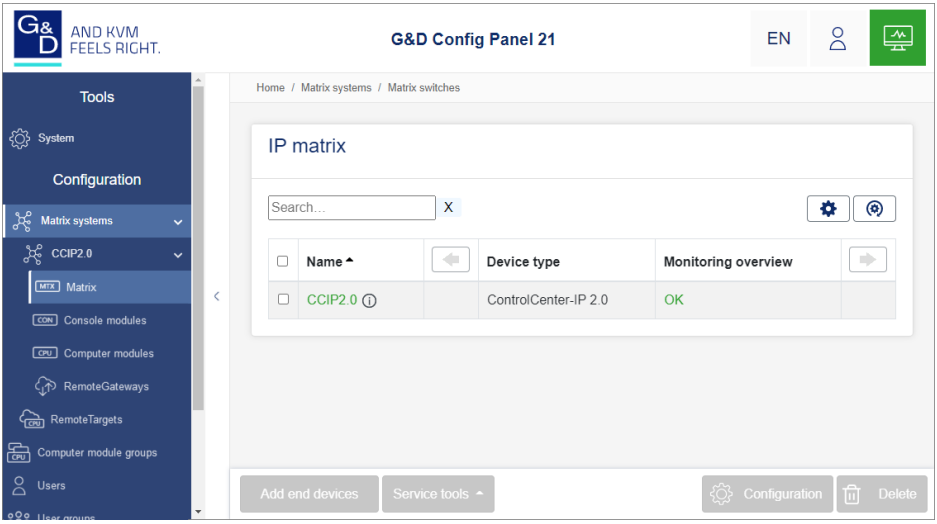
G&D ControlCenter-IP 2.0

EN Web Application»Config Panel«
Configuring the matrix switch



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1 Basic functions

Introduction

The *ConfigPanel* web application provides a graphical user interface to configure the KVM system. The application can be operated from any supported web browser (see page 2).

ADVICE: The web application can be used in the entire network independently from the locations of the devices and consoles connected to the KVM system.

Thanks to its enhanced functions, the graphical user interface provides the following features for easy operation:

- Clearly arranged user interface
- Monitoring of various system features
- Advanced network functions (netfilter, syslog, …)
- Backup and restore function

System requirements

IMPORTANT: Before starting the web application via web browser, connect the device from which you want to load the web application to the local network. The *Installation* manual of the device provides more information.

If not already done, adjust the network settings as described on page 3.

The web application *ConfigPanel* has been successfully tested with the following web browsers:

- Apple Safari 18
- Google Chrome 137
- Microsoft Edge 134
- Mozilla Firefox 139

Supported operating systems

- Microsoft Windows
- macOS
- Linux
- Android
- iOS

Recommended resolutions

- A minimum resolution of 1280 × 800 pixels is recommended.
- The web application is optimized to display the content in landscape mode.
- Portrait mode is supported. In this mode, not all contents may be visible.

Initial configuration of the network settings

NOTE: In the defaults, the following settings are pre-selected:

- IP address of *network interface A*: **192.168.0.1**
- IP address of *network interface B*: address obtained using **DHCPv4**
- Global network settings: obtain settings dynamically

To access the web application, the network settings of the device on which the web application is operated need to be configured.

How to configure the network settings before integrating the device into the local network:

1. Use a category 5 (or better) twisted pair cable to connect the network interface of any computer to the device's *Network A* interface.
2. Ensure that the IP address of the computer's network interface is part of the subnet to which the device's IP address belongs to.

   NOTE: Use the IP address *192.168.0.100,* for example.
3. Switch on the device.
4. Start the computer's web browser and enter **192.168.0.1** in the address bar.
5. Configure the network interface(s) and the global network settings as described in the paragraph *Network settings* on page 20 f.

   IMPORTANT: It is not possible to operate both network interfaces within one subnet!
6. Remove the twisted pair cable connection between computer and device.
7. Implement the device in the local network.

(De)Activating the integrated DHCP server

If required, you can activate the DHCP server integrated in the matrix switch. The DHCP server is *deactivated* by default.

The DHCP server provides basic functionalities for the automatic integration of clients (this also includes the computer and console modules) into a network.

IMPORTANT: Activation and use of the integrated DHCP server *is not* possible when using the **MatrixGuard** function (see page 271) or when using the **DirectRedundancyShield** function (see page 280)!

Overview of the assigned IP addresses

If you have already activated the integrated DHCP server, the wizard starts with the overview of the assigned IP addresses.

The table lists the MAC address of each client and the assigned IP address.

You can (de)activate the DHCP server comfortably with a wizard. Click on the menu **Advanced features** and select the entry **DHCP-Server**. Click on **Configure** to start the wizard.

The following paragraphs briefly summarise the wizard's configuration options.

Step 1: Select device

IMPORTANT: The integrated DHCP server may only be activated on *one* matrix switch of a matrix system.

NOTE: This step is automatically skipped if a matrix switch is operated stand-alone.

- Click the matrix switch on which the integrated DHCP server is to be activated.
- Click **Save and continue**.

Step 2: Configure DHCP server

Configure the DHCP server in this step according to your requirements.

How to configure the DHCP server:

1. Enable or disable the DHCP server:

Enable DHCP server:	Switch the toggle switch to the right (enabled) to enable the DHCP server. Switch the toggle switch to the left (disabled) to disable the DHCP server.

2. If the DHCP server is enabled, you can configure the following settings::

IP address range from:	Enter the first IP address to be assigned by the DHCP server.
IP address range to:	Enter the last IP address to be assigned by the DHCP server.
Netmask:	Specify the netmask of the network.
Lease time:	Enter the amount of time in days that a client is allowed to keep the assigned IP address.
Gateway:	Specify the IP address of the gateway (*optional*).

3. Click **Save and continue**.

Step 3: Configuration completed

- The wizard confirms the successful setup of the DHCP server.

4. Click **Finish**.

Getting started

This chapter introduces you to the basic operation of the web application.

NOTE: For a detailed explanation of the functions and configuration settings, refer to the following chapters of this manual.

Starting the web application

NOTE: Information on the system requirements of the web application can be found on page 7.

How to start the web application

1. Enter the following URL in the address line:

   https://[IP address of the device]

2. Enter the following data in the login mask:

Agree to the terms of use:	Click on the text to read the terms of use. Click on the checkbox to accept the terms of use.
	NOTE: The terms of use only appear if a corresponding configuration has been made (see *Showing terms of use* on page 15 ff.).
Username:	Enter a username.
Password:	Enter a password for your user account.
2-Factor Auth Code (TOTP):	Enter the 2-Factor Auth Code (TOTP) from two-factor authentication.
	NOTE: The 2-Factor Auth Code (TOTP) is only requested if two-factor authentication has been configured (see page 54 f.) and activated (see page 77 ff.).

IMPORTANT: Change the administrator account's default password.

To do this, log into the web application with the administrator account and then change the password (see page 81).

The *default* access data to the administrator account are:

- **Username:** **Admin**
- **Password:** see *login* information on the label on the bottom of the device

NOTE: The default *admin* password for devices manufactured before June 2020 is **4658**.

3. Click on **Login**.

4. Click on the **Config Panel 21** icon.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

NOTE: As an alternative to the **Config Panel 21** you can open the **EasyControl** (see page 286) tool after login, if you have activated the **IP-Control-API** feature for a fee.

Operating the web application

User interface

The user interface of the web application consists of several areas:

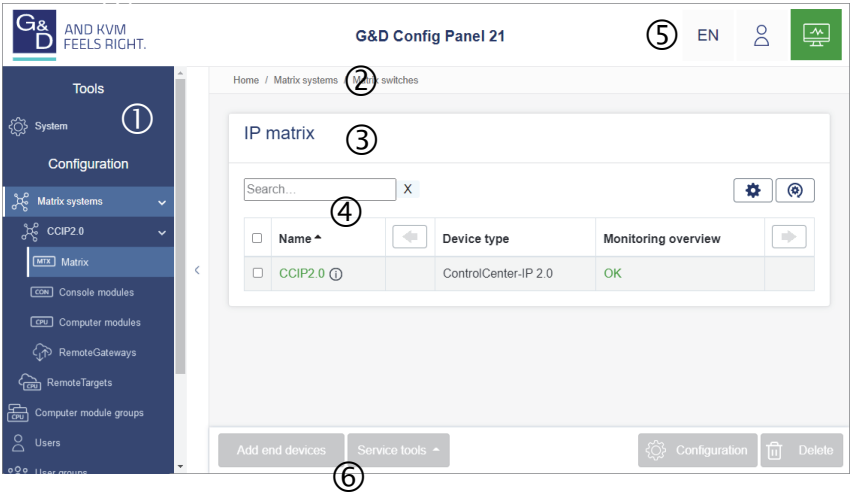


Figure 1: User interface of the web application

The different areas of the user interface serve different tasks. The following table lists the purpose of each area:

Menu ①:	In the menu the different functions of the web application are summarised in various topics.
Breadcrumb navigation ②:	The breadcrumb navigation shows you the path to the currently opened dialog. To quickly return to a higher-level dialog, you can click on it in the breadcrumb navigation.
Filter function ③:	You can use the filter function to narrow down the items displayed in the main view. In the text box, enter part of the name of the element you want to find. Only elements that contain this text in one of the *displayed* columns are displayed in the main view. The names are not case-sensitive during filtering. To delete the filter, click on the **[X]** icon.

Main view ④:	After selecting a topic in the menu, the contents of this topic are displayed here. Devices with *SecureCert feature* activated are marked with a lock symbol.
Shortcuts ⑤:	**Language selection:** The language identifier (for example **EN** for *English*) shows the currently active language in the web application. To switch the language, click the language identifier. This opens a submenu that shows the supported languages and the corresponding identifiers. Switch the language by clicking on the desired language. **User:** A click on the user icon opens a submenu: ▪ The name of the active user is displayed in the submenu. ▪ Click on *User* to access the user settings of the active user. ▪ Click on *Logout* to exit the active session. **Monitoring status:** This icon shows you at a glance whether all monitoring values are within the normal range (green icon) or if at least one monitoring value is outside the normal range (yellow or red icon). The *Monitoring status* icon always takes the colour of the *most critical* monitoring value If the icon is displayed in yellow or red, you can access the *Active alarms* dialog by clicking on the icon.
Buttons ⑥:	Depending on the dialog shown, different buttons are displayed in this area.

Frequently used buttons

The user interface uses various buttons to perform operations. The following table informs you about the names and functions of the buttons used in many dialog masks:

Configuration:	Show configuration settings of the selected element (device, user, ...)
Service tools:	If you select a device in the main view, you can use the service tools to perform certain tasks (for example, update, backup, show syslog).
Save:	Saving of the entered data. The opened dialog is still displayed.
Cancel:	The data you have entered will be discarded and the dialog will be closed.
Close:	The entered data is cached and the dialog is closed. Only after clicking on **Save** or **Cancel** the data is permanently stored or discarded.

Configuring table columns

You can adapt the table columns to be displayed under **Matrix systems** and **Users** to your requirements.

By default, the columns *Name*, *Device type*, *Comment* and *Monitoring overview* are shown under **Matrix systems**:

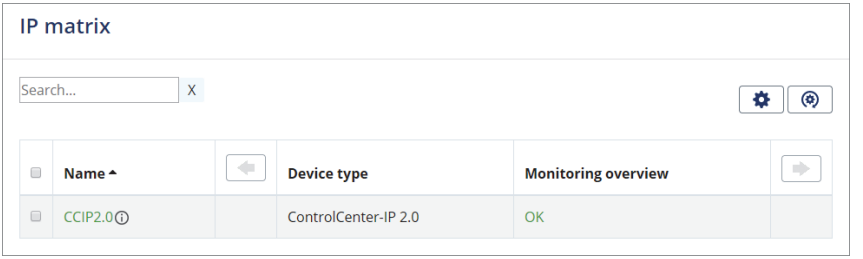


Figure 2: Table columns (selection) of a matrix switch

NOTE: Click the chain icon in the **Name** column to display grouped devices as a unit or list each device individually.

How to change the columns to be displayed:

> **NOTE:** The **Name** column is *always* shown as the first column of the table.

1. Click on the gears icon ( ) above the table.

Figure 3: Table configuration

2. To add a column, select it from the **Columns** drop-down box and click on **Add column**.
3. To delete a column, click on the red button ( ) below the column header.
4. Click on the green **check mark** ( ) to save your settings or klick on the red **Discard** button ( ).

How to change the column order:

> **NOTE:** The **Name** column is *always* shown as the first column of the table.

1. Click on the gears icon above the table.
2. To move a column to the left, click on the **arrow left** icon ( ) of this column.
3. To move a column to the right, click on the **arrow right** icon ( ) of this column.
4. Click on the green **check mark** ( ) to save your settings or click on the red **Discard** button ( ).

How to reset the table configuration to the default settings

1. Click on the **Table configuration reset** icon ( ) above the table.
2. Confirm the security prompt by clicking on **Yes**.

Language settings

Selecting the language of the web application

How to change the language of the web application:

1. Click the language identifier of the current language in the upper right corner.
2. Switch the language to be used by clicking on the desired language.

NOTE: The selected language is saved in the user settings of the active user. The next time this user logs on, the previously selected language setting is applied.

Selecting the system language

The specified system language is assigned to all user accounts by default.

If required, you can permanently assign a (different) language to each user account.

NOTE: All language settings apply to the web application as well as to the on-screen display (OSD) of the device.

If the OSD does *not* support the selected language, the OSD will be displayed in English.

How to set the system language:

1. Click **System** on the menu.
2. Click **System language**.
3. Select the desired language.
4. Click **Save**.

Selecting the language for a specific user account

How to set the language of a specific user account:

1. On the menu, click **Users**.
2. Click the user account you want to configure, and then click **Configuration**.
3. Click the **KVM matrix systems** tab, and then click the **Personal profile** area selection.
4. In the **Language** field, choose between the following options:

System:	Use the system language (see above).
[Selection]	Use the selected language.

5. Click **Save.**

Automatic logout

The Automatic logout function is used to automatically log out the user of the web application if no activity is detected for a certain period of time.

It is also possible to select whether the user is shown a timer (time counting down in minutes:seconds until automatic logout).

Define this period by entering a value between **1** and **60** minutes.

NOTE: To disable the function, enter the value **0**.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

How to (de)activate the Auto logout function:

1. Click **System** on the menu.
2. Click **Automatic logout**.
3. In the **Automatic logout of the Config Panel (0-60 minutes)** field, you can define the time of inactivity before automatic logout between **1** and **60** minutes.

   NOTE: If user activity is detected, the timer is reset.

   When an update process is started via the web application, the timer is also reset and only runs again once the update process has been completed.

4. In the **Show timer** field, you can select between the following options:

On:	The timer is displayed to the user at the top right of the web application if the entry in the **Automatic logout of the Config Panel (0-60 minutes)** is not **0** (*default*).
Off:	No timer is displayed to the user.

5. Click **Save**.

Showing terms of use

If the terms of use are displayed, they must be accepted before each (new) device access.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

How to configure the display of terms of use:

1. Click **System** on the menu.
2. Click **Terms of use**.
3. In the **Show terms of use** field, you can select between the following options:

Off:	*No* terms of use are displayed during log in (*default*).
User defined:	*Individual* terms of use are displayed during log in.
DoD Notice and Consent Banner:	The terms of use of the *US Department of Defense* are used during log in (can only be selected if the optional *SecureCert feature* is activated).

4. If you selected *User defined* in the previous step, go to the **Short text** field and enter the the text that a user is shown before accepting the terms of use (**example**: *I have read the terms of use and hereby agree to them*). This text field is limited to 70 characters.
5. Now enter the desired terms of use in the **Long text** field. This field is limited to 1,500 characters.
6. Click **Save**.

Password complexity

You can configure password complexity to comply with your individual password guidelines and improve security.

IMPORTANT: Changes in the section of password complexity have **no** effect on existing passwords, but are only taken into account when a password is changed (see *Changing the password of a user account* on page 81 ff.) and a new user account is created (see *Creating a new user account* on page 76). You should therefore configure the password complexity as early as possible.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

IMPORTANT: Changes in the section of password complexity have **no** effect on user authentication with external directory services. The directory services have their own configuration options.

How to configure the password complexity:

1. Click **System** on the menu.
2. Click **Password complexity**.
3. In the **Minimum password length** field, enter the desired minimum password lenght (*Default*: 3 or 15 with activated *SecureCert-Feature*)
4. In the **Minimum number of capital letters (e.g. ABCDEF)** field, enter the desired minimum number of capital letters within a password (*Default*: 0 or 1 with activated *SecureCert-Feature*)
5. In the **Minimum number of lowercase letters (e.g. abcdef)** field, enter the desired minimum number of lowercases within a password (*Default*: 0 or 1 with activated *SecureCert-Feature*)
6. In the **Minimum number of digits (e.g. 012345)** field, enter the desired minimum number of digits within a password (*Default*: 0 or 1 with activated *SecureCert-Feature*)
7. In the **Minimum number of special characters (e.g. !#%&?@)** field, enter the desired minimum number of special characters within a password (*Default*: 0 or 1 with activated *SecureCert-Feature*)

8. In the **Minimum number of characters of the previous password to be changed** field, enter the desired minimum number of characters that must be differnt compared with the previous password (*Default*: 0 or 8 with activated *SecureCert-Feature*)

> **NOTE:** The minimum number of different characters compared with the previous password must not be higher than the minimum password length.

9. Click **Save**.

Login options

To improve security, further configuration options are available in the login options area.

You can specify how many failed attempts are accepted when entering a password and how long a user is locked out after exceeding the maximum number of failed attempts.

In this area, you can also specify how many simultaneous superuser sessions are permitted.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

How to configure the Login options:

1. Click **System** on the menu.
2. Click **Login optionsy**.
3. In the **Number of consecutive invalid login attempts up to the time of blocking (0=off)** field, enter the desired maximum number of failed attempts when entering the password (*Default*: 0 = off/unlimited number of failed attempts or. 3 with activated *SecureCert-Feature*, max. 1,000)
4. In the **Locking time (in minutes)** field, enter the desired locking time in minutes for which a user is locked after exceeding the maximum number of failed password entry attempts (*Default*: 1 (if max. failed attempts > 0) or 15 with activated *SecureCert-Feature*, max. 1,440 minutes)
5. In the **Limit the number of simultaneous sessions with superuser rights** field, enter the desired number of maximum simultaneous superuser sessions (*Default*: 0 = off/unlimited number of superuser sessions, max. 1,024)

   NOTE: The maximum number of simultaneous superuser sessions is effectiv per interface (device/OSD and ConfigPanel).
6. Click **Save**.

Showing the version number of the web application and general information

How to show the version number of the web application and general information:

1. In the menu, click on **Information**.
2. The **General** tab provides you with information about the *ConfigPanel* version.

ADVICE: Here you will also find a list of the IP addresses per interface.

Closing the web application

Use the *Close* button to end the active session of the web application.

IMPORTANT: To protect the web application against unauthorised access, always use the *Logout* function after finishing your work with the web application.

How to close the web application:

1. Click on the **user icon** at the top right.
2. Click on **Logout** to exit the active session.

Basic configuration of the web application

Network settings

The device provides two network interfaces (*Network A* and *Network B*). The network interfaces lets you integrate a device into up to two separate networks.

IMPORTANT: Note the separate instructions about the *Initial configuration of the network settings* on page 3.

Configuring the network interfaces

To connect the device to a local network, you need to configure the settings of the network.

NOTE: These are the default settings:

- IP address of the *network interface A*: **192.168.0.1**
- IP address of *network interface B*: Obtain address via **DHCPv4**
- Global network settings: Obtain settings dynamically

How to configure the settings of a network interface:

IMPORTANT: It is not possible to use both network interfaces within the same subnet.

NOTE: The *Link Local* address space 169.254.0.0/16 is reserved for internal communication between devices in accordance with RFC 3330. It is not possible to assign an IP address of this address space.

IMPORTANT: Configuration of **IPv6** should only be performed **by technically experienced users**. While IPv6 offers advanced features and a larger address space, it also introduces **more complex requirements regarding network structure, security, and compatibility**. Incorrect settings may lead to **connectivity issues or unexpected network behavior**. If you are **not familiar** with the IP addressing and network topology specific to IPv6, we recommend that you thoroughly **inform yourself about the implications** before enabling IPv6, or consult with your network administration.

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Interfaces**.

5. Enter the following values under **Interface A** or **Interface B**:

> **NOTE:** Each network interface is assigned a unique **zone ID** in addition to its name, which specifies the interface number. This is required to uniquely identify the corresponding interface when using *IPv6 link-local addresses*.

Operating mode: Select the operational mode of **Interface A** or **Interface B**:

- **Off:** Disable network interface.
- **Static IPv4:** A static IPv4 address is assigned.
- **DHCPv4:** Obtain IPv4 address from a DHCP server

> The drop-down list shows the text **Link aggregation active** if the interface has been added to a network interface group.
>
> In this case, configure the network interfaces under »Link aggregation«.

IPv4 address: Enter the IPv4 address of the interface (only when operating mode *Static IPv4* is selected)..

> **IMPORTANT:** The IP address *192.168.0.1* should **not** be used on the *Vision IP series*. As this IP address is also used as standard IP address for the network management interfaces of the KVM-over-IP end devices, conflicts may otherwise occur during communication. If possible, select an IP address in a different subnet.

Netmask: Enter the netmask of the network (only when operating mode *Static IPv4* is selected).

IPv6: Click the toggle switch to enable IPv6 (green/right = enabled).

> **NOTE:** When IPv6 is enabled, a link-local IPv6 address is automatically generated based on the MAC address of the interface by default, in accordance with RFC 4921. This link-local IPv6 address cannot be modified by the user.

Click the toggle switch to disable IPv6 (grey/left = disabled (*default*)).

IPv6 address: Enter the static IPv6 address of the interface.

Subnet prefix length: Specify the prefix length (*default*: 64) for the interface according to the notation rules defined in RFC 5952.

6. Click on **Save**.

Configuring global network settings

Even in complex networks global network settings ensure that the web application is available from all subnetworks.

How to configure global network settings:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Now go to **Global network settings**.
5. Enter the following values:

Operating mode:	Enter the desired operating mode: ▪ **Static:** Use of static settings. ▪ **Dynamic:** Partial automatic retrieval of the settings described below from a DHCP server (IPv4) or via SLAAC (IPv6).
Hostname:	Enter the hostname of the device.
Domain:	Enter the domain to which the device should belong.
Gateway IPv4:	Enter the IPv4 address of the gateway.
Gateway IPv6:	Enter the IPv6 address of the gateway.
DNS server 1:	Enter the IP address of the DNS server..
NOTE: If a link-local IPv6 address is entered, the zone ID of the interface must be specified. The zone ID is appended to the link-local IPv6 address, separated by the percent sign **%**.	
DNS server 2:	*Optionally*, enter the IP address of another DNS server..
NOTE: If a link-local IPv6 address is entered, the zone ID of the interface must be specified. The zone ID is appended to the link-local IPv6 address, separated by the percent sign **%**.	
Prioritization of IPv6:	Click the toggle switch if IPv6 should be preferred when a destination has both an IPv6 and an IPv4 address (green/right = IPv6 is preferred). Click the toggle switch if IPv6 should not be preferred (grey/left = IPv6 is not preferred, *default*).

Use IPv6 Stateless Address Auto-configuration (SLAAC):	Click the toggle switch if SLAAC should be used (green/right = SLAAC is used, *default* if the *SecureCert feature* is not activated). Click the toggle switch if SLAAC should not be used (grey/left = SLAAC is not used, *default* if the *SecureCert feature* is activated).
Send ICMP Echo Reply to Echo Request from a Multicast/anycast address (IPv6):	Click the toggle switch if ICMPv6 Echo Requests should be answered (green/right = Echo Requests are answered, *default*). Click the toggle switch if ICMPv6 Echo Requests should not be answered (grey/left = Echo Requests are not answered).
Send ICMP destination unreachable messages (IPv6):	Click the toggle switch if an ICMPv6 error message should be sent to the sender when a packet cannot be delivered (green/right = error message is sent, *default*). Click the toggle switch if no ICMPv6 error messages should be sent (grey/left = error message is not sent).
Process redirect messages (IPv6):	Click the toggle switch if redirect messages should be accepted and processed (green/right = redirect messages are processed, *default*). Click the toggle switch if redirect messages should not be processed (grey/left = redirect messages are not processed).
Duplicate Address Detection (IPv6):	Click the toggle switch if a check for duplicate IPv6 addresses should be performed before an address is used (green/right = duplicate address check is performed, *default*). Click the toggle switch if no check for duplicate IPv6 addresses should be performed (grey/left = no duplicate address check is performed).

6. Click on **Save**.

Increasing the reliability of network connections by link aggregation

By default, you can use both network interfaces at the same time to acees the web application from two different network segments, for example

To increase reliability, the entwork interfaces can be grouped via *link aggregation*. Within a group, only one interface is active at a time. Another interface only becomes active if the active interface fails.

Two different modes are available for monitoring the interfaces:

- **MII mode:** The carrier status of the network interface is monitored via the *media independent interface*. In this mode, only the functionality of the network is tested.
- **ARP mode:** Using the *address resolution protocol*, requests are sent to an ARP target on the network. The response from the ARP target confirms both the functionality of the network interface and a proper network connection to the ARP target.

If the ARP target is connected to the network but temporarily offline, the requests cannot be answered. For this reason, you should determine several ARP targets in order to obtain a response from at least one target even if an ARP target fails.

NOTE: It is not possible to combine **MII** and **ARP mode**.

How to configure the settings of grouped network interfaces:

NOTE: The *Link Local* address space 169.254.0.0/16 is reserved for internal communication between devices in accordance with RFC 3330. It is not possible to assign an IP address of this address space.

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Link aggregation**.

5. Enter the following values under **Network**:

> **NOTE:** The network interface is assigned a unique **zone ID** in addition to its name, which specifies the interface number. This is required to uniquely identify the corresponding interface when using *IPv6 link-local addresses*.

Name:	Enter the name of the network interface group.
Operating mode:	Select the operating mode for grouped network interfaces: ▪ **Off:** Disable link aggregation. *Go to »Interfaces« to configure the network interfaces (see Configuring the network interfaces on page 20 ff.).* ▪ **Static IPv4:** A static IPv4 address is assigned. ▪ **DHCPv4:** Obtain IPv4 address from a DHCP server.
IPv4 address:	Enter the IPv4 address of the interface (only when operating mode *Static IPv4* is selected).
Netmask:	Enter the netmask of the network (only when operating mode *Static IPv4* is selected).
IPv6:	Click the toggle switch to enable IPv6 (green/right = enabled). **NOTE:** When IPv6 is enabled, a link-local IPv6 address is automatically generated based on the MAC address of the interface by default, in accordance with RFC 4921. This link-local IPv6 address cannot be modified by the user. Click the toggle switch to disable IPv6 (grey/left = disabled (*default*)).
IPv6 address:	Enter the static IPv6 address of the interface.
Subnet prefix length:	Specify the prefix length (*default*: 64) for the interface according to the notation rules defined in RFC 5952.

6. Enter the following values under **Parameter**:

Primary Follower:	Select whether data traffic should preferably be transmitted via the interface *Network A* (**Interface A**) or the interface *Network B* (**Interface B**). As soon as the selected interface is available, this interface is used for data traffic. If you select the option **None**, the data traffic is sent via any interface. A switch-over occurs only if the active interface fails.
Link monitoring:	Select whether you want to use the **MII** or the **ARP** mode (see explanation above) to monitor the interface.
MII down delay:	Waiting period in milliseconds before a failed network interface is disabled. The entered value must be a multiple of 100 ms (the MII link monitoring frequency).
MII up delay:	Waiting period in milliseconds before a reset network interface is activated. The entered value must be a multiple of 100 ms (the MII link monitoring frequency).
ARP interval:	Enter the interval (100 to 10,000 milliseconds) after which the system checks for incoming ARP packets of the network interfaces.
ARP validate:	The validation ensures that the ARP packet for a particular network interface has been generated by one of the specified ARP targets. Select whether or which of the incoming ARP packets should be validated: ▪ **None:** ARP packets are not validated (default). ▪ **Active:** Only the ARP packets of the active network interface are validated. ▪ **Backup:** Only the ARP packets of the inactive network interface are validated ▪ **All:** The ARP packets of all network interfaces of the group are validated.
ARP target:	The table contains a list of all configured ARP targets. Use the buttons **New**, **Edit** and **Delete** to manage the ARP targets.

7. Click on **Save**.

Reading out the status of the network interfaces

The current status of both network interfaces can be read out in the web application.

How to detect the status of the network interfaces:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Information**.
4. Go to the paragraph **Link status**.
5. The paragraphs **Interface A** and **Interface B** include the following values:

> **NOTE:** The network interface is assigned a unique **zone ID** in addition to its name, which specifies the interface number. This is required to uniquely identify the corresponding interface when using *IPv6 link-local addresses*.

Link detected:	Connection to the network established (**yes**) or interrupted (**no**).
Auto-negotiation:	Both the transmission speed and the duplex method have been configured automatically (**yes**) or manually by the administrator (**no**).
Speed:	Transmission speed
Duplex:	Duplex mode (**full** or **half**)

6. Click on **Save**.

Creating and administrating netfilter rules

By default, all network computers have access to the web application *ConfigPanel* (open system access).

NOTE: The open system access allows unrestricted connections via ports 80/TCP (HTTP), 443/TCP (HTTPS) and 161/UDP (SNMP).

Once a netfilter rule has been created, open system access is disabled and all incoming data packets are compared with the netfilter rules. The list of netfilter rules is processed in the stored order. As soon as a rule applies, the corresponding action is executed and the following rules are ignored.

NOTE: As soon as a netfilter rule is used, the *Default DROP policy* takes effect.

If *certain* IP addresses are to be accepted, it is sufficient to assign the *Accept* filter rule to them. Data packets via *all* other IP addresses are not processed (*"dropped"*) due to the *Default DROP policy*.

IMPORTANT: If data packets are only not to be processed (*"dropped"*) via *certain* IP addresses, the *Drop* filter rule must be assigned to these IP addresses. The *Accept* filter rule must then be assigned to the IP addresses that are to be accepted, as further data packets via other IP addresses will otherwise also not be processed (*"dropped"*) due to the *Default DROP policy*. If all other IP addresses are to be accepted, the *Accept* rule can be applied to *all* IP addresses (**0.0.0.0/0**).

Creating new netfilter rules

How to create a new netfilter rule:

1. In the menu, click on **KVM switches**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Netfilter**.

5. Enter the following values:

Interface:	In the pull-down menu, select on which network interfaces the data packets are to be intercepted and manipulated: ▪ **All** ▪ **Interface A** ▪ **Interface B** ▪ **Link-Aggregation group**
Option:	In the pull-down menu, select how to interpret the sender information of the rule: ▪ **Normal:** The rule applies to data packets whose sender information corresponds to the IP address or MAC address specified in the rule. ▪ **Inverted:** The rule applies to data packets whose sender information does *not* correspond to the IP address or MAC address specified in the rule.
IP address/ Prefix length:	Enter the IP address of the host or, by specifying the **Prefix length**, define the network segment. **Examples IPv4:** ▪ **192.168.150.187/32:** for IP address 192.168.150.187 If only an IP address is entered without specifying a prefix length, the system will automatically apply **/32** as the prefix in the background. ▪ **192.168.150.0/24:** IP addresses of section 192.168.150.x ▪ **192.168.0.0/16:** IP addresses of section 192.168.x.x ▪ **192.0.0.0/8:** IP addresses of section 192.x.x.x ▪ **0.0.0.0/0:** all IPv4 addresses **Examples IPv6:** ▪ **2001:db8::222:4dff:fe84:3cb6/128:** Only this IP address If only an IP address is entered without specific a prefix length, the system will automatically apply **/128** as the prefix in the background. ▪ **fe80::/64:** all link local IP addresses ▪ **2001:db8::/64:** IP addresses of space 2001:db8::/64 ▪ **::/0:** all IPv6 addresses **NOTE:** The *IP address* and/or a *MAC address* can be specified within a rule. **NOTE:** Enter link local IPv6 addresses here without a zone ID, if applicable.
MAC address:	Enter the MAC address to be considered in this filter rule. **NOTE:** The *IP address* and/or a *MAC address* can be specified within a rule.

Filter rule:	▪ **Drop:** Data packets whose sender information matches the IP address or MAC address are not processed. ▪ **Accept:** Data packets whose sender information matches the IP address or MAC address are processed.
Service:	Select a specific service for which this rule is used exclusively, or choose (**All**).

6. Click on **Add** to save the values in a new filter rule.

   The new filter rule is added to the end of the list of existing filter rules.

7. Click on **Save**.

NOTE: The new nefilter rule is not applied to active connections. Restart the device if you want to disconnect the active connections and then apply all the rules.

Editing existing netfilter rules

How to edit an existing netfilter rule:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Netfilter**.
5. In the list of existing netfilter rules, select the rule you want to change.

6. The current rule settings are displayed in the upper part of the dialog. Check and change the following settings.

Interface:	In the pull-down menu, select on which network interfaces the data packets are to be intercepted and manipulated: ▪ **All** ▪ **Interface A** ▪ **Interface B** ▪ **Link-Aggregation group**
Option:	In the pull-down menu, select how to interpret the sender information of the rule: ▪ **Normal:** The rule applies to data packets whose sender information corresponds to the IP address or MAC address specified in the rule. ▪ **Inverted:** The rule applies to data packets whose sender information does *not* correspond to the IP address or MAC address specified in the rule.
IP address/ Prefix length:	Enter the IP address of the host or, by specifying the **Prefix length**, define the network segment. **Examples IPv4:** ▪ **192.168.150.187/32:** for IP address 192.168.150.187 If only an IP address is entered without specifying a prefix length, the system will automatically apply **/32** as the prefix in the background. ▪ **192.168.150.0/24:** IP addresses of section 192.168.150.x ▪ **192.168.0.0/16:** IP addresses of section 192.168.x.x ▪ **192.0.0.0/8:** IP addresses of section 192.x.x.x ▪ **0.0.0.0/0:** all IPv4 addresses **Examples IPv6:** ▪ **2001:db8::222:4dff:fe84:3cb6/128:** Only this IP address If only an IP address is entered without specific a prefix length, the system will automatically apply **/128** as the prefix in the background. ▪ **fe80::/64:** all link local IP addresses ▪ **2001:db8::/64:** IP addresses of space 2001:db8::/64 ▪ **::/0:** all IPv6 addresses **NOTE:** The *IP address* and/or a *MAC address* can be specified within a rule. **NOTE:** Enter link local IPv6 addresses here without a zone ID, if applicable.
MAC address:	Enter the MAC address to be considered in this filter rule. **NOTE:** The *IP address* and/or a *MAC address* can be specified within a rule.

Filter rule:	▪ **Drop:** Data packets whose sender information matches the IP address or MAC address are not processed. ▪ **Accept:** Data packets whose sender information matches the IP address or MAC address are processed.
Service:	Select a specific service for which this rule is used exclusively, or choose (**All**).

7. Click on **Apply** to save your settings.
8. Click on **Save**.

NOTE: The new nefilter rule is not applied to active connections. Restart the device if you want to disconnect the active connections and then apply all the rules.

Deleting existing netfilter rules

How to delete existing netfilter rules:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Netfilter**.
5. In the list of existing netfilter rules, select the rule you want to delete.
6. Click on **Delete**.
7. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.
8. Click on **Save**.

Changing the order or priority of existing netfilter rules

The list of netfilter rules is processed in the stored order. As soon as a rule applies, the corresponding action is executed and the following rules are ignored.

IMPORTANT: Pay attention to the order or priority of the individual rules, especially when adding new rules.

