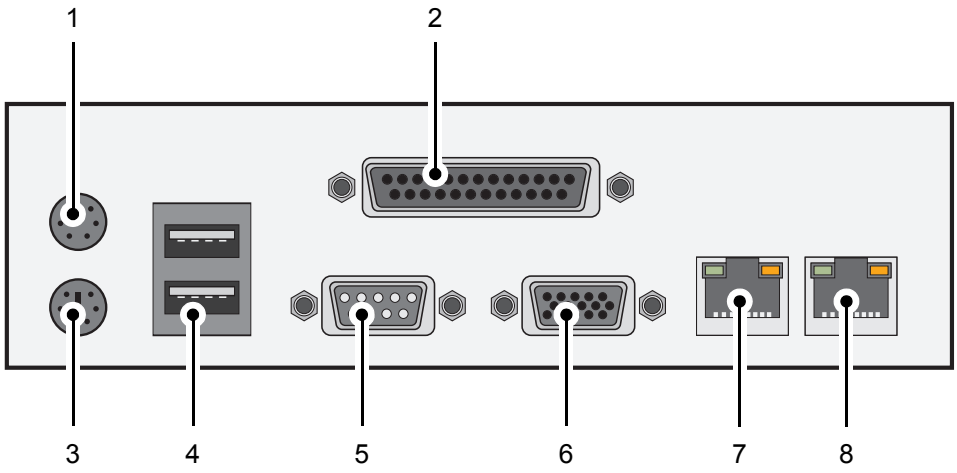


Figure 2-14: ATX connector panel on rear

No.	Item	Explanation
1	mouse	PS/2 connector to connect a mouse to the system
2	parallel port	DB-25 connector for the connection of an external device, such as a printer

No.	Item	Explanation
3	keyboard	PS/2 connector to connect a keyboard to the system
4	USB ports	These USB connectors (universal serial bus) offer you the possibility to connect other devices to your system
5	COM port	RS-232 connector for the connection of serial interface devices
6	VGA	DB-15 connector (female) to connect a monitor If an extra graphic card is installed in your system (see section "Slot Panel Connectors" on page 2-18), this connector will not be operational.
7, 8	LAN (1000 Mb)	Gigabit Ethernet (1000 Base-T) connection ports to connect the system to a network

2.3.5 Slot Panel Connectors

CLIPSTER provides on its slot panel connector area various connections, such as the graphic card panel and the video I/O panel. Furthermore, if applicable, some additional panels may be present for internal reasons or on customer request.

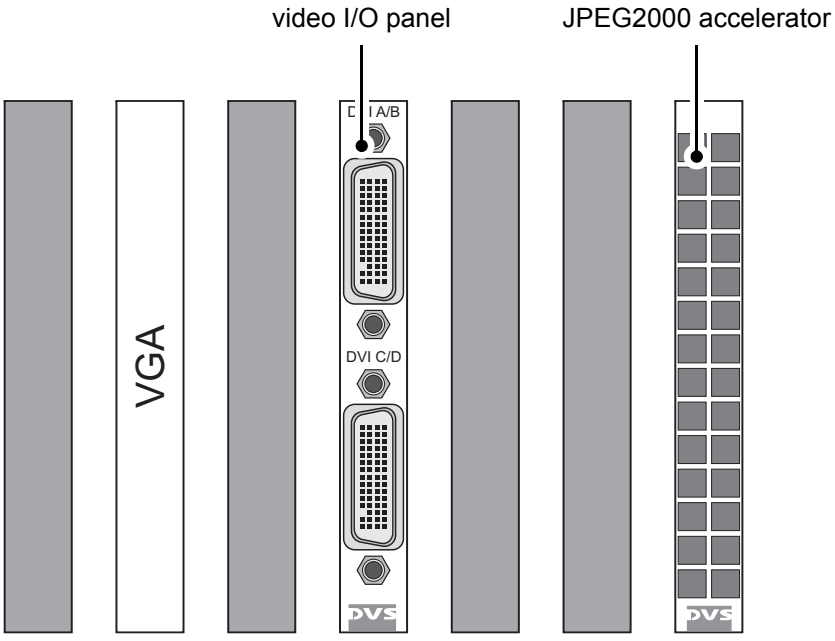


Figure 2-15: Slot panels on rear

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.

VGA

The on-board graphic card of the motherboard may not be sufficient to handle digital video. Then the system will be equipped with an additional graphic card. The VGA panel is the panel of this graphic card. If available, the monitor for CLIPSTER has to be connected here.