How to change the order or priority of existing netfilter rules:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Netfilter**.
5. In the list of existing netfilter rules, select the rule whose order/priority you want to change.
6. Click the button **Arrow up** to increase the priority or the button **Arrow down** to decrease the priority.
7. Click on **Save**.

Creating an SSL certificate

Use the free implementation of the SSL/TLS protocol *OpenSSL* to create an SSL certificate.

IMPORTANT: For security reasons, network certificates for the web application (see page 34 ff.) and, if used, additional user certificates for the KVM connection are **not** included in a backup and may have to be stored again after a restore.

The following websites provide detailed information about operating OpenSSL:

- OpenSSL project: **https://www.openssl.org/**
- Win32 OpenSSL: **http://www.slproweb.com/products/Win32OpenSSL.html**

IMPORTANT: Creating an SSL certificate requires the software OpenSSL. If necessary, follow the instructions on the websites mentioned above to install the software.

The instructions on the following pages explain *exemplarily* how to create an SSL certificate.

In principle, a certificate is created in 5 steps:

1. Creating a Private Key
2. Creating a Certificate Signing Request (CSR)
3. Submitting the CSR to the CA
4. Receiving the certificate from the CA
5. Creating the PEM file

Special features for complex KVM systems

If different G&D devices are to communicate with each other within a KVM system, the identical *Certificate Authority* (see page 35) must be used when creating certificates for these devices.

Alternatively, the identical PEM file (see page 39) can also be used for all devices. Inthis case, all characteristics of the certificates are identical.

Creating a Certificate Authority

A *Certificate Authority* enables the owner to create digital certificates (e. g. for a matrix switch.

How to create a key for the Certificate Authority:

> **IMPORTANT:** The following steps describe how to create keys that are not coded. If necessary, read the OpenSSL manual to learn how to create a coded key.

1. Enter the following command into the command prompt and press **Enter**:

```
openssl genrsa -out ca.key 4096
```

2. OpenSSL creates the key and stores it in a file named *ca.key*.

How to create the Certificate Authority:

1. Enter the following command into the command prompt and press **Enter**:

```
openssl req -new -x509 -days 3650 -key ca.key -out ca.crt
```

2. Now, OpenSSL queries the data to be integrated into the certificate.

   The following table shows the different fields and an exemplary entry:

Field	Example
Country Name (2 letter code)	DE
State or Province Name	NRW
Locality Name (e.g., city)	Siegen
Organization Name (e.g., company)	Guntermann & Drunck GmbH
Organizational Unit Name (e.g., section)	
Common Name (e.g., YOUR name)	Guntermann & Drunck GmbH
Email Address	

IMPORTANT: The device's IP address must not be entered under *Common Name*.

   Enter the data you want to state, and confirm each entry by pressing **Enter**.

3. OpenSSL creates the key and stores it in a file named *ca.crt*.

IMPORTANT: Distribute the certificate *ca.crt* to the web browsers using the web application. The certificate checks the validity and the trust of the certificate stored in the device.

Creating any certificate

How to create a key for the certificate to be created:

> **IMPORTANT:** The following steps describe how to create keys that are not coded. If necessary, read the OpenSSL manual to learn how to create a coded key.

1. Enter the following command into the command prompt and press **Enter**:

```
openssl genrsa -out server.key 4096
```

2. OpenSSL creates the key and stores it in a file named *server.key*.

How to create the certificate request:

1. Enter the following command into the command prompt and press **Enter**:

```
openssl req -new -key server.key -out server.csr
```

2. Now, OpenSSL queries the data to be integrated into the certificate.

   The following table shows the different fields and an exemplary entry:

Field	Example
Country Name (2 letter code)	DE
State or Province Name	NRW
Locality Name (e.g., city)	Siegen
Organization Name (e.g., company)	Guntermann & Drunck GmbH
Organizational Unit Name (e.g., section)	
Common Name (e.g., YOUR name)	192.168.0.10
Email Address	

> **IMPORTANT:** Enter the IP address of the device on which the certificate is to be installed into the row *Common Name*.

   Enter the data you want to state, and confirm each entry by pressing **Enter**.

3. If desired, the *Challenge Password* can be defined. This password is needed if you have lost the secret key and the certificate needs to be recalled.

4. Now, the certificate is created and stored in a file named *server.csr*.

Creating and signing an X509 certificate

1. Enter the following command into the command prompt and press **Enter**:

```
openssl req -x509 -days 3650 -in server.csr -CA ca.crt -CAkey ca.key -set_serial 01 -out server.crt
```

2. OpenSSL creates the certificate and stores it in a file named *server.crt*.

IMPORTANT: If you do not create the certificats as explained in the previous sections, but use your own certificates with certificate extensions, the command to be entered must be adapted or extended accordingly.

EXAMPLE: If you use *Extended Key Usage* to restrict the permitted use of the key, at least the *serverAuth* and *clientAuth* extensions must be activated or taken into account:

```
openssl req -x509 -days 3650 -in server.csr -CA ca.crt -CAkey ca.key -set_serial 01 -out server.crt -addext 'extendedKeyUsage = serverAuth, clientAuth'
```

ADVICE: To check which certificate extensions are used, use:

```
openssl x509 -text -in ca.crt
```

Creating a PEM file

NOTE: The *.pem* file contains the following three components:

- server certificate
- private server key
- certificate of the certification authority

If these three components are available separately, enter them successively to the *Clear text* entry before updating the certificate stored in the device.

1. Enter the following command(s) into the prompt and press **Enter**:

   a. Linux

   ```
   cat server.crt > gdcd.pem
   cat server.key >> gdcd.pem
   cat ca.crt >> gdcd.pem
   ```

   b. Windows

   ```
   copy server.crt + server.key + ca.crt gdcd.pem
   ```

2. The *gdcd.pem* file is created while copying. It contains the created certificate and its key as well as the *Certificate Authority*.

Selecting an SSL certificate

By default, each G&D device with integrated web application stores at least one SSL certificate. The certificate has two functions:

- The connection between web browser and web application can be established via an SSL-secured connection. In this case, the SSL certificate allows the user to authenticate the opposite side.

  If the device's IP address does not match the IP address stored in the certificate, the web browser sends a warning message.

  ADVICE: You can import a user certificate so that the device's IP address matches the IP address stored in the certificate.

- The communication between G&D devices within a system is secured via the devices' certificates.

  IMPORTANT: Communication between devices is possible only if all devices within a KVM system use certificates of the same *Certificate Authority* (see page 35).

How to select the SSL certificate you want to use:

IMPORTANT: After activating *another* certificate, close the currently active »Config Panel« sessions and start new sessions.

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Certificate**.

5. Select the certificate you want to use:

G&D certificate #1:	This certificate is enabled for *new* devices. **NOTE:** Make sure that you use the same certificate for all devices within the KVM system.
G&D certificate #2:	This certificate is supported by some older G&D devices with integrated web application.
User certificate:	Select this option if you want to use a certificate purchased from a certificate authority or if you want to use a user certificate. Now you can import and upload the certificate: ▪ Click on **Import certificate from file** and use the file dialog to select the .pem file you want to import. You can also copy the plain text of the server certificate, the server's private key and the certificate of the certificate authority to the text box. ▪ Click on **Upload and activate** to store and activate the imported certificate for the device.

6. Click on **Save**.

IMPORTANT: For security reasons, network certificates for the web application (see page 34 ff.) and, if used, additional user certificates for the KVM connection are **not** included in a backup and may have to be stored again after a restore.

Firmware update

The firmware of each device of the KVM system can be updated via the web application.

Firmware update of a single device

IMPORTANT: This function only updates the firmware of the device on which the web application was started.

How to execute a firmware update of a single device:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to update.
3. Open the menu **Service tools** and select the entry **Firmware update**.
4. Click on **Supply firmware image files**.

   NOTE: If the firmware file is already available in the internal storage, you can skip this step.

   Select the firmware file on your local disk and click on **Open**.

   NOTE: Multiple selection of firmware files is possible by simultaneously pressing the **Shift** or **Ctrl** key and the left mouse button.

   The firmware file is transferred to the internal storage and can then be selected for the update.
5. Select the firmware files to be used from the internal storage and click on **Continue**.
6. Select the **Intended version** of the devices if you selected more than one firmware files for one device.
7. Move the **Update** slider to the right (green) in the rows of all devices to be updated.
8. Click on **Start update**.

IMPORTANT: Do **not** close the browser session while the device is being updated! Do **not** turn off the product or disconnect it from the power supply during the update.

Firmware update of multiple KVM system devices

How to execute a firmware update of multiple KVM system devices:

1. In the menu, click on **System**.
2. Click on **System update**.
3. Select the devices whose firmware you want to update and click **Firmware update**.

   NOTE: For devices for which a firmware update is currently not possible, the reason for this is displayed in the **Status** field.

4. Click on **Supply firmware image files**.

   NOTE: If the firmware file is already in the internal storage, you can skip this step.

   Select the firmware file on your local disk and click **Open**.

   NOTE: Multiple selection of firmware files is possible by simultaneously pressing the **Shift** or **Ctrl** key and the left mouse button.

   The firmware file is transferred to the internal storage and can then be selected for the update.
5. Select the firmware files to be used from the internal storage and click **Continue**.
6. Select the **Intended version** of the devices if you selected more than one firmware files for one device.
7. Move the **Update** slider to the right (green) in the rows of all devices to be updated.
8. Click on **Start update**.

NOTE: In order to ensure the transfer of updates to the end devices for larger data volumes, the end devices are updated in groups as required.

IMPORTANT: Do **not** close the browser session while the devices are being updated! Do **not** turn off the products or disconnect them from the power supply during the update.

Restoring the system defaults

With this function, the system defaults of the device on which the web application is operated can be restored.

How to restore the system defaults:

1. In the menu, click on **System**.
2. Click on **System defaults**.
3. Select the scope of the recovery:

Reset all settings:	Reset all settings of the device.
Reset only local network settings:	Reset only local network settings.
Reset only KVM application settings:	Reset all settings except the local network settings.

4. Click on **Set system defaults**.

Restarting the device

This function restarts the device. Before restarting, you will be prompted for confirmation to prevent an accidental restart.

How to restart the device using the web application:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the desired device.
3. Open the menu **Service tools** and select the entry **Restart**.
4. Confirm the confirmation prompt with **Restart**.

Network functions of the devices

The devices within the KVM system provide *separate* network functions.

The following functions can be configured for each device within the KVM system:

- Authentication against directory services (LDAP, Active Directory, RADIUS)
- Time synchronisation via NTP server
- Forwarding of log messages to syslog servers
- Monitoring and control of computers and network devices via *Simple Network Management Protocol* (see page 67 ff.)

NTP server

The date and time of a device can be set either automatically by time synchronization with an NTP server (*Network Time Protocol*) or manually.

Time sync with an NTP server

How to change the NTP time sync settings:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.

4. Go to the paragraph **NTP server** and enter the following values:

General	
NTP time sync:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the time synchronization: ▪ **Disabled** (*default*) ▪ **Enabled**
Time zone:	Use the pull-down menu to select the time zone of your location.
NTP server 1	
Address:	Enter the IP address of a time server.
Authentication:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the authentication: ▪ **Disabled** (*default*) ▪ **SHA1**
Key ID:	After enabling the authentication, enter the key ID that can be used for key authentication with the NTP server.
Key:	Enter the key in the form of up to 40 hex digits.
NTP server 2	
Address:	O*ptionally* enter the IP address of a second time server.
Authentication:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the authentication: ▪ **Disabled** (*default*) ▪ **SHA1**
Key ID:	After enabling the authentication, enter the key ID that can be used for key authentication with the NTP server.
Key:	Enter the key in the form of up to 40 hex digits.

5. Click on **Save**.

Manual setting of time and date

How to manually set the time and date of the device:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **NTP server**.

> **IMPORTANT:** If necessary, disable the **NTP time sync** option. Otherwise, you might not be able to set time and date manually.

5. Go to the entry **Time** under **Time/date** to enter the current time (*hh:mm:ss*).
6. Go to the entry **Date** under **Time/date** to enter the current time (*DD.MM.YYYY)*.

> **ADVICE:** Click on **Accept local date** to copy the current system date of the computer on which the web application was opened to the *Time* and *Date* fields.

7. Click on **Save**.

Logging syslog messages

The syslog protocol is used to transmit log messages in networks. The log messages are transmitted to a syslog server that logs the log messages of many devices in the computer network.

Among other things, eight different severity codes have been defined to classify the log messages:

- **0:** Emergency
- **1:** Alert
- **2:** Critical
- **3:** Error
- **4:** Warning
- **5:** Note
- **6:** Info
- **7:** Debug

The web application enables you to configure whether the syslog messages are to be locally logged or sent to up to two syslog servers.

EXAMPLE: When using severity code 6 (*default*), the following events are logged with time stamp (ISO8601) and other information, for example:

- User login: Which user has logged on to which device and is the user already logged on to another device (usercount N)
- Login failure: An incorrect login attempt was made on which device (even when using severity level 5)
- User rights change: Which user has made a change to rights via which device
- Connection to a remote target: Which user has connected to which remote target on which device via which RemoteAccess-IP-CPU
- (Auto)backup failure: For which device has an (auto)backup failed (even when using severity level 3)

NOTE: The selected severity and all lower severity levels are logged.

Local logging of syslog messages

How to locally log syslog messages:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Syslog** enter the following data under **Syslog local**:

Syslog local:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the local logging of syslog messages: ▪ **Disabled** ▪ **Enabled** (*default*)
Log level:	In this pull-down menu, select the severity from which a log message is to be logged (*Default*: 6 - Info). The selected severity and all lower severity levels are logged.

If you select the severity *2 - Critical*, messages for this code as well as for the severity levels *1 - Alert* and *0 - Emergency* are logged.

5. Click on **Save**.

Sending syslog messages to a server

How to send syslog messages to a server:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Syslog** and enter the following values under **Syslog server 1** or **Syslog server 2**:

Syslog server:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the sending of syslog messages to a server: ▪ **Disabled** (*default*) ▪ **Enabled**
Log level:	In this pull-down menu, select the severity level from which a log message is to be logged. The selected severity level and all lower severity levels are logged. If you select the severity *2 - Critical*, messages for this code as well as for the severity levels *1 - Alert* and *0 - Emergency* are logged.
IP address/ DNS name:	Enter the IP address or the FQDN of the destination server for the syslog messages.
Port:	Enter the port - usually 514 - on which the syslog server accepts incoming messages.
Protocol:	Select the protocol - usually UDP - on which the syslog server accepts incoming messages: ▪ **TCP** ▪ **UDP**

5. Click on **Save**.

Viewing and saving local syslog messages

If the function to log the local syslog messages is activated, these syslog messages can be viewed and, if necessary, stored in the information dailog.

How to view and store local syslog messages:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure.
3. Open the menu **Service tools** and select the entry **Syslog**.
4. Click on **Retrieve syslog**.

   The local syslog messages are now retrieved and displayed in the text field.

   ADVICE: Click on **Save syslog** to save the messages in a text file.

5. Click on the red **[X]** to close the window.

User authentication with directory services

In internal corporate networks, user accounts are often managed centrally by a directory service. The device can access such a directory service and authenticate users against the directory service.

NOTE: If the directory service fails to authenticate the user account *Admin*, the user account is authenticated against the database of the device.

The directory service is used exclusively to authenticate a user. Rights are granted by the database of the KVM system. The following paragraphs describe the different scenarios:

- **The user account exists in the directory service and in the KVM system**
  The user can log on with the password stored in the directory service. After a successful login, the rights of the account with the same name are assigned to the user in the KVM system.

  NOTE: The password with which the user has successfully logged on is transferred to the database of the KVM system.

- **The user account exists in the directory service, but not in the KVM system**
  A user who has been successfully authenticated against the directory service but does not have an account of the same name in the KVM system's database will be granted the rights of a *RemoteAuth* user.
  If required, change the rights of this particular user account to set the rights for users without a user account.

  ADVICE: Deactivate the *RemoteAuth* user to prevent users without user accounts to log on to the KVM system.

- **The user account exists in the KVM system, but not in the directory service**
  If the directory service is available, it reports that the user account does not exist. Access to the KVM system is denied to the user.
  If the server is not available but the fallback mechanism is activated, the user can log on with the password stored in the KVM system.

  IMPORTANT: In order to prevent the logon of a user locked or deactivated in the directory service when the connection to the directory service fails, please observe the following security rules:
  - If a user account is deactivated or deleted in the directory service, this action must also be carried out in the user database of the KVM system!
  - Activate the fallback mechanism only in exceptional cases.

  IMPORTANT: When using two-factor authentication
  (see *Setting up two-factor authentication on the device (optional)* on page 54),
  the fallback mechanism **cannot** be used.

How to configure the authentication of user accounts:

NOTE: If no directory service is used, the user accounts are managed by the device.

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **Authentication**.

5. Enter the following values under **Authentication service**:

Authentication server: Select the **Local** option if the user administration is to be carried out by the KVM system.

If you want to use a certain external directory service, select the corresponding entry from the pull-down menu:

- **LDAP**
- **Active Directory**
- **Radius**

After selecting a external directory service, enter the settings of the directory service server in the corresponding dialog box.

NOTE: User names can be subject to a naming convention when using external directory services (see *Creating a new user account* on page 76).

ADVICE: When using *LDAP* or *Active Directory*, enter the path from which the respective search should be started in the **Base DN/SearchScope** field. This saves time and prevents an unnecessarily long search.

Fallback: Activate this option if you want to use the local user administration of the KVM system if the directory service is temporarily unavailable.

IMPORTANT: In order to prevent the logon of a user locked or deactivated in the directory service when the connection to the directory service fails, please observe the following security rules:

- If a user account is deactivated or deleted in the directory service, this action must also be carried out in the user database of the KVM system!
- Activate the fallback mechanism only in exceptional cases.

IMPORTANT: When using two-factor authentication, the fallback mechanism **cannot** be used
(see *Setting up two-factor authentication on the device (optional)* on page 54).

6. Click on **Save**.

Setting up two-factor authentication on the device (optional)

Standard user authentication involves querying a password. To provide a greater level of security, optional two-factor authentication (2FA) can be used to query a second factor based on a device in the user's possession. 2FA makes use of a time-based one-time password (TOTP). Authenticator apps or hardware tokens can be used.

To enable use of 2FA, support for it must first be activated on the relevant device.

IMPORTANT: If you no longer have access to your possession-based factor or if it is broken, you will lose access to the system. Take precautions by, for example, keeping the emergency codes in a safe place if you are using the internal OTP server and configuring settings that will minimise the risk of losing access (see *Activating two-factor authentication (optional)* on page 77).

How to activate 2FA on the device:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Double-click the device that is to be configured.
3. Click on the tab **Network**.
4. Select the section **2-factor authentication (2FA)**.

5. In the sector 2-factor authentication, enter the following data:

2FA support:	▪ **Disabled** (*default*) ▪ **Enabled**
OTP server:	Select the option **Internal** (*default*), if you will be using an authentication server that is provided in the device. If you want to use a specific external directory service, select the corresponding entry from the pull-down menu: ▪ **LDAP** ▪ **Active Directory** ▪ **Radius** Once you have selected a directory service, enter the settings for the directory service server in the dialogue screen that opens.
Login only for users with configured 2FA:	If the internal OTP server is used, you can specify whether login for users without activated 2FA will permitted (*default*) or prevented. This option can be used to set up a transition period for setting up the OTPs, for example. ▪ **No** (*default*) ▪ **Yes**

NOTE: Note that usernames may be subject to a naming convention if a directory service is used (see *Creating a new user account* on page 76).

IMPORTANT: If an external directory service is used, the second factor will be required for **every** user profile on login.

6. Click on **Save**.

IMPORTANT: Use time sync with an NTP server (see page 45). Alternatively, you can set the time and date manually (see page 47).

Information on activating two-factor authentication is provided on page 77.

KVM connection

Defining the ports of the KVM-over-IP connection

To establish the KVM-over-IP connection, the control port and the communication port must be defined.

How to configure the ports of the KVM-over-IP connection:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Go to the paragraph **Local** and enter the following values:

Control Port:	Enter the number of the port to be used (*default*: 18246).
Communication Port (K, M, misc):	Enter the number of the port to be used (*default*: 18245).

5. In the line **Establish connection via own certificate**, select whether the connection setup to the remote station is to be protected with a certificate:

IMPORTANT: A connection can only be established if the counterpart uses a certificate by the same Certificate Authority!

Deactivated:	The connection establishment *is not* protected by a certificate.
Activated, network certificate:	The network certificate is used to establish the connection (see *Selecting an SSL certificate* on page 40).
Activated, separate certificate:	A purchased certificate from a certificate authority or a self-created certificate are used to establish the connection (see *Creating an SSL certificate* on page 34). Click **Upload certificate** and select the .pem file to import in the file dialog. Click **Upload and activate** to save and activate the certificate.

6. Click on **Save**.

IMPORTANT: For security reasons, network certificates for the web application (see page 34 ff.) and, if used, additional user certificates for the KVM connection (see page 56) are **not** included in a backup and may have to be stored again after a restore.

Classifying IP packets (DiffServ)

For QoS purposes (Quality of Service) you have the possibility to use **Differentiated Services Codepoints** (DSCP) to classify the IP packets.

Through this classification, you can prioritize the data packets, for example, through a switch.

How to configure the DSCPs of the IP data packets:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Go to the paragraph **Connection settings** and enter the following values:

DiffServ Communication (K, M, misc):	Define the **Differentiated Services Codepoint** (DSCP) to be used for the classification of the IP packets of the **Communication** data packets.

> **NOTE:** Take. into consideration that some network switches automatically assign the server class **Network Control** (DSCP name: **CS6**) for *all* data packets.
>
> In such environments, the **DSCP 48** option must not be selected!

5. Click on **Save**.

Determination of the type of video transmission

In the default setting, the computer modules (**IP-CPU**) send the video streams via multicast to the console modules (**IP-CON**).

This option allows users with *Device rights: MultiAccess* right to connect to a computer module to which *another* user is already connected.

> **IMPORTANT:** The multicast streams are controlled by the network switches and enable efficient distribution of the streams to multiple recipients at the same time.
>
> Please note the requirements for the *network switch* for sending the video streams via multicast. Refer to the Installation Guide for detailed information.

Alternatively, you can specify that the computer modules (**IP-CPU**) send the video streams via *unicast* to the console modules (**IP-CON**).

The connection of a user to a computer module to which another user is already connected is *not* possible in this mode!

NOTE: This option places significantly *less* demands on the network switch.

You can define the type of video transmission system-wide. The system-wide setting is applied by default by all computer modules. In addition, you can specify the type of video transmission individually for each computer module (see page 126).

How to configure the system-wide multicast or unicast video transmission setting:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Enter your setting in the paragraph **Multicast**:

IP adress range:	Preset based on the UID
Netmask:	Preset
Multicast video:	Select **On** (default) to enable Mulitcast video. Select **Off** to disable Multicast video.
Multicast group-management:	Select **Early re-use** (default) or **Deleyed re-use**.
Group standby-time:	Enter the desired standby-time in seconds (*default*: 130 seconds).

NOTE: The *default* settings in the **Multicast** section cover most applications. Only in a few exceptional cases, you need to make adjustments in this area.

If you have any questions, please contact our support team.

5. Click on **Save**.

Restricting KVM-over-IP counterparts (UID locking)

By default, *each* IP matrix, *each* console module and *each* computer module is allowed to establish a KVM-over-IP connection to the matrix switch.

ADVICE: Activate the function **UID locking** if you want to *specify* which counterparts should be able to connect to the matrix switch.

How to enable/disable UID locking:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Enter your setting in the paragraph **UID locking**:

UID locking:	Only the counterparts specified in the list may establish a KVM-over-IP connection (**Enabled**), or all counterparts may establish a connection (**Disabled**).
Connected device UIDs:	If UID locking is switched on, activate the **Permitted** slider in the line of each device that is allowed to establish a connection to the matrix switch.
Add computer module:	Click this button and enter the UID of the computer module that is allowed to connect to this matrix switch. Click on **Save**.
Add console module:	Click this button and enter the UID of the console module that is allowed to connect to this matrix switch. Click on **Save**.
Add RemoteAccess-IP-CPU:	Click this button and enter the UID of the computer module that is allowed to connect to this matrix switch. Click on **Save**.
Add IP matrix:	Click this button and enter the UID of the IP matrix that is allowed to connect to this matrix switch. Click on **Save**.
Remove:	Click on a permitted counterpart and then on **Remove** to revoke the permission.

5. Click on **Save**.

Used network ports and protocols

The following network ports and protocols can be used by G&D KVM-over-IP.

IMPORTANT: Make sure that these ports and protocols are not blocked in your network.

Port	Service	Type	Description	Note
-	IGMP	IGMP	IGMP multicast	not changeable
-	L2 multicast		01:0F:F4.. Device Finder	not changeable
-	IPSec	ESP	IPSec Encapsulating Security Payload	not changeable
-	IPSec	AH	IPSec Authentication Header	not changeable
22	SSH	TCP	optional communication RemoteAccess-IP-CPU and RemoteTargets	changeable (see page 168)
67	DHCP	UDP	DHCP server	not changeable (see page 4)
68	DHCP	UDP	DHCP client	not changeable (see page 4)
80	http	TCP	for opening the web application (forwarding to https)	deactivatable, if forwarding is not required or desired
123	NTP	UDP	for time sync	not changeable (see page 45)
161	SNMP	UDP	optional SNMP agent	changeable (see page 67)
162	SNMP-Traps	UDP/ TCP	optional SNMP agent	changeable (see page 70)
389	LDAP	UDP/ TCP	optional communication authentication service	not changeable (see page 51)

443	https	SSL/ TCP	for opening the web application	not changeable (see page 28)
445	CIFS	TCP	for auto-backup function	changeable (see page 96)
514	Syslog	UDP/ TCP	optional Syslog server 1/ Syslog server 2	changeable (see page 48)
636	Active Directory	UDP/ TCP	optional communication authentication service	not changeable (see page 51)
1812	Radius	UDP/ TCP	optional communication authentication service	not changeable (see page 51)
2049	NFS	UDP/ TCP	for auto-backup function	changeable (see page 96)
3389	RDP	TCP	optional communication RemoteAccess-IP-CPU and RemoteTargets	changeable (see page 168)
5900	VNC	TCP	optional communication RemoteAccess-IP-CPU	changeable (see page 168)
6137	U2-LAN	UDP	optional communication U2-LAN	not changeable
18244	KVM-over-IP	UDP	KVM-over-IP: Data-Port (video, only for end device communication)	changeable (OSD)
18245	KVM-over-IP	UDP	KVM-over-IP: Communication Port (K, M, misc)	changeable (see page 56)
18246	KVM-over-IP	UDP	KVM-over-IP: Control Port and IPSec Internet Key Exchange (IKE)	changeable (see page 56)
27994	Remote-Port	TCP	optional Remote control access, for example IP Control API	changeable (see page 223)

27996	Database communica-tion	TCP	internal communication, for exsample MatrixGuard	changeable (see page 278)
37996	Database communica-tion	TCP	internal communication	not changeable

NOTE: It is possible that additional ports are used, e.g. when using the optional *RemoteAccess-Streaming-Features* (see *Remote gateways and remote targets* on page 153 ff.).

Database mode

In the default setting, each matrix switch has the database mode **Leader** and administers its own database.

IMPORTANT: It is *not* possible to edit the database mode when using the **DirectRedundancyShield** function (see page 280 ff.).

How to edit the database mode:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Database mode**.
4. Enter your setting in the paragraph **Edit database mode**:

Database mode:	Select **Leader** (*default*) if the matrix switch is to assume the role of the database leader and should store the database in this device. Select **Follower** if the matrix switch should take over the settings of another matrix switch.
Database port (local):	Enter the number of the port to be used (*default*: 27996).
Database IP (remote):	If you have selected the database mode **Follower**, enter the IP address of the matrix switch that has the database role **Leader**.
Database port (remote):	If you have selected the database mode **Follower**, enter the database port of the matrix switch that has the database role **Leader**.

NOTE: In general, no manual adjustments need to be made in the **Database mode** section. The settings are controlled via the wizards of the **Advanced features**.

If you have any questions, please contact our support team.

5. Click on **Save**.

Click on **Test database connection** to check, if the set database is available.

Monitoring functions

Under **Matrix systems** and **System monitoring** you can view the monitoring values of any devices connected to the KVM system.

The following exemplary figure shows the monitoring values *Status*, *Main power* and *Temperature* of a device:

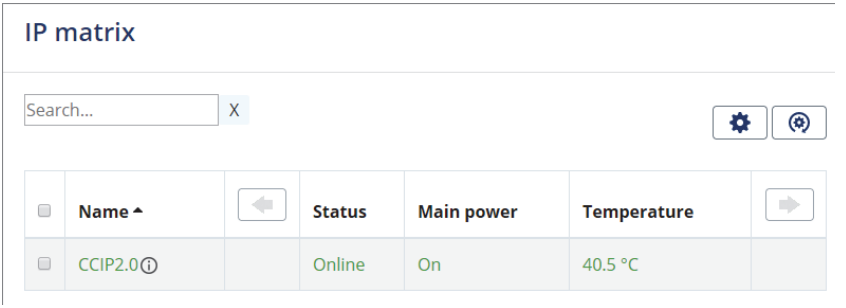


Figure 4: Detailed view of an exemplary monitoring table

The values configured for the table view (see *Configuring table columns* on page 10) are listed in the table.

You can see immediately from the colour whether the status is correct (green) or critical (red). The text displayed in the column also provides information about the current status.

Viewing all monitoring values

You can see the list of all monitoring values under **Matrix systems**.

NOTE: Matrix switches with firmware version 1.1.000 or higher additionally support monitoring of the computer and console modules.

How to show a list of all monitoring values:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to check and then click on **Configuration**.
3. Click on the tab **Monitoring**.

   The displayed table contains a list of all available monitoring values.
4. Click on **Close**.

Enabling/disabling monitoring values

You can switch each monitoring value on and off *separately* or you can switch all monitoring values on or off *together*.

Deactivated monitoring values are *not* displayed in the web application.

IMPORTANT: The web application does *not* give any warnings about deactivated monitoring values and does also *not* send any SNMP traps for these values.

How to enable/disable an *individual* monitoring value:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Monitoring**.
4. Turn the slider in the column **Enabled** of the desired monitoring value to the right (enabled) or to the left (disabled).
5. Click on **Save**.

How to enable/disable *all* monitoring values:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Monitoring**.
4. Mark or unmark the **Enabled** checkbox in the column header to switch all values on or off.
5. Click on **Save**.

Advanced features for managing critical devices

The **Monitoring status** icon (see *User interface* on page 8) shows you at a glance whether all monitoring values are within the normal range (green icon) or if at least one monitoring value is outside the normal range (yellow or red icon).

The *Monitoring status* icon always takes the colour of the *most critical* monitoring value

Displaying the list of critical monitoring values

If the **Monitoring status** icon is displayed in yellow or red, you can access the **Active alarms** dialog by clicking on the icon.

The *Active alarms* dialog shows any critical values.

Confirm the alarm of a critical device

Many alarm messages require immediate action by the administrator. Other alarms (for example, the failure of the redundant power supply), on the other hand, indicate possibly uncritical circumstances.

In such a case, you can confirm the alarm message of a value. The value is thus downgraded from **Alarm** (red) to **Warning** (yellow).

How to acknowledge the monitoring message of a device:

1. Click on the red **Monitoring status** icon at the top right.
2. Select the alarm you want to acknowledge.
3. Click on **Confirm**.

Monitoring devices via SNMP

The *Simple Network Management Protocol* (SNMP) is used to monitor and control computers and network devices.

Practical use of the SNMP protocol

A *Network Management System* (NMS) is used to monitor and control computers and network devices. The system queries and collects data from the *agents* of the monitored devices.

IMPORTANT: Chinese and Cyrillic characters are not supported by many network management systems.

Therefore, make sure that the passwords you use do not contain such characters!

NOTE: An *agent* is a program that runs on the monitored device and determines its status. The determined data is transmitted to the *Network Management System* via SNMP.

If an *agent* detects a serious event on the device, it can automatically send a *trap* packet to the *Network Management System*. This ensures that the administrator is informed about the event at short notice.

Configuring an SNMP agent

How to configure an SNMP agent:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Go to the paragraph **SNMP agent**.

5. Enter the following values under *Global*:

Status:	Select the particular entry to either switch the SNMP agent off (**Disabled**) or on (**Enabled**).
Protocol:	Select the protocol (**TCP** or **UDP**) – usually UDP – to be used to transmit the SNMP packets.
Port:	Define the port – usually 161 – on which the *incoming* SNMP packets are to be accepted.
SysContact:	Enter the admin's contact data (e.g. direct dial or e-mail address).
SysName:	Enter the device name.
SysLocation:	Enter the location of the device.

6. If you want to process packets of protocol version **SNMPv2c,** enter the data listed on the following page in the section with the same name.

Access:	Activate read access (**View**), write access (**Full**) or deny access (**No**) via the *SNMPv2c* protocol.
Source IPv4:	Enter the IP address of the host or the network segment from which SNMP packets should be received. **Examples:** ▪ **192.168.150.187/32:** Only IP address 192.168.150.187 ▪ **192.168.150.0/24:** IP addresses of space 192.168.150.x ▪ **192.168.0.0/16:** IP addresses of space 192.168.x.x ▪ **192.0.0.0/8:** IP addresses of space 192.x.x.x
Source IPv6:	Enter the IP address of the host or the network segment from which SNMP packets should be received. **Examples:** ▪ **2001:db8::222:4dff:fe84:3cb6/128:** Only this IP address ▪ **2001:db8::/64:** IP addresses of space 2001:db8::/64 ▪ **fe80::/64:** ▪all link local IP addresses **NOTE:** Enter link local IPv6 addresses here without a zone ID, if applicable.
Read-only community:	Enter the name of the *Community* which has also been selected in the *Network Management System*.

IMPORTANT: The password (*Community*) of the packages of protocol version *SNMPv2c* is transmitted unencrypted and can therefore be easily tapped.

If necessary, use the protocol version *SNMPv3* (see below) and a high *security level* to ensure secure data transmission.

7. If you want to process packets of protocol version **SNMPv3c,** enter the data in the section with the same name:

Access:	Activate read access (**View**) or deny access (**No**) via the *SNMPv3c* protocol.
User:	Enter the username for the communication with the *Network Management System*.
Authentication protocol:	Select the authentication protocol which has been activated in the *Network Management System*: ▪ **SHA-1** ▪ **SHA-224** ▪ **SHA-256** ▪ **SHA-384** ▪ **SHA-512** (*default*) ▪ **MD5** **NOTE:** As it is now known that **MD5** does not offer collision resistance it is not recommended to use it.
Authentication passphrase:	Enter the authentication passphrase for the communication with the *Network Management System*.
Security level:	Select one of the following options: ▪ **NoAuthNoPriv:** user authentication and *Privacy* protocol deactivated ▪ **AuthNoPriv:** user authentication activated, *Privacy* protocol deactivated ▪ **AuthPriv:** user authentication and *Privacy* protocol activated
Privacy protocol:	Select the privacy protocol which has been activated in the *Network Management System*: ▪ **AES128** ▪ **AES192** ▪ **AES256** (*default*) ▪ **DES.** **NOTE:** Due to the short key length of **DES**, its use is not recommended.
Privacy passphrase:	Enter the privacy passphrase for secure communication with the *Network Management System*.

Engine ID method:	Select how the **SnmpEngineID** should be assigned: ▪ **Random:** The *SnmpEngineID* is re-assigned with every restart of the device. ▪ **Fix:** The *SnmpEngineID* is the same as the MAC address of the device's network interface. ▪ **User:** The string entered under *Engine ID* is used as *SnmpEngineID*.
Engine ID:	When using the *Engine ID method* **User**, enter the string that is used as *Engine ID*.