If the VGA panel is present in your system, the VGA connector available on the ATX connector panel will not be operational (see chapter “ATX Connector Panel” on page 2-17).

For further information about the graphic card, please refer to the original manufacturer’s documentation included in the delivery of CLIPSTER.

Video I/O Panel

The video I/O panel of CLIPSTER holds two video interfaces (DMS-59 connectors) for an output of analog and digital video signals. They can be connected to breakout cables that will then provide each two standard DVI connectors. The breakout cables are included in the delivery of CLIPSTER. Pin-outs of the DMS-59 and DVI connectors can be found in section “Signal In- and Outputs” on page A-9.

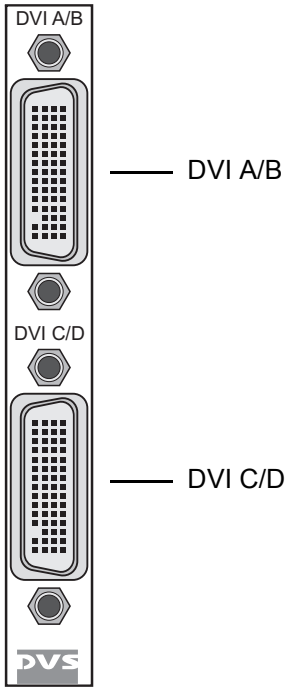


Figure 2-16: Video I/O panel

In detail the panel provides the following:

Item	Description
DVI A/B	DMS-59 connector for an output of analog and digital video signals (channel A/B, either two independent single-link or one dual-link connection); it can be connected to a breakout cable to provide two standard DVI connectors
DVI C/D	DMS-59 connector for an output of analog and digital video signals (channel C/D, either two independent single-link or one dual-link connection); it can be connected to a breakout cable to provide two standard DVI connectors

JPEG2000 Accelerator

This slot panel is the JPEG2000 accelerator of CLIPSTER which is part of optionally available features (see chapter “Introduction” on page 1-1). It allows you to encode and decode (play out) files with JPEG2000 compression near or in real time. Because the JPEG2000 accelerator is an internally used processing hardware of the DVS system, it provides no connectors.

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, the system is likely to break down. Therefore, it is recommended to change a failed power supply unit immediately.

For more information about how to deal with a malfunctioning power supply unit see section "Power Supply Maintenance" on page 5-10.

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

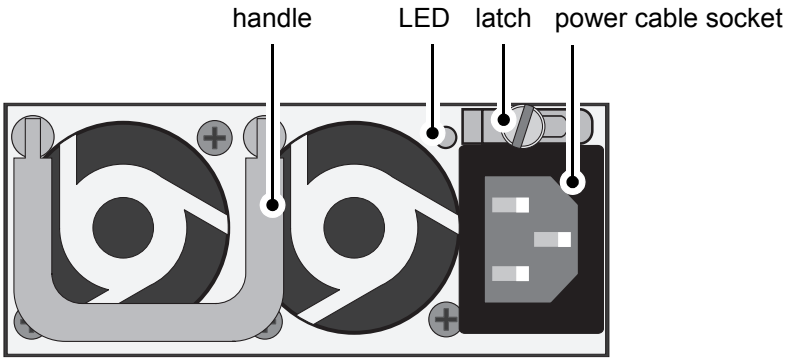


Figure 2-17: Overview of the power supply

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 — The power supply unit is operating normally.
- red/off — The power supply unit is either disconnected from power or has a malfunction.
- off — The system is disconnected from power completely or in standby mode. In some cases this may also indicate a 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.

Installation



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

To install the hardware of CLIPSTER perform the following:

- Unpack CLIPSTER and its accessories.



Please check your delivery and compare it with the delivery note which has been 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 CLIPSTER 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 1024 × 768 pixels (default manufacturing setting).



The recommended resolution to run the DVS software is 1600 × 1200 pixels.

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

Operation



This chapter describes how to operate the CLIPSTER 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 on the front of the system.



Figure 4-1: The power switch

All other items necessary for a correct operation of the CLIPSTER 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 CLIPSTER 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 CLIPSTER right away.

4.2 Shutting Down the System

There are several possibilities to shut down CLIPSTER. All depend on whether the operating system is already loaded or not. 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. Occasionally, this may lead to a loss of system data.

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

With the operating system not completely loaded

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



Shutting down the system while the operating system is loading may lead to corrupted system data. Use this procedure only if absolutely necessary.

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

The system will then shut down immediately.



Maintenance

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 the 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 follows a description 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. Because of this DVS uses RAID 5 to add protection to the stored data as any single disk can fail, but the data will still be recoverable.

The RAID 5 feature makes CLIPSTER tolerant of disk failures. Even with a broken disk an operation can still be continued and, once the failed disk has been replaced, the missing data can be recovered easily.

The main storage of CLIPSTER comprises up to 24 hard disks and the data is striped across these hard disks. Additionally, it provides two RAID controllers that each connects a set of eight hard disks (*4U chassis*; *5U chassis:* 12 hard disks). The RAID controllers and their disk sets are independent RAID systems and make the data protection available for the connected hard disks. The information necessary to rebuild a failed hard disk (parity information) is generated and written across the disks connected to a RAID controller. Thus, for each controller present in CLIPSTER one hard disk can fail and the system will still be functional and able to recover data.

You can identify the hard disks that are connected to a RAID controller easily in CLIPSTER because every two rows (*4U chassis*; *5U chassis:* three rows) represent one disk set:

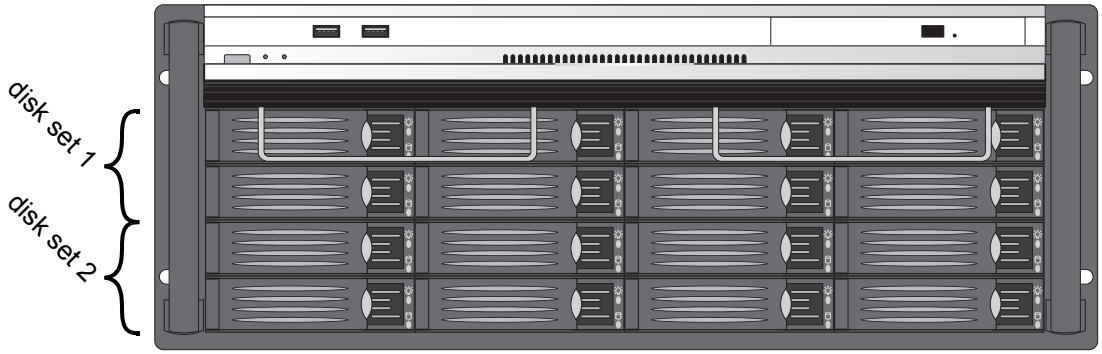


Figure 5-1: Disk sets in the DVS system

If one hard disk within a disk set fails, the missing data can be recalculated due to the parity information stored on the other disks of the set. Thus, a DVS system equipped with RAID 5 can withstand disk failures without losing data or access to data.



If a second disk within the same disk set fails, your data will be unrecoverable.

5.1.2 Replacing a Hard Disk

In case of a hard disk failure an alarm will be sounded. Then during continuous accesses to the hard disk array you can identify the broken disk easily: It will be the one no longer blinking (either continuously on or off). With this you have the possibility at hand to replace the broken disk.



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 of the hard disk array 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.

Data accesses to the hard disk array are still possible because any missing data will be recalculated from the parity information distributed among the other hard disks of the disk set. Normally this will limit the overall performance and real-time operations may no longer be possible.



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

The hardware replacement of a failed disk can be divided into three steps:

1. Remove the hard disk from the system.
2. Replace the hard disk.
3. Reassemble it into the system.

All steps are explained in the following.

Step 1: Removing the Hard Disk

The hard disks that are accessible at the front of the system store the data of the main storage. Because they are connected to the whole system with the help of disk carriers, they can be removed easily.

For an overview of a disk carrier as well as further information about it see section “Hard Disk Array” on page 2-8.

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).
- Unlock the disk carrier of the defective hard disk by pressing the opener of the disk carrier to the left (1).

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

- Take the lever and turn it more to the left (2) until it cannot be moved further:

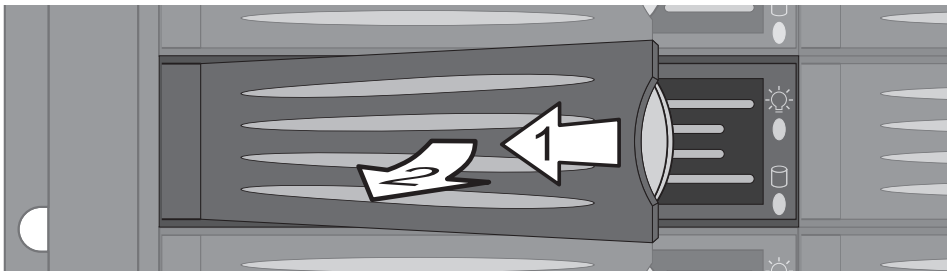


Figure 5-2: Pulling out the lever

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

- Once the interface connection inside the system is 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.