8. Click on **Save**.

Adding and Configuring SNMP traps

How to add a new trap or edit an existing trap:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the tab **Network**.
3. Go to the paragraph **SNMP trap**.
4. Click on **Add** or on **Edit**.
5. Enter the followng values under **Global**:

Server:	Enter the IP address of the *Network Management Server*.
Protocol:	Select the protocol (**TCP** or **UDP**) – usually UDP – to be used to transmit the SNMP packets.
Port:	Enter the port – usually 162 – on which *outgoing* SNMP packets are transmitted.
Retries:	Enter the number of retries to send an *SNMP Inform*.
	NOTE: Inputs are only possible if the *Inform* option is selected in the *Notification type* field.
Timeout:	Enter the timeout (in seconds) after which an *SNMP Inform* will be resent if no confirmation is received.
	NOTE: Inputs are only possible if the *Inform* option is selected in the field *Notification type*.

Log level:	Select the severity of an event from which an SNMP trap is to be sent. The selected severity and all lower severity levels are logged.

NOTE: If you select the severity *2 - Critical*, SNMP traps will be sent for events of this severity level as well as for events of the severity levels *1 - Alert* and *0 - Emergency*.

Version:	Select if the traps are to be created and sent according to the *SNMPv2c* (**v2c**) or *SNMPv3* (**v3**) protocol.
Notification type:	Select if events are sent as *Trap* or *Inform* packet.

NOTE: Inform packets require a confirmation of the Network Management System. If this confirmation is not available, transmission is repeated.

6. If you selected protocol version **SNMPv2c** in the last step, enter the name of the *Community*, which was also selected in the *Network Management System*.

IMPORTANT: The password (*Community*) of the packages of protocol version *SNMPv2c* is transmitted unencrypted and can therefore be easily tapped.

If necessary, use the protocol version *SNMPv3* (see below) and a high *security level* to ensure secure data transmission.

7. If you selected protocol version **SNMPv3** in step 5, enter the following data in the section with the same name:

Username:	Enter the username for the communication with the *Network Management System*.
Authentication protocol:	Select the authentication protocol which has been activated in the *Network Management System*: ▪ **SHA-1** ▪ **SHA-224** ▪ **SHA-256** ▪ **SHA-384** ▪ **SHA-512** ▪ **MD5** (*default*)

NOTE: As it is now known that **MD5** does not offer collision resistance it is not recommended to use it.

Authentication passphrase:	Enter the authentication passphrase for secure communication with the *Network Management System*.

Security level:	Select one of the following options: ▪ **NoAuthNoPriv:** user authentication and *Privacy* protocol deactivated ▪ **AuthNoPriv:** user authentication activated, *Privacy* protocol deactivated ▪ **AuthPriv:** user authentication and *Privacy* protocol activated
Privacy protocol:	Select the privacy protocol which has been activated in the *Network Management System*: ▪ **AES128** ▪ **AES192** ▪ **AES256** ▪ **DES** (*default*). **NOTE:** Due to the short key length of **DES**, its use is not recommended.
Privacy passphrase:	Enter the privacy passphrase for secure communication with the *Network Management System*.
Engine ID:	Enter the *Engine ID* of the trap receiver.

8. Click on **Save**.

How to delete an existing trap:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the tab **Network**.
3. Go to the paragraph **SNMP trap**.
4. In the row of the receiver you want to delete, click on **Delete**.
5. Click on **Save**.

Users and groups

Efficient rights administration

The web application administrates up to 1,024 user accounts as well as the same amount of user groups. Any user within the system can be a member of up to 20 groups.

User accounts and user groups can be provided with different rights to operate the system.

ADVICE: Rights administration can be carried out almost completely through user groups. Therefore, user groups and the assigned rights have to be planned and implemented beforehand.

This way, user rights can be changed quickly and efficiently.

The effective right

The effective right determines the right for a particular operation.

IMPORTANT: The effective right is the maximum right, which consists of the user account's individual right and the rights of the assigned group(s).

EXAMPLE: The user *JDoe* is member of the groups *Office* and *DeviceConfig*.

The following table shows the user account rights, the rights of the assigned groups and the resulting effective right:

Right	User *JDoe*	Group *Office*	Group *DeviceConfig*	Effective right
Computer module config	No	No	**Yes**	**Yes**
Change own password	No	**Yes**	No	**Yes**
(Computer module) Access	**Yes**	View	No	**Yes**

The settings of the *Computer module config* and *Change own password* rights result from the rights assigned to the user groups. The *(Computer module) Access* right is given directly in the user account.

The dialogue windows of the web application additionally display the effective right for every setting.

ADVICE: Click on the **i** button to get a list of the groups and rights assigned to the user account.

Efficient user group administration

User groups let you create a shared right profile for multiple users with identical rights. Furthermore, any user accounts included in the member list can be grouped and therefore no longer have to be individually configured. This facilitates the rights administration within the system.

If the rights administration takes place within user groups, the user profile only stores general data and user-related settings (key combinations, language settings, …).

When initiating the system, it is recommended to create different groups for users with different rights (e. g. »*Office*« and »*IT*«) and assign the respective user accounts to these groups.

EXAMPLE: Create more groups if you want to divide the user rights even further. If, for example, you want to provide some users of the »*Office*« group with the *Change device configuration* right, you can create a user group for these users:

- Create a user group (e. g., »*Office_Change device configuration*«) with identical settings for the »*Office*« group. The *Change device configuration* right is set to *Yes*. Assign the respective user accounts to this group.
- Create a user group (e. g., »*Change device configuration*«) and set only the *Change device configuration* right to *Yes*. In addition to the »*Office*« group, also assign the respective user accounts to this group.

In both cases, the user is provided with the *Yes* effective right for *Change device configuration*.

ADVICE: The user profile lets you provide extended rights to a group member.

Administrating user accounts

User accounts let you define individual rights for every user. The personal profile also provides the possibility to define several user-related settings.

IMPORTANT: The administrator and any user assigned with the *Superuser* right are permitted to create and delete user accounts and edit rights and user-related settings.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

Creating a new user account

The web application manages up to 1,024 user accounts. Each user account has individual login data, rights and user-specific settings for the KVM system.

IMPORTANT: If an individual password policy is to be taken into account, you must configure the password complexity (see *Password complexity* on page 16) before creating a new user account.

How to create a new user account:

1. In the menu, click on **User**.
2. Click on **Add user**.
3. Enter the following values in the dialog box:

Name:	Enter a user name. **NOTE:** User names can be subject to a naming convention when using external directory services (see *User authentication with directory services* on page 51 ff.).
Password:	Enter the user account password.
Confirm password:	Repeat the password.
Clear text:	If necessary, mark this entry to view and check both passwords.
Full name:	If desired, enter the user's full name.
Comment:	If desired, enter a comment regarding the user account.
Enabled:	Mark this checkbox to activate the user account. **NOTE:** If the user account is deactivated, the user is not able to access the KVM system.

4. Click on **Save**.

IMPORTANT: After the user account has been created, it does not have any rights within the KVM system.

5. If two-factor authentication is activated on the device (see page 54), the settings for the user account must be made in the next step (see page 77).

Activating two-factor authentication (optional)

NOTE: To use optional two-factor authentication, it first needs to be set up on the device (see page 54).

If the internal OTP server is used for 2FA, it can be activated for almost any user profile (exception: user *RemoteAuth*). To generate the security key for activation, various controlling parameters are used in addition to the key itself, which can be generated automatically. The key and the controlling parameters can be modified by the user. This is necessary for setting up hardware tokens. If authenticator apps are used, the parameters do not generally need to be modified.

IMPORTANT: If an external directory service is used (see *Setting up two-factor authentication on the device (optional)* on page 54 ff.), 2FA is activated automatically for each user profile in the database. This means that login from the device is only possible if the external OTP server has identical user profiles and the second factor is validated successfully.

IMPORTANT: To activate or deactivate 2FA for a user profile, the user needs superuser rights (see page 91), or the user must be logged in with the corresponding user profile (see page 91) and have the right *Change own password* (see page 92).

IMPORTANT: Use time sync with an NTP server (see page 45). Alternatively, you can set the time and date manually (see page 47).

NOTE: 2FA can be activated for almost all user profiles. The only exception is the user *RemoteAuth*.

How to activate 2FA in the user account:

1. In the menu, click on **User**.
2. Click on the user account that is to be configured and then click on **Configuration**.
3. Click on **Edit** in the line **2-factor authentication**.
4. Select **Enabled** in the section **2FA for this user**.
5. Enter the following data in the menu:

Encryption key:	When the parameter **2FA for this user** is changed from **Disabled** to **Enabled**, a encryption key is generated and displayed automatically. **IMPORTANT: Base32 format** must be used for the entry. Click on **Generate** to obtain a new encryption key.
Hash algorithm:	▪ **SHA1** ▪ **SHA256** (*default*) ▪ **SHA512**
Validity period (secs):	Enter how long the 2-Factor Auth Code (TOTP) should remain valid. The value entered must be between **10** and **200** seconds (*default*: 30 seconds). **ADVICE:** It is a good idea to avoid selecting a validity period that is too short, as access problems could otherwise occur if the time is not synchronised correctly.
Length of 2-Factor Auth Code (TOTP):	▪ **6 digits** (*default*) ▪ **8 digits**
2-Factor Auth Code (TOTP) window width:	The window width specifies how many previous 2-Factor Auth Codes (TOTP) are valid in addition to the current one. It is **not** possible to allow future 2-Factor Auth Codes (TOTP). The value entered must be between **1** and **20** (*default*: 1). **ADVICE:** To avoid access problems from occurring as the result of the time not being synchronised correctly, it can be a good idea to permit several previous 2-Factor Auth Codes (TOTP).
Show QR code & copy security key:	Clicking the button validates the entries that have been made. A security key is generated and a QR code is displayed that contains the generated security key and that can be used to scan in with an authenticator app. The security key is copied to the clipboard.
Verification code:	Enter a verification code here that you receive from a hardware token or an authenticator app that you are using. Only numbers can be entered in this field.

6. Click on **Save**.

IMPORTANT: Following successful activation of 2FA, it the internal OTP server is used, the additional button **Emergency codes** is displayed in the line **2-factor authentication**. If you click this button, five emergency codes will be displayed. Each of these emergency codes enables a user account to be accessed **once** only. These codes are **not** limited to a specific time period. The codes should be kept in a safe place. The emergency codes can be used, for example, if a hardware token is lost to enable continued access to the system.

Click on **Get new codes** to create five new codes.

NOTE: A user who has been successfully authenticated against the directory service but who does not have an account with the same name in the database of the KVM system will be given the rights of the user *RemoteAuth*.

The 2-Factor Auth Code (TOTP) is validated by the configured external OTP server.

Change the rights of this special user account to configure the rights of users without their own account (see *Changing the user account rights* on page 82).

Deactivate the user *RemoteAuth* to prevent users from logging in to the KVM system without their own user acoount (see *Enabling or disabling a user account* on page 85).

Once 2FA has been activated in the user acoount, the 2-Factor Auth Code (TOTP) will be queried in addition to the username and password on login (see *Starting the web application* on page 6).

Renaming a user account

How to change the name of a user account:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Enter the username under **Name**.
4. *Optional:* Enter the user's full name under **Full name**
5. Click on **Save**.

NOTE: User names can be subject to a naming convention when using external directory services (see *User authentication with directory services* on page 51 ff.).

Changing the password of a user account

NOTE: The activated *Superuser* right
(see *Rights for unrestricted access to the system (Superuser)* on page 91 ff.)
or the right *Change own password*
(see *Rights to change your own password* on page 92 ff.)
are prerequisite for changing the password of a user account.

NOTE: When changing the password, any defined password policies
(see *Password complexity* on page 16) are taken into account.

How to change the password of a user account:

1. In the menu, click on **Users**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Change the following values in the dialog box:

Current password:	Enter the current password.
	NOTE: No entry is required in this field for users with activated superuser rights (see page 91 ff.).
New password:	Enter the new password.
Confirm password:	Repeat the new password.
Clear text:	Mark this entry to view and check entered passwords.
Verification code:	Enter the 2-Factor Auth Code (TOTP) from two-factor authentication.
	NOTE: The 2-Factor Auth Code (TOTP) is only requested if two-factor authentication has been configured (see page 54 f.) and activated (see page 77 ff.).

4. Click on **Save**.

Changing the user account rights

Any user account can be assigned with different rights.

The following tables lists the different user rights. Further information on the rights can be found on the indicated pages.

System rights

Name	Right	Page
Superuser right	Unrestricted access to the configuration of the system	page 91
Config Panel Login	Login to the *ConfigPanel* web application	page 91
EasyControl Login	Access to *EasyControl* tool	page 92
Change own password	Change own password	page 92
Confirm monitoring alert	Confirmation of a monitoring alarm	page 92

Global device rights

Name	Right	Page
Edit personal profile	Change personal user settings	page 212
Computer module config	Configuration of computer modules	page 109
Permission to replace device	Execution of the „Replace device“-function	page 93
MultiAccess	Access type when a computer module is simultaneously accessed	page 103
Access to exclusive signals	Access to exclusive signals	page 134
Access to USB devices	Access USB devices	page 106

Computer module rights and device group rights

Name	Right	Page
Access	Access to a computer module or a computer module group	page 100
MultiAccess	Access type when a computer module is simultaneously accessed	page 103
Access to exclusive signals	Access to exclusive signals	page 134
Access to USB devices	Access USB devices	page 106

Console module rights

Name	Right	Page
Push-Get	Carry out Push-Get function	page 220

Scripting rights and scripting group rights

Name	Right	Page
Execution	Execute scripts and script groups	page 232

Changing a user account's group membership

NOTE: Any user within the system can be a member of up to 20 user groups.

How to change a user account's group membership:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the **Membership** tab.
4. In the **Members** column, turn the slider of the group to which you want to add the user to the right (enabled).

   ADVICE: If necessary, use the *Search* field to limit the number of user groups to be displayed in the selection window.

5. In the **Members** column, turn the slider of the group from which the user is to be removed to the left in the (disabled).

   ADVICE: If necessary, use the *Search* field to limit the number of user groups to be displayed in the selection window.

6. Click on **Save**.

Enabling or disabling a user account

IMPORTANT: If a user account is disabled, the user has no access to the KVM system.

How to enable or disable a user account:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Mark the check box **Enabled** to activate the user account.

   If you want to block access to the system with this user account, unmark the checkbox.
4. Click on **Save**.

Deleting a user account

How to delete a user account:

1. In the menu, click on **User**.
2. Click on the user account you want to delete and then click on **Delete**.
3. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.

Administrating user groups

User groups enable the user to create a common rights profile for several users with the same rights and to add user accounts as members of this group.

This way, the rights of these user accounts do not have to be individually configured, which facilitates the rights administration within the KVM system.

NOTE: The administrator and any user with the *Superuser* right are authorised to create and delete user groups as well as edit the rights and the member list.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

Creating a new user group

The user can create up to 1,024 user groups within the system.

How to create a new user group:

1. In the menu, click on **User groups**.
2. Click on **Add user group**.
3. Enter the following values in the dialog box:

Name:	Enter the username.
Comment:	If desired, enter a comment regarding the user account.
Enabled:	Mark this checkbox to activate the user account.

NOTE: If the user group is disabled, the group rights do *not* apply to the assigned members.

4. Click on **Save**.

IMPORTANT: Directly after the new user group has been created, it contains no rights within the system

Renaming a user group

How to rename a user group:

1. In the menu, click on **User groups**.
2. Click on the user group you want to configure and then click on **Configuration**.
3. Enter the group name under **Name**.
4. Click on **Save**.

Changing the user group rights

The various user groups can be assigned with different rights.

The following tables lists the different user rights. Further information about the rights is given on the indicated pages.

System rights

Name	Right	Page
Superuser right	Unrestricted access to the configuration of the system	page 91
Config Panel Login	Login to the *ConfigPanel* web application	page 91
EasyControl Login	Access to *EasyControl* tool	page 92
Change own password	Change own password	page 92
Confirm monitoring alert	Confirmation of a monitoring alarm	page 92

Global device rights

Name	Right	Page
Edit personal profile	Change personal user settings	page 212
Computer module config	Configuration of computer modules	page 109
Permission to replace device	Execution of the „Replace device“-function	page 93
MultiAccess	Access type when a computer module is simultaneously accessed	page 103
Access to exclusive signals	Access to exclusive signals	page 134
Access to USB devices	Access USB devices	page 106

Computer module rights and device group rights

Name	Right	Page
Access	Access to a computer module or a computer module group	page 100
MultiAccess	Access type when a computer module is simultaneously accessed	page 103
Access to exclusive signals	Access to exclusive signals	page 134
Access to USB devices	Access USB devices	page 106

Console module rights

Name	Right	Page
Push-Get	Carry out Push-Get function	page 220

Scripting rights and scripting group rights

Name	Right	Page
Execution	Execute scripts and script groups	page 232

Administrating user group members

How to administrate user group members:

1. In the menu, click on **User groups**.
2. Click on the user group you want to configure and then click on **Configuration**.
3. Click on the **Members** tab.
4. In the **Members** column, click on the slider of the users you want to add to the group (enabled).

   ADVICE: If necessary, use the *Search* field to limit the number of users to be displayed in the selection window.

5. In the **Members** column, click on the slider of the users you want to delete from the group (disabled).

   ADVICE: If necessary, use the *Search* field to limit the number of users to be displayed in the selection window.

6. Click on **Save**.

(De)activating a user group

How to (de)activate a user group:

1. In the menu, click on **User groups**.
2. Click on the user group you want to configure and then click on **Configuration**.
3. Activate the **Enabled** slider to activate the user group.

   If you want to lock the access to the KVM system for members of this user group, deactivate the checkbox.

4. Click on **Save**.

Deleting a user group

How to delete a user group:

1. In the menu, click on **User groups**.
2. Click on the user group you want to delete and then click on **Delete**.
3. Confirm the confirmation prompt by clicking **Yes** or cancel the process by clicking **No**.

System rights

Rights for unrestricted access to the system (Superuser)

The *Superuser* right allows a user unrestricted access to the configuration of the KVM system.

NOTE: The information about the user's previously assigned rights remains stored when the *Superuser* right is activated and is reactivated when the right is revoked.

How to assign a user account with unrestricted access to the system:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **System rights**.
4. Under **Superuser right**, select between the following options:

Activated:	Allow full access to the KVM system and the connected devices
Deactivated:	Deny full access to the KVM system and the connected devices

5. Click on **Save**.

Changing the login right to the web application

How to change the login right to the web application:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **System rights.**
4. Under **Config Panel Login**, select between the following options:

Activated:	Allow access to web application
Deactivated:	Deny access to web application

5. Click on **Save**.

Rights to access the EasyControl tool

How to change the rights to access the *EasyControl* tool:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **System rights.**
4. Under **EasyControl Login**, select between the following options:

Yes:	Allow access to the *EasyControl* tool
No:	Deny access to the *EasyControl* tool

5. Click on **Save**.

Rights to change your own password

How to change the right to change your own password:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **System rights**.
4. Under **Change own password**, select between the following options:

Activated:	Allow users to change their own password
Deactivated:	Deny users the right to change their own password

5. Click on **Save**.

Authorization to confirm a monitoring alarm

How to change the authorization to confirm a monitoring alarm:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **System rights**.
4. Under Confirm monitoring alert, select between the following options:

Activated:	Confirmation of monitoring alarms allowed
Deactivated:	Confirmation of monitoring alarms denied

5. Click on **Save**.

Authorisation to execute the *Replace device* function

If a computer or a console module is replaced by new device, the previous config settings can be copied to the new device. After the config settings have been copied to the new device, it can be operated immediately.

In the default settings, the authorisation to execute the function is limited to the administrator and all users with activated superuser rights.

If desired, the authorization can be granted to other users.

How to change the right to replace devices:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems**.
4. Go to the **Global device rights** section.
5. Under **Permission to replace device**, select between the following options:

Activated:	Allow users to execute the function
Deactivated:	Deny users to execute the function

6. Click on **Save**.

Advanced functions of the KVM system

Identifying a device by activating the Identification LED

Some devices provide an *Identification* LED.

Use the web application to switch the device LEDs on or off in order to identify the devices in a rack, for example.

How to (de)activate the *Identification* LED of a device:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure.
3. Open the menu **Service tools** and select the entry **Ident LED**.
4. Click on **LED on** or **LED off**.
5. Click on the red **[X]** to close the window.

Saving the configurations

The backup function lets you save your configurations. You can reset your configurations with the restore function.

How to save the configuration of the KVM system:

1. In the menu, click on **System**.
2. Click on **Backup & restore**.
3. Click the **Backup** tab.
4. *Optional:* Enter a **Password** to secure the backup file or a **Comment**.
5. Select the scope of data you want to back up: You can back up either the **network settings** and/or the **application settings**.
6. Click **Backup**.

IMPORTANT: For security reasons, network certificates for the web application and, if used, additional user certificates for the KVM connection are **not** included in a backup and may have to be stored again after a restore.

Saving the configurations with auto backup function

The device can save an automatic backup on a network drive at a defined interval. This means that you do not have to make a manual backup after a configuration option has been changed. You can reset your configurations with the restore function.

How to use the auto backup function:

1. In the menu, click on **System**.
2. Click on **Auto Backup**.
3. Enter the following data:

Auto Backup:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the auto backup function: ▪ **Disabled** (*default*) ▪ **Enabled**
Filename prefix:	Enter the filename prefix. **ADVICE:** When the auto backup function is enabled, the filename prefix field is automatically filled with the **UID** of the device. You can change this entry. **IMPORTANT:** Only letters (upper and lower case), numbers (*0* to *9*) and the characters - and _ are permitted. The prefix may contain a maximum of 25 characters.
Backup password:	*Optional*: Enter a password to secure the backup file. **IMPORTANT:** Double inverted commas („ and “) cannot be used here.
Backup scope:	Select the scope of data you want to back up: You can back up either the **network settings** and/or the **application settings**.

Path:	Enter the path for the backup files. **IMPORTANT:** The syntax of the path depends on the selected protocol. When using the **NFS** protocol, the URL format defined in RFC 2224 must be used – taking into account the general URL notation specified in RFC 3986. When using the **CIFS** protocol, the URL format must follow RFC 3986. Contrary to the specifications in RFC 2224 and RFC 3986, the protocol, port, username, and password must not be included in the path parameter. These values are taken exclusively from the separate parameters: **Protocol**, **Port**, **User**, and **Password**. **Examples:** ▪ **NFS:** *name:/directory1/directory2* ▪ **CIFS:** *//name/directory1/directory2*
Protocol:	Choose between the following protocols: ▪ **NFS** (*default*) ▪ **CIFS**
Port:	Enter the port. This field is filled automatically depending on the selection in the *protocol* field: ▪ **2049** (when selected *NFS*) ▪ **445** (when selected *CIFS*)
User:	*Optional:* Enter the name of the user.
Password:	*Optional:* Enter a password to secure the share.
Time:	Enter the following data: ▪ **Hour** (numbers *0* to *23*) ▪ **Minute** (numbers *0* to *59*)
Selection of the day:	You can choose between the following options: ▪ **1.** to **31. day of the month** ▪ **Select all** (every day of the month)

4. Click on **Save & Test** or **Save**.

> **ADVICE:** Use **Save & Test** and check whether a backup was successfully saved with the desired parameters.

> **IMPORTANT:** You can see whether the test was successful in the syslog messages (see *Logging syslog messages* on page 48 ff.).

IMPORTANT: For security reasons, network certificates for the web application and, if used, additional user certificates for the KVM connection are **not** included in a backup and may have to be stored again after a restore.

Restoring the configurations

How to restore the configuration of the KVM system:

1. In the menu, click on **System**.
2. Click on **Backup & restore**.
3. Click on **Restore** tab.
4. Click **Select file** and open a previously created backup file.
5. Use the information given under **Creation date** and **Comment** to check if you selected the right backup file.
6. Select the scope of data you want to restore: You can restore either the **network settings** and/or the **Application settings**.

   NOTE: If one of these options cannot be selected, the data for this option was not stored.

   NOTE: If a password was entered when the data was saved, it is requested here.

7. Click **Restore**.

IMPORTANT: For security reasons, network certificates for the web application and, if used, additional user certificates for the KVM connection are **not** included in a backup and may have to be stored again after a restore.

Activating premium functions

With every purchase of a premium function (see *Optional functions* on page 213 ff.), you receive a feature key. This file contains a key to activate the purchased function(s).

The premium function(s) is/are activated by importing this key to the web application.

IMPORTANT: The *SecureCert feature* is only available with the order of new devices. After sales implementation is **not** possible!

How to import a feature key to activate the purchased function(s):

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure.
3. Open the menu **Service tools** and select the entry **Features**.
4. Click on **Import feature key from file...** and import the feature key (file) via the file interface.

   After the file is loaded, the clear text of the feature key is displayed in the text field.

   NOTE: The clear text of the feature key can also be copied into the text field.
5. Click on **Save**.

ADVICE: You can display the activated functions in the respective overview table. For this, add the Active features column
(see *Configuring table columns* on page 10 ff.)

2 Matrix system

In the *Matrix systems* menu of the web application, you can configure various settings of the matrix switches and the devices connected.

IMPORTANT: If optional DirectRedundancyShield (see page 280) is activated, on the passive matrix switch, configuration is only possible to a limited extend. Switch to the web application of the device with active DRS status. Carry out the configuration there and then simply transfer it from there using the "DirectRedundancyShield (DRS)" wizard (see *Step 2: Adjust configuration* on page 284 ff.).

The following pages provide a detailed description of these settings.

Computer modules

Computer modules connect computers to the KVM matrix system and can be accessed with console modules.

Adjusting access and configuration rights

Access rights to a computer module

ADVICE: We recommend using computer module groups to help assign all computer module access rights (see page 173).

This makes it easier to keep an overview of the KVM matrix system. It also benefits the operating performance of the system's on-screen display (OSD).

In order to execute particular user settings which deviate from existing computer module groups, you can assign users with individual access rights in addition to group rights.

How to change computer module access rights:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Individual rights** in the selection area on the right-hand side.
4. In the **Individual computer module rights** field, you can select the desired computer module on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

5. In the **Access** field on the right-hand side of the dialogue, you can select between the following options:

Yes:	Allow full access to the computer connected to the computer module.
No:	Deny access to the computer connected to the computer module.
View:	View screen contents of the computer connected to the computer module

6. Repeat steps 5 and 6 if you want to change the access rights for other computer modules.
7. Click on **Save**.

Access rights to a computer module group

How to change the computer module group access rights:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Device group rights** in the selection area on the right-hand side.
4. In the **Device group rights** field, you can select the desired computer module group on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer module groups to be displayed in the selection window.

5. In the **Access** field on the right-hand side of the dialogue, you can select between the following options:

Yes:	Allow full access to the computer modules of the group.
No:	Deny access the computer modules of the group.
View:	View screen contents of a computer module of a group

6. Repeat steps 5 and 6 if you want to change the access rights for other computer modules.
7. Click on **Save**.

Access mode for simultaneous access to computer modules

In the default settings of the KVM matrix system only one user can access a computer module.

This restriction can be lifted by changing the *MultiAccess* right for a user account or a user group.

After being assigned with *MultiAccess right*, a user or a user group can access computer modules even if they are already accessed by another user.

You can either change the global settings to allow multiple users to access a computer module at the same time (for all computer modules to which a user or a user group has access) *or* you can change the rights for particular computer modules or computer module groups only.

NOTE: The right for simultaneous access to computer modules depends on the user's effective right (see page 73). The effective right is the highest right and results from the individual right of a user account and the rights of the assigned group(s).

How to change the MultiAccess right for *all* computer modules:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Global device rights** in the selection area on the right-hand side.
4. Select one of the options given under **MultiAccess**:

Yes:	Allow access to a computer module already accessed by another user
No:	Deny access to a computer module already accessed by another user
View:	When connecting to a computer module with an already active connection, only the monitor image is displayed. **no** inputs possible

5. Click on **Save**.

How to change the MultiAccess right for a *particular* computer module:

> **NOTE:** MultiAccess rights can be configured and used only if a user or a user group is assigned with the required rights to access the computer module (see page 100 f.).

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Individual rights** in the selection area on the right-hand side.
4. In the **Individual computer module rights** field, you can select the desired computer module on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

5. Select one of the options given under **MultiAccess** on the right-hand side:

Yes:	Allow access to a computer module already accessed by another user
No:	Deny access to a computer module already accessed by another user
View:	When connecting to a computer module with an already active connection, only the monitor image is displayed. **no** inputs possible

6. Click on **Save**.

How to change the MultiAccess right for *a particular* computer module group:

> **NOTE:** MultiAccess rights can be configured and used only if a user or a user group is assigned with the required rights to access the computer module (see page 100 f.).

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Device group rights** in the selection area on the right-hand side.
4. In the **Device group rights** field, you can select the desired computer module group on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer module groups to be displayed in the selection window.

5. Select one of the options given under **MultiAccess** on the right-hand side:

Yes:	Allow access to a computer module of a computer module group already accessed by another user
No:	Allow access to a computer module of a computer module group already accessed by another user
View:	When connecting to a computer module with an already active connection, only the monitor image is displayed. **no** inputs possible

6. Click on **Save**.

Access to USB devices

In the defaults of the matrix system, users have access to the USB devices of a channel group.

If required, this right can be denied by changing the right »Access to USB devices« of a user account or a user group.

You can either deny users the right to access USB devices of a particular computer module globally (for all computer modules to which a user or a user group has access) *or* you can change the rights for particular computer modules or computer module groups only.

NOTE: The access right depends on the user's effective right (see page 73). The effective right is the highest right and results from the individual right of a user account and the rights of the assigned group(s).

How to change the right to access USB devices for *all* computer modules:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Global device rights** in the selection area on the right-hand side.
4. Select one of the options given in the **Access to USB devices** field:

Yes:	Allow access to USB devices.
No:	Deny access to USB devices.

5. Click on **Save**.

How to change USB access rights for *a particular* computer module:

NOTE: USB access rights can be configured and used only if a user or a user group is assigned with the required rights to access the computer module (see page 100 f.).

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Individual rights** in the selection area on the right-hand side.
4. In the **Individual computer module rights** field, you can select the desired computer module on the left-hand side.

   IMPORTANT: Configure USB access rights for the computer module that provides the main KVM channel of the channel group. The USB channel is assigned to the same channel group.

   ADVICE: If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

5. Select one of the options given in the **Access to USB devices** field:

Yes:	Allow access to USB devices.
No:	Deny access to USB devices.

6. Click on **Save** to save your settings.

How to change the right to access USB devices for *a particular* computer module group:

> **NOTE:** USB access rights can be configured and used only if a user or a user group is assigned with the required rights to access the computer module (see page 100 f.).

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Device group rights** in the selection area on the right-hand side.
4. In the **Device group rights** field, you can select the desired computer module group on the left-hand side.

> **IMPORTANT:** Configure USB access rights for the computer module that provides the main KVM channel of the channel group. The USB channel is assigned to the same channel group.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer module groups to be displayed in the selection window.

5. Select one of the options given in the **Access to USB devices** field:

Yes:	Allow access to USB devices of computer module group.
No:	Deny access to USB devices of computer module group.

6. Click on **Save**.

Rights to configure computer modules

How to change the right to view and edit the configuration of a computer module:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Global device rights** in the selection area on the right-hand side.
4. Select one of the options given under **Computer module config**:

Yes:	Allow user or user group to view and edit the computer module configuration.
No:	Deny user or user group to view and edit the computer module configuration.

5. Click on **Save**.

Basic configuration of computer modules

Changing the name of a computer module

During the start-up of the KVM matrix system any computer modules are named automatically.

How to change the name of a computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Enter the name of the computer module in the **Name** field of the *Device* section.
4. Click on **Save**.

Changing the comment of a computer module

The list field of the web application displays the name of a computer module as well as the comment entered.

ADVICE: For example, use the comment field to note where the computer module is placed.

How to change the comment of a computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Enter any comment in the **Comment** field of the *Device* section.
4. Click on **Save**.

Deleting a computer module from a KVM matrix system

If the system is not able to find a computer module that has previously been integrated in the KVM system, the system assumes that the device is switched off. If a computer module has been permanently removed from the system, you can manually delete it from the list of computer modules.

NOTE: You can delete only computer modules that are switched off.

How to delete a computer module that is switched off or disconnected from the system:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to delete and then click on **Delete**.
3. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.

Copying configuration settings to a new computer module

If a computer module of the KVM matrix system is replaced by another device, you can copy the configuration settings of the device to be replaced to the new device. After you copied the configuration settings to the new device, you can operate it immediately.

IMPORTANT: The computer module whose settings you copy to a new device will then be deleted from the KVM matrix system.

How to copy configuration settings to a new computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the *new* device.
3. Open the **Service tools** menu and select the item **Replace device**.
4. Select the device whose configuration settings you want to copy.
5. Click on **Save**.

Copying the configuration settings of a computer module

You can copy the configuration settings **General**, **KVM connection**, **Channels**, **GPIO** (if supported by the device) and/or **Monitoring**) of a computer module to the settings of one or multiple other computer modules.

NOTE: The name of and the comment about the computer module are not copied.

How to copy the configuration settings of a computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the computer module whose configuration you want to copy.
3. Click on **Service tools** and then click on **Copy configuration**.
4. In the upper area, you can select which settings of the computer module you want to copy (**General**, **KVM connection** and/or **Monitoring**).
5. In the lower area, select the computer modules to which you want to copy the data.
6. Click on **Copy configuration**.

Settings for special hardware

(De)Activating an USB keyboard mode the Generic USB mode

USB computer modules support different USB input devices. You can use the special features of a USB input device after selecting the specific USB keyboard mode.

As an alternative to the specific USB keyboard modes, you can also use the **generic USB** mode. In this mode, the data from the USB devices connected to the interface of the console module is transmitted to the active computer module.

IMPORTANT: The **generic USB** mode supports USB mass storage devices and many available HID device. However, being able to operate particular USB device in generic USB mode can not be guaranteed.

- **USB keyboards:** In addition to the keys of standard keyboard layouts, the default USB keymode **PC Multimedia** supports several multimedia keys like **Loud** and **Quiet**.

When using *Apple* keyboards, special keyboard modes let you use the special keys of these keyboards.

The following table lists the supported USB keyboards:

INPUT DEVICE	SETTING
PC keyboard with standard keyboard layout	‣ PC Standard:
PC keyboard with additional multimedia keys	‣ Multimedia
Apple keyboard with numeric keypad (A1243)	‣ Apple A1243

▪ **Displays and tablets:** You can operate computers connected to the computer module with one of the supported *displays* or *tablets* (depending on model):

INPUT DEVICE	SETTING
HP 2310tk	‣ HP 2310t
iiyama T1931	‣ iiyama T1931
iiyama TF2415	‣ iiyama TF2415
NOTTROT N170 KGE	‣ NOTTROT N170 KGE
Wacom Cintiq 21UX Gen 1	‣ Wacom Cintiq 21UX
Wacom Cintiq 21UX Gen 2	‣ Wacom Cintiq 21UX Gen2
Wacom Cintiq Pro 24 Pen	‣ Wacom Cintiq Pro 24 Pen
Wacom Cintiq Pro 27	‣ Wacom Cintiq Pro 27
Wacom Cintiq Pro 32 Pen	‣ Wacom Cintiq Pro 32 Pen
Wacom Cintiq Pro 32 Touch	‣ Wacom Cintiq Pro 32 Touch
Wacom DTK-2451	‣ Wacom DTK-2451
Wacom Intuos3	‣ Wacom Intuos 3
Wacom Intuos4 S	‣ Wacom Intuos 4 S
Wacom Intuos4 M	‣ Wacom Intuos 4 M
Wacom Intuos4 L	‣ Wacom Intuos 4 L
Wacom Intuos4 XL	‣ Wacom Intuos 4 XL
Wacom Intuos5 S	‣ Wacom Intuos 5 S
Wacom Intuos5 M	‣ Wacom Intuos 5 M
Wacom Intuos5 L	‣ Wacom Intuos 5 L
Wacom Intuos Pro L	‣ Wacom Intuos Pro L

▪ **Generic-USB mode:** In this mode, data of the USB device connected to the interface of the console module is transmitted to the computer module without being altered.

INPUT DEVICE	SETTING
any USB mass storage or USB HID device	‣ Generic USB

IMPORTANT: The **generic USB** mode supports many available USB mass storage devices and HID devices. However, being able to operate particular device in generic USB mode can not be guaranteed.

▪ **Controller:** The **ShuttlePRO v2** multimedia controller is used to control various audio and video programs. With a special USB keyboard mode, you can use the controller to operate the computer connected to the computer module:

INPUT DEVICE	SETTING
Contour ShuttlePRO v2	‣ Contour Shuttle Pro 2

▪ **LK463-compatible keyboard:** You can connect an LK463-compatible keyboard to the console module. The arrangement of the 108 keys of such keyboards corresponds to the OpenVMS keyboard layout.

A special USB keyboard mode ensures that the pressing of a special key on this keyboard is transmitted to the computer:

INPUT DEVICE	SETTING
LK463-compatible keyboard	‣ LK463

How to select a USB keyboard mode:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Select the desired option in the **USB HID mode** field of the *Configuration* paragraph (see table on page 112):.

NOTE: Update the firmware of both the matrix switch and the computer module if the web application does not show all keyboard modes.

4. Click on **Save**.

Adjusting the operating mode of the RS232 interface

In the default setting of the computer module, you can connect any RS232-compatible device to the RS232 interface of the computer module (depending on model). The RS232 data stream is transmitted unchanged to the console module.

For transmitting RS422 signals, you can use two **G&D RS232-422 adapters**. Each of the adapters converts the RS232 interface of the console module and the computer module into **RS422** interfaces.

IMPORTANT: If you want to transmit **RS422** signals, in addition to using adapters, you also need to change the operating mode of the *RS232* interfaces of both the console *and* the computer module.

How to set the operating mode of the RS232 interface of the computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **General**.
4. Select one of the options of the **Serial communication** field under the paragraph **Configuration**:

RS232:	The data stream of an RS232 device is transmitted from the computer module to the console module (*default*).
RS422:	The data stream of an RS422 device is transmitted from the computer module to the console module via separately available G&D RS232-422 adapters.

5. Click on **Save**.

Defining the EDID profile to be used

The EDID information (*Extended Display Identification Data*) of a monitor inform the graphics card of the connected computer about various technical features of the device.

The EDID profile of the monitor connected to the console module is not available at the computer module. Therefore, the computer module transmits a standard profile to the computer. The EDID information of this profile is optimised for most graphics cards.

We provide additional profiles for special resolutions.

> **ADVICE:** In some cases it is recommended to read out the EDID profile of the console monitor and activate the configuration of the computer module afterwards.

How to choose the EDID profile to be transmitted to the computer:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. In the **EDID profile** field of the *Configuration* section, you can select either the default profile (**Device specific default profile**) or another profile from the list.

   > **NOTE:** The names of G&D profiles provide information on the profile's resolution and refresh rate.
   >
   > For example, the profile **GUD DVI1024D4 060 1280×1024/60** is provided for a resolution of 1280×1024 pixels at a 60 Hz refresh rate.

4. Click on **Save**.

Reducing the colour depth of image data to be transmitted

By default, the computer module transmits image information with a maximum colour depth of 24 bit to the console module.

When using a high image resolution and displaying moving images, it may happen in exceptional cases that some images are "skipped" on the console module.

In this case, reduce the colour depth of the image data to be transmitted to 18 bit. This can reduce the data volume to be transmitted.

NOTE: Depending on the content of the image, slight colour gradations may occur when reducing the colour depth.

How to reduce the colour depth of image data to be transmitted:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the computer module you want to configure and then click on **Configuration**.
3. In the **Colour depth** field of the *Configuration* section, you can select one of the following options:

24 Bit:	Transmit image data with a maximum colour depth of 24 bits.
18 Bit:	Reduce colour depth of image data to 18 bits.

4. Click on **Save**.

Advanced features

Wake On LAN

Wake on LAN (WoL) is a standardized method to start a computer that is powered off or in sleep mode via a network command. If a WoL-compatible and accordingly configured computer receives a so-called magic packet on the LAN connection, the network card and BIOS initiate the startup process. In addition to the network card and the BIOS, the computer's operating system also needs to be configured accordingly.

The matrix switch also supports this function to use WoL in a KVM installation.

How to configure WoL function:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. In the section *Wake On LAN*, enter the following data:

Wake On LAN:	Enable or disable the *WoL* function.
MAC-Adresse:	Enter the MAC address of the WoL-compatible and configured computer connected to the selected computer module.
Password:	Enter a password if a password has been stored on the computer at the WoL setup.
Automatic Wake On LAN on connection:	Enable or disable the automatic Wake On LAN when connection to the defined computer module.

4. Click on **Save**.

How to send a WoL command to the defined computer:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure.
3. Öpen the **Service tools** menu and click on **Wake On LAN** to send the WoL command to the defined computer.

Sending a key combination after disconnecting all users

Use the **Key Macros** function to send a key combination to the computer connected to the computer module after having disconnected all users.

NOTE: For example, send the key combination **Win+L** to lock a Windows computer after disconnecting all users.

How to configure a key macro:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Under *Key-Macros*, select one of the following options:

Send a key combination after disconnecting all users:	Enable or disable the *Key Macro* function.
Key combination:	Select up to three of the listed keys that are sent to the computer together as a key combination.

4. Click on **Save**.

Enabling/disabling the keyboard signal

In the default settings, the signals of keyboard and mouse connected to the console are transmitted to a computer module.

In the settings of the computer modules of the VisionXS-IP series, you can enable or disable the transmission of the keyboard signal.

How to enable/disable the transmission of the keyboard signal:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. In the **Keyboard activated** field of the *Configuration* section, select one of the following options:

Enabled:	Transmit keyboard signals to the computer module of this channel (*default*).
Disabled:	Do *not* transmit keyboard signals to the computer module.

4. Click on **Save**.

Multi-user information

If multiple users are accessing a computer module (multi-user mode), *multi-user* information can be activated. This way, all users accessing a computer module are provided at the console module with the information that *at least* one other user is currently accessing the same computer module.

NOTE: The setting to display this information is usually configured for the entire system and individually for each user account.

Both options are described on this page.

How to enable or disable multi-user information for the entire system:

1. In the menu, click on **Matrix systems > [Name] > Matrix.**
2. Click on the matrix switch and then click on **Configuration**.
3. Select one of the options given under **Multi-user display**:

On:	Enables the display of *multi-user* information
Off:	Disables the display of *multi-user* information

4. Click on **Save**.

How to enable or disable the display of *multi-user* information for a *particular* user account:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. Select one of the options given under **Multi-user OSD info**:

Off:	Disables the display of *multi-user* information
On:	Enables the display of *multi-user* information
System:	Apply global system settings (see above)

5. Click on **Save**.

Configure Mouse mode | CrossDisplay-Switching

If you want to use the *CrossDisplay-Switching* function, we recommend that you activate the function for the entire system (see *Enabling CrossDisplay-Switching for the entire system* on page 251 ff.). This affects all computer modules that use the system-wide setting (*default*).

You can override the system-wide settings for each computer module and enable or disable *CrossDisplay-Switching* for certain computer modules only.

ADVICE: You can also disable the system settings and enable *CrossDisplay-Switching* only in the settings of computer modules on which you want to use the function.

ADVICE: You can also configure the CDS settings of computer modules comfortably with a wizard (see *Step 6: Configure CDS settings of computer modules* on page 257 ff.).

How the change CDS settings of a specific computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the field **Mouse mode | CrossDisplay-Switching**, you can select between the following options:

System:	Apply global system settings (*default*)
Relative mouse coordingates | CDS disabled:	Disable *CrossDisplay-Switching*.
Absolute mouse coordinates | CDS activatedt:	Enable *CrossDisplay-Switching*.

5. Click on **Save**.

How to change the mouse speed for a specific computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. Move the **CDS mouse speed** slider to the desired value.
5. Click on **Save**.

How to adjust the *CrossDisplay* resolution of a specific computer module:

NOTE: With active *CrossDisplay-Switching*, the mouse speed is not controlled by the operating system of the computer but by the matrix switch.

If the cursor speed changes between horizontal and vertical mouse movements, the monitor resolution could not be auto detected.

In such cases, a resolution of 1680×1050 pixels applies. If the monitor's resolution differs from this resolution, the mouse moves as described above.

In this case, you can adjust the monitor resolution manually.

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. Disable the **Auto** option in the **CDS resolution** field.
5. Enter the vertical and horizontal resolution in the input boxes.
6. Click on **Save**.

How to change the mouse position for a specific computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **CDS mouse positioning** field, you can select between the following options:

System:	Apply global system settings (*default*)
Off:	The mouse cursor remains at the position at which the switching to the module of the next monitor takes place.
On:	According to the CDS mouse hideout setting the mouse cursor is positioned so that it is barely visible. Only during *multi-user access*, the cursor remains at the position at which the switching to the next monitor takes place.
On (multi access:	According to the **CDS mouse hideout** setting, even during *multi-user access*, the mouse cursor is positioned so that it is barely visible.

ADVICE: You can enable or disable this function for particular modules independently from the selected system setting (see below).

5. With activated CDS mouse positioning, you can select between the following options in the **CDS mouse hideout** field:

Right:	The mouse cursor is placed on the right edge of the monitor so that it is barely visible.
Bottom:	The mouse cursor is placed on the bottom edge of the monitor so that it is barely visible.

6. Click on **Save**.

Extended settings of KVM-over-IP connection

Limiting the bandwidth

By default, the KVM extender uses the maximum available bandwidth of a Gigabit Ethernet. By means of manual bandwidth management you can adapt the transmission to different bandwidth requirements.

EXAMPLE: Typical bandwidth requirements for KVM-over-IP

VisionXS-IP models are available in several variants: DVI-I, DP-HR and DP-HR-DH with 1 Gbit; DP-UHR and TypeC-UHR with multi-Gbit (1-10 Gbit). The bandwidth is unlimited by default but can optionally be restricted.

- 1920 × 1080 = 300-400 Mbit/s
  (office application with approx. 40% of change: e.g. VisionXS-IP-DVI-I)
- 2560 × 1440 = 500-600 Mbit/s
  (office application with approx. 40% of change: e.g. VisionXS-IP-DP-HR)
- 2 × 2560 × 1440 = 800-900 Mbit/s
  (office application with approx. 40% of change: e.g. VisionXS-IP-DP-HR-DH)
- 3840 × 2160 = 2000-2500 Mbit/s
  (office application with approx. 40% of change: e.g. VisionXS-IP-DP-UHR)
  the maximum video bandwidth usage is 5 Gbit/s
- Static image: 25 Mbit/s at 3840 × 2160

How to set a limit for the bandwidth of a KVM-over-IP connection:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. In the section **Connection settings** you can set the bandwidth limit in Mb/s under **Max. bandwidth**.

   NOTE: Entering the value **0** deactivates the limit.

5. Click on **Save**.

Classifying IP packets (DiffServ)

For QoS purposes (Quality of Service) you have the possibility to use **Differentiated Services Codepoints** (DSCP) to classify the IP packets.

Through this classification, you can prioritize the data packets, for example, through a switch.

How to configure the DSCPs of the IP data packets:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Go to the paragraph **Connection settings** and enter the following values:

DiffServ Data (AR, V):	Define the **Differentiated Services Codepoint** (DSCP) to be used for the classification of the IP packets of the **Data** data packets.

> **NOTE:** Take. into consideration that some network switches automatically assign the server class **Network Control** (DSCP name: **CS6**) for *all* data packets.
>
> In such environments, the **DSCP 48** option must not be selected!

5. Click on **Save**.(

De)Activating signals

By default, not only keyboard, video and mouse data but also audio data are transmitted.

In addition, you can enable the transmission of RS232 data and, alternatively, disable the transmission of audio data.

How to (de)activate the transmission of audio or RS232 signals:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Under **Deactivatable signals** select the desired option in the line **Audio**. Select the desired option in the line **Serial communication**.
5. Click on **Save**.

Determination of the type of video transmission

In the default setting, the computer modules (**IP-CPU**) send the video streams via multicast to the console modules (**IP-CON**).

This option allows users with »Computer module multi access« right to connect to a computer module to which *another* user is already connected.

IMPORTANT: The multicast streams are controlled by the network switches and enable efficient distribution of the streams to multiple recipients at the same time.

Please note the requirements for the *network switch* for sending the video streams via multicast. Refer to the Installation Guide for detailed information.

Alternatively, you can specify that the computer modules (**IP-CPU**) send the video streams via *unicast* to the console modules (**IP-CON**).

The connection of a user to a computer module to which another user is already connected is *not* possible in this mode!

NOTE: This option places significantly *less* demands on the network switch.

You can define the type of video transmission system-wide (see page 57). The system-wide setting is applied by default by all computer modules. In addition, you can specify the type of video transmission individually for each computer module.

How to configure the individual multicast or unicast video transmission settings of a computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Enter your setting in the paragraph **Multicast** in the line **Multicast video**:

System:	Apply global system settings (see page 57).
Disabled:	Multicast video disabled.
Enabled:	Multicast video enabled.

5. Click on **Save**.

Viewing status information of a computer module

How to view the status information of a computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the tab **Information**.
4. The following information is displayed in the dialog box that opens now (depending on model):

Name:	Name of computer module
Device ID:	Unique ID of computer module
Status:	Current status (*Online* or *Offline*) of computer module
Class:	Device class

Firmware name:	Firmware name
Firmware rev.:	Firmware version
Hardware rev.:	Hardware version
IP address Netzwork:	IP addresses of Network interfaces
IP address Transmission:	IP addresses of Transmission interface
MAC Network:	MAC addres of Network interfaces
MAC Transmission:	MAC address of Transmission interface
Serial number:	Serial number of the module

NOTE: In addition, *Active features* and the *Monitoring* information of the device are displayed.

5. Click on **Close**.

Restarting a computer module

Use this function to restart a computer module. Before restarting you will be prompted for confirmation to prevent an accidental restart.

How to restart a computer module using the web application:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to restart.
3. Open the **Service tools** menu and select the item **Restart**.
4. Confirm the security prompt by clicking on **Yes**.

Updating the firmware of computer modules

You can update the firmware of computer modules comfortably via web application.

How to update the firmware of computer modules:

1. In the menu, click on **Matrix systems > [Name] > Computer modules**.
2. Click on the computer module you want to update.
3. Click on **Service tools** and then click on **Firmware update**.
4. Click on **Supply firmware image files**.

   NOTE: If the firmware file is already stored in the internal device memory, you can skip this step.

   Select the firmware file on your local data carrier and click on **Open**.

   NOTE: Press the **Shift** key to select multiple firmware files using the left mouse key.

   The firmware file is transferred to the internal device memory and can then be selected for the update.
5. Select the firmware files to be used from the internal device memory and click on **Continue**.
6. If required, select the **Target version** of the devices if you have selected several firmware files for one device in step 5.
7. Click on the **Update** slider of all devices you want to update.
8. Click **Run update**.

   IMPORTANT: Do **not** close the browser session while devices are being updated. Do **not** turn off the devices or disconnect them from the power supply during the update.

Console modules

The computers connected to the system are operated via the console modules of the KVM matrix system.

Operating modes of console modules

Depending on the intended use, you can select the console module's operating mode from the following options:

Standard operating mode

NOTE: The standard operating mode is the default operating mode.

The standard operating mode only permits the access to the KVM matrix system after users are authenticated with their username, password and optional 2-factor authentication (see page 77) if set up.

The user rights can be individually adjusted in the settings of the user accounts.

OpenAccess operating mode

The access to the KVM matrix system is not password-protected.

For this console module, you can configure the same access rights as for a user account.

IMPORTANT: For the configuration of access rights, a user account is created for each console mdoule with activated *OpenAccess* mode.

The user account of an *OpenAccess* console applies to all users at this console module.

ADVICE: The user accounts of the *OpenAccess* console modules are marked with a *OAC* symbol.

The color of the symbol indicates whether the corresponding console is currently operating in *OpenAccess* mode (**green**) or is operating neither in *OpenAccess* mode nor in *video* mode (**gray**, the console module has been switched back to *standard* operating mode).

Video operating mode

A video console is only possible when combined with the optional *Push-get function* (see page 218). It is especially suited when used with a projector since mouse and keyboard do not have to be connected.

If the video console is provided with mouse and keyboard, entires can be made on the on-screen display only.

You can configure the same access rights for this console as you can configure for a user account.

IMPORTANT: The configured access rights apply for *all* users at this console module.

NOTE: A video console *does not* create an occupancy state.

As a result, an accessing video console is not highlighted to other accessing users. A user without *multiuser* rights can therefore access the console module simultaneously to the video console.

Selecting the console module's operating mode

How to select the console module's operating mode:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Operating mode** field, you can select between the following options:

Standard:	Standard operating mode
OpenAccess console:	OpenAccess operating mode
Video:	Video operating mode

NOTE: Selecting the *OpenAccess* or *Video* options activates further submenus to configure the access rights.

5. Click on **Save**.

Basic configuration of console modules

Changing names or comments of console modules

How to change names or comments of console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Name** field, you can rename the console module.
5. In the **Comment** field, you can change or enter comments about the console module.
6. Click on **Save**.

Enabling or disabling console modules

You can disable a console module if you want to deny its access to the KVM matrix system.

NOTE: If the console module is disabled, the monitor displays the message »*This console has been disabled*«. It is therefore not possible to open the on-screen display or the login box.

If a user is accessing this console module, access is *immediately* withdrawn.

How to enable or disable a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab
4. In the **Enabled** field, you can choose between the following options:

Enabled:	Console module is enabled.
Disabled:	Console module is disabled.

5. Click on **Save**.

Copying configuration settings to a new console module

If a console module of the KVM matrix system is replaced by another device, you can copy the configuration settings of the device to be replaced to the new device.

After you copied the configuration settings to the new device, you can operate it immediately.

IMPORTANT: The console module whose settings you copied to a new device will be deleted from the KVM matrix system.

How to copy configuration settings to a new console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the *new* device.
3. Open the **Service tools** menu and select the item **Replace device**.
4. Select the device whose configuration settings you want to copy.
5. Click on **Save**.

Copying the configuration settings of a console module

You can copy the configuration settings **General**, **KVM connection**, **Channels**, **GPIO** (if supported by the device) and/or **Monitoring** of a console module to the settings of one or multiple other console modules.

NOTE: The name of and the comment about the console module are not copied.

How to copy the configuration settings of a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules.**
2. Click on the console module whose configuration you want to copy.
3. Click on **Service tools** and then click on **Copy configuration**.
4. In the upper area, you can select which settings of the console module you want to copy (**General** and/or **Monitoring**).
5. In the lower area, select the console modules to which you want to copy the data.
6. Click on **Copy configuration**.

Deleting a console module from the KVM matrix system

If the KVM matrix system is not able to detect a console module that already has been connected to the system, the console module is considered inactive.

Manually delete the console module you want to permanently remove from the system from the list of console modules.

> **NOTE:** Only administrators and users with the *superuser* right can delete inactive console modules.

How to delete a console module that is switched off or disconnected from the system:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to delete and click on **Delete**.
3. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.

(De)Activating access to exclusive signals

There are signals that cannot be connected to several console modules at the same time (e.g. Generic-HID, RS232, GPIO). In the default setting, the console module that connects to computer module first is given access to these exclusive signals.

It may be that the exclusive signals are not needed at this console module or that certain users should not have access to them. Therefore, access to the exclusive signals can be deactivated for console modules as well as users and user groups.

How to (de)activate access to exclusive signals for a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
1. Click on the console module you want to configure and then click on **Configuration**.
2. Click on the tab **General**.
3. Select one of the options of the **Access to exclusive signals** field under the paragraph **Configuratio**

Enabled:	Basically access to the exclusive signals (*default*)
Disabled:	**No** access to the exclusive signals

> **IMPORTANT:** The user only has access to the exclusive signals if the access is enabled at the corresponding console module **and** the user has the corresponding right (*default*).

4. Click on **Save**.

Rights for access to exclusive signals

You can either change the global settings to allow access to exclusive signals (for all computer modules to which a user or a user group has access) *or* you can change the rights for particular computer modules or computer module groups only.

NOTE: The right for access to exclusive signals depends on the user´s effective right (see page 73). The effective right is the highest right and results from the individual right of a user account and the rights of the assigned group(s).

How to change the rights to access exclusive signals for *all* computer modules:

1. In the menu, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Global device rights** in the selection area on the right-hand side.
4. Select one of the options given under **Access to exclusive signals**:

Enabled:	Basically access to the exclusive signals (*default*)
Disabled:	**No** access to the exclusive signals

IMPORTANT: The user only has access to the exclusive signals if the user has the corresponding right **and** the access is enabled at the corresponding console module (*Standard*).

5. Click on **Save**.

How to change the rights to access exclusive signals for a particular computer module:

1. In the menu, click on **Users** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Individual rights** in the selection on the right-hand-side.
4. In the **Individual computer module rights** field, you can select the desired computer module on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

5. Select one of the options given in the **Access to exclusive signals** field:

Enabled:	Basically access to the exclusive signals (*default*)
Disabled:	**No** access to the exclusive signals

> **IMPORTANT:** The user only has access to the exclusive signals if the user has the corresponding right **and** the access is enabled at the corresponding console module (*Standard*).

6. Click on **Save**.

How to change the rights to access exclusive signals for a *particular* computer module group:

1. In the menu, click on **Users** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Device group rights** in the selection on the right-hand-side.
4. In the **Device group rights** field, you can select the desired computer module group on the left-hand side.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer module groups to be displayed in the selection window.

5. Select one of the options given in the **Access to exclusive signals** field:

Enabled:	Basically access to the exclusive signals (*default*)
Disabled:	**No** access to the exclusive signals

> **IMPORTANT:** The user only has access to the exclusive signals if the user has the corresponding right **and** the access is enabled at the corresponding console module (*Standard*).

6. Click on **Save**.

Settings for special hardware

Support of any USB devices

In **Generic USB** mode, the data from the USB devices connected to the interface of the console module is transmitted to the active computer module.

NOTE: When the **Generic USB** mode is enabled, it is *not possible* to operate the OSD with a keyboard connected to the **Generic** interface.

IMPORTANT: The **Generic USB** mode supports many available HID devices (including FIDO security keys, for example). However, the operation of a particular HID device in **Generic USB** mode can not be guaranteed.

In **Generic USB** mode, you can connect USB hubs or USB composite devices to the **Generic** interface of the console module.

NOTE: In *multiuser* mode, the generic USB device is available on the first active console module. Once this console module logs off and another console module logs in, the generic USB device of the other console module is available.

How to enable/disable the Generic USB mode of a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Generic USB** field, you can select between the following options:

Disabled:	You can connect either a USB keyboard or a USB mouse to the **Generic** interface of the console module.
Enabled:	Data from any USB device connected to the **Generic** interface is transmitted to the active computer module.

IMPORTANT: To use a generic USB device, enable the USB HID mode **Generic USB** of the computer modules you want to access (see page 112).

5. Click on **Save**.

Reinitialising USB input devices

After connecting a USB keyboard or mouse to the console module, the input devices are initialised and can be used immediately.

Some USB input devices require a reinitialisation of the USB connection. Enable the automatic reinitialisation of USB devices if a USB keyboard or mouse does not respond to your inputs during operation.

How to enable/disable the reinitialisation of USB devices:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. Under **USB Auto Refresh**, you can choose between the following options:

Off:	The status of the USB devices is **not** monitored. If communication to a USB device is interrupted, the device is **not** reinitialised.
All devices:	The status of the USB devices is monitored. If communication to one USB device is interrupted, all devices are reinitialised.
Only faulty devices:	The status of USB devices is monitored. If the communication with a USB devices is interrupted, this device is reinitialised (*recommended setting*).

5. Click on **Save**.

Advanced functions

Automatic user logout

A console module can be configured in a way that the access to the computer module is automatically disconnected after a user has been inactive for a certain amount of time. This way, the inactive user is automatically logged out of the KVM matrix system.

How to set the automatic user logout:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Auto logout (minutes)** field, you can set the time (between **1** to **999** minutes) for the automatic logout.

   NOTE: Entering the value »0« disables the automatic user logout.

5. Click on **Save**.

Configuring default execution after a user logon

After a user has logged on to a console module, the OSD usually opens on the screen of said console module.

The configuration setting **Default execution** allows you to define a computer module that is automatically accessed after a user logs on. As an alternative, you can also define a script that runs automatically.

IMPORTANT: If the **Return to last computer module** function (see page 142 f.) or the **Restore last FreeSeating session** function (see page 143 f.) is activated, the user's configured default action is ignored.

How to select a default computer module that is automatically executed after a user logon:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. In the **Default execution** field, select the option **Default computer module**.
5. Scroll down to the **Default computer module** area.

6. Click on the slider of the desired default computer module in the column **Default computer module** (enabled).

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

7. Click on **Save**.

How to select a default script or a script group that is automatically executed after a user logon:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. In the **Default execution** field, select the option **Default script/script group**.
5. Scroll down to **Default script/script group**.
6. Click on the slider of the desired default script/script group in the column **Default script/script group**.

> **ADVICE:** If necessary, use the *Search* field to limit the number of scripts and groups to be displayed in the selection window.

7. Click on **Save**.

How to disable the configured default action:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. In the **Default execution** field, select the option **None**.
5. Click on **Save**.

Return to the last computer module

Enable the **Return to last computer module** function in your personal profile to remember the computer module you accessed before logging out of the system. After the next login, you will automatically be switched to this computer module.

NOTE: Turning off the console module on which the user is logged in is treated like a logout.

IMPORTANT: If the **Return to last computer module** function is activated, the user's configured default execution (see page 140 f.) isignored.

How to enable automatic access to the last accessed computer module:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. Select the option **Return to last computer module** under **Restore last session**.
5. Click on **Save**.

Restore the last FreeSeating session

Enable the **Restore last FreeSeating session** function in the personal profile to save the connection status of FreeSeating members. With this function, the last connection state can be restored when logging in again at the same workplace or another workplace that is set up and configured accordingly. By logging in or logging out to the Tradeswitch leader, all other FreeSeating members are automatically logged in with the same user (if no other user is logged in yet) or logged out (if the same user is logged in).

IMPORTANT: The prerequisite for this is the activation and configuration of the premium *Tradeswitch* function (see page 238 ff.).

NOTE: Turning off the console module on which the user is logged in is treated like a logout.

IMPORTANT: If the **Restore last FreeSeating session** function is activated, the user's configured default execution (see page 140 f.) isignored.

How to enable the restore last FreeSeating session function:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. Select the option **Restore last FreeSeating session** under **Restore last session**.
5. Click on **Save**.

Deactivation of the Restore last session function

How to disable the Restore last session function:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and click on **Personal profile** in the selection area on the right-hand side.
4. Select the option **Off** under **Restore last session**.
5. Click on **Save**.

Automatically disconnecting access to computer modules

Console modules can be configured in a way that the active access to a computer module is automatically disconnected after a user has been inactive for a certain amount of time.

If the OSD is opened at the moment of disconnection, it remains on the screen even after it has been automatically disconnected.

If the OSD is closed at the moment of disconnection, the message displayed on the right-hand side is shown on the screen of the console module.

```
CON-Admin
Not connected
```

How to automatically disconnect the access to a computer module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Auto disconnect (minutes)** field, you can set the time (between **1** to **999** minutes) for automatically disconnecting the access to a computer module.

   NOTE: The value 0 disables the automatic disconnection when a computer module is accessed.

5. Click on **Save**.

Remembering a username in the login box

If the same users often works at a certain console module, their login can be used as default in the login box of the KVM matrix system.

After a user has logged out of the system, the login mask automatically remembers the username of the last active user.

How to remember the username in the login mask:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Remember last user** field, you can select between the following options:

Yes:	The system remembers the last user.
No:	The system does not remember the last user.

5. Click on **Save**.

Setting the hold time for the screensaver

The screensaver deactivates the screen display at the console module after the user has been inactive for an amount of time you can adjust.

NOTE: This setting operates independently from the screensaver settings of the computer.

How to set the hold time of the screensaver:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Screensaver (minutes)** field, you can set the holding time (**1** to **999** minutes) for activating the screensaver.

   NOTE: Entering the value 0 disables the screensaver of the console module.

5. Click on **Save**.

Setting the hold time for the login screensaver

The screensaver deactivates the screen display at the console module after the user has been inactive for an amount of time you can adjust.

NOTE: This setting operates independently from the screensaver settings of the computer.

How to set the hold time of the screensaver:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **Login screensaver (minutes)** field, you can set the holding time (**1** to **999** minutes) for activating the screensaver.

   NOTE: Entering the value 0 disables the screensaver of the console module.

5. Click on **Save**.

Enabling or disabling DDC/CI support

Most of the computer and console modules supported by the *Vision IP series* system are ready to support monitors with **DDC/CI** functionality.

After the function has been activated, the DDC/CI information is *transparently* forwarded to the monitor in order to support as many monitors as possible. However, we *cannot* guarantee the support for all monitors.

You can set the **DDC/CI** support for the entire system. The system-wide setting is used by all console modules. In addition, you can define these settings for each console module individually.

How to configure the sytem-wide setting of the DDC/CI support:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **DDC/CI** field, you can select between the following options:

Disabled:	Disable transmission of DDC/CI signals (*default*).
CPU > monitor:	Carry out transmission of DDC/CI signals exclusively from computer module to monitor.
Bidirectional:	Carry out transmission of DDC/CI signals bidirectionally.

5. Click on **Save**.

How to configure the individual settings of the DDC/CI support of a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the **DDC/CI support** field, you can select between the following options:

System:	Use system-wide setting (see above).
Disabled:	Disable transmission of DDC/CI signals (*default*).
CPU > monitor:	Carry out transmission of DDC/CI signals exclusively from computer module to monitor.
Bidirectional:	Carry out transmission of DDC/CI signals bidirectionally.

5. Click on **Save**.

Adjusting the operating mode of the RS232 interface

In the default setting of the console module, you can connect any RS232-compatible device to the RS232 interface of the console module (depending on model). The RS232 data stream is transmitted unchanged to the computer module.

Fro transmitting RS422 signals, you can use two **G&D RS232-422 adapters**. Each of the adapters converts the RS232 interface of the console module and the computer module into **RS422** interfaces.

IMPORTANT: If you want to transmit **RS422** signals, in addition to using adapters, you also need to change the operating mode of the *RS232* interfaces of both the console *and* the computer module.

How to set the operating mode of the RS232 interface:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. Select one of the options of the **Serial communication** field under the paragraph **Configuration**:

RS232:	The data stream of an RS232 device is transmitted from the console module to the computer module (*default*).
RS422:	The data stream of an RS422 device is transmitted from the console module to the computer module via separately available G&D RS232-422 adapters.
Tradeswitch:	With the tradeswitch mode you can use optional LED sets. This facilitates locating the monitor (computer) to which the keyboard/mouse focus is switched to (see page 238).

5. Click on **Save**.

Restarting a console module

This function enables you to restart the console module. Before restarting the device you are requested to confirm your action to prevent accidental restarts.

How to restart a console module via web application:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to restart.
3. Click on **Service tools** and then click on **Restart.**
4. Confirm the security prompt with **Yes.**

Updating the firmware of a console module

You can use the web application to update the firmware of a console module.

How to update the firmware of a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to update.
3. Click on **Service tools** and then click on **Firmware update.**
4. Click on **Supply firmware image files**.

   ADVICE: If the firmware file is already stored in the internal device memory, you can skip this step.

   Select the firmware file on your local data carrier and click on **Open**.

   ADVICE: Press the **Shift** key to select multiple firmware files using the left mouse key.

   The firmware file is transferred to the internal device memory and can then be selected for the update.
5. Select the firmware files to be used from the internal device memory and click on **Continue**.
6. If required, select the **Target version** of the devices if you have selected several firmware files for one device in step 5.
7. Click on the **Update** slider of all devices you want to update.
8. Click on **Run update.**

   IMPORTANT: Do **not** close the browser session while devices are being updated. Do **not** turn off the devices or disconnect them from the power supply during the update.

Viewing status information of a console module

How to view the status information of a console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **Information** tab.
4. Now you are provided with the following information:

Name:	Name of the console module
Device ID:	Unique ID of the console module
Status:	Current status (*Online* or *Offline*) of the console module
Klasse:	Device class

Firmware name:	Firmware name
Firmware rev:	Firmware version
Hardware rev.:	Hardware version
IP address Transmission:	IP addresses of the *Transmission* interfaces
MAC Transmission:	MAC address of the *Transmission* interfaces
Serial number:	Serial number of the module

NOTE: In addition, *Active features* and the *Monitoring* information of the device are displayed.

5. Click on **Close**.

Remote gateways and remote targets

The computer modules of the **RemoteAccess-IP-CPU** series let you integrate virtual machines into the IP matrix switch. You can access these virtual machines via network.

NOTE: To establish a network connection to virtual machines, you can use the **SSH**, **VNC** or **RDP** protocol.

With the fee-based **RemoteAccess Streaming Feature**, streams can also be received via **RTP/TCP**, **RTSP/TCP** and **MMSH** transport protocols. The **H.265**, **H.264**, **VP8** and **VP9** codecs for decoding video data and **MPGA**, **MP3** and **AC3** for decoding audio data are supported.

Like other computer modules, the virtual machines connected via these computer modules are integrated into the OSD and the operating concept of the matrix switch:

As usual, you connect to a virtual machine (*remote target*) via the **Select** menu in the OSD and can also use functions such as *push-get*, *multi-user access* or *CrossDisplay-Switching* with these virtual machines.

The instructions and functions provided in the chapter *Computer modules* on page 100 ff. also apply for remote targets (apart from marked exceptions).

To connect a *remote target*, you need to configure the *remote gateway*, the different *remote targets* and the *remote pools*.

NOTE: The following terms are important to distinguish in connection with remote targets:

- **Remote gateway:** Each connected computer module of the **RemoteAccess-IP-CPU** series is listed under *Remote Gateways* in the web application.

Remote gateways establish a connection between a KVM matrix system and virtual machines

- **Remote targets:** Configured virtual machines are called remote targets within a KVM matrix system. They are listed under *Remote targets* in the web application
- **Remote pools:** A remote pool groups all remote targets that are accessible via the remote gateways included in the pool.

NOTE: You can adjust the mouse speed of a *remote target*. Further information on this topic are provided on page 257 of this manual and in the separate OSD manual.

Configuring remote gateways

Changing the name of a remote gateway

How to change the name of a remote gateway:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the remote gateway/computer module you want to configure and then click on **Configuration**.
3. Enter the name in the **Name** field of the *Device* section.
4. Click on **Save**.

Changing the comment of a remote gateway

The list field of the web application displays the name of a remote gateway as well as the comment entered.

How to change the comment of a remote gateway:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the remote gateway/computer module you want to configure and then click on **Configuration**.
3. Enter any comment in the **Comment** field of the *Device* section.
4. Click on **Save**.

Configuring the network interface

The device provides a network interface. This interface is used to connect to one of the virtual machines and allows direct access to the web application.

By default, the following settings of the *Network* interface are preselected:

- IP address of the *Network* interface:
  Obtain address via **DHCPv4** (Fallback: IP address:192.168.0.1)
- Global network settings:
  Obtain settings dynamically

How to configure the settings of a network interface:

NOTE: The *Link Local* address space 169.254.0.0.0/16 is reserved for internal communication between devices according to RFC 3330. It is not possible to assign an IP address of this address space!

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.