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 front of the disk array.
- Push it 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.



The disk carrier of the replaced disk should be level with the others at the front of the system's disk 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. Once the system has finished the rebuild, CLIPSTER will be fully operational again.



A rebuild takes several hours. It is strongly recommended to avoid accesses to the hard 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 CLIPSTER system perform the following:



The system your 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.

- If appropriate, shut down the system.
- 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).

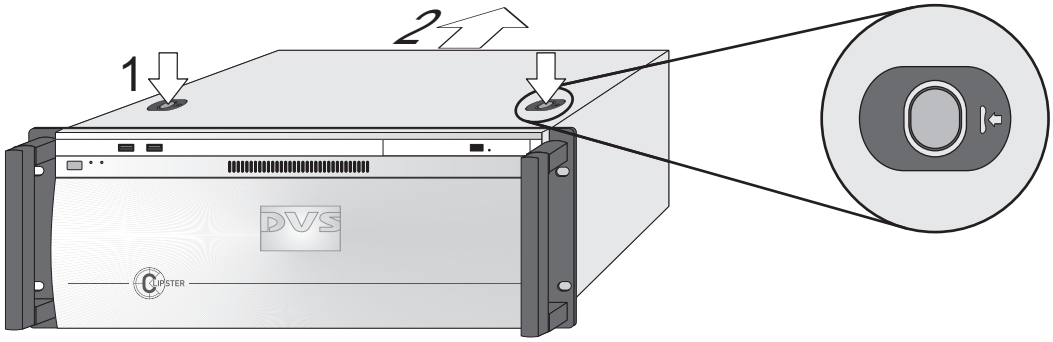


Figure 5-3: Removal of the cover of the casing

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 CLIPSTER 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 to close 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 your 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.

Fan maintenance 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 5-6.

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).

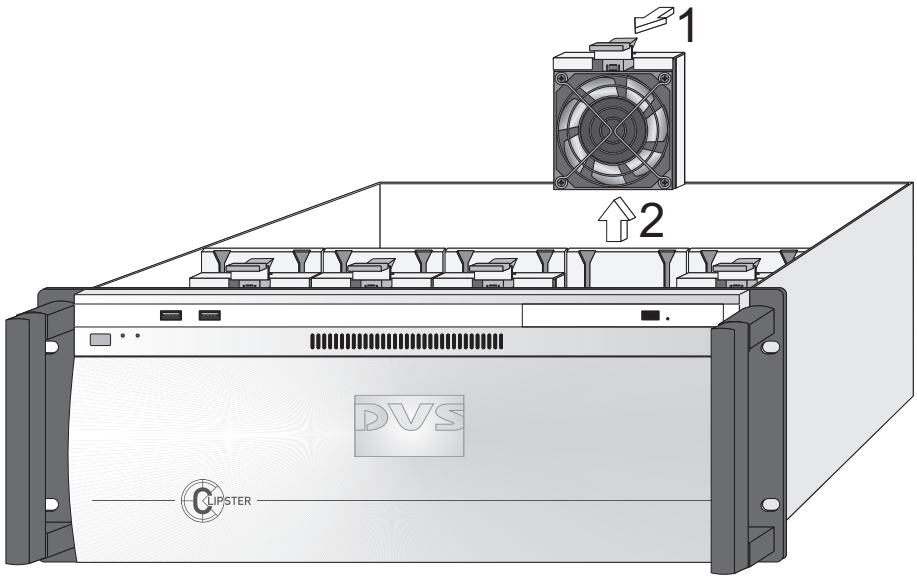


Figure 5-4: Removal of fan module

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.



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 5-6.

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.

5.4 Power Supply Maintenance

The redundant power supply provides the system with power. It is a very 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, the system is likely to break down. Therefore, it is recommended to change a failed power supply unit immediately.

When a power supply unit failure occurs, you will be notified by 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).



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.

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



For an overview of a power supply unit see section "Power Supply" on page 2-21.

- 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 either extinguished or lit in red.
- Next unplug the power cord from this power supply unit.
- Take the handle of the respective unit and use the unit's latch 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.



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

- Connect the power source (the 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.