4. Enter the following values under **Network**:

> **NOTE:** Each network interface is assigned a unique **zone ID** in addition to its name, which specifies the interface number. This is required to uniquely identify the corresponding interface when using *IPv6 link-local addresses*.

Operating mode:	Select the operating mode of the **Network** interface: ▪ **Off:** Disable network interface. ▪ **Static IPv4:** A static IPv4 address is assigned. ▪ **DHCPv4:** Obtain IPv4 address from a DHCP server.
IPv4 address:	Enter the IPv4 address of the interface (only when operating mode *Static IPv4* is selected).
Netmask:	Enter the netmask of the network (only when operating mode *Static IPv4* is selected).
IPv6:	Click the toggle switch to enable IPv6 (green/right = enabled). **NOTE:** When IPv6 is enabled, a link-local IPv6 address is automatically generated based on the MAC address of the interface by default, in accordance with RFC 4921. This link-local IPv6 address cannot be modified by the user. Click the toggle switch to disable IPv6 (grey/left = disabled (*default*)).
IPv6 address:	Enter the static IPv6 address of the interface.
Subnet prefix length:	Specify the prefix length (*default*: 64) for the interface according to the notation rules defined in RFC 5952.

5. Click on **Save**.

Configuring global network settings

Global network settings ensure that the web application is accessible from all subnetworks, even in complex networks.

How to configure global network settings:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network**.
4. Select the section **Global settings**.
5. Enter the following values:

Operating mode:	Enter the desired operating mode: ▪ **Static:** Use of static settings. ▪ **Dynamic:** Partial automatic retrieval of the settings described below from a DHCP server (IPv4) or via SLAAC (IPv6).
Hostname:	Enter the hostname of the device.
Domain:	Enter the domain to which the device should belong.
Gateway IPv4:	Enter the IPv4 address of the gateway.
Gateway IPv6:	Enter the IPv6 address of the gateway.
DNS server 1:	Enter the IP address of the DNS server..
	NOTE: If a link-local IPv6 address is entered, the zone ID of the interface must be specified. The zone ID is appended to the link-local IPv6 address, separated by the percent sign **%**.
DNS server 2:	*Optionally*, enter the IP address of another DNS server..
	NOTE: If a link-local IPv6 address is entered, the zone ID of the interface must be specified. The zone ID is appended to the link-local IPv6 address, separated by the percent sign **%**.
Prioritization of IPv6:	Click the toggle switch if IPv6 should be preferred when a destination has both an IPv6 and an IPv4 address (green/right = IPv6 is preferred). Click the toggle switch if IPv6 should not be preferred (grey/left = IPv6 is not preferred, *default*).

Use IPv6 Stateless Address Auto-configuration (SLAAC):	Click the toggle switch if SLAAC should be used (green/right = SLAAC is used, *default* if the *SecureCert feature* is not activated). Click the toggle switch if SLAAC should not be used (grey/left = SLAAC is not used, *default* if the *SecureCert feature* is activated).
Send ICMP Echo Reply to Echo Request from a Multicast/anycast address (IPv6):	Click the toggle switch if ICMPv6 Echo Requests should be answered (green/right = Echo Requests are answered, *default*). Click the toggle switch if ICMPv6 Echo Requests should not be answered (grey/left = Echo Requests are not answered).
Send ICMP destination unreachable messages (IPv6):	Click the toggle switch if an ICMPv6 error message should be sent to the sender when a packet cannot be delivered (green/right = error message is sent, *default*). Click the toggle switch if no ICMPv6 error messages should be sent (grey/left = error message is not sent).
Process redirect messages (IPv6):	Click the toggle switch if redirect messages should be accepted and processed (green/right = redirect messages are processed, *default*). Click the toggle switch if redirect messages should not be processed (grey/left = redirect messages are not processed).
Duplicate Address Detection (IPv6):	Click the toggle switch if a check for duplicate IPv6 addresses should be performed before an address is used (green/right = duplicate address check is performed, *default*). Click the toggle switch if no check for duplicate IPv6 addresses should be performed (grey/left = no duplicate address check is performed).

6. Click on **Save**.

Assigning a remote pool

A *remote pool* groups all remote targets that are accessible via the existing remote gateways included in the pool.

All *remote targets* and *remote gateways* are automatically assigned to the default pool. If you want to limit the accessibility, you can do so at any time by assigning a pool that you have defined.

How to change the pool assignment of a remote gateway:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Remote pool**.
4. In the **Assigned** column, click on the slider of the pool (enabled) to which you

   > **NOTE:** Each remote gateway belongs to exactly *one* remote pool.
   >
   > If you don't select a *specific* pool, the remote gateway automatically belongs to the default pool.

   want to assign the remote gateway.
5. Click on **Save**.

Extended settings of KVM-over-IP connection

Limiting the bandwidth

By default, the maximum available bandwidth of a Gigabit Ethernet is used. By means of manual bandwidth management you can adapt the transmission to different bandwidth requirements.

How to set a limit for the bandwidth of a KVM-over-IP connection:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. In the section **Connection settings** you can set the bandwidth limit in Mb/s under **Max. bandwidth**.

   > **NOTE:** Entering the value **0** deactivates the limit.
5. Click on **Save**.

Classifying IP packets (DiffServ)

For QoS purposes (Quality of Service) you have the possibility to use **Differentiated Services Codepoints** (DSCP) to classify the IP packets.

Through this classification, you can prioritize the data packets, for example, through a switch.

How to configure the DSCPs of the IP data packets:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Go to the paragraph **Connection settings** and enter the following values:

DiffServ Data (AR, V):	Define the **Differentiated Services Codepoint** (DSCP) to be used for the classification of the IP packets of the **Data** data packets.

> **NOTE:** Take. into consideration that some network switches automatically assign the server class **Network Control** (DSCP name: **CS6**) for *all* data packets.
>
> In such environments, the **DSCP 48** option must not be selected!

5. Click on **Save**.

(De)Activating signals

By default, not only keyboard, video and mouse data but also audio data are transmitted.

How to (de)activate the transmission of audio signals:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Under **Deactivatable signals** select the desired option in the line **Audio**.
5. Click on **Save**.

Determination of the type of video transmission

In the default setting, the computer modules (**RemoteAccess-IP-CPU**) send the video streams via multicast to the console modules (**IP-CON**).

This option allows users with »Computer module multi access« right to connect to a computer module to which *another* user is already connected.

IMPORTANT: The multicast streams are controlled by the network switches and enable efficient distribution of the streams to multiple recipients at the same time.

Please note the requirements for the *network switch* for sending the video streams via multicast. Refer to the Installation Guide for detailed information.

Alternatively, you can specify that the computer modules (**RemoteAccess-IP-CPU**) send the video streams via *unicast* to the console modules (**IP-CON**).

The connection of a user to a computer module to which another user is already connected is *not* possible in this mode!

NOTE: This option places significantly *less* demands on the network switch.

You can define the type of video transmission system-wide (see page 57). The system-wide setting is applied by default by all computer modules. In addition, you can specify the type of video transmission individually for each computer module.

How to configure the individual multicast or unicast video transmission settings of a computer module:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **KVM connection**.
4. Enter your setting in the paragraph **Multicast** in the line **Multicast video**:

System:	Apply global system settings (see page 57).
Disabled:	Multicast video disabled.
Enabled:	Multicast video enabled.

5. Click on **Save**.

Viewing monitoring values

You can see the list of all monitoring values under **Remote gateways**.

How to open the list containing all monitoring values:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Monitoring**.

   The displayed table contains a list of all available monitoring values.
4. Click on **Save**.

NOTE: Chapter *Monitoring functions* on page 64 ff. provides more information on how to configure monitoring values.

Viewing status information of a remote gateway

How to view the status information of a remote gateway:

1. In the menu, click on **Matrix systems > [Name] > RemoteGateways.**
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Information**.
4. The following information is displayed in the dialog box that opens now:

Name:	Name of the remote gateway
Device ID:	Unique ID of the remote gateway
Status:	Current status (*online* or *offline*) of the remote gateway
Class:	Device class

Firmware name:	Firmware name
Firmware rev.:	Firmware version
Hardware rev.:	Hardware version
IP address A:	IP addresses of the network interface
IP address Transmission:	IP addresses of the transmission interface
MAC A:	MAC address of the network interface
MAC Transmission:	MAC address of the transmission interface
Serial number:	Serial number of the module

NOTE: In addition, *Active features* and the *Monitoring* information of the device are displayed.

5. Click on **Close**.

Configuring remote targets

Changing the name of a remote target

How to change the name of a remote target:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Enter the name of the remote target in the **Name** field of the *Device* section.
4. Click on **Save**.

Changing the comment of a remote target

The list field of the web application displays the name of a remote target as well as the comment entered.

How to change the comment of a remote target:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Enter any comment in the **Comment** field of the *Device* section.
4. Click on **Save**.

Saving the resolution of a virtual machine

To make sure the video signal from the virtual machine is displayed correctly on the console modules, you need to provide information about the resolution set in the virtual machine.

How to save the resolution set in a virtual machine in the KVM matrix system:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Select the resolution set in the virtual machine in the **Resolution** field on the *General* tab:

1024x768/60Hz/VESA DMT
1280x1024/60Hz/VESA DMT
1680x1050/60Hz/VESA CVT
1600x1200/60Hz/VESA DMT
1920x1080/60Hz/CTA-861-D
2560x1440/60Hz/VESA CVT-RB
2560x1600/60Hz/VESA CVT-RB
3840x2160/30Hz/VESA CVT-RB

4. Click on **Save**.

Reducing the colour depth of the image data to be transmitted

By default, a remote target transmits image information with a maximum colour depth of 24 bit to the console module.

When using a high image resolution and displaying moving images, it may happen in exceptional cases that some images are "skipped" on the console module.

In this case, reduce the colour depth of the image data to be transmitted to 18 bit. This can reduce the data volume to be transmitted.

NOTE: Depending on the content of the image, slight colour gradations may occur when reducing the colour depth.

How to reduce the colour depth of image data to be transmitted:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. In the **Colour depth** field of the *Configuration* section, select one of the following options:

24 Bit:	Transmit image data with a maximum colour depth of 24 bits.
18 Bit:	Reduce colour depth of image data to 18 bits.

4. Click on **Save**.

Holding a connection

IMPORTANT: Activating this option may pose a security risk, since reconnecting to the remote target *within the holding period* does not require a new login!

In the default setting of the matrix switch, the existing connection is disconnected when switching from a *remote target* to a "*classic" computer module* or to a remote target of another pool. The connection to the "classic" computer module is then established.

You can also hold the connection to the remote target for a specified period of time (**1** to **10** minutes) or **permanently**. Within this time span, you can quickly continue the existing connection by reconnecting to the console module.

NOTE: When connecting to another remote target of the same pool, the existing connection cannot be maintained, since only one connection via a remote gateway is possible at any time.

How to set the hold period of a connection:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Set the holding period in the **Hold connection** field of the *Configuration* paragraph between **1** and **10** minutes or **permanently**.

   You can also disable the hold function **(No)**.
4. Click on **Save**.

Connection repeats

If the connection to a remote target is interrupted or not possible, you can configure a number and interval of connection repeats.

> **NOTE:** Connection repeats are **disabled** in the default settings.

How to set the number and the interval of connection repeats:

1. In the menu, click on **Matrix systems > RemoteTargets**.
2. Click on the remote target you want to configure and then click on **Configuration**.
3. In the **Number of connection repeats** field under *Configuration*, you can define the number of connection repeats (between **0** and **999**).
4. In the **Interval of connection repeats (seconds)** field, you can define an interval between **1** and **999** seconds at which several connection repeats are executed.
5. Click on **Save**.

Defining the connection parameters for a remote target

How to configure the basic connection parameters for a remote target:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Click on the tab **Connection**.
4. Enter the following values:

IP address/DNS name:	Enter the IP address or name of the virtual machine.
Protocol:	Select the protocol used to connect the virtual machine: ▪ **SSH** ▪ **VNC** ▪ **RDP** ▪ **Streaming**
Port:	Enter the port to be used to connect to the terminal server.

5. When selecting the **RDP** protocol, additionally enter the following information:

Remote FX optimisation:	Enable Remote FX optimisation if supported by the RDP server. You can enable RemoteFX optimisation specifically for static images (**Image**) of a common desktop environment or for moving images (**Video**).

6. When selecting the **VNC** protocol, additionally enter the following information:

Quality:	Select a quality level between **0** (low) and **9** (high).
Compression:	Select a compression level between **0** (fast) and **9** (best).
Cursor highlighting:	After enabling the function, the local cursor (circle) of the *RemoteAccess-CPU* is displayed in addition to the cursor of the virtual machine.

7. When selecting the **Streaming** protocol, additionally enter the following information:

Audio delay:	Set the delay in the range from -2500 to 2500 ms.

8. Click on **Save**.

Saving login data or use the matrix credentials for login

To automatically log on a user after connecting to the virtual machine, you can save the login data in the web application.

Alternatively you have the option to use the login data of the matrix for the login of the remote targets, as well.

How to capture the credentials for login of the remote target:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Click on the tab **Connection**.
4. Enter the following values:

Use matrix credentials:	Enable or disable this function. *Default*: function is disabled. If you enable this function, any remote target credentials (username and password) that may have been entered are ignored.
Username	Enter the username of the user to log on.
Password	Enter the password of the user to log on.

NOTE: Depending on the configuration of the virtual machine, it is sometimes necessary to enter both username *and* password; sometimes you only need to enter the password!

5. Click on **Save**.

Assigning a remote pool

A *remote pool* groups all remote targets that are accessible via the existing remote gateways included in the pool.

All *remote targets* and *remote gateways* are automatically assigned to the default pool. If you want to limit the accessibility, you can do so at any time by assigning a pool that you have defined.

How to change the pool assignment of a remote target:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Click on the tab **Remote pool**.
4. In the **Assigned** column, click on the slider of the pool (enabled) to which you want to assign the remote target.

   NOTE: Each remote target belongs to exactly *one* remote pool.

   If you don't select a *specific* pool, the remote target automatically belongs to the default pool.
5. Click on **Save**.

Viewing monitoring values

You can see the list of all monitoring values under **RemoteTargets**.

How to open the list containing all monitoring values:

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Click on the tab **Monitoring**.

   The displayed table contains a list of all available monitoring values.
4. Click on **Save**.

NOTE: The chapter *Monitoring functions* on page 64 ff. provides more information on how to configure monitoring values.

Viewing status information of a remote target

How to view the status information of a remote target

1. In the menu, click on **Matrix systems > RemoteTargets.**
2. Click on the remote target you want to configure and then click on **Configuration**.
3. Click on the tab **Information**.
4. The following information is displayed in the dialog box that opens now:

Name:	Name of the remote target
Device ID:	Physical ID of the remote target
Status:	Current status (*online* or *offline*) of the remote target
Class:	Device class

NOTE: In addition, the *Monitoring* information of the remote target are displayed.

5. Click on **Close**.

Computer module groups and view filters

Computer modules of the KVM matrix system can be arranged in computer module groups and view filters.

Intended use of computer module groups

Creating computer module groups enables administrators to quickly assign the rights of a user or a user group to all computer modules within a group.

NOTE: The different computer modules can be members of *multiple* computer module groups.

Intended use of view filters

View filters enable users of a KVM matrix system to organise the different computer modules into OSD views. Especially in large KVM matrix systems, creating view filters provides better orientation in the OSD.

You can group computer modules according to their location (e.g. the server room) or other features (e.g. to the operating system of the connected computer).

Administrating computer module groups

The »New IP targets« computer module group

By default, the *New IP targets* computer module group is created in the KVM matrix system. This group automatically contains all computer modules as soon as they are first connected to the KVM matrix system. For this, the computer connected to the module has to be switched on.

If you want to provide a user or a user group with particular rights to all recently connected computer modules, change the device group rights (see page 100) of either the user account or the user group.

Creating a new computer module group

How to create a new computer module group:

1. In the menu, click on **Computer module groups**.
2. Click on **Add computer module group** and select the type of group you want to add.
3. In the **Name** field, you can enter the name of the computer module group.
4. In the **Comment** field, you can enter a comment about the computer module group.
5. Click on **Save**.

NOTE: You can assign the rights for this computer module group by changing the device group rights (see page 102) of either the user account or the user group.

Changing the name or comment of a computer module group

How to change the name or comment of a computer module group:

1. In the menu, click on **Computer module groups**.
2. Click on the computer module group you want to configure and then click on **Configuration**.
3. In the **Name** field, you can change the name of the computer module group.
4. In the **Comment** field, you can enter or change a comment about the computer module group.
5. Click on **Save**.

Administrating computer module group members

NOTE: You can assign up to 20 computer modules to each computer module group of the KVM matrix system.

How to administrate the members of a computer module group:

1. In the menu, click on **Computer module groups**.
2. Click on the computer module group you want to configure and then click on **Configuration**.
3. Click on the **Members** tab.
4. In the **Members** column, click on the slider of the computer modules you want to add to the group (enabled).

   ADVICE: If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

5. In the **Members** column, click on the slider of the computer modules you want to delete from the group (disabled).

   ADVICE: If necessary, use the *Search* field to limit the number of computer modules to be displayed in the selection window.

6. Click on **Save**.

Deleting a computer module group

How to delete a computer module group:

1. In the menu, click on **Computer module groups**.
2. Click on the computer module group you want to delete and then click on **Delete**.
3. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.

Administrating view filters

To administrate view filters, you can use the **View filter** wizard provided in the menu **Advanced features**.

The wizard shows you how to set up, configure and assign a view filter to one or more user accounts.

How to start the »View filter« wizard:

1. In the menu, click on **Advanced features**.
2. Click on **View filter** and then click on **Configuration**.
3. Follow the instructions of the wizard.

Creating a new view filter

How to create a new view filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on **Add**.
3. In the **Name** field, you can enter a name.
4. In the **Comment** field, you can enter a comment.
5. Click on **Save**.

Changing the name of a view filter

How to change the name of a view filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on the view filter you want to edit and then click on **Edit**.
3. Edit the name of and/or the comment about the view filter.
4. Click on **Save**.

Deleting a view filter

How to delete a view filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on the view filter you want to delete and then click on **Delete**
3. Confirm the confirmation prompt by clicking on **Yes** or cancel the process by clicking on **No**.

Adding a computer module to a view filter

How to add a computer module to a view filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on the view filter you want to edit and then click on **Edit**.
3. In **Step 2**, click on the slider (in the **Show devices** column) of the computer modules you want to add to the view filter.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed selection window.

> **NOTE:** To *simultaneously* assign all computer modules to a view filter, mark the check box in the header of the **Show devices** column.

Deleting a computer module from a view filter

How to delete a computer module from the view filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on the view filter you want to edit and then click on **Edit**.
3. In **Step 2**, click on the slider (in the **Show devices** column) of the computer modules you want to delete from the view filter.

> **ADVICE:** If necessary, use the *Search* field to limit the number of computer modules to be displayed selection window.

> **NOTE:** To *simultaneously* delete all displayed computer modules from the view filter, mark the check box in the header of the **Show devices** column.

Assigning a view filter as default in the OSD

How to set a default filter:

1. Start the **View filter** wizard (see page 176 f.).
2. In **Step 1** of the wizard, click on the view filter you want to edit and then click on **Edit**.
3. In **Step 2**,assign one or multiple computer module(s) to the view filter.
4. In **Step 3**, click on the slider (in the **Use as default in OSD** column) of the user accounts that will use the view filter as default in the OSD (enabled).

> **ADVICE:** If necessary, use the *Search* field to limit the number of user accounts to be displayed selection window.

> **NOTE:** To *simultaneously* set a view filter as default for all displayed user accounts, mark the check box in the header of the **Use as default in OSD** column.

Accessing computer modules via select keys

After you have defined Select-Key modifier key(s) and a Select-Key Set and activate a Select-Key Set in the user account, you can connect to a computer module by pressing key combinations on the console module keyboard.

Changing select key modifier or valid key type

Select keys enable you to quickly access a particular computer module with a key combination. For this, you can create *select key sets* in the KVM matrix system.

In combination with a select key modifier, a select key set defines the key combination to be pressed to access a particular computer module.

In addition to the select key modifier, you are also enabled to define valid keys for the select keys.

How to change the select key modifier or the valid keys:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Select *at least* one of the listed modifiers under **Select key modifier** in the *Configuration* paragraph by marking the respective entry:

▪ **Ctrl**	▪ **Win**
▪ **Alt**	▪ **Shift**
▪ **Alt Gr**	

4. In the **Valid select keys** field, you can select one of the following options:

Only numbers:	*Only numerical keys* are interpreted as select keys when pressed in combination with the select key modifier
Only characters:	*Only alphabetic keys* are interpreted as select keys when pressed in combination with the select key modifier
Numbers and characters:	*Alphabetical and numerical keys* are interpreted as select keys when pressed in combination with the select key modifier

IMPORTANT: The selected valid keys and the select key modifier are *no longer* provided as key combinations to the operating system and the applications on the desired computer.

5. Click on **Save**.

Administrating select key sets

The KVM matrix system allows you to create 20 global select key sets or ten individual select key sets for each user.

Within a select key set, you can define select keys for computer modules you want to access.

NOTE: Global select key sets are available for all users of the KVM matrix system.

You can administrate select key sets comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Select keys**. Click on **Configuration** to start the wizard.

The following paragraphs briefly summarise the wizard's configuration options.

Step 1: Select a matrix switch

- Select the matrix switch on which you want to store the configuration of the select key set.

NOTE: After you selected a matrix switch, you will see the current configuration of the **select key modifier** and the **valid select keys** (see above). If required, you can change these settings directly in this menu.

Step 2: Select a user

- Select a user account for which the configured select keys will be available.
  When selecting the entry **Available for all (global)**, you create a global select key set that will be available for all users.

Step 3: Select key sets

- Select the select key set you want to configure.
  Click on the buttons **Add**, **Edit** or **Delete** to add a new select key set or to edit or delete an existing set.
- Click on the slider **Activate select key set for current user** if you want to activate the set for the user selected in step 2.

IMPORTANT: If you have selected the table entry **Available for all (global)** in step 2, clicking on the slider activates the set for all users.

NOTE: Only by assigning a select key set to a user account, the select keys defined in the set are accepted as inputs on the console module and switching to the corresponding computer module takes place.

Step 4: Configure a select key set

- Enter the desired key combinations for the computer modules.

ADVICE: In the line **Return to last computer module** you can define a key combination for switching to the computer module that was switched on last.

Automatic or manual switching between computer modules

Auto scanning all computer modules (Autoscan)

The *Autoscan* function successively accesses all computer modules that are included in the active scan mode set and available to users.

The *Scantime* setting (see page 183) enables you to define how long you want to switch to a computer module.

When switching to a computer module, the console module name, the name of the currently accessed computer module, and a note regarding the *Autoscan* function are displayed.

NOTE: If the *Autoscan* function is active, keyboard and mouse inputs are transmitted to the currently accessed computer module.

During inputs, the *Autoscan* function stops and continues after the inputs are finished.

Applying the *Autoscan* function

Requirements for using this function:

- *Creating a scanmode set* (see page 186 ff.)
- *Assigning a scanmode set to a user account* (see page 186 ff.)

Configuring the scantime of the *Autoscan* function

By default, a computer module is accessed for 10 seconds before the connection is disconnected and the next computer module is accessed.

Select a time span between 1 and 99 seconds to define how long you want to switch to a computer module.

How to change the scantime:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tab **Matrix systems** and then go to **Personal Profile**.
4. In the **Scantime (1-99 seconds)** field, enter a time span between **1** and **99** seconds.
5. Click on **Save**.

Auto scanning all active computer modules (Autoskip)

The *Autoskip* function successively switches to computer modules that are included in the active scancode set and available to users.

The connected computer must be active to carry out this function.

The *Scantime* setting (see page 183) enables you to define how long each computer module is to be accessed.

When accessing the computer modules, the console module name, the name of the currently accessed computer module, and a note regarding the *Autoscan* function are displayed.

NOTE: If the *Autoskip* function is activated, all keyboard and mouse inputs are transmitted to the currently accessed computer module.

The *Autoskip* function stops during the user's inputs and continues after all inputs are finished.

Applying the *Autoskip* function

Requirements for using this function:

- *Creating a scanmode set* (see page 186 ff.)
- *Assigning a scanmode set to a user account* (see page 186 ff.)

Configuring the scantime of the *Autoskip* function

By default, a computer module is accessed for 10 seconds before the connection is disconnected and the next computer module is accessed.

Select a time span between 1 and 99 seconds to define how long you want to switch to a computer module.

How to change the scantime:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the **Matrix systems** tab and then go to **Personal Profile**.
4. In the **Scantime (1-99 seconds)** field, enter a time span between **1** and **99** seconds.
5. Click on **Save**.

Scanning computer modules manually (Stepscan)

By pressing a key, the *Stepscan* function successively switches to all computer modules that are included in the scan mode set and available to users.

When accessing the computer modules, the console module name, the name of the currently accessed computer module and a note regarding the *Stepscan* function are displayed.

Starting and stopping the *Stepscan* function

Requirements for using this function:

- *Creating a scanmode set* (see page 186 ff.)
- *Assigning a scanmode set to a user account* (see page 186 ff.)
- *Configuring keys to scan the computer modules manually* (see page 186 ff.)

Configuring keys for manually scan

By pressing a key, the *Stepscan* function successively switches to all computer modules that are available to users.

You can select different keys to access the next (default: **Up**) or the previous (default: **Down**) computer module.

How to select keys for using the *Stepscan* function:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the **KVM matrix systems** tab and then go to **Personal Profile**.
4. In the **Step keys** field, you can select between the following options:

Up/Down:	Arrow keys *Up* and *Down*
PgUp/PgDn:	*Page↑* and *page↓* keys
Num Up/Down:	Arrow keys *Up* and *Down* of the numeric keypad
Num PgUp/PgDn:	*Page↑* and *page↓* keys of the numeric keypad
Num +/-	*Plus* and *minus* keys of the numeric keypad

5. Click on **Save**.

Administrating scan mode sets

The matrix system enables you to create 20 global select key sets or ten individual scan mode sets for each user.

Scan mode sets allow you to define the computer modules to be accessed when executing the *Autoscan*, *Autoskip* or *Stepscan* function.

NOTE: Global scan mode sets are available for all users of the KVM matrix system.

You can administrate scan mode sets comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Scan mode sets**. Click on **Configuration** to start the wizard.

The following paragraphs briefly summarise the wizard's configuration options.

Step 1: Select a user

- Select a user account for which the configured scan mode keys will be available.
  When selecting the entry **Available for all (global)**, you create a global scan mode set that will be available for all users.

Step 2: Scan mode sets

- Select the scan mode set you want to configure.
  Click on the buttons **Add**, **Edit** or **Delete** to add a new scan mode set or to edit or delete an existing set.
- Click on the slider **Activate scan mode set for current user** if you want to activate the set for the user selected in step 2.

IMPORTANT: If you have selected the table entry **Available for all (global)** in step 2, clicking on the slider activates the set for all users.

NOTE: Only by assigning a scan mode set to a user account, the computer modules defined in the set are considered when executing the *Autoscan*, *Autoskip* or *Stepscan* function.

Step 3: Configure scan mode set

- Click on the slider **Add device** of all computer modules you want to include in the automatic switching process.

NOTE: Enable the option **Add device** in the column header to add all computer modules to a set.

Configuring the on-screen display

The on-screen display (OSD) of the KVM matrix system enables the user to operate and configure the system. By default, the OSD is provided on all console modules.

Configuration

Most basic functions and features of the OSD can be adjusted to your demands.

You can define a hotkey to open the OSD as well as the position and font size of the OSD.

Any adjustable settings are described on the following pages.

Changing the hotkey to open the OSD

The hotkey to open the OSD is used on the console modules connected to the KVM matrix system. This hotkey enables you to open the OSD in order to operate and configure the system.

NOTE: The hotkey modifier **Ctrl** and the hotkey **Num** are the *default* settings.

The hotkey consists of at least one hotkey modifier key and an additional hotkey, which you can freely select.

Both the **Ctrl** hotkey modifier key and the **Num** hotkey can be configured by the user.

How to change the hotkey to open the OSD:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Select at least one of the modifiers listed under **Hotkey modifier**:

▪ **Ctrl**
▪ **Alt**
▪ **Alt Gr**
▪ **Win**
▪ **Shift**

4. In the **Hotkey** field, select one of the following options:

Pause	*Pause* key
Insert	*Insert* key
Delete	*Delete* keye
Home	*Home* key
PgUp	*Page up* key
PgDown	*Page down* key
Num	*Num* key
End	*End* key
Space	*Space* key

5. Click on **Save**.

Opening the OSD via double keypress

Instead of opening the OSD with a hotkey, you can define a key to press twice to open the OSD.

How to define the key to open the OSD via double keypress:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Select one of the following options under **OSD via double keypress**:

Off:	Open OSD via double keypress *disabled* (*default*)
Ctrl:	Open OSD via double keypress of *Ctrl* key
Alt:	Open OSD via double keypress of *Alt* key
Alt Gr:	Open OSD via double keypress of *Alt Gr* key
Win:	Open OSD via double keypress of *Win* key
Shift:	Open OSD via double keypress of *Shift* key
Print:	Open OSD via double keypress of *Print* key
Cursor-Left:	Open OSD via double keypress of *Cursor-Left* key
Cursor-Right:	Open OSD via double keypress of *Cursor-Right* key
Cursor-Up:	Open OSD via double keypress of *Cursor-Up* key
Cursor-Down:	Open OSD via double keypress of *Cursor-Down* key

4. Click on **Save**.

Automatic closing of the OSD after inactivity

If desired, you can set the OSD to close automatically after a period of inactivity.

Define this period by entering a value between **5** and **99** seconds.

> **NOTE:** To disable the function, enter the value **0**.

How to change a period of inactivity after which the OSD closes:

1. In the menu, click on **User**.
2. Click on the user account you want to edit and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Personal Profile**.
4. In the **Timeout of OSD sessions (5-99 seconds)** field, you can define a time span between **5** and **99** seconds.
5. Click on **Save**.

Adjusting the OSD transparency

In the default settings, the screen content under the OSD is semi-visible. The screen content shines through the part that is covered by the OSD.

You can either adjust or turn off the OSD transparency in the personal profile of a user.

How to adjust the OSD transperency:

1. In the menu, click on **User**.
2. Click on the user account you want to edit and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Personal Profile**.
4. In the **OSD transparency** field,you can select between the following options:

High:	Screen content almost completely visible
Average:	Screen content semi-visible (*default*)
Low:	Screen content slightly visible
Off:	Screen content is covered

5. Click on **Save**.

Adjusting the information display

NOTE: You can set the information display separately for computer modules with view rights and all other computer modules.

When switching to a computer module, a temporary information display (5 seconds) opens. The display informs you about the console name, the name of the currently accessed computer module and provides further information.

The information display can also be permanently displayed or deactivated. The selected setting is assigned to your user account and stored in your *Personal Profile*.

ADVICE: When active, the temporary information can be recalled by pressing **Ctrl+Caps Lock**.

How to change the general settings of the information display:

1. In the menu, click on **User**.
2. Click on the user account you want to edit and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Personal Profile**.
4. In the **Show OSD info** field, you can select between the following options:

5 seconds:	Temporary information display
Perm:	Permanent information display
Off:	Deactivate information display

5. Click on **Save**.

How to change the general settings of the information display for computer modules with view right:

1. In the menu, click on **User**.
2. Click on the user account you want to edit and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Personal Profile**.
4. In the **Show OSD info for computer modules with view rights** field, you can select between the following options:

Use regular OSD info:	Using the general setting of the information display (see above)
5 seconds:	Temporary information display
Perm:	Permanent information display
Off:	Deactivate information display

5. Click on **Save**.

Changing the colour of the information display

By default, information displays (like when accessing a computer module) are shown in light green. In their personal profiles, users can change the colour of the information display.

The following colours are supported:

black	**dark red**
green	**dark yellow**
dark blue	**purple**
dark turquoise	**silver**
light green	**yellow**
blue	**fuchsia**
light turquoise	**white**

How to change the colour of the information display:

1. In the menu, click on **User**.
2. Click on the user account you want to edit and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Personal Profile**.
4. In the **Colour of OSD info** field, you can select the desired colour.
5. Click on **Save**.

Defining a default view filter

After the user login, the *Select* menu is displayed. The default setting of the *Select* menu displays all computer modules. By applying a view filter, you can filter the computer modules to be displayed.

If you want to activate a certain view filter directly after accessing the *Select* menu, you can configure the user account accordingly.

> **NOTE:** The default view filter is applied directly after you log in on the matrix system.
>
> By applying this view filter, you can change the default and therefore activate another filter.

How to select a default view filter for the Select menu:

1. In the menu, click on **Advanced features**.
2. Click on a view filter and then click on **Configuration**.
3. In **step 1**, select the desired **view filter** and click on **Save and continue**.
4. In **step 2,** select the computer modules you want to include in the view filter and click on **Save and continue**.
5. In **step 3,** select the users who should use this view filter as default and click on **Save and continue**.

Selecting a keyboard layout for OSD entries

If the characters entered on the console keyboard deviate from the characters displayed on the on-screen display, the selected keyboard layout does not fit the keyboard.

In this case, please ascertain which keyboard layout does apply to the connected keyboard and select the layout in the console settings.

How to select the keyboard layout for the console keyboard:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**
3. Click on the **General** tab.
4. In the **Keyboard layout** field, you can select one of the following options:

- **German**
- **English (US)**
- **English (UK)**
- **French**
- **Spanish**
- **Latin American**
- **Portuguese**
- **Swedish**
- **Swiss-French**
- **Danish**

5. Click on **Save**.

Operating the OSD by mouse

In the default settings of the KVM matrix system, the OSD can only be opened with a configured key combination.

If a Microsoft »IntelliMouse Explorer« or another compatible mouse with five keys is connected to the console module, you can open the OSD with mouse keys four and five on the side of the mouse.

How to enable/disable mouse support to operate the OSD:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. In the **OSD by Mouse** field in the paragraph *OSD configuration*, select one of the following options:

On:	Open OSD with mouse key 4 and 5 of a compatible mouse.
Off:	Disable the possibility to open the OSD by mouse.

4. Click on **Save**.

Enabling/disabling the OSD

This function defines if users of a console module can activate the OSD or if they can use only select keys to switch between channels.

How to (de)activate the OSD:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Under **OSD blocked** in the paragraph *OSD configuration*, select one of the following options:

No:	OSD and displaying of info messages available
OSD menu:	OSD blocked; displaying of info messages available
OSD menu + OSD info:	OSD and displaying of info messages blocked.

4. Click on **Save**.

Adjusting the OSD resolution

In the defaults of the matrix switch the OSD is displayed on the console monitor in a resolution of 1024 × 768 pixels if the monitor does support this resolution. If the monitor does not support this resolution, a resolution of 640 × 480 pixels is used.

You can also set the OSD resolution for the entire system (see table below). Adjusting the resolution for the entire system includes all console modules. However, you can also individually set the OSD resolution for each console module.

How to adjust the OSD resolution of the entire system:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix you want to configure and then click on **Configuration**.
3. In the **OSD resolution** field, select one of the following options:

Auto:	If supported by the monitor, the OSD is displayed in a resolution of 1024 × 768 pixels. If the monitor does not support this resolution, a resolution of 640 × 480 pixels is used. (*default*).
640×480:	OSD is displayed in a resolution of 640 × 480 pixels
720×400:	OSD is displayed in a resolution of 720 × 400 pixels
1024×768:	OSD is displayed in a resolution of 1024 × 768 pixels

4. Click on **Save**.

How to adjust the OSD resolution of a particular console module:

1. In the menu, click on **Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. In the **OSD resolution** field of the paragraph *OSD configuration*, select one of the following options:

System:	Use system-wide (see above) setting (*default*).
Auto:	If supported by the monitor, the OSD is displayed in a resolution of 1024 × 768 pixels. If the monitor does not support this resolution, a resolution of 640 × 480 pixels is used. (*default*).
640×480:	OSD is displayed in a resolution of 640 × 480 pixels
720×400:	OSD is displayed in a resolution of 720 × 400 pixels
1024×768:	OSD is displayed in a resolution of 1024 × 768 pixels

4. Click on **Save**.

Expanding switchable signals

You can expand the switchable signals of a computer or a console through *channel grouping*

EXAMPLE: To transmit a second video signal and a USB 2.0 signal of the same computer, in addition to a first computer module, connect a second computer module (second video channel) and a **U2-LAN-04-CPU** module (USB2.0) to the computer.

In addition to the first console module, connect a second console module (second video channel) and a **U2-LAN-04-CON** module (USB2.0) to the console the aforementioned computer is accessing.

With the *Vision IP series*, you can switch various computer modules of *one* computer or various console modules of *one* console at the same time.

NOTE: Only in this mode, you can hold the USB signal using the OSD **Operation** menu at the currently active computer. If you switch to another computer after executing the *hold function*, the USB signal remains on the computer that you accessed first.

After disabling the *hold function* on the **Operation** menu, the USB signal switches to the currently active computer.

Expanding the system through channel grouping

The web application lets you assign up to seven additional video channels and one USB 2.0 channel to the KVM channel of the console.

You can also assign up to seven additional video channels to the KVM channel of the computer. In addition, you can create **pools** of four devices for the USB 2.0.

NOTE: Within the channel groups of the console a USB 2.0 channel represents one single device. For computers such a channel represents a group of up to four devices.

By using pools, you can grant up to four users the right to access the USB 2.0 channel *at the same time*. For this, the matrix switch selects an available device from the pool after switching.

Assigning multiple channels to a console or computer creates a *channel group*.

NOTE: The OSD does *not* show any console or computer modules that you added as additional channels to the channel group.

Creating a new channel group

How to create a new channel group:

1. In the menu, click on **Matrix systems > [Name] > Console modules** or **Computer modules**.
2. Click on a console or a computer module that is not assigned to a *channel group*.
3. Click on **Channel grouping**.

   The selected module is assigned to the first KVM channel and is shown in the **Device group** column. The right column (**Unassigned**) lists the matrix switch modules you can add to the new channel group.

   > **NOTE:** You can assign up to seven additional video channels and one USB channel to a console's KVM channel.
   >
   > You can assign up to seven additional video channels to the KVM channel of the computer, too. In addition, you can create a **pool** of four devices for the USB 2.0 channel.

   > **NOTE:** All channels of a channel group are switched at the same time.

4. In the right column (**Unassigned**), click on the module you want to add. In the left column (**Device group**), click on the channel you want to add the module to.

   > **NOTE:** To change the order of already added channels, mark a channel and click on (*arrow down*) or (*arrow up*). The chosen channel is moved up or down.

5. Click on (*arrow left*) to assign the module to the chosen channel.
6. Repeat steps 4 and 5 to add another module to the *channel group*.
7. Click on **Save**.

Adding or deleting modules from a channel group

How to add modules to or delete them from a channel group:

1. In the menu, click on **Matrix systems > [Name] > Console modules** or **Computer modules**.
2. Click on a console module or a computer module that is already assigned to the channel group to which you want to add another module or from which you want to delete a module.
3. Click on **Channel grouping**.

   Now you can see the current configuration. The right column (**Not assigned**) lists the matrix switch modules you can add to the channel group.

> **NOTE:** You can assign up to seven additional video channels and one USB channel to a console's KVM channel.
>
> You can assign up to seven additional video channels to the KVM channel of the computer, too. In addition, you can create a **pool** of four devices for the USB 2.0 channel.

4. Add more modules to or delete them from the *channel group*:

Adding modules:	▪ In the right column (**Unassigned**), click on the module you want to add. In the left column (**Device group**), click on the channel to which you want to add the module. ▪ Click on (*arrow left*) to assign the module to the selected channel.
Deleting modules:	▪ In the right column (**Assigned**), click on the module you want to delete from the *channel group*. ▪ Click on (*arrow right*) to delete the module's assignment.

5. Click on **Save**.

Deleting a channel group

How to delete a multichannel configuration:

1. In the menu, click on **Matrix systems > [Name] > Console modules** or **Computer modules**.
2. Click on a console module or a computer module already assigned to the *channel group* you want to delete.
3. Click on **Channel group** to see the current configuration.

   NOTE: The web application deletes a channel group if it does not contain any other channels than KVM channel 1.

4. In the left column (**Device group**), click on a module that is assigned to one of the 2 to 8 channels or to the USB channel.

   Click on (*arrow right*) to delete the module's assignment.

5. Repeat step 4 to delete the assignment of other modules.
6. As soon as only one module is assigned to KVM channel 1, click on **Save**.

   The *channel group* is deleted.

Advanced functions of the KVM matrix switch

Copying the config settings of a matrix switch

You can copy the **General**, **KVM connection**, **Monitoring** and/or **Tradeswitch/CDS** configuration settings of one matrix switch to the settings of one or more other matrix switches.

NOTE: The name and the comment of a matrix switch are *not* copied.

How to copy matrix switch config settings:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch whose configuration you want to copy.
3. Open the menu **Service tools** and select the entry **Copy configuration**.
4. In the upper area, select which tabs (**General**, **KVM connection**, **Monitoring** and/or **Tradeswitch/CDS**) of the matrix switch should be copied.
5. In the lower area select the matrix switch(es) to which you want to copy the data.
6. Click on **Copy configuration**.

Restoring the connection status after a restart

If you enable the function to **Restore connection state,** after every restart the matrix switch automatically logs in the last active users at the console modules. Then the connection to the last accessing computer modules are automatically restored.

NOTE: The original access order is *not* considered when restoring the connection state. This can result in restrictions when using the multi-user mode.

How to enable or disable the restore of connection states:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch you want to configure and then click on **Configuration**.
3. Select one of the options under **Restore connection state**:

On:	After you restart the matrix switch, the last connection states are restored.
Off:	After you restart the matrix switch, the login box is displayed at all console modules (*default*).

4. Click on **Save**.

Restarting the matrix switch

This function enables you to restart the matrix switch. Before restarting the device you are requested to confirm your action to prevent accidental restarts.

How to restart the matrix switch via web application:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch you want to restart.
3. Click on **Service tools** and select the entry **Restart**.
4. Confirm the confirmation prompt by clicking on **Yes.**

Restoring the connection state after a restart

If you enable the function to **Restore connection state,** after every restart the matrix switch automatically logs in the last active users at the console modules. Then the connection to the last accessing computer modules are automatically restored.

NOTE: The original access order is *not* considered when restoring the connection state. This can result in restrictions when using the multi-user mode.

How to enable or disable the restore of connection states:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch you want to configure and then click on **Configuration**.
3. Select one of the options given under **Restore connection state**:

Off:	After you restart the matrix switch, the login box is displayed at all console modules (*default*).
On:	After you restart the matrix switch, the last connection states are restored.

4. Click on **Save**.

Copying config settings to a new matrix switch

If a matrix switch of the KVM matrix system is replaced by another device, the settings of the old device can be copied to the new one.

After the config settings have been copied, the new device is immediately ready for operation.

IMPORTANT: The matrix switch whose settings are copied is afterwards deleted from the KVM matrix system.

How to copy configuration settings of matrix switches:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the *new* device.
3. Click on **Service tools** and select the entry **Replace device**.
4. Select the device whose configuration settings you want to copy.
5. Click on **Save**.

Freeze mode

When the cable connection between the computer module and the console module is lost during operation, the console monitor no longer show an image in the default settings of the KVM matrix system.

Enable the freeze mode if you want to display the last image received at the console module before the loss of connection. This image is displayed until the connection is re-established.

ADVICE: To emphasize the lost connection, the image last received is either highlighted by a coloured frame and/or the note **Frozen** and the time past since the loss of connection.

You can set the freeze mode for the entire system, too. The setting for the entire system applies to all console modules. In addition, you can set the freeze mode individually for each console module.

How to configure the freeze mode for the entire system:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch you want to configure and then click on **Configuration**.
3. Select one of the options given under **Freeze mode**:

Off:	Display no image on disconnection (*default*).
On | OSD timer + frame:	Show a coloured frame in case of a disconnection and the message *Frozen* and the time past since the loss of connection.
On | OSD timer:	Show the message *Frozen* and the time past since the loss of connection.
On | Frame:	Show coloured frame in case of a disconnection.

4. Click on **Save**.

How to configure the freeze mode individually for a console module:

1. In the directory tree, click on **Matrix systems > [Name] > Console modules**.
2. Select a console module and then click on **Configuration**.
3. Select one of the options given under **Freeze mode**:

System:	Apply setting (see above) to the entire system (*default*).
Off:	Display no image on disconnection.
On | OSD timer + frame:	Show a coloured frame in case of a disconnection and the message *Frozen* and the time past since the loss of connection.
On | OSD timer:	Show the message *Frozen* and the time past since the loss of connection.
On | Frame:	Show coloured frame in case of a disconnection.

4. Click on **Save**.

Changing push event key modifiers and valid key-modes

NOTE: This function is available only after activating the additional **IP-Control-API** function.

Push event keys let users at console modules trigger push events via XML control.

The triggered push event contains the following information:

- String entered by a user,
- Console modulename and device ID,
- Name and device ID of the computer module switched to the console module.

You can trigger a push event by pushing and holding the push event key modifier and entering a valid string (see entry **Valid push event keys)**.

How to change push event key modifiers or the valid keymode:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Select the matrix switch and then click on **Configuration**.
3. Under **Configuration**, go to **Push event key modifier** and select *at least* one modifier key by ticking the control box:

▪ **Ctrl**	▪ **Win**
▪ **Alt**	▪ **Shift**
▪ **Alt Gr**	

4. In the **Valid push event keys** field, select one of the following options:

Only numbers:	*Only numerical keys* are forwarded as part of a push event when pressing the push event key modifier
Only characters:	*Only alphabetic keys* are forwarded as part of a push event when pressing the push event key modifier
Numbers and characters:	*Numerical and alphabetical keys* are forwarded as part of a push event when pressing the push event key modifier

IMPORTANT: The computer's operating system and its application programs are not able to use the selected keymode as hotkey when it is combined with the selected push event key modifier(s),.

5. Click on **Save**.

Rights administration

Right to change the personal profile

How to change the right to change the personal profile:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Global device rights**.
4. In the **Edit personal profile** field, you can select one of the following options:

Yes:	Allow users to view and edit own user profile
No:	Deny users to view and edit own user profile

5. Click on **Save**.

Optional functions

The functional range of the KVM system can be expanded by purchasing additional functions.

Name	Function	Description
Push-Get function	The Push-Get function allows the user to push the image on his monitor to the display of another workplace or a large-screen projection or to get it from there.	page 218
IP-Control-API	The IP-Control-API enables text-based XML control of a KVM matrix system over the network. It offers developers/administrators the ability to create custom applications for control, send switching commands and retrieve selective information on switching states and computer status. Thanks to easy integration into existing systems, including those from third-party manufacturers, the API offers a flexible and expandable solution that goes beyond the standard functions of the KVM matrix system and enables seamless integration into IT infrastructures from various providers.	page 222
Scripting function	With the scripting function, as part of the IP Control API, you can create, manage and execute scripts. A script is an XML document that contains one or more commands that are executed by the matrix switch. This allows you to automate scenarios such as changing the switching status of individual workplaces, several workplaces or the entire system. HTTP requests can also be used to control external devices.	page 225
EasyControl tool	You can use the EasyControl tool integrated in the web application to connect a console module to a specific computer module or to execute an existing script or script group.	page 286

Name	Function	Description
Tradeswitch function	The TradeSwitch-Function (TS function) optimizes the operation of workplaces that, through multiple console modules, are responsible for the simultaneous monitoring or control of multiple computers. Instead of assigning a separate keyboard and mouse to each console module, the TradeSwitch-Function provides a central keyboard and mouse for controlling the entire workplace. The user can switch these two input devices to any console module using a hotkey.	page 238
CrossDisplay-Switching function	With CrossDisplay-Switching (CDS) as part of the TradeSwitch function, user-friendly switching via mouse movement is enabled. The mouse behaves as if on a "virtual desktop" and can be seamlessly moved across the connected monitors. When the mouse pointer moves from one monitor to another, the keyboard-mouse focus is automatically redirected to another module, thus switching to a different computer.	page 244
FreeSeating function	With the FreeSeating function, as part of the TS-Function, the user's personal work environment is automatically restored at any workplace within the group – including the last connected sources. The simplified login process optimizes workflows and increases productivity: The login credentials only need to be entered once to log into all console modules of the group and switch to the most recently used sources. Similarly, a single logout is sufficient to log out the entire group.	page 143
MatrixGuard function	The MatrixGuard function allows any matrix switch within the MatrixGuard system to take over the role of the database leader if the original database leader fails or becomes inaccessible. This transition is performed automatically according to predefined rules. The participants in the MatrixGuard connect to the new leader, and the system resumes operation automatically. The full operation of the remaining components is ensured. Manual intervention is not required.	page 271

Name	Function	Description
Direct Redundancy Shield function	With the DirectRedundancyShield (DRS) the KVM installation can be protected by implementing a redundant KVM-over-IP matrix system that takes over instantly if the first system fails or cannot be accessed. Once the DRS function has been configured, each console module and each computer module establishes two permanent connections to the active and the passive KVM-over-IP matrix via the network, only using one transmission line. If the primary connection is broken, the previously passive connection takes over automatically and directly. The transition is seamless, without any delay in the image transmission.	page 280
2-factor authentication	To provide a greater level of security, optional two-factor authentication (2FA) can be used to query a second factor based on a device in the user's possession. 2FA makes use of a time-based one-time password (TOTP). Authenticator apps or hardware tokens can be used.	page 54
Total Activated Endpoint Licences	In the standard scope of delivery, the IP matrix switch supports a maximum of 20 end devices. The number of devices can be increased by purchasing a feature key.	page 99

Name	Function	Description
SecureCert Feature	Feature to implement certified security functions. The following certifications are taken into account: ▪ Common Criteria EAL2+ ▪ DoDIN APL as *Video Distribution System over IP* ▪ FIPS 140-3 **IMPORTANT:** This feature is only available with the order of new devices. After sales implementation is **not** possible! The *SecureCert feature* can be ordered with the following devices: ▪ Devices of the *ControlCenter-IP* series from firmware 1.6.0 ▪ Devices of the *ControlCenter-IP-XS* series from firmware 1.1.0 ▪ Devices of the *VisionXS-IP* series from firmware 1.4.0 ▪ Devices of the *Vision-IP* series from firmware 2.4.0 ▪ Devices of the *RemoteAccess-IP-CPU* series from firmware 1.3.0	

ADVICE: You can display the activated functions in the respective overview table. For this, add the Active features column (see *Configuring table columns* on page 10 ff.).

Viewing the status information of matrix switches

The context menu of matrix switches enables you to call an interface, which provides various status information of the device. Besides technical data, the name, the status and the MAC address are displayed.

How to view the status information of matrix switches:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Click on the tab **Information**.
4. The following information are displayed. Depending on the configuration, you see further information here, e.g. the cascade mode.

Name:	Matrix switch name
Device ID:	Physical ID of the matrix switch
Status:	Current status (*Online* or *Offline*) of the matrix switch
Class:	Device class

FIrmware name:	Firmware name
Firmware rev:	Firmware version
Hardware rev.:	Hardware revision
IP Address A:	IP addresses of *network interface A*
IP Address B:	IP addresses of *network interface B*
IP Address Transmission:	IP addresses of the *Transmission* interface
KVM ports:	Number of console ports on the matrix switch
MAC A:	MAC address of *network interface A*
MAC B:	MAC address of *network interface B*
Serial number:	Serial number of the matrix switch

NOTE: In addition, *Active features*, the *Link status*, and the *Monitoring* information of the device are displayed.

5. Click on **Close**.

Push-get function (optional)

IMPORTANT: Using the Push-get function requires the purchase and activation of the premium **Push-get Function**.

The optional *Push-Get function* allows the user to push the switch state of his console module to another console module or to get it from there.

Changing the right to execute the Push-get function

IMPORTANT: This setting is only available if the additional *Push-get function* has been activated.

How to change the right for using the *Push-get* function:

1. In the menu, click on **User** or **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **Matrix systems** and go to **Individual rights**.
4. Select the desired console module on the left side of the list field of the paragraph **Individual console rights**.

   ADVICE: If necessary, use the *Search* field to limit the number of console modules to be displayed in the selection window.

5. In the **Push-Get** field on the right side, you can select between the following options:

Yes:	Allow use of *Push-get* function
No:	Deny use of *Push-get* function

6. Click on **Save**.

Changing push-get key modifiers and valid keys

Push-get keys let you push orget the switch state from or to a console module by using key combinations. For this, you can create *Push-get key sets* in the matrix system.

In combination with a defined push-get key modifier a push-get key set defines the key combination to be pressed for push or get switch states.

In addition to the push-get key modifier you can also define valid keys to be used as push-get keys.

How to change push-get key modifiers or valid keys:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Select at least one of the listed modifiers under **Push get key modifier** by marking the respective entry:

▪ **Ctrl**	▪ **Win**
▪ **Alt**	▪ **Shift**
▪ **Alt Gr**	

4. Under **Valid push-get keys**, you can select one of the following options:

Only numbers:	*Only numerical keys* are interpreted as push-get keys when pressed in combination with the push get key modifier
Only characters:	*Only alphabetic keys* are interpreted as push-get keys when pressed in combination with the push get key modifier
Numbers and characters:	*Aphabetical and numerical keys* are interpreted as push-get keys when pressed in combination with the push get key modifier

IMPORTANT: The selected valid keys and the push-get key modifier are *no longer* provided as key combinations to the operating system and the applications on the computer.

5. Click on **Save**.

Administrating push-get key sets

The KVM matrix system allows you to create 20 global push-get key sets or ten individual push-get sets for each user.

Within push-get key sets you can define push-get keys for selected console modules to push/get the switch state of a console module.

> **NOTE:** Global push-get key sets are available for all users of the KVM matrix system.

You can administrate push-get key sets comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Push-get keys**. Click on **Configuration** to start the wizard.

The following paragraphs briefly summarise the wizard's configuration options.

Step 1: Select a matrix switch

- Select a matrix switch on which you want to store the configuration of the push-get keys.

> **NOTE:** After you selected a matrix switch, you will see the current configuration of the **Push-get key modifier** and the **valid push-get keys** (see above). If required, you can change these settings directly in this menu.

Step 2: Select a user

- Select a user account for which the configured push-get keys are available.
  When selecting the entry **Available for all (global)**, you create a global push-get key set that will be available for all users.

Step 3: Select push-get key set

- Select the push-get key set you want to configure.
  Click on the buttons **Add**, **Edit** or **Delete** to add a new select key set or to edit or delete an existing set.
- Click on the slider **Activate push-get key for current user** if you want to activate the set for the user selected in step 2.

IMPORTANT: If you have selected the table entry **Available for all (global)** in step 2, click on the slider to activate the set for all users.

NOTE: Only when a push get-key set is assigned to a user account, the push get-keys defined in the set are evaluated when entries are made at the workplace.

Step 4: Configure push-get key set

- Enter the desired key combinations for the console modules.

IP-Control-API (optional)

IMPORTANT: Using the IP-Control-API requires the purchase and activation of the premium function **IP-Control-API**.

After you activate the additional *IP-Control-API* function, you are able to access the KVM matrix system over a TCP/IP connection and you can use the network interfaces to send text-based commands in the form of XML files to the matrix switch.

NOTE: The structure of a valid XML document as well as possible commands and their syntax are desribed in the chapter *XML control of a matrix switch* in the separate *Configuration and Operation Guide*.

Supported functions via text-based control

You can use the text-based control to perform the following functions:

- **Logon User:** ▪user logon at a console module
- **Logout User:** ▪user logout at a console module
- **Connect CPU:** ▪Accesses computer module with a console module

  NOTE: This function can only be executed if an user with the computer module access rights *ViewOnly* or *FullAccess* is logged on to the console module or if it is an *OpenAccess* console with these rights.

- **Disconnect CPU:** ▪disconnects active access
- **List Connections:** ▪queries connections between connected devices
- **List MatrixSwitches:** ▪queries known matrix switches
- **List CPUs:** ▪queries known computer modules
- **List Consoles:** ▪queries known console modules
- **Redirection:** ▪redirects keyboard and mouse data

  NOTE: Only after you have purchased the additional *Tradeswitch* function (see page 238 ff.), you are enabled to forward keyboard and mouse data to another console module or another computer module.

ADVICE: On request, our support will provide you with examples for API encryption in the programming languages **C#** and **C++**.

Configuring access for text-based control

Use the web application *Config Panel* to configure the service for text-based control. In the web application, you can define »remote control« accesses and their settings.

IMPORTANT: Text-based control is only possible with these accesses.

How to create a new access or edit existing accesses:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the device you want to configure and then click on **Configuration**.
3. Click on the tab **Network** and go to **Remote Control**.
4. To create a new access, click on **Add remote control access**.
   To adit an existing access, click on **Edit**.

5. Enter or edit the following data:

Port:	Enter the port you want to use for text-based communication. Some ports are *not* available for XML control (see *Used network ports and protocols* on page 60 ff.).
Status:	Select if the access is **enabled** or **disabled**.
Encryption:	The following types of encryption are supported: ▪ **Unencrypted:** Select **None** to transmit the data without encryption (default). ▪ **Partly encrypted:** Select **Password: CBC-3DES**, to transmit only login passwords with encryption. ▪ **Encrypted:** Select **CBC-3DES** or **TLS** to transmit the data entirely encrypted.
Key:	After enabling the encryption type **CBC-3DES**, enter the key (192 bit) in the form of 48 hex digits.
Initialization vector:	Enabling the encryption type **CBC-3DES** additionally requires an initialization vector. Enter the initialization vector (64 bit) in the form of 16 hex digits.
Certificate Authentication:	With **TLS encryption** *enabled*, you can additionally enable **Certificate authentication** after uploading a certificate (in the *Remote Control* section of the *Network* tab).

6. Click on **Save**.

Scripting function (optional)

IMPORTANT: Using the scripting function requires the purchase and activation of the premium function **IP-Control-API**.

The scripting function lets you create, manage and execute scripts.

A script is an XML document that contains one or more commands carried out by the matrix switch.

EXEMPLARY SCRIPT TO ESTABLISH A CONNECTION

```
<?xml version="1.0" encoding="utf-8"?>
<root>
    <connect>
        <DviConsole>0x22222222</DviConsole>      <!-- ID of the console module -->
        <DviCpu>0x33333333</DviCpu>              <!-- ID of the computer module -->
        <CloseDialogs/>                          <!-- Close OSD after connect
    </connect>
</root>
```

The structure of a valid XML document and any possible commands as well as their syntax are described in the chapter *XML control of the matrix switch* of the separate *Configuration and Operation Guide*.

ADVICE: Use the OSD of the matrix system to save the switching states of a console module/multiple console modules or of the entire system in a script (see chapter *Scripting function* of the separate *Configuration and Operation Guide*l).

The scripts stored in the matrix system can be executed via the OSD of the KVM matrix system.

Configuring scripts

You can configure the »Scripting« function comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Scripts and script groups**.

Step 1: Select the option »Scripts«

- Select the option **Scripts** to create, edit or merge individual scripts to control a device.

Steps 2 and 3: Create, edit, merge or delete scripts

NOTE: Script commands are stored in an XML document. Each XML document can contain one or more commands.

The structure of a valid XML document as well as possible commands and their syntax are described in the chapter *XML control of a matrix switch* in the separate *Configuration and Operation Guide*.

NOTE: For controlling external devices **HTTP requests** can be used.

EXAMPLE: With the following GET request, you can switch off outlet 4 of a connected ePower-Switch. The two line breaks at the end are important here so that the target device interprets the request correctly.

```
GET /hidden.htm?MO:04=OFF HTTP/1.1

```

IMPORTANT: Only users with assigned **Superuser** rights are able to create, edit and delete scripts in the web application.

How to create a new script:

1. Click on **Add script**.
2. Enter the following data into the dialogue box:

Name:	Enter the desired script name.
Enabled:	Enable or disable the execution *and* display of the script in the Script menu.
Execution delay:	After calling the script, you can delay its execution by up to 999 seconds. Enter the desired delay time in seconds.
Comment:	If desired, enter a comment about the script.
XML code:	Enter the XML code or HTTP request using script commands.

3. Click on **Save**.

How to edit an existing script:

1. Select the script you want to edit and click on **Edit**.
2. Enter or update the following data into the dialogue box:

Name:	Enter the desired script name.
Enabled:	Enable or disable the execution *and* display of the script in the Script menu.
Execution delay:	After calling the script, you can delay its execution by up to 999 seconds. Enter the desired delay time in seconds.
Comment:	If desired, enter a comment about the script.
XML code:	Enter the XML code or HTTP request using script commands.

3. Click on **Save**.

How to delete an existing script:

1. Select the script you want to delete and click on **Delete**.
2. Confirm the security prompt by clicking on **Yes**.

How to merge existing scripts into a new script:

1. Select the existing scripts you want to merge.

   ADVICE: Press the Ctrl key to select several scripts from the list.

2. Click on **Merge**.
3. Enter the following data:

Name:	Enter the desired script name.
Comment:	If desired, enter a comment about the script.

4. If desired, you can change the order of the scripts you want to merge. Mark a script and click on (*arrow up*) or (*arrow down*). The selected script is moved either up or down.

   NOTE: The XML documents of the selected scripts are copied to a new script in the selected order. In the new script, you can edit the XML document (created from the individual scripts) as required.

5. Click on **Save**.

Step 4: Define owner

A script can be executed by users who are the *owner* of the script or are assigned with rights to execute the script.

NOTE: Only scripts without owners can be added to script groups.

- Activate the **Owner** slider in the line of the user to be entered as the owner of the script.

Step 5: Script availability

If a script is *not* assigned to a console module, it is shown on all console modules whose users are assigned with the right to execute the script.

If the script is assigned to one or several console modules, it is shown only at the *assigned* console module(s) if their users are assigned with the right to execute the script.

- Activate the **Available** slider in the row of the console modules on which to show the script.

NOTE: Use the **Available** option in the column header to move the sliders of all console modules.

NOTE: Use the slider in the **EasyControl** line to control the availability of the script in the **EasyControl** tool.

ADVICE: Do not activate any slider if you want the script to be available on all console modules.

Step 6: Target device

In the script configuration, you can specify whether the script is to be executed locally *or* on *another* matrix switch or device.

NOTE: Prerequisite for the execution on another matrix switch is that the additional **IP-Control-API** function is also activated on the target matrix switch.

- Enable the **Execute on this device** slider *or* enter the IP address and port of the other matrix switch or device.
- Activate the **Ignore device response** slider if the device response should not be evaluated.

Configuring script groups

You can configure the »Scripting« function comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Scripts and script groups**.

Step 1: Select the option »Scripts groups«

- Select the option **Scripts groups** to organise several existing scripts in a script group.

Steps 2 and 3: Create, edit or delete script groups

How to create a new script group:

1. Click on **Add script group**.
2. Enter the following data into the dialogue box:

Name:	Enter the desired name of the script group.
Enabled:	Enable or disable the execution *and* display of the script group in the script menu.
Execution delay:	After calling the script group, you can delay its execution by up to 999 seconds. Enter the desired delay time in seconds.
Comment:	If desired, enter a comment about the script group.

3. Click on **Save**.

How to edit an existing script group:

1. Select the script group you want to edit and click on **Edit**.
2. Enter or update the following data into the dialogue box:

Name:	Enter the desired name of the script group.
Enabled:	Enable or disable the execution *and* display of the script group in the script menu.
Execution delay:	After calling the script group, you can delay its execution by up to 999 seconds. Enter the desired delay time in seconds.
Comment:	If desired, enter a comment about the script group.

3. Click on **Save**.

How to delete an existing script group:

1. Select the script group you want to delete and click on **Delete**.
2. Confirm the security prompt by clicking on **Yes**.

Step 4: Add scripts to group or delete them from group

The dialog lists all scripts of the matrix switch to which no owner has been assigned.

- Click on the **Add** slider on the row of the scripts you want to add to the group.
- Disable the **Add** slider on the row of the scripts you want to delete from the group.

NOTE: Use the **Add** option in the column header to move the sliders of all scripts.

Step 5: Define order of script execution

- If desired, you can change the order of the scripts within a group. Mark a script and click on (*arrow up*) or (*arrow down*). The selected script is moved either up or down.

Step 6: Script group availability

- Click on the **Available** slider in the row of the console modules on which to show the script group.

NOTE: Use the **Available** option in the column header to move the sliders of all console modules.

ADVICE: Do not activate any slider if you want the script to be available on all console modules.

Assigning rights to execute scripts and script groups

NOTE: Users always have the right to execute and delete their own scripts (**Owner**). This option does not require any additional rights.

Executing a script that is not assigned to your own user account requires the right to execute this script. The same applies for script groups.

The **right to execute scripts** can be assigned in the settings of a user account. You can also manage this right via user groups (see *Efficient rights administration* on page 73).

Defining the right to execute a script

How to change the right to execute a particular script:

1. In the men, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Scripting rights**.
4. In the list field of the **Scripting rights** paragraph, select the desired script from the list on the left-hand side.

   ADVICE: If necessary, use the *Search* box to limit the scripts that appear in the selection window.

5. In the **Execution** field on the right-hand side, select one of the following options:

Activated:	Allow the execution of the script.
Deactivated:	Deny the execution of the script.

6. Click on **Save**.

Defining the right to execute a script group

How to change the right to execute a particular script group:

1. In the men, click on **User** or on **User groups**.
2. Click on the user account or the user group you want to configure and then click on **Configuration**.
3. Click on the tab **KVM matrix systems** and then go to **Scripting group rights**.
4. In the list field of the **Scripting group rights** paragraph, select the desired script group from the list on the left-hand side.

   ADVICE: If necessary, use the *Search* box to limit the script groups that appear in the selection window.

5. Select the desired script group from the list on the left-hand side.
6. Under **Execution**, select one of the following options:

Activated:	Allows the execution of the script group.
Deactivated:	Denies the execution of the script group.

7. Click on **Save**.

Assigning and configuring script keys

After the script key modifier(s) and a script key set have been adjusted and a script key set has been activated in the user account, a script can be executed by pressing key combinations on the console module keyboard.

Using script keys at a console module

Opening the OSD is not necessary for using script keys to execute scripts. Hence, scripts can be executed much faster if you know the script keys required for the execution.

How to use script keys to execute a script:

1. Press the script key modifier key(s) defined in the matrix system and the script key assigned to the script.

> **EXAMPLE:**
> - Script key modifier keys: **Win** + **Shift**
> - Script key for script: **1**
>
> Press and hold the keys **Win** + **Shift** while pressing script key **1**. The scrip is executed when releasing the keys.

Changing the script key modifier and the valid keys

Script keys let you execute scripts quickly with the help of hotkeys. For this, you can create *script key sets* in the matrix system.

Together with a defined script key modifier, a script key set defines the hotkey to be pressed to execute a script.

In addition to defining the script key modifier, you can also define keys to be used as script keys.

How to change the script key modifier or the valid keys:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Select at least one of the modifiers listed in the **Script key modifier** field by marking the respective entry:

▪ **Ctrl**	▪ **Win**
▪ **Alt**	▪ **Shift**
▪ **Alt Gr**	

4. In the **Valid keys** field, select one of the following options:

Only numbers:	*only numerical keys* are interpreted as script keys when pressed in combination with the script key modifier
Only characters:	*only alphabetic keys* are interpreted as script keys when pressed in combination with the script key modifier
Numbers and characters:	*alphabetical and numerical keys* are interpreted as script keys when pressed in combination with the script key modifier

IMPORTANT: The selected valid keys and the script key modifier(s) are *no longer* provided as key combinations to the operating system and the applications installed on the computer.

5. Click on **OK** to save your settings.

Administrating script key sets

The KVM matrix system lets you create 20 global script key sets or ten additional, individual script key sets for each user.

Within script key sets you can define individual script keys to execute individual scrips.

NOTE: Global script key sets are available to all users of the KVM matrix system.

You can administrate script key sets comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Script keys**. Click on **Configure** to start the wizard.

The following paragraphs briefly summarise the wizard's configuration options.

Step 1: Select a device

- Select the matrix switch on which you want to store the configuration of the script key set.

NOTE: After you selected a matrix switch, you will see the current configuration of the **script key modifier** and the **valid select keys** (see above). If required, you can change these settings directly in this menu.

Step 2: Select a user

- Select a user account for which the configured script keys are available.
  When selecting the entry **Available for all (global)**, you create a global script key set that will be available to all users.

Step 3: Add or select script key sets

- Select the script key set you want to configure.
  Click on the buttons **Add**, **Edit** or **Delete** to add a new script key set or to edit or delete an existing set.
- Click on the slider **Activate script key set for current user** if you want to activate the set for the user selected in step 2.

IMPORTANT: If you have selected the table entry **Available for all (global)** in step 2, clicking on the slider activates the set for all users.

NOTE: Only by assigning a script key set to a user account, the script keys defined in the set are accepted as inputs and execute the assigned script.

Step 4: Assign scripts and edit script key sets

- Enter the desired key combinations to execute scripts or script groups.

OSD settings fo the Scripting function

Editing the default menu mode

In the defaults, after accessing the OSD at a console module, you can select a computer via the *Select* menu. If desired, you can use your personal profile to define that the *Script* menu is shown directly after you open the OSD.

ADVICE: Independent of the default setting, you can always use the hotkey **Ctrl+X** to switch between *Select* menu and *Script* menu.

How to edit the default menu mode:

1. In the menu, click on **Users**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tabs **KVM matrix systems** and then go to **Personal profile**.

4. In the **Default OSD menu** field, select one of the following options:

Select:	The *Select* menu is shown after you open the OSD.
Script:	The *Script* menu is shown after you open the OSD.

5. Click on **Save**.

Switching threshold to switch the menu mode by mouse

In addition to switching the menu mode via the hotkey **Ctrl+X** you can also use the mouse to switch between menu modes.

ADVICE: After the activation of the switching of the menu mode by mouse, you can move the mouse to the left or to the right to switch between the two modes in the *Select* menu and in the *Script* menu.

IMPORTANT: Switching the menu mode by mouse is *not* possible if the entry is not available in the *Select* menu or in the *Script* menu!

How to activate/deactivate the switching threshold and/or adjust its sensitivity:

1. In the menu, click on **Users**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tabs **KVM matrix systems** and then go to **Personal profile**.
4. In the **Select/script menu mouse switching** field, select one of the following options:

Off:	Mouse switching of the OSD menu mode deactivated (*default*)
Sensitivity 1:	lowest sensitivity level for mouse switching of the OSD menu mode
Sensitivity 10:	maximum sensitivity level for mouse switching of the OSD menu mode
Sensitivity 2-8:	further sensitivity levels for mouse switching of the OSD menu mode

5. Click on **Save**.

Tradeswitch function (optional)

IMPORTANT: Using the Tradeswitch function requires the purchase and activation of the premium **TS-Function**.

The Tradeswitch function optimises the operation of workplaces monitoring multiple computers over multiple modules.

Instead of connecting keyboard and mouse to each console module, the Tradeswitch function provides a central keyboard/mouse for all operating tasks of the workplace.

In order to enable this, several console modules of a KVM matrix system are arranged into a group. Only one of the group's modules is provided with keyboard and mouse.

By using a hotkey, users are now able to switch the two input devices to the monitors of the other console modules. This makes it possible to operate the connected computer modules and computers.