5.5 Removal of the Faceplate

The faceplate of the system can be removed, for example, for transports. 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 indicated in the following figure:

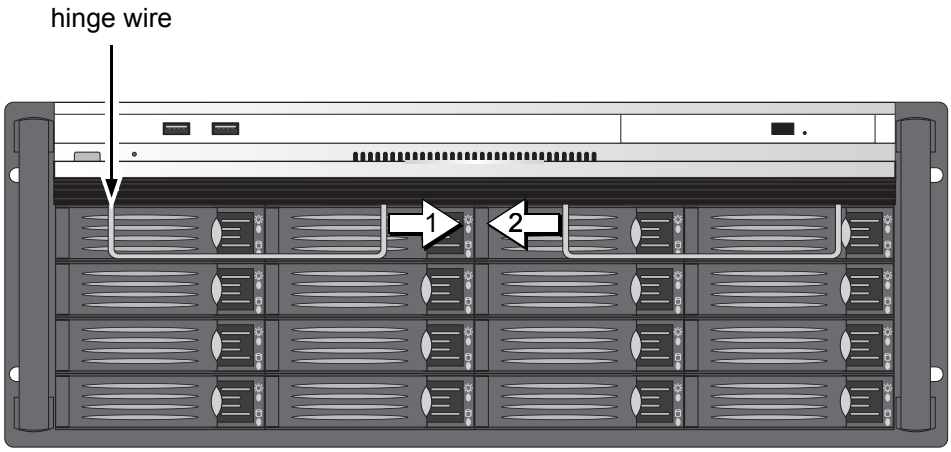


Figure 5-5: Removing the hinge wires

Afterwards the faceplate can be taken off.

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 CLIPSTER are provided.

A.1 Troubleshooting

The table below lists some errors that may occur during the operation of CLIPSTER and details how to resolve them. If you experience trouble with the system 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 play-out/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 so that it is no longer capable of real-time operations.	Contact the DVS service department.
	One or more hard disks of the hard disk array are worn.	Detecting worn hard disks in a RAID configured storage can prove difficult. If you are able to detect the worn disk(s) (see section "Replacing a Hard Disk" on page 5-3), replace them as described in the same section. Otherwise 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.	A fan has failed.	Check whether a fan has failed as described in section "Fan Maintenance" on page 5-7. If necessary replace the broken module as described in the same section.
	The system is overheated.	If you can rule out the above mentioned cause, the alarm must be due to overheating. An overheating rarely occurs, and then most likely caused by too much dirt accumulated at the ventilation holes. Shut down the system immediately (see section "Shutting Down the System" on page 4-2). Afterwards open the casing as described in section "Opening the Casing" on page 5-6 and clean all ventilation holes. When finished, reassemble the system (see section "Closing the Casing" on page 5-6) and start it. In case the problem persists, contact the DVS service department.

Error	Cause	Solution
An alarm is sounded. 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 or lit in red, 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 or lit in red, a power supply unit has failed. Replace the broken unit as described in section "Power Supply Maintenance" on page 5-10.
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, i.e. one or more hard disks are not recognized by the system.	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 5-3. 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.2 Technical Data

This section provides technical data of CLIPSTER.

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 CLIPSTER are as follows:

Weight	*4U chassis:* approx. 45 kg *5U chassis:* approx. 70 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.

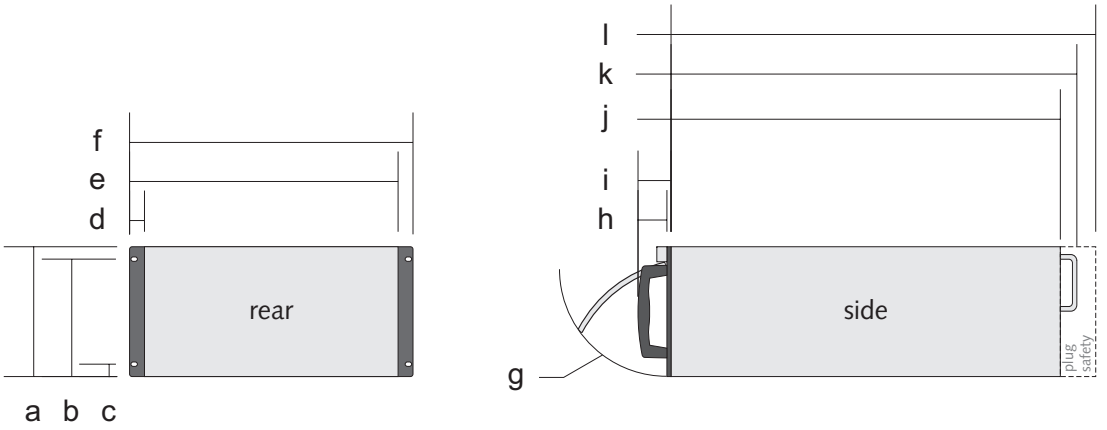


Figure A-1: Measured dimensions

4U chassis:

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

5U chassis:

a	220 mm	g	197 mm
b	199 mm	h	50 mm
c	21 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 CLIPSTER.

Table A-1: CLIPSTER specifications

Video	Input	Output
Analog		3 BNC for RGB/ YUV
DVI (analog and digital)		2 DMS-59 (4 DVI-I via break-out cables)
SD Serial Digital 4:2:2 8 bit		2 BNC
HD Serial Digital 4:2:2 8/10/12 bit HD Serial Digital 4:4:4 8/10/12 bit	2 BNC 4 BNC	2 BNC 4 BNC (2 with 3-Gbit SDI)
4K Serial Digital 4:4:4 8/10/12 bit (quad HD-SDI)		8 BNC
Reference	**Input**	**Output**
Analog Reference Genlock	1 BNC	1 BNC for S
Wordclock		1 BNC
Audio	**Input**	**Output**
Embedded Audio, 8 Digital Stereo Channels	2 BNC (via Video In)	1 BNC (via Video Out)
AES/EBU, 8 Digital Stereo Channels	2 DB-25 (XLR via breakout cable)	2 DB-25 (XLR via breakout cable)
Analog Audio		2 stereo headphone jacks (6.3 mm/¼")
Timecode	**Input**	**Output**
Longitudinal (LTC)	1 XLR female	1 XLR male
Vertical (VITC)	2 BNC (via Video In)	2 BNC (via Video Out)
Data and Control Interfaces	**Input**	**Output**
Serial RS-422	1 DB-9 female	1 DB-9 female
	2 DB-9 female (auxiliary)	

Table A-1: CLIPSTER specifications (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	Uncompressed YUV 4:2:2 YUVA 4:2:2:4 RGB 4:4:4 RGBA 4:4:4:4 all in 8/10/12 bit, user selectable
Internal Processing	Color space conversion User definable LUT Frame repetition Real-time mixer Real-time scaler Input raster detection
Audio Formats	48 kHz, 20/24 bit

A.4 Video Rasters

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

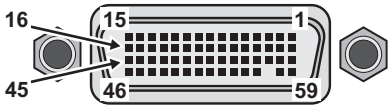
Table A-2: Supported video rasters

Raster	Total lines per frame	x size	y size	Aspect ratio
525i /29.97 (NTSC)	525	720	486	4:3
625i /24 (Slow PAL) /25 (PAL)	625	720	576	4:3
525i /29.97 (NTSC HR)	525	960	486	16:9
625i /25 (PAL HR)	625	960	576	16:9
720p /23.976/24/25/29.97/30 /50/59.94/60/71.928/72	750	1280	720	16:9
1035i /29.97/30	1125	1920	1035	16:9
1080i /23.976/24/25/29.97/30	1125	1920	1080	16:9
1080p /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	1125	2048	1080	2:1
2048p /24	1600	2048	1536	4:3
2048p /24	1600	2048	1556	4:3
2048psF /23.976/24	1125	2048	1080	2:1
2048psF /24	1600	2048	1536	4:3
2048psF /14.985/15/19.98/20 /24/30/36	1600	2048	1556	4:3
4096p /24	2200	4096	2160	16:9
4096psF /24	2200	4096	2160	16:9
4096psF /5	3375	4096	3112	4:3

A.5 Signal In- and Outputs

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

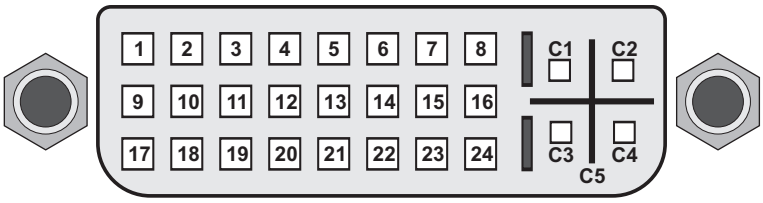
Digital Video Interface (DMS-59 Output Connectors)