Computer modules can also be integrated into the tradeswitch group and the keyboard and mouse signals can be switched directly to them. This makes it possible, for example, to operate a laptop that has its own monitor.

Changing tradeswitch key and valid key type

Tradeswitch keys allow you to switch the keyboard and mouse signals of a console module to another console module or computer module by entering a key combination.

You can group any console modules and/or computer modules into a workplace and individually define the keys to be pressed to switch the keyboard and mouse signals to a specific console module or computer module.

In addition to the tradeswitch key modifier, you can also define the valid key type for tradeswitch keys.

How to change tradeswitch key modifier or valid tradeswitch keys:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. In the **Tradeswitch key modifier** field, select *at least* one of the listed key modifiers by checking the respective box.

   - **Ctrl**
   - **Alt**
   - **Alt Gr**
   - **Win**
   - **Shift**

4. In the **Valid tradeswitch keys** field, select one of the following options:

Only numbers:	*Only numerical keys* are interpreted as tradeswitch keys when pressed in combination with the tradeswitch key modifier.
Only characters:	*Only alphabetic keys* are interpreted as tradeswitch keys when pressed in combination with the tradeswitch key modifier.
Numbers and characters:	*Alphabetical and numerical keys* are interpreted as tradeswitch keys when pressed in combination with the tradeswitch key modifier

IMPORTANT: The selected keymode and tradeswitch key modifier(s) are *no longer* provided as key combinations to the operating system and the applications on the computer.

5. Click on **Save**.

Administrating tradeswitch workplaces

You can comfortably manage the tradeswitch workplaces with a wizard. Click on the **Advanced features** menu and select **Tradeswitch/FreeSeating/Cross-Display Switching**.

To start the wizard, click **Configure**.

The following sections briefly summarize the configuration options of the wizard.

Step 1: Select a matrix switch

- Select the matrix switch on which you want to store the configuration of the tradeswitch workplace.

NOTE: After you selected a matrix switch, you will see the current configuration of the »Tradeswitch« function and »CrossDisplay-Switching« (see above). If required, you can change these settings directly in this menu.

Step 2: Tradeswitch workplace

- Select a tradeswitch workplace you want to configure.
  Click on **Add**, **Edit** or **Delete** to create a new tradeswitch workplace or edit or delete existing ones.

Step 3: Configure tradeswitch workplace

- Entering a key combination to switch the monitor adds a module to the tradeswitch workplace.
- Delete an already entered key combination to delete a module from the tradeswitch workplace.
- Click on the slider **Tradeswitch leader** in the row of the module whose keyboard and mouse are used to operate the tradeswitch workplace.
- Click on the slider **FreeSeating member** in the rows of the modules to be included when restoring the last FreeSeating session (see *Restore the last FreeSeating session* on page 143).

NOTE: Each console module of a tradeswitch workplace can be FreeSeating member. Console modules can be a FreeSeating member in several tradeswitch workplaces.

IMPORTANT: To use the FreeSeating function, at least the tradeswitch leader must be a FreeSeating member.

Step 4: Tradeswitch configuration completed

You can now use the configured key combinations to switch between monitors .

Advanced functions

Configure Tradeswitch visualization

If you purchased the *Tradeswitch function*, the messages »*Forwarding to...«* (on the Tradeswitch leader) or »*FORWARDED«* (on the target workplace) can be displayed at the monitor at a console module.

Additionally (or alternatively) you can activate a frame that permanently or temporarily marks the monitor of the module connected via tradeswitch function.

How to configure the Tradeswitch visualization for a console module:

1. In the menu, click on **KVM Matrix systems > [Name] > Console modules**.
2. Click on the console module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. Under **Tradeswitch visualization**, you can select between the following options:

No:	Disable Tradeswitch visualization
Yes|OSD:	The message »Forwarding to…« (at the Tradeswitch leader) or »FORWARDED« (at the target workplace) is displayed on the screen.
Yes|Frame temporary:	A frame temporarily marks the monitor of the module connected via tradeswitch function.
Yes|Frame:	A frame permanently marks the monitor of the module connected via tradeswitch function.
Yes|OSD+Frame temporary:	The message »Forwarding to…« (at the Tradeswitch leader) or »FORWARDED« (at the target workplace) is temporarily displayed on the screen. In addition, a frame temporarily marks the monitor of the module connected via tradeswitch function.
Yes|OSD+Frame:	The message »Forwarding to…« (at the Tradeswitch leader) or »FORWARDED« (at the target workplace) is permanently displayed on the screen. In addition, a frame permanently marks the monitor of the module connected via tradeswitch function.

5. Click on **Save**.

Customizing the appearance of the tradeswitch frame

You can set the display duration of the tradeswitch frame as well as its appearance (color settings, transparency effect and frame width) system-wide.

Each user of the matrix system can use their personal profile to change the system-wide default by making an individual adjustment, provided they have the appropriate permission (see *Right to change the personal profile* on page 212 ff.).

How to change the *system-wide* appearance of the tradeswitch frame:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Customize the settings in the **Tradeswitch frame configuration** section to suit your needs:

Temporary display time:	Set the temporary display duration of the tradeswitch frame between **0.0** (off) and **10.0** seconds.
Colour settings:	Select the **brightness** and **colour** of the tradeswitch frame.
Transparency effect:	Select the transparency effect (**normal** or **high**) of the Tradeswitch frame.
Frame width:	Select the frame width (**normal** to **quadruple**) of the Tradeswitch frame.

4. Click on **Save**.

How to change the appearance of the tradeswitch frame for a *specific* user account:

1. In the menu, click on **User**.
2. Click on the user account you want to configure and then click on **Configuration**.
3. Click on the tabs **KVM matrix systems** and then go to **Personal profile**.
4. Enable the **Personal tradeswitch frame display** option.
5. Customize the settings in the **Tradeswitch frame configuration** section to suit your needs:

Temporary display time:	Set the temporary display duration of the tradeswitch frame between **0.0** (off) and **10.0** seconds.
Colour settings:	Select the **brightness** and **colour** of the tradeswitch frame.
Transparency effect:	Select the transparency effect (**normal** or **high**) of the Tradeswitch frame.
Frame width:	Select the frame width (**normal** to **quadruple**) of the Tradeswitch frame.

6. Click on **Save**.

CrossDisplay-Switching (optional)

IMPORTANT: Using the CrossDisplay-Switching function requires the purchase and activation of the premium **TS-Function** (see page 238 ff.).

With **CrossDisplay-Switching** (**CDS**), you can use the mouse to switch between the modules of a Tradeswitch configuration (see page 238 ff.).

IMPORTANT: Depending on operating system and mouse driver, there might be some restrictions:

- Under *Mac OS*, the mouse might jitter at the edge of the screen.
- Under *Linux* there might be some problems when placing and moving the mouse.

NOTE: It is possible that mouse gestures used by some programs (like Firefox) to run functions cannot be applied.

Using »CrossDisplay-Switching«

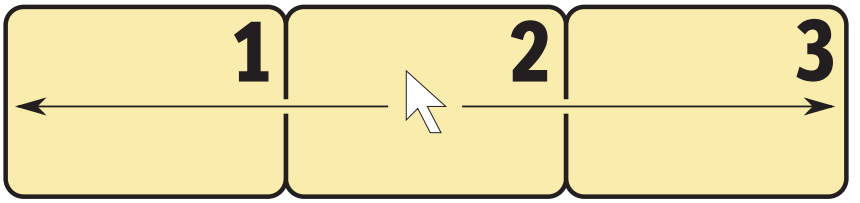


Figure 1: Exemplary order of three monitors

How to use *CrossDisplay-Switching* to switch to another module:

Move the cursor to the edge of an active monitor placed next to another monitor.

The matrix switch switches to the module of the next monitor and positions the cursor. You will barely realize the switching between computers.

EXAMPLE: If you move the cursor to the right edge of **Monitor 2**, the matrix switch switches to the module connected to **Monitor 3**.

If you move the cursor to the left edge of **Monitor 2**, the matrix switch switches to the module connected to **Monitor 1**.

If you reach the outer edges (left edge of **Monitor 1** or right edge of **Monitor 3**) *CrossDisplay-Switching does not* take place.

If you hold a mouse key while moving the mouse, switching cannot be carried out. However, you can still drag and drop objects.

ADVICE: When using multi head groups, you can enable specific mouse modes that allow drag and drop operations when working with Windows and Linux operating systems (see page 267).

NOTE: You can define the monitor order in the web application (see page 267).

Requirements for »CrossDisplay-Switching«

Using *CrossDisplay-Switching* requires the following:

- Enabled premium **Tradeswitch** function (see page 238).
- Established and configured *Tradeswitch configuration* (see page 240).
- Enabled *CrossDisplay-Switching* (see page 251).
- Order of workplace monitors saved in the web application (see page 248).

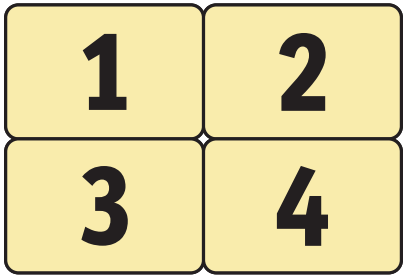
IMPORTANT: Only USB computer modules connected to the computer by USB cables support *CrossDisplay-Switching*.

Order and proportions of monitors

Figure 1 shows three monitors placed in a row.

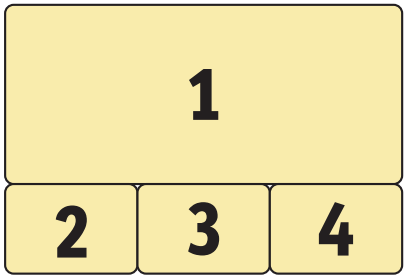
In addition to monitors placed next to each other, any combinations are supported. Even the monitors' proportions can vary. The following table shows some examples and describes special features.

NOTE: In the web application you can save the order and proportions of your monitors according to how they are placed on the desk.



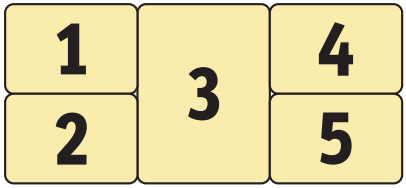
In addition to switching to a monitor placed on the left or the right side of the active monitor, you can also switch to monitors placed above or below the active monitor:

Move the cursor to one of the edges between monitors **1** and **3** or **2** and **4** to switch from an upper monitor to a lower monitor (or vice versa).



If the monitors are placed as shown on the left, it is important to mind the exact *vertical* cursor position when reaching the lower edge of **Monitor 1**:

- In the first third you can switch to monitor 2.
- In the second third you can switch to monitor 3.
- In the last third you can switch to monitor 4.



If the monitors are placed as shown on the left, it is important to mind the exact *horizontal* cursor position when reaching the left or right edge of **Monitor 3**:

- In the upper half you can switch to monitors 1 or 4.
- In the lower half you can switch to monitors 2 or 5.

Implementing multi-head monitors

NOTE: A description on how to create CDS multihead groups is given on page 261. For *CDS with multihead groups*, the individual channels are not managed, configured and switched as group, but individually in the KVM matrix system.

Matrix systems support computers whose desktop is displayed on multiple monitors (see page 199 ff.). These computers are called *multi-head computers*.

By default, the monitor of a multi-head computer is displayed in the standard monitor size. However, you can change the size (monitor 2 in the example below) to the proportions of the other monitors:

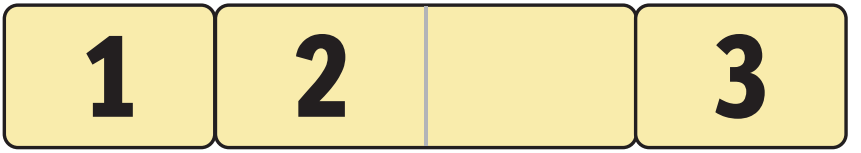


Figure 2: Two monitors of a multi-head computer between other monitors

NOTE: Install the driver **CrossDisplay-Switching - Multi-Monitor Support** if you cannot move the cursor across the two monitors of a multi-head computer.

You can download the driver from **www.gdsys.com/en** under **Service** and **Tools & Drivers**.

The »CrossDisplay-Switching« view

In the web application, you can save the order and proportions of console monitors. Based on these information, the matrix switch switches to the desired monitor if you move the cursor to the edge of a monitor.

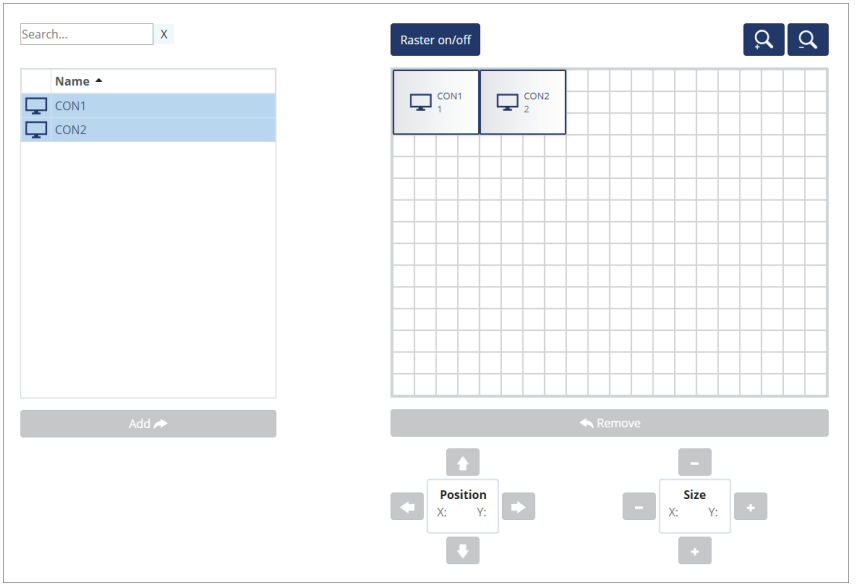


Figure 3: The view »CrossDisplay-Switching«

The tab is divided into four parts. The following paragraphs provide detailed information about each part.

List of modules

The *left column* lists all console modules and computer modules that are assigned to the tradeswitch workplace and *not* yet placed in the workspace.

Click on **Add** to move the selected module to the display range.

ADVICE: You can also drag and drop the modules by mouse to move the module to the display range.

Workspace

The *right column* (in the following called *workspace*) shows monitors of modules you can switch by using *CrossDisplay-Switching*.

Monitors are displayed as rectangles. Both the module name and the assigned tradeswitch key are displayed in the rectangle. You can use the handles and the **Size** buttons underneath the grid to change the rectangles' height and width.

Click on **Remove** to remove the selected rectangle from the workspace.

> **ADVICE:** You can also use »drag and drop« mouse operations to delete rectangles from the workspace.

The workspace's standard zoom level shows 20×15 units. However, you can adjust the size of the workspace:

- Press (*zoom in*) to maximize the workspace. The maximum zoom level shows a workspace of 4×3 units.
- Press (*zoom out*) to minimize the workspace. In the minimum zoom level, the workspace is displayed as 38×28 units (default setting).

> **NOTE:** The maximum size of the workspace is adjusted dynamically if you drag an element beyond the available workspace.
>
> You can increase the original size of 20×15 units as required.

Basic configuration

IMPORTANT: Before you can configure the *CrossDisplay-Switching* feature, you need to enable the premium **Tradeswitch** function (see page 238) and create a *Tradeswitch configuration* (see page 240).

Enabling CrossDisplay-Switching for the entire system

If you want to use the *CrossDisplay-Switching* function, we recommend that you activate the function for the entire system. This affects all computer modules that use the system-wide setting (*default*).

You can override the system-wide settings for each computer module and enable or disable *CrossDisplay-Switching* for certain computer modules only.

ADVICE: You can also disable the system settings and enable *CrossDisplay-Switching* only in the settings of computer modules on which you want to use the function.

How to change the CrossDisplay-Switching system settings:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Click on the **General** tab.
4. In the field **Mouse mode | CrossDisplay-Switching**, you can select between the following options:

Relative mouse coordingates | CDS disabled:	Disable *CrossDisplay-Switching* for the entire system.
Absolute mouse coordinates | CDS activated:	Enable *CrossDisplay-Switching* for the entire system.

ADVICE: You can enable or disable *CrossDisplay-Switching* for certain modules independently of the selected system settings (see below).

5. Click on **Save**.

Adjusting the general CDS mouse speed

If *CrossDisplay-Switching* is enabled, the mouse speed is not controlled by the operating system of the computer, but by the matrix switch.

If the cursor moves too fast or too slow, you can adjust the speed in the matrix switch.

You can adjust the mouse speed for the entire system or for one computer module only.

How to change the system settings of the mouse speed:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Click on the **General** tab.
4. Move the **CDS mouse speed** slider to the desired value.
5. Click on **Save**.

CDS mouse positioning

When moving the mouse cursor to an edge of the active monitor with a second monitor placed next to the active monitor, the mouse cursor remains at the position at which the switching to the module of the second monitor takes place.

NOTE: When using CDS for switching, a mouse cursor may be visible on several monitors.

In addition, when leaving the monitor, the matrix switch can position the mouse cursor so that it is barely visible. For this, you can use the settings **Right** and **Bottom**.

You can define this setting for the entire system. By default, all CDS modules use the system-wide setting. However, you can also individually define the mouse position for each CDS module.

How to change the system setting of the mouse position:

1. In the menu, click on **Matrix systems > [Name] > Matrix**.
2. Click on the matrix switch and then click on **Configuration**.
3. Click on the **General** tab.

4. In the **CDS mouse positioning** field, you can select between the following options:

Off:	The mouse cursor remains at the position at which the switching to the module of the next monitor takes place (*default*).
On:	According to the CDS mouse hideout setting the mouse cursor is positioned so that it is barely visible. Only during *multi-user access*, the cursor remains at the position at which the switching to the next monitor takes place.
On (multi access:	According to the **CDS mouse hideout** setting, even during *multi-user access*, the mouse cursor is positioned so that it is barely visible.

ADVICE: You can enable or disable this function for particular modules independently from the selected system setting.

5. With activated CDS mouse positioning, you can select between the following options in the **CDS mouse hideout** field:

Right:	The mouse cursor is placed on the right edge of the monitor so that it is barely visible.
Bottom:	The mouse cursor is placed on the bottom edge of the monitor so that it is barely visible.

6. Click on **Save**.

Enabling CrossDisplay-Switching for a specific computer module

How to change the CrossDisplay-Switching settings for a specific computer module:

1. In the menu, click on **Matrix systems > [Name] > Computer modules.**
2. Click on the computer module you want to configure and then click on **Configuration**.
3. Click on the **General** tab.
4. In the field **Mouse mode | CrossDisplay-Switching**, you can select between the following options:

System:	The system settings are adopted (*default*)
Relative mouse coordingates | CDS disabled:	Disable *CrossDisplay-Switching* for the specific computer module.
Absolute mouse coordinates | CDS activated:	Enable *CrossDisplay-Switching* for the specific computer module.

5. If you select **Absolute mouse coordinates|CDS activated** for this specific computer module, then select the desired options in the fields **CDS mouse speed**, **CDS mouse positioning** and **CDS mouse hideout** as described in the system settings (see page 252 ff.).
6. Click on **Save**.

Configuring the CrossDisplay-Switching function

You can configure the CrossDisplay-Switching function comfortably with a wizard. Click on the menu **Advanced features** and select the entry **Tradeswitch/FreeSeating/ CrossDisplay-Switching**. Click on **Configure** to start the wizard.

NOTE: Steps 1 through 4 (see page 240 ff.) of the wizard show you how to create a tradeswitch workplace.

NOTE: A tradeswitch workplace is a basic requirement to set up the »CrossDisplay-Switching« function.

Step 5: Position displays

How to add monitors to the workspace:

1. In the *left column*, select a console module or a computer module.
2. Click on the **Add** icon.

   ADVICE: You can also drag and drop monitors by mouse.

   In the workspace, each added module is displayed as a grey rectangle (4×3 units) with a black frame and is placed on a free position.

   The rectangle symbolises the monitor of the module placed on your desk. The name of the connected module and the assigned tradeswitch key are displayed in the rectangle.

How to remove monitors from the workspace:

1. In the *right column*, select the rectangle of the monitor you want to remove.
2. Click on the **Remove** icon.

   ADVICE: You can also drag and drop monitors by mouse.

   Each removed module monitor is added to the list of modules in the *left column*.

How to move monitors within the workspace:

IMPORTANT: Exact switching is only possible if the monitors shown in the web application are placed in the same order as on your desk.

NOTE: Spaces between the monitors in the workspace are skipped during *CrossDisplay-Switching*.

1. Move the mouse over the rectangle of the monitor you want to move.
2. Press and hold the **left mouse key** while dragging the rectangle to the desired position.

   If the frame of the rectangle turns **red** while dragging it, the current position is (partly) occupied and therefore the rectangle cannot be placed there.

   Drag the handle beyond the right or left edge if the workspace is too small for the monitor size you want to adjust. The workspace maximizes automatically.
3. Release the left mouse key when a **green** frame is displayed.

ADVICE: For finetuning and as an alternative to mouse operations, you can use the **Position** buttons below the grid after clicking a rectangle.

How to adjust proportions among monitors:

NOTE: Adjust the monitor proportions exactly to be able to position the mouse precisely and switch between monitors.

The monitor resolution is *not important* for this step.

1. Click on the rectangle of the monitor for which you want to change the size.

   On each of the rectangle's corners and in the middle between the two corners you can see adjustment handles (small black squares).
2. Click one of the handles and hold the **left mouse key** while dragging the handle to the desired position.

   If the frame of the rectangle turns **red** while dragging it, the position is (partly) occupied and therefore the rectangle cannot be placed there.

   Drag the handle beyond the right or left edge if the workspace is too small for the monitor size you want to adjust. The workspace maximizes automatically.

3. Release the left mouse key after a **green** frame is displayed.

> **ADVICE:** For finetuning and as an alternative using a mouse, you can use the **Position** buttons below the grid after clicking on a rectangle.

4. If required, repeat steps 2 and 3 with the other handles of the rectangle.

Step 6: Configure CDS settings of computer modules

How the change »CrossDisplay Switching« settings of computer modules:

1. Click on the computer module you want to configure and then click on **Edit**.
2. In the **CrossDisplay-Switching** field, you can select between the following options:

System:	The matrix switch settings are applied to the entire system (see above).
Disabled:	*CrossDisplay-Switching* is disabled for this computer module. The system settings are ignored.
Enabled:	*CrossDisplay-Switching* is enabled for this computer module. The system settings are ignored.

3. Click on **Save**.

How to change the mouse speed of computer modules:

1. Click on the computer module you want to configure and then click on **Edit**.
2. In the **CDS mouse speed** field, you can select between the following options:
   a. If you want to apply the system settings of the mouse speed to the computer module, enable the option **System**.
   b. If you want to set an individual mouse speed, disable the **System** option and set the desired value.
3. Click on **Save**.

How to adjust the *CrossDisplay* resolution of a computer module:

NOTE: With active *CrossDisplay-Switching*, the mouse speed is not controlled by the operating system of the computer but by the matrix switch.

If the cursor speed changes between horizontal and vertical mouse movements, the monitor resolution could not be auto detected.

In such cases, a resolution of 1680×1050 pixels applies. If the monitor's resolution differs from this resolution, the mouse moves as described above.

In this case, you can adjust the monitor resolution manually.

1. Click on the computer module you want to configure and then click on **Edit**.
2. Disable the **Auto** option in the **CDS resolution** field.
3. Enter the vertical and horizontal resolution in the input boxes.
4. Click on **Save**.

How to change the mouse position of a particular computer module:

1. Click on the computer module you want to configure and then click on **Edit**.
2. In the **CDS mouse positioning** field, you can select between the following options:

System:	Use systemwide (see above) setting (*default*).
Off:	The mouse cursor remains at the position at which the switching to the module of the next monitor takes place.
On:	According to the **CDS mouse hideout** setting the mouse cursor is positioned so that it is barely visible. Only during *multi-user access*, the cursor remains at the position at which the switching to the next monitor takes place.
On+Multi:	According to the **CDS mouse hideout** setting, even during *multi-user access*, the mouse cursor is positioned so that it is barely visible.

3. With activated CDS mouse positioning, you can select between the following options in the **CDS mouse hideout** field:

Right:	The mouse cursor is placed at the right edge of the monitor so that it is barely visible.
Bottom:	The mouse cursor is placed at the bottom edge of the monitor so that it is barely visible.

4. Click on **Save**.

Messages

In some cases *CrossDisplay-Switching* cannot be used.

In such cases, a message is displayed on the monitor of the console module. The messages have the following meaning:

Message	Meaning
No CDS: Globally disabled	No CDS possible as the function is deactivated for the entire system (see *Enabling CrossDisplay-Switching for the entire system* on page 251)
No CDS: Disabled	No CDS possible as the computer module uses relative mouse coordinates (see *Enabling CrossDisplay-Switching for a specific computer module* on page 254).
No CDS: No Tradeswitch modifier	No CDS possible because no tradeswitch key modifier (see *How to change tradeswitch key modifier or valid trade-switch keys:* on page 239) has been configured.
No CDS: Computer module not found	No CDS possible because the computer module was not found.
No CDS: Computer module multiuser mode	No CDS possible as a user is already connected to the computer module and this does not support MultiAccess (see *Access mode for simultaneous access to computer modules* on page 103).
No CDS: Computer module not supported	No CDS possible as the computer module does not support switching via CDS. Contact our support team for more information.
No CDS: Console not found	No CDS possible because the console module does not exist in the matrix switch database (anymore).
No CDS: Console MultiAccess mode	No CDS possible because the console module is included in several Workplaces (Tradeswitch configurations) and does not support multiuser CDS.
No CDS: Unknown error	No CDS possible. Contact our support team for more information.

CDS multihead groups

CDS multihead groups let you create a CDS workplace. You can switch *any* video channel to the monitors of this workplace.

The video channel can be either the (only) video channel of a computer with one graphics output only or a *given* video channel of a computer with multiple graphics outputs.

The configuration settings of a CDS multihead group provide the matrix switch with the resolutions and order of connected video channels belonging to one display range of a computer. These information allow flexible switching via CDS.

IMPORTANT: If two different users operate two different computer modules of a CDS multihead group at the same time, the mouse jumps between the affected video channels of both users.

Differences between CDS modes

CDS multihead groups expand the functional range of *CrossDisplay-Switching (CDS)*:

- In **CDS with channel grouping** mode, the matrix switch can display an additional video channel (added via channel group) of a computer with multiple graphics outputs only on monitors of console modules that also have a compatible channel group

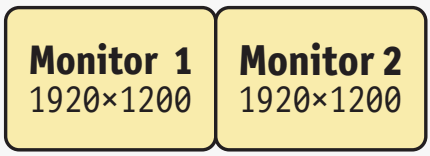
  Showing the *first* video channel of another computer module on an *additional* monitor of a channel group is not possible.
- **CDS with multihead groups** lets you display on *every* monitor either the (only) video channel of a computer with one graphics output or a *given* video channel of a computer with multiple graphics outputs.

IMPORTANT: In **CDS with channel grouping** mode, connect each computer module within the group to the computer using a USB cable.

Example of use

The following example shows the difference between the two CDS modes:

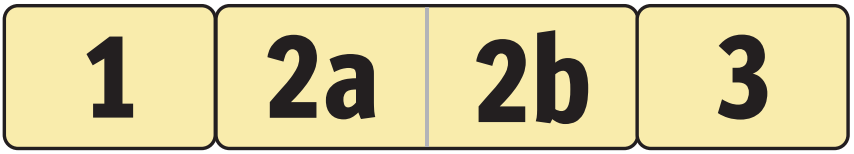
EXAMPLE: A display range of 3840×1200 pixels is defined in the graphics settings of a computer. The computer uses two video channels with 1920×1200 pixels each to transmit the display range to two monitors.



CDS with channel groups

The chapter *Implementation of multihead monitors* (see page 248) describes how to implement multihead computers with channel groups into the CDS configuration.

In the CDS configuration, the *combined* size of the monitors belonging to a channel group (monitors **2a** and **2b** in the example below) is adjusted so that their size ratio fits the other monitors:



IMPORTANT: Only monitor *2b* of the CDS workplace can display the *second* video channel of a multihead computer!

It is *not* possible to display the first video channel of a computer module on this monitor.

At the CDS workplace, when moving the mouse cursor to the right-hand margin of monitor **1**, the matrix switch switches to monitor **2a** and places the cursor in a way that you barely realise the changing between the cursors of both computers.

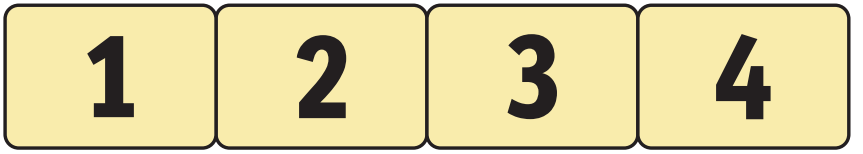
When moving the mouse cursor to the right-hand margin of monitor **2a**, the matrix switch detects with the help of the CDS configuration that the next monitor **2b** is connected to another graphics output of the already accessed computer. Therefore, a switching does *not* take place and the mouse cursor is *not* positioned.

When switching a computer with only one video channel to monitor **2a**, you need to drag the mouse through the unused display range of monitor **2b** before using CDS switching to switch to monitor **3**.

NOTE: This type of CDS configuration is recommended when you always switch multihead computers to particular monitors of the CDS workplace (**2a** and **2b** in the example).

CDS with mulithead groups

CDS with multihead groups allows you to display the individual video channels of multihead computers on any monitor of the CDS workplace.



You can switch the two display ranges of the multihead computer mentioned in the example above to monitors **1 and 2**, monitors **2 and 3** or monitors **3 and 4**.

NOTE: For *CDS with multihead groups,* instead of being grouped, individual channels are managed, configured and switched within the KVM matrix system.

You can switch *any* video channel to *each* monitor of the CDS workplace.The channel can be either the (only) video channel of a computer with one graphics output or a *given* video channel of a computer with multiple graphics outputs..

NOTE: CDS with multihead groups requires *additional* configuration settings.

According to the configuration of the CDS multi head group, the matrix switch detects the order of the devices and the resolution of each channel. This way, switching via CDS takes place reliably at the margins of the display range.

Requirements

- Enabled premium **Tradeswitch** function (see page 238).
- Established and configured *Tradeswitch configuration* (see page 240 ff.).
- Enabled *CrossDisplay-Switching* (see page 251).
- The channels of multihead computers must not be part of channel groups (see page 200). If necessary, delete the channel groups of the computer modules you want to configure.

  IMPORTANT: Channel groups are required to implement multihead computers as described in the chapter *Implementation of multihead monitors* (see page 248).

  Both CDS operating modes can be used at the same time in a KVM matrix system. However, you can use only one operating mode per computer and per CDS workplace.

- Order and size ratio of the monitors at the CDS workplace are saved in the web application (see page 249).
- The computer modules used at the individual video channels of a computer are all individually connected to the computer via USB.

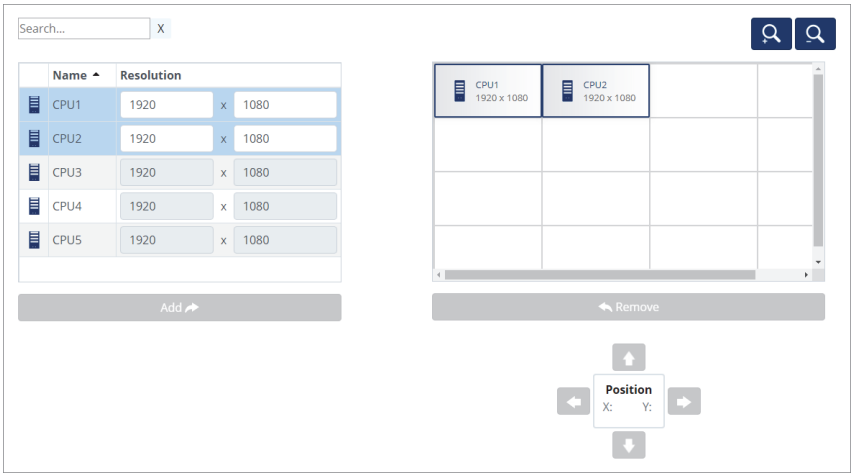
The *Member configuration* view

During basic CDS configuration you already defined order and size ratio of the monitors belonging to the CDS workplace (see page 249).

When configuring CDS multihead groups, you first reproduce the computer's display ranges and then enter their resolutions.

IMPORTANT: The configuration of CDS multihead groups *must* comply with the configuration of the computer's graphics settings!

The following screenshot shows two adjoining video channels (1920×1200 each) of a multihead computer (see example on page 261). The combined display range of the *CDS multihead group* has a resolution of 3840×1200 pixels.



The tab is divided into two parts The following paragraphs provide a detailed description of these parts.

List of computer modules

The table on the *left-hand side* lists all computer modules that are not part of a CDS multihead group.

By clicking on **Add** you can move the highlighted module into the display range.

ADVICE: You can also use »drag and drop« mouse operations to move modules to the display range.

Workspace

The workspace on the *right-hand side* shows the display ranges of video channels of multihead computers. Each display range is transmitted by a separate computer module.

The display ranges are displayed as rectangles. The name of the computer module and the resolution of its display range is displayed inside of the rectangle.

You can arrange the individual display ranges in horizontal or vertical order or in blocks. Blocks must be put together to form complete quadrangles. L-shaped arrangements are *not* supported.

IMPORTANT: The display range entered in the workspace must reflect the computer's *entire* display range.

Click on **Remove** to delete the selected rectangle from the workspace.

ADVICE: You can also use »drag and drop« mouse operations to delete rectangles from the workspace.

At default zoom level, the workplace is displayed in units of 4×4. You can adjust the size of the display range:

- Click on (*zoom in*) to maximize the workspace. At maximum zoom level, the workspace is displayed in units of 2×2.
- Click on (*zoom out*) to minimize the workspacer. At minimum zoom level, the workspace is displayed in units of 20×20 (default).

NOTE: The maximum size of the workspace adjusts dynamically when you move an element over the available workspace.

You can expand the default size of 16×16 units as far as you wish.

Configuring *CDS multihead groups*

You can configure the *CDS multihead groups* comfortably with a wizard. Click on the menu **Advanced features** and select the entry **CDS multihead groups**. Click on **Configure** to start the wizard.

NOTE: Steps 1 through 4 (see page 240 ff.) of the **Tradeswitch function/CrossDisplay-Switching** wizard show you how to create a tradeswitch workplace.

NOTE: Steps 5 and 6 (see page 255 ff.) of the **Tradeswitch function/CrossDisplay-Switching** wizard show you how to set up the **CrossDisplay-Switching** function.

Step 1: Administrate CDS multihead groups

How to create a new CDS multihead group:

1. Click on **Add**.
2. In the **Name** field, you can enter the name of the group.
3. *Optional:* In the **Comment** field, you can enter a comment about the group.
4. Select one of the options listed in the **CDS mouse mode** field:

NOTE: By default, when reaching one of the edges of the active monitor, switching does not take place if a mouse button is pressed while moving the mouse.

When working with Windows and Linux operating systems, you can enable specific mouse modes that allow drag and drop operations.

Standard:	When reaching one of the edges of the active monitor, switching does not take place if a mouse button is pressed while moving the mouse.
Windows:	Under *Windows* operating systems switching takes place even when pressing a mouse key while moving the mouse to the edge of the active monitor.
Linux:	Under *Linux* operating systems switching takes place even when pressing a mouse key while moving the mouse to the edge of the active monitor.

5. Click on **Save**.

How to change the settings of a CDS multihead group:

1. Click on the group you want to configure and then click on **Edit**.
2. In the **Name** field, you can change the name of the group.

3. *Optional:* In the **Comment** field, you can change or enter a comment about the group.

4. Select one of the options listed in the **CDS mouse mode** field:

> **NOTE:** By default, when reaching one of the edges of the active monitor, switching does not take place if a mouse button is pressed while moving the mouse.
>
> When working with Windows and Linux operating systems, you can enable specific mouse modes that allow drag and drop operations.

Standard:	When reaching one of the edges of the active monitor, switching does not take place if a mouse button is pressed while moving the mouse.
Windows:	Under *Windows* operating systems switching takes place even when pressing a mouse key while moving the mouse to the edge of the active monitor.
Linux:	Under *Linux* operating systems switching takes place even when pressing a mouse key while moving the mouse to the edge of the active monitor.

5. Click on **Save**.

How to delete a CDS multihead group:

1. Click on the group you want to delete and then click on **Delete**.
2. Confirm the security prompt by clicking on **Yes** or cancel the process by clicking on **No**.

Step 2: Configure CDS multihead groups

Saving order and resolutions of workspaces

Arrange the display ranges of the graphics cards installed in the multihead computer as they are displayed in the computer's graphics configuration.

> **IMPORTANT:** You can arrange the individual display ranges into horizontal or vertical order or in blocks. Blocks must be put together to form complete quadrangles. L-shaped arrangements are *not* supported.

How to add a workspace to the display range:

1. Select a computer module from the *left column*.
2. Click on **Add**.

> **ADVICE:** You can also drag and drop computer modules by mouse.

In the workspace, each added computer module is displayed as a grey rectangle (1×1 units) with a black frame and is placed on a free position.

The name of the computer module and the resolution of its display range are displayed inside the rectangle.

How to remove a display range from the workspace:

1. On the right-hand side of the workspace, select the rectangle symbolizing the display range you want to delete.
2. Click on **Remove**.

> **ADVICE:** You can also drag and drop display ranges by mouse.

How to move a display range within the workspace:

> **IMPORTANT:** Exact switching is possible only if the monitor arrangement stored in the web application complies with the arrangement at the workstation.

> **NOTE:** Empty spaces between display ranges are not valid.

1. Move the mouse over the rectangle symbolizing the display range you want to move.
2. Press and hold the **left mouse key** while dragging the rectangle to the desired position within the workspace.

   If the frame of the rectangular turns **red** while dragging it, the position is already occupied and therefore not valid.

   Drag the over the right or the bottom frame if the workspace is too small for the desired position. This way, the workspace becomes automatically larger.
3. Release the left mouse key when a **green** frame is displayed.

> **ADVICE:** as an alternative to using a mouse, you can use the **Position** buttons below the grid after clicking on a rectangle.

How to adjust the resolution of a display range:

1. In the table on the left, enter the **resolutions** of the computer modules of the CDS multihead group.
2. Click on **Save and continue**.

MatrixGuard (optional)

IMPORTANT: Using the MatrixGuard function requires the purchase and activation of the premium **MatrixGuard Function**.

IMPORTANT: The MatrixGuard Function is *not* compatible with *U2-LAN devices*.

If the current database leader is unavailable, the MatrixGuard function organises the forwarding of the leader role to another, available matrix switch of the Matrix-Guard.

All matrix switches of a MatrixGuard system share a common (virtual) MatrixGuard address. The MatrixGuard automatically determines the database leader based on the availability and priority of its members.

IMPORTANT: Configure the same MatrixGuard address on each matrix switch of the MatrixGuard system (see page 278).

Rules for the assignment of the leader role

1. When negotiating the leader role, the assigned priorities are taken into account (see page 278).

   If *several* matrix switches have the highest priority, the MatrixGuard function decides which matrix switch is assigned the leader role.

2. When restarting a matrix switch that used to be the database leader before the restart, the system checks whether a new leader exists in the MatrixGuard system.

   If this is the case, the booting matrix switch is downgraded to follower during the restart.

3. If a leader matrix switch becomes available again without restarting the device (e.g. after a temporary failure of a network component), the leader role is renegotiated if a new leader has become available in the MatrixGuard system in the meantime.

Example 1: Restart of all components

If all KVM components are restarted (e.g. after a power failure), each matrix switch checks whether one or more matrix switches of the MatrixGuard system are available as soon as it has initialized its network functions.

The first available matrix switch automatically becomes the database leader, since no other matrix switch of the MatrixGuard is available at this time.

The then starting matrix switches are automatically downgraded to follower during the boot process (see rule no. 2).

Example 2: Failure of the current database leader

All matrix switches in the MatrixGuard system regularly check whether the database leader is available. As soon as the database leader is no longer available, the remaining matrix switches renegotiate the leader role based on the assigned priorities.

IMPORTANT: When another matrix switch takes over the **leader** role, all end devices *briefly* lose the connection to the KVM matrix system and all open **Config Panel** sessions are terminated.

Example 3: Recognition of another database leader

A MatrixGuard system may contain only one available database leader.

If, for example, after the network connection of the previously active database leader has been restored, another database leader becomes available within the MatrixGuard system, the leader matrix switches renegotiate the leader role based on the assigned priorities.

IMPORTANT: When another matrix switch takes over the **leader** role, all end devices *briefly* lose the connection to the KVM matrix system and all open **Config Panel** sessions are terminated.

Example 4: Failure of a network component

If a network component fails, it is possible to separate a MatrixGuard system into several individual parts.

If the network switch fails, none of the matrix switches reaches another matrix switch included in the MatrixGuard system.

The current follower matrix switches therefore renegotiate the leader role. Since each follower matrix switch cannot reach another matrix switch due to the missing network connection, each matrix switch takes over the leader role for itself.

As soon as the network component is available again, the matrix switches renegotiate the roles as described in example 3.

Important notes

- Each matrix switch manages its MatrixGuard settings autonomously.

  When setting up the MatrixGuard function, it is therefore necessary to separately configure the settings in *all* matrix switches of the group via the web application of the individual matrix switches.

  The group automatically negotiates the **leader** role. The other matrix switches are automatically configured as database **follower**.
- All matrix switches of the MatrixGuard group are assigned the same virtual network interface.

  The web application of the current leader can be reached via the IP address of the virtual network interface.
- After setup, the current MatrixGuard role of a matrix switch is displayed on the overview page of the MatrixGuard function.

  You can also display the **Database mode** column in the web application under **Matrix systems > Matrix** (see page 10) and get the status from there.
- Each IP matrix switch supports a maximum of 20 end devices in the standard scope of delivery. Make sure that all participants of the **MatrixGuard** support sufficient end devices!

Requirements

Before configuring the MatrixGuard function, make sure to meet the following requirements:

- A functioning KVM matrix system is available.
- The matrix switches are in the same subnet.
- The network switches are able to forward **multicast** packets.
- The **MatrixGuard** feature is enabled for all matrix switches.

IMPORTANT: Use of the MatrixGuard function *is not* possible with **activated DHCP server** (see page 4) and/or when using the **DirectRedundancyShield** function (see page 280)!

Configuring a MatrixGuard member

IMPORTANT: Each matrix switch manages its MatrixGuard settings autonomously.

When setting up the MatrixGuard function, it is therefore necessary to separately configure the settings in all matrix switches of the group via the web application of the individual matrix switches.

You can configure each MatrixGuard member conveniently with a wizard. Click on the menu **Advanced features** and select **MatrixGuard**. To start the wizard, click on **Configure**.

The following sections briefly summarize the wizard's configuration options.

Overview: Configuration of a MatrixGuard member

If you have already configured the member's MatrixGuard function, the wizard starts with an overview of the member's most important settings.

NOTE: When configuring the MatrixGuard function for the first time, the wizard immediately starts with **step 1** (see below).

You can find the following information in the overview:

- **Priority:** User-defined priority of this matrix switch
- **MatrixGuard member:** Name of this matrix switch
- **MatrixGuard role:** Role this matrix switch currently has in the MatrixGuard group.

You can perform the following actions on the overview page of the wizard:

- **Remove member:** After clicking this button you will be prompted to select the future operating mode and to configure the connection to the leader.
- **Assign leader role:** If the member is currently operated as follower (see column **MatrixGuard role)**, you can click on this button to make it the leader.
- **Configure:** Click on this button to go to configuration steps 1 to 3 (see below).

Step 1: Set system time

IMPORTANT: If the time difference between the matrix switches is too large, an encrypted connection cannot be established between the matrix switches.

Therefore, we strongly recommend using an NTP server for automatic time alignment.

How to change the NTP time sync settings:

1. Under **NTP server**, enter the following data:

General	
NTP time sync:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the time synchronization: ▪ **Disabled** (*default*) ▪ **Enabled**
Time zone:	Use the pull-down menu to select the time zone of your location.
NTP server 1	
Address:	Enter the IP address of a time server.
Authentication:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the authentication: ▪ **Disabled** (*default*) ▪ **SHA1**
Key ID:	After enabling the authentication, enter the key ID that can be used for key authentication with the NTP server.
Key:	Enter the key in the form of up to 40 hex digits.
NTP server 2	
Address:	O*ptionally* enter the IP address of a second time server.
Authentication:	By selecting the corresponding entry in the pull-down menu, you can enable or disable the authentication: ▪ **Disabled** (*default*) ▪ **SHA1**
Key ID:	After enabling the authentication, enter the key ID that can be used for key authentication with the NTP server.
Key:	Enter the key in the form of up to 40 hex digits.

2. Click on **Save and continue**.

How to manually set the time and date of the device:

1. Go to **NTP server**.

   IMPORTANT: If necessary, disable the option **NTP time sync**. Otherwise, it is not possible to set the time and date manually.

2. In the **Time** field of the **Time/date** paragraph, enter the time in the format *hh:mm:ss.*
3. In the **Date** field of the **Time/date** paragraph, enter the current date in the format

   ADVICE: Click on **Accept local date** to copy the current system date of the computer on which the web application was opened into the fields *Time* and *Date*.

   DD.MM.YYYY.

4. Click on **Save and continue**.

Step 2: Set certificate

Communication between matrix switches is possible only if all devices use certificates of the same *Certificate Authority*.

For self-created certificates, be sure to use the same *certificate authority* or alternatively use **Certificate #1** (preferred) or **Certificate #2** for all matrix switches.

How to select the SSL certificate to be used:

IMPORTANT: After activating *another* certificate, close any active »Config Panel« sessions and start new sessions.

1. Select the SSL certificate you want to use:

G&D certificate #1:	This certificate is enabled for *new* devices. **NOTE:** Make sure that you use the same certificate for all devices within the KVM system.
G&D certificate #2:	This certificate is supported by some older G&D devices with integrated web application.
User certificate:	Select this option if you want to use a certificate purchased from a certificate authority or if you want to use a user certificate. Now you can import and upload the certificate: 1. Click on **Import certificate from file** and select the .pem file you want to import. You can also copy the plain text of the server certificate, the server's private key and the certificate of the certificate authority to the text box. 2. Click on **Upload and activate** to store and activate the imported certificate for the device.

3. Click on **Save and continue**.

Step 3: Configure members

In this step, you configure the MatrixGuard settings of the matrix switch whose web application you have opened:

- **Priority:** Assign this matrix switch a priority between **1 (high)** and **10 (low)**.

> **NOTE:** The matrix switches negotiate the leader role based on the defined priorities.
>
> The matrix switch with the highest priority is assigned the leader role. If this priority is assigned to several matrix switches, the MatrixGuard function decides which of these matrix switches gets the leader role.

> **IMPORTANT:** Assign priority 1 to exactly one **MatrixGuard** participant and other priorities to the other participants.
>
> In this way you can avoid a *permanent* role assignment of all MatrixGuard participants in the event of *short-term* network failures.

- **Interface:** Select the network interface via which this matrix switch is available in the MatrixGuard group.

  You can select the physical network interfaces and (if configured) also the **link aggregation** interface.
- **MatrixGuard address:** Assign the matrix switch an IP address that is not assigned in the subnet.

> **IMPORTANT:** Assign the *same* virtual IP address to all matrix switches included in the MatrixGuard group.

- **MatrixGuard netmask:** Enter the netmask of the subnet.

> **IMPORTANT:** The MatrixGuard function requires all matrix switches to be on the same subnet.

> **NOTE:** A virtual network interface is set up using the parameters **MatrixGuard address** and **MatrixGuard network**.
>
> The current leader of the MatrixGuard system is available under this virtual IP address.

- **Port (»local« and »remote«):** Define the port (usually 27996) through which this device communicates with the other devices of the MatrixGuard group.

> **NOTE:** Assign the same port to all devices included in the MatrixGuard group.

Click on **Save and continue** to add this device to the MatrixGuard system.

IMPORTANT: Make sure that the computer and console modules are *directly* connected to the IP matrix system via the **MatrixGuard** address.

The easiest way to ensure this is to decouple and re-connect the computer and console modules to the IP-Matrix via the web application of the **MarixGuard** leader (see chapter *Basic configuration of the KVM-over-IP™ connection* in the installation manual).

DirectRedundancyShield (optional)

NOTE: Using the DirectRedundancyShield feature requires the purchase and activation of the premium **DirectRedundancyShield feature** for both matrix switches.

The DirectRedundancyShield (DRS) is based on the application of an active and a passive matrix switch. Both matrices establish independent encrypted connections to all KVM-over-IP end devices at system startup.

Thus, two connections to independent matrix switches are available to the end devices. The end devices use the DRS to automatically connect to the matrix switch, which has the DRS status **Active**.

During operation, the DRS ensures that the switching states of the KVM-over-IP end devices are continuously synchronized at both matrix switches. In case the first matrix switch is no longer accessible, a second matrix switch is available via DRS. The continued operation of the matrix system is ensured with a changeover time of less than one second while maintaining all switching states.

The DRS status

The **DRS status** column of the respective matrix switch can be displayed via **matrix systems > matrix** in the web application (see page 10) and the status can be viewed. By activating the DRS function, the DRS status column is automatically displayed.

The DRS status can be as follows:

- **Active**: The matrix switch which has the DRS status **Active** is currently being operated. The end devices connect to this matrix switch. The switching states are transferred from this matrix switch to the matrix switch having the DRS status **Passive**.
- **Passive**: The matrix switch which has the DRS status **Passive** is not currently being operated. The switching states of the matrix switch, which has the DRS status **Active**, are transmitted to this passive matrix switch. It can start operating at any time in the event the currently active matrix switch fails. In this case, the DRS status immediately changes from **Passive** to **Active**.

  It is also possible to carry out maintenance operations (e.g., a firmware update) on the matrix switch with the DRS status **Passive**.
- **Deactivated**: The DRS function has *not* yet been configured. The switching states are *not* transmitted and synchronized.

IMPORTANT: To operate your matrix system via an external IP control (see *IP-Control-API (optional)* on page 222 ff.), you must select the matrix switch with DRS status **Active**. In this case, a verification of the DRS status should be integrated before executing commands.

Rules for the assignment of the DRS status

1. When configuring the DRS function, the DRS status is initially determined.
2. When restarting a matrix switch which occupied the DRS status **Active** before the restart, it is verified whether the second matrix switch has taken over the connections and the status **Active** in the meantime. In this event, the restarting matrix switch is assigned the DRS status **Passive**.
3. If both matrix switches become available again as soon as the device is restarted (for example, after a temporary failure of a network component), the DRS status is assigned according to the initial setup.

Example 1: Restart of all KVM components

When all KVM components are restarted (for example, after a power failure), the first available matrix switch automatically receives the DRS status **Active**, since the other matrix switch is not yet available at this point. The subsequent starting matrix switch automatically receives the DRS status **Passive** during the boot process.

Example 2: Failure of the active matrix switch

The two matrix switches of the DRS group regularly check whether the active matrix switch is available. Whenever the active matrix switch is no longer accessible, the previously passive matrix switch is automatically and immediately assigned the DRS status **Active**.

Example 3: Failure of a network component

If a network component fails, it is possible to separate a DRS group. If the network switch fails, the two matrix switches are unable to communicate with the respective counterpart. Both matrix switches receive the DRS status **Active**. As soon as the network component is accessible again, the DRS status is assigned according to the initial setup (see *Step 1: Initial setup and definition of the target system* on page 283 ff.).

Important notes

- The **Database mode** column of the respective matrix switch can be displayed via **matrix systems > matrix** in the web application (see page 10) and the status can be viewed.
- You can view the **DRS status** column of the respective matrix switch by selecting **matrix systems > matrix** in the web application (see page 10) and check the status. By activating the DRS function, the DRS status column is automatically displayed.

Requirements

Before configuring the DRS function, make sure to meet the following requirements:

- A functioning KVM matrix system is available.
- Both matrix switches communicate with each other via a network connection.
- The *DirectRedundancyShield-Feature* is enabled in both matrix switches.
- Both matrix switches are set to database mode **Leader**.
- The *DirectRedundancyShield-Feature* must be supported by the end devices used. This is generally the case for all G&D devices that use KVM-over-IP for transmission. A firmware update may be required. Supported are:
  - Devices of the *VisionXS-IP* series from firmware 1.3.0
  - Devices of the *Vision-IP* series from firmware 2.3.0
  - Devices of the *RemoteAccess-IP-CPU* series from firmware 1.2.0
- Both matrix switches support **sufficient end devices**. Each IP matrix switch supports a maximum of 20 end devices in the standard scope of delivery.

IMPORTANT: Using the DirectRedundancyShield function is not possible with **activated DHCP server** (see page 4) and/or when using the **MatrixGuard** function (see page 271)!

Configuring the DRS function

The configuration of the DRS function for the two devices is performed conveniently with a wizard. In the web application of the matrix switch which is to initially adopt the DRS status **Active**, click the **Advanced features** menu and select **DirectRedundancyShield (DRS)**. To start the wizard, click on **Configure**.

IMPORTANT: It is recommended to complete the entire system configuration if possible before activating the DRS function! After the configuration of the DRS function is completed, the passive matrix switch receives the database information of the active matrix switch once.

For direct switching between the matrix switches, continuous database synchronization (system-wide settings as well as configuration of the terminals, user rights, etc.) was dispensed with for the DRS function. Only switching states are synchronized. Later changed configuration parameters on the active matrix switch must be manually adjusted using the wizard and transferred to the passive matrix switch again (see *Step 2: Adjust configuration* on page 284).

The following sections briefly summarize the wizard's configuration options.

Step 1: Initial setup and definition of the target system

How to configure the DRS function:

1. Enter the following data:

Direct Redundancy Shield (DRS):	▪ **Enabled** ▪ **Disabled** (*default*)
IP address/ hostname of the target system:	Enter the IP address or the host name of the initial passive matrix switch (target system).
Control port of the target system:	Enter the number of the control port of the target system (*default*: *18246*).

> **NOTE:** The following input boxes appear as soon as you select *Enabled* in the field **Direct-RedundancyShield (DRS)**.
>
> The entries in these fields are not permanently stored in the database of the active matrix switch but are only used for the following connection setup.

User of the target system with superuser rights:	Enter the user name of a user of the target system with superuser rights.
Password:	Enter this user's password.
One-time password:	Enter the one-time password for the two-factor authentication of this user.

> **NOTE:** The one-time password must only be entered if two-factor authentication has been set up (see page 54 ff.) and has been enabled (see page 77 ff.).

2. Click on **Save and continue**.

> **IMPORTANT:** The matrix system restarts and the connections to the end devices are reestablished. Plan for a short downtime of the system at this point!

Step 2: Adjust configuration

In step 2, the configuration of the active matrix switch can be transferred to the passive matrix switch.

IMPORTANT: Click **Save and continue** to transfer the configuration of the active matrix switch to the passive matrix switch/the specified target system. As a result, the original data of the target system will be overwritten. The transfer process can take up to 5 minutes. During this time, the target system is offline and is not available for operation.

1. Click on **Save and continue**.

IMPORTANT: Do not restart either matrix switch during the transfer process and do not close the browser session.

2. Enter the following data in the pop-up window that opens:

User name:	Enter the user name of a user of the source system with superuser rights.
Password:	Enter this user's password.
One-time password:	Enter the one-time password for the two-factor authentication of this user. **NOTE:** The one-time password must only be entered if two-factor authentication has been set up (see page 54 ff.) and has been enabled (see page 77 ff.).
Name of the target system:	Enter a name for the target system if the previous name is not to be used. The previous name of the target system is read out and entered here by default.
Select the IP address of the source system used for connection to the end devices:	Select the IP address of this active matrix switch used for the connection to the end devices. You may also click on the input box and enter the IP address.

3. Click on **Continue**.

4. If an error message appears, click **Cancel** and repeat the process.

Step 3: DRS configuration completed

After successfully transferring the configuration to the passive matrix switch/the target system, the DRS is set up on both matrix switches.

ADVICE: Check in the web application of the passive matrix switch whether all end devices have established the connection to the passive matrix switch and the configuration has been successfully adopted.

IMPORTANT: Once the DRS configuration is complete, modify the configuration parameters only on the active matrix switch and transfer them as soon as possible to the passive matrix switch (see *Step 2: Adjust configuration* on page 284). In this way, you can ensure that no changes are lost and that both matrix switches are synchronized. On the passive matrix switch, configuration is only possible to a limited extend.

IMPORTANT: If you operate the DRS function with **UID locking** enabled, you must manually add the respective counterpart to UID locking in both matrix switches after completing the DRS configuration
(see *Restricting KVM-over-IP counterparts (UID locking)* on page 59 ff.).
This is the only way that the two matrix switches can subsequently communicate with each other and synchronize the switching states.

EasyControl (optional)

IMPORTANT: Using the EasyControl tool requires the purchase and activation of the premium **IP-Control-API** (see page 286 ff.).

You can use the **EasyControl** tool integrated in the web application to connect a console module to a specific computer module or to execute an existing script or script group.

After activating the **IP-Control-API** (see page 286 ff.), all users who assigned with the right to access the tool (see page 92) can use it.

Starting the »EasyControl« tool

How to start the tool:

1. Enter the following URL in the address line:

   https://[IP address of the device]

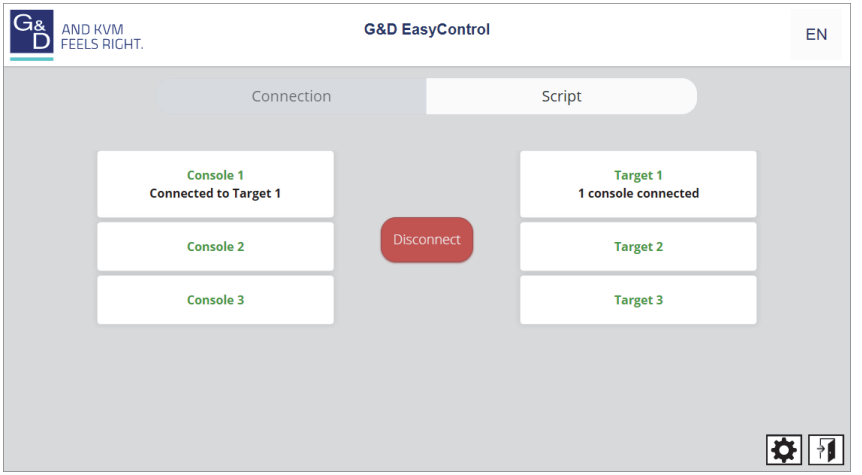
2. Enter the following data in the login mask:

Agree to the terms of use:	Click on the text to read the terms of use. Click on the checkbox to accept the terms of use.
	NOTE: The terms of use only appear if a corresponding configuration has been made (see *Showing terms of use* on page 15 ff.).
Username:	Enter a username.
Password:	Enter a password for your user account.
2-Factor Auth Code (TOTP):	Enter the 2-Factor Auth Code (TOTP) from two-factor authentication.
	NOTE: The 2-Factor Auth Code (TOTP) is only requested if two-factor authentication has been configured (see page 54 f.) and activated (see page 77 ff.).

3. Click on **Login**.
4. Click on the **EasyControl** icon.

Establishing and disconnecting a connection

Use the tool in **Connection** mode to connect a console module to a computer module.



The left column lists the **console modules** on which you are logged in at the moment.

> **NOTE:** The following console modules are *not* listed here:
> - Grouped console modules (except main channel 1),
> - CON modules of **U2-**, **U2+** or **U2-LAN** variants.

> **ADVICE:** You can use scripts (see below) to log on to other console modules without having to log on to the OSD.

The *right* column lists all **computer modules** you can access according to the access rights assigned to your account.

> **NOTE:** The following computer modules are *not* listed here:
> - Grouped computer modules (except main channel 1),
> - CPU modules of **U2-**, **U2+** or **U2-LAN** variants

If a console or computer module has an active connection to a remote terminal, a short note indicates this condition in the list:

- **Console modules:** Connected to [*name of computer module*]
- **Computer modules:** [*x*] console(s) connected

Switching functions

How to connect a console module and a computer module:

1. Click on **Connection**.
2. *Successively* click the buttons of the console module and the computer module which you want to connect with each other.

> **NOTE:** The last clicked button is displayed as *marked*.
> Click anywhere outside of the button or on the button to cancel the mark.

   The two devices connected via mouse click remain marked until the next click is made.

How to disconnect a console module from a computer module:

1. Click on the button of the *console module* you want to disconnect from a computer module.
2. Click on **Disconnect**.

How to show the remote station of the connected computer module:

1. Click on the button of the *console module* or *computer module* whose remote station you want to show.

   The selected module and the module connected to it are now marked in the lists.

Hiding modules on the user interface

How to show or hide console or computer modules from the list:

1. Click on the gears icon at the bottom right ().

   Each entry in the list of the console or computer modules contains the slider **Hide device**.

2. *Activate* the sliders of modules you want to hide from the list.

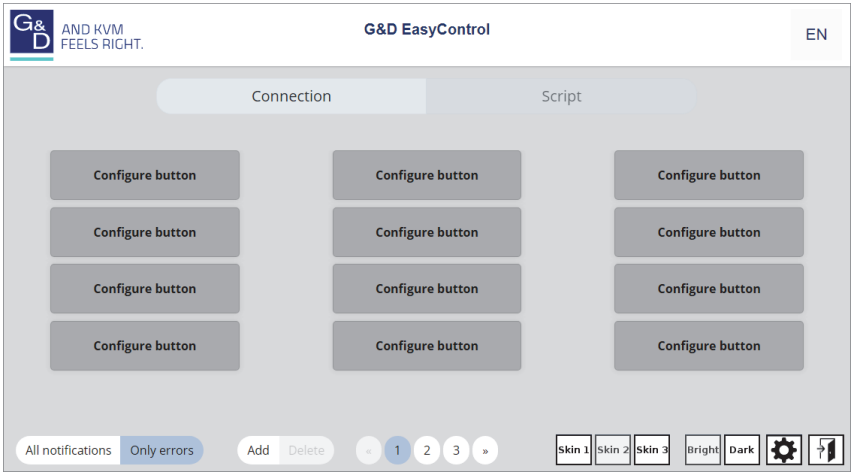
   Deactivate the sliders of modules you want to show on the list.

3. Click the gears icon again ().

Executing scripts

Use the tool in **Script** mode to execute an existing script or script group.

Each page of the user interface contains 12 buttons. Each of these buttons can be assigned a script or a script group.



To be able to call a script or a script group using the tool, the following requirements must be met:

- The user logged in to EasyControl is assigned the right to execute a script or script groups.
- In the settings of the script or the script group the use in EasyControl is permitted.

IMPORTANT: When opening the script view of the tool for the first time, no buttons are configured yet.

You can only execute scripts or script groups after you have configured the buttons.

Configuring the interface

How to assign a script or a script group to an unconfigured button:

> **IMPORTANT:** Unconfigured buttons are only visible in the configuration view. These buttons are not visible in the user view.

1. Click on the gears icon at the bottom right ([⚙]).

   All available buttons are displayed in the middle of the view.

   > **NOTE:** Buttons that have already been configured show the name of the assigned script or script group.
   >
   > Unconfigured buttons are marked with **Configure**.

2. Click on an unconfigured button marked with **Configure**.
3. Select the script or script group you want to execute using this button.

How to assign a colour to a configured button:

1. Click on the gears icon at the bottom right ([⚙]).

   All available buttons are displayed in the middle of the view.

   > **NOTE:** Buttons that have already been configured show the name of the assigned script or script group.
   >
   > Unconfigured buttons are marked with **Configure**.

2. Click on a configured button.
3. Select the desired colour of this button.

How to add a page to or delete it from the view:

1. Click on the gears icon at the bottom right ([⚙]).
2. Click on **Add** in the middle of the footer to add another empty page.

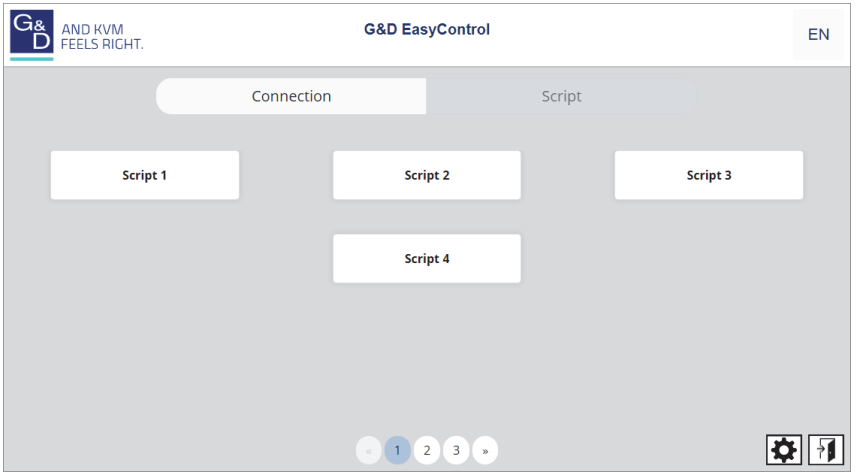
   Click on **Delete** to delete the currently displayed page.

   > **NOTE:** Only empty pages can be deleted.

How to delete the configuration of a configured button:

1. Click on the gears icon at the bottom right ([⚙]).
2. Click on the [**X**] in the upper right corner of a configured button.

Operating the user interface



How to execute a script or a script group:

1. Click on **Script**.

   All configured buttons are displayed in the middle of the view.

2. If necessary, use the page selection in the middle of the footer to select the page containing the desired button.

3. Click on the desired button.

General configuration settings

Showing all notifications or only errors

1. Click on the gears icon at the bottom right (⚙).
2. Select one of the given options:

All notifications:	Show all status and error notifications
Only errors:	Show only error notifications

3. Click the gears icon again (⚙).

Changing the colour scheme of the tool

NOTE: The selected colour scheme is saved in the user settings of the active user. When using the tool the next time, the previously selected colour scheme is applied.

How to change the colour scheme:

1. Click on the gears icon at the bottom right (⚙).
2. Click on the button of the colour scheme you want to use (**Skin 1**, **Skin 2** or **Skin 3**).
3. Each colour scheme is available in a variant for light and dark working environments. Select the desired variant:

Bright:	Apply variant for bright surroundings
Dark:	Apply variant for dark surroundings

4. Click the gears icon again (⚙).

Closing the tool

How to close the tool:

1. Click on the **Exit (⏻)** icon at the bottom right.

Possible messages and their meanings

There are various messages that can appear on the monitor of the console module in certain cases. You have the option of adjusting or deactivating these information displays (see *Adjusting the information display* on page 192 ff.).

Below you find a selection of possible messages and their meanings:

Message	Meaning
Forwarding to ...	The console module is the leader workplace of the Tradeswitch workplace (see *Administrating tradeswitch workplaces* on page 240). This message appears when the input devices are switched to another console module. You can switch this message off if you want (see *Configure Tradeswitch visualization* on page 241).
FORWARDED	The console module is a target workplace of the Tradeswitch workplace. This message appears when the input devices are switched from the leader workplace to this console module. You can switch this message off if you want (see *Configure Tradeswitch visualization* on page 241).
No CDS: Globally disabled	No CDS possible as the function is deactivated for the entire system (see *Enabling CrossDisplay-Switching for the entire system* on page 251 ff.).
No CDS: Disabled	No CDS possible as the computer module uses relative mouse coordinates (see *Enabling CrossDisplay-Switching for a specific computer module* on page 254 ff.).
No CDS: No Tradeswitch modifier	No CDS possible because no tradeswitch key modifier (see *Changing tradeswitch key and valid key type* on page 238 ff.) has been configured.
No CDS: Computer module not found	No CDS possible because the computer module was not found.
No CDS: Computer module multiuser mode	No CDS possible as a user is already connected to the computer module and this does not support MultiAccess (see *Access mode for simultaneous access to computer modules* on page 103 ff.).
No CDS: Computer module not supported	No CDS possible as the computer module does not support switching via CDS. Contact our support team for more information.
No CDS: Console not found	No CDS possible because the console module does not exist in the matrix switch database (anymore).
No CDS: Console MultiAccess mode	No CDS possible because the console module is included in several Workplaces (Tradeswitch configurations) and does not support multiuser CDS.
No CDS: Unknown error	No CDS possible. Contact our support team for more information.
Not connected	The console module is not connected to any computer module (for detailed information, please refer to the separate manual *Configuration and operation*).

Message	Meaning
Computer module not available	The console module should be connected to a computer module. However, this computer module is not available in the system.
No user logged in	The console module should be connected to a computer module. However, no user is logged on (for detailed information, please refer to the separate manual *Configuration and operation*).
Insufficient access rights	The console module should be connected to a computer module. However, the user rights do not allow this (see *Adjusting access and configuration rights* on page 100 ff.).
No MultiAccess right	The console module should be connected to a computer module. However, another user is already connected and the user does not have MultiAccess rights (see *Access mode for simultaneous access to computer modules* on page 103 ff.).
Unknown route to computer module	The console module should be connected to a computer module. However, the matrix switch does not know where the computer module is connected (for detailed information, please refer to the separate manual *Configuration and operation*).
No route to computer module available	The console module should be connected to a computer module. The matrix switch knows how to reach the computer module. However, there is no free line via which the computer module can be reached (for detailed information, please refer to the separate manual *Configuration and operation*).
Connection failed	The console module should be connected to a computer module. However, the router was unable to fulfill its task.
VIEW ONLY	Operation of the connected computer module is disabled (see *Adjusting access and configuration rights* on page 100 ff.). You can switch this message off if you want (see *How to change the general settings of the information display for computer modules with view right:* on page 193).
MULTIUSER	If several users are connected to a computer module, the number of connected users is displayed. You can switch this message off if you want (see *Multi-user information* on page 120 ff.).
AUTOSCAN	The computer module uses the autoscan function (see *Auto scanning all computer modules (Autoscan)* on page 182 ff.).
AUTOSKIP	The computer module uses the autoskip function (see *Auto scanning all active computer modules (Autoskip)* on page 184 ff.).

Message	Meaning
STEPSCAN	The console module uses the stepscan function and the keys to scan the computer modules manually are active (see *Scanning computer modules manually (Stepscan)* on page 185 ff.).
HDCP content suppressed	The connected computer module has detected HDCP-protected image data that may not be displayed.
Frozen for ...	When using freeze mode, the image last received is either highlighted by a coloured frame and/or the note Frozen and the time past since the loss of connection (see *Freeze mode* on page 208 ff.)
Please reconnect	A disconnection has been detected. Check the cables.
Communication was interrupted Auto-switched to channel ...	A CON-2 console module was automatically switched to the specified channel due to a connection failure.
Stream CPU ...	Index of the displayed video stream when switching of the video stream (when connected to a DH computer module)
Illegal format	Problem with video parameters: Incorrect data format
Pixel clock too high	Problem with video parameters: Pixel clock higher than supported by the current console module
Resolution too high	Problem with video parameters: Image width or image hight greater than supported by the current console module
Pixel clock too low	Problem with video parameters: Pixel clock below the minimum clock rate
Resolution too low	Problem with video parameters: Image width or image height less than required for output
Invalid parameter	Problem with video parameters: Image parameters inconsistent or incorrect
No AV-stream received	The reception of AV data is configured. However, no AV data is received.

NOTES

G&D. FEELS RIGHT.

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