(external view;
female on interface, male on cable)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	21	/DVI2_TX2	41	DVI_TX2 GND
2	VGA1_RED	22	–	42	DVI_TX1 GND
3	VGA1_BLUE	23	–	43	DVI_TX0 GND
4	GND	24	–	44	/DVI2_TX CLK
5	+5V	25	DVI1_TX2	45	DVI2_TX CLK
6	VGA1_SCL	26	/DVI1_TX2	46	GND
7	VGA1_SDA	27	DVI1_TX1	47	VGA2_GREEN
8	GND	28	/DVI1_TX1	48	–
9	VGA2_SDA	29	DVI1_TX0	49	DVI2_CLK GND
10	VGA2_SCL	30	/DVI1_TX0	50	VGA2_HSYNC
11	+5V	31	DVI1_TX CLK	51	VGA2_VSYNC
12	GND	32	/DVI1_TX CLK	52	GND
13	VGA2_BLUE	33	DVI_TX0 GND	53	–
14	VGA2_RED	34	DVI_TX1 GND	54	GND
15	GND	35	DVI_TX2 GND	55	VGA1_VSYNC
16	DVI2_TX0	36	DVI1_HPD	56	VGA1_HSYNC
17	/DVI2_TX0	37	–	57	DVI1_CLK GND
18	DVI2_TX1	38	–	58	Blocked
19	/DVI2_TX1	39	–	59	VGA1_GREEN
20	DVI2_TX2	40	DVI2_HPD		

Digital Video Interface (DVI-I Output Connectors on Breakout Cable)



(external view;
female on breakout cable, male on cable)

Table A-3: Pin-out for Output Connector (DVI OUT)

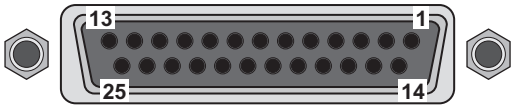
Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	/TX_2	9	/TX_1	17	/TX_0
2	TX_2	10	TX_1	18	TX_0
3	GND	11	DVI_CLK_B	19	/DVI_CLK_B
4	/TX_4	12	/TX_3	20	/TX_5
5	TX_4	13	TX_3	21	TX_5
6	DDC_CLK	14	+5V	22	GND
7	DDC_DAT	15	GND	23	TX_CLK
8	ANALOG_VSYNC	16	HP_DETECT	24	/TX_CLK

C1	ANALOG_RED	C3	ANALOG_BLUE	C5	GND
C2	ANALOG_GREEN	C4	ANALOG_HSYNC		

Analog Audio (6.3 mm (¼") Headphone Jack)

Output Impedance	75 Ohm
Output Level	1.55 V (at 600 Ohm)

Digital Audio (25-Pin D-Sub Connector)



(external view;
female on interface, male on cable)

Table A-4: Dig. Audio Ch. 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	–		

Table A-5: Dig. Audio Ch. 9-16

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

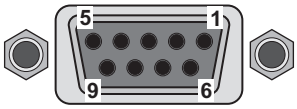
SATA (External SATA (eSATA) Connector)



(external view;
female on interface, male on cable)

Pin No.	Signal	Pin No.	Signal
1	GND	5	RX
2	TX	6	/RX
3	/TX	7	GND
4	GND		

RMT In, RMT Out and AUX 1/2 (9-Pin D-Sub Connectors)

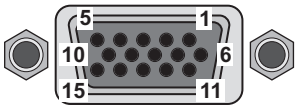


(external view;
female on interface/breakout cable, male on cable)

RMT In	
Pin No.	**Signal**
1	–
2	/TX_D_CON
3	RX_D_CON
4	GND
5	–
6	GND
7	TX_D_CON
8	/RX_D_CON
9	–

RMT Out	
Pin No.	**Signal**
1	–
2	/RX_C_CON
3	TX_C_CON
4	GND
5	–
6	GND
7	RX_C_CON
8	/TX_C_CON
9	–

Remote In- and Output (15-Pin D-Sub HD Connector)



(external view;
female on interface, male on breakout cable)

Pin No.	Signal	Pin No.	Signal
1	/RX_A_CON	9	GND
2	–	10	TX_B_CON
3	/TX_A_CON	11	GND
4	RX_B_CON	12	RX_A_CON
5	GND	13	/TX_B_CON
6	TX_A_CON	14	–
7	GND	15	/RX_B_CON
8	–		

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:

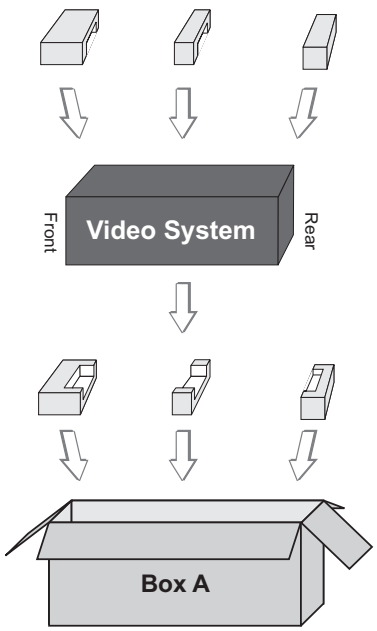
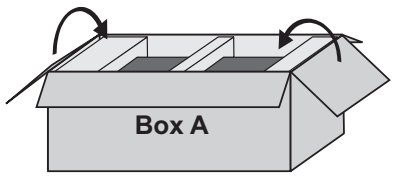
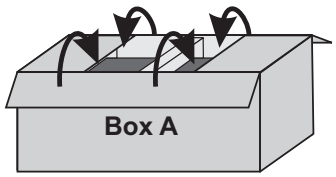


Figure 2:

a)



b)



c)

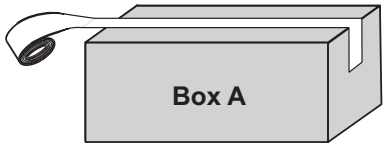


Figure 3:

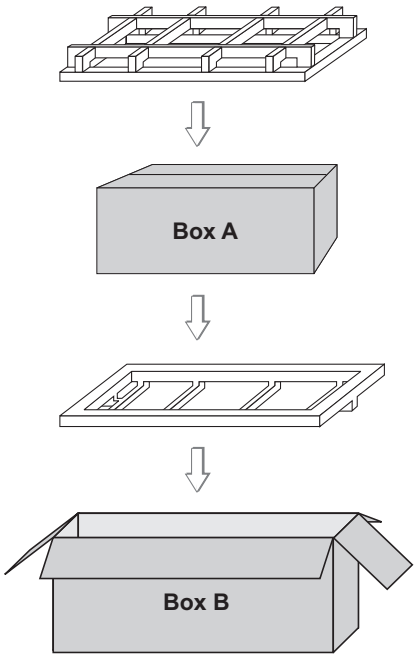


Figure 4:

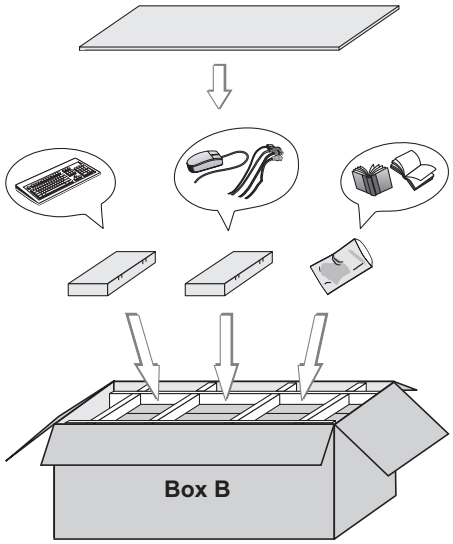
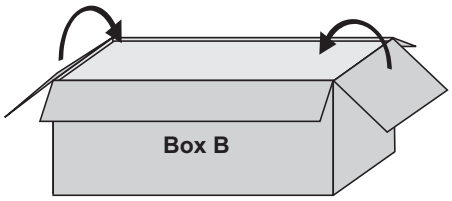
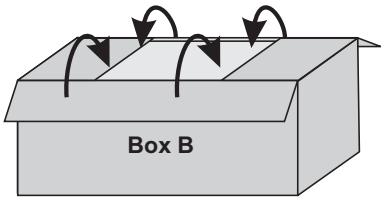


Figure 5:

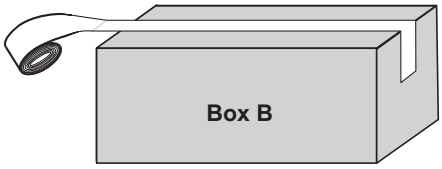
a)



b)



c)



A.7 Conformity Declarations

CLIPSTER 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 CLIPSTER devices are manufactured in compliance with this directive.

A.7.2 EC Declaration of Conformity (CE Marking)

DVS Digital Video Systems AG 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:

CLIPSTER	EC Directives: – EMC Directive 89/336/EEC – Low-Voltage Directive 73/23/EEC
	Applied Harmonized Standards: – EN50081-1 – EN50082-1 – EN55022 – EN55024 – EN61000-3-2 – EN61000-3-3 – IEC61000-4-2 – IEC61000-4-3 – IEC61000-4-4 – IEC61000-4-5 – IEC61000-4-6 – IEC61000-4-11

A.7.3 FCC Compliance Statement

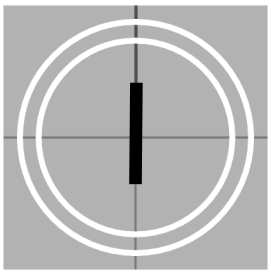
DVS Digital Video Systems AG herewith declares that the following equipment has been tested according to the applying valid FCC regulations:

– CLIPSTER

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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