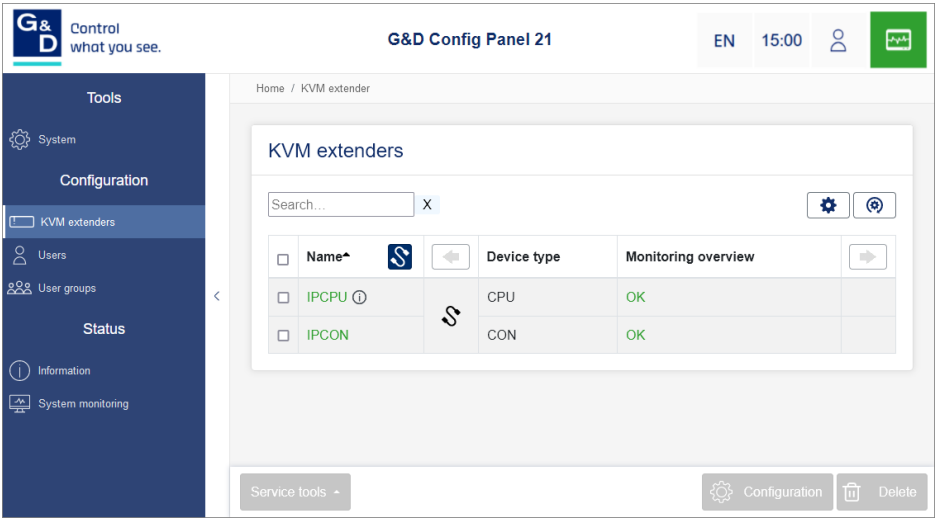
G&D VisionXS-IP series

EN »Config Panel« Web Application
Configuring the extender



A9200162-1.53

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1 Basic functions

Introduction

The *ConfigPanel* web application provides a graphical user interface to configure the matrix switches of 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

IMPORTANT: When operating the devices in matrix mode, refer to the manual of the matrix switch.

System requirements

IMPORTANT: Before the web application can be started via the web browser of a computer, the device from which the web application is loaded must first be connected to the local network. The *Installation* manual of the device provides more information.

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

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

- Apple Safari 26
- Google Chrome 149
- Microsoft Edge 144
- Mozilla Firefox 152

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 the *network interface »Network (Management)«*: **192.168.0.1**
- 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 5e (or better) twisted pair cable to connect the network interface of any computer to the device's *network interface Network (Management)*.
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 (see *Network settings* on page 17 ff.) f.
6. Remove the twisted pair cable connection between computer and device.
7. Implement the device in the local network.

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 2.

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.
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 terms of use only appear if a corresponding configuration has been made (see *Showing terms of use* on page 13 ff.).

NOTE: The 2-Factor Auth Code (TOTP) is only requested if two-factor authentication has been configured (see page 51 f.) and activated (see page 66 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 70).

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

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

3. Click on **Login**.

Operating the web application

User interface

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

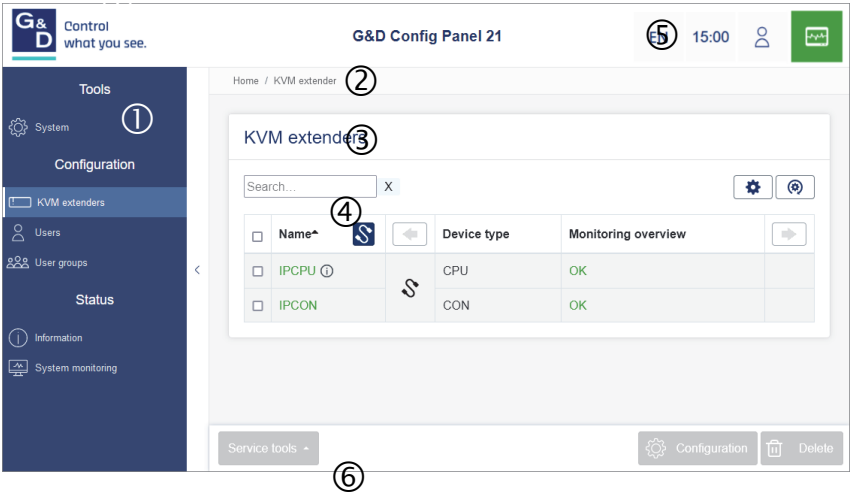


Figure 1: User interface of the web application

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 **KVM extender** and **Users** to your requirements.

By default, the columns *Name*, *Device type*, *Module*, *Comment* and *Monitoring overview* are shown under **KVM extender**:

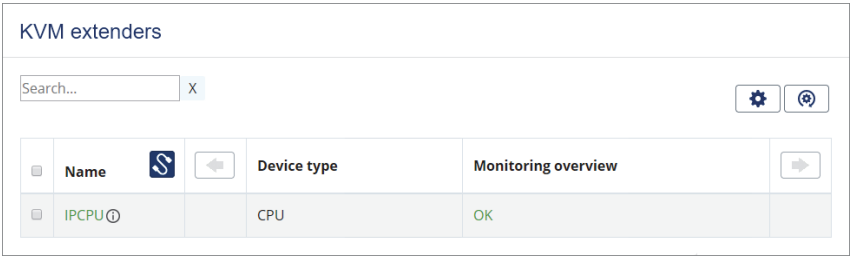


Figure 2: Table columns (selection) of a KVM extender

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 click 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 extender 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**.

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 (*default*: 15 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**.
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.

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 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 70 ff.) and a new user account is created (see *Creating a new user account* on page 65). You should therefore configure the password complexity as early as possible.

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 lowercase letters 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 different 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.

How to configure the Login options:

1. Click **System** on the menu.
2. Click **Login options**.
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 effective 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.

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 *VisionXS IP series* series devices are equipped with two network interfaces:

- **Interface A:** This interface allows the integration of a device into a network for accessing the web application and using the extended network functions (network filter, syslog,...) of the devices.
- **Transmission:** The KVM data is transmitted via the interface to the counterpart station via a KVM-over-IP™ connection.

IMPORTANT: Please mind the separate instructions regarding *Initial configuration of the network settings* on page 3.

Configuring the network settings

Configure the network settings to connect the device to a local network.

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

- IP address of interface »*Interface A*«: **192.168.0.1**
- IP address of the *Transmission* interface of a computer module (CPU) address is obtained via **DHCPv4** (fallback: IP address 172.17.0.10)
- IP address of the *Transmission* interface of a console module (CON) address is obtained via **DHCPv4** (fallback: IP address 172.17.0.11)
- 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 **KVM extender**.
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. Use **Transmission** or **Interface A** paragraphs to enter the following data:

> **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*.

Operational mode:	Use the pull-down menu to select the operating mode: ▪ **Off:** switches off 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.

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 **KVM extender**.
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 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 transmission connection by link aggregation

To increase reliability, you can enable the **Transmission 2** interface of the KVM extender with the **Transm. Redundancy** feature, which is available for a fee, or with a **2C/2F** variant (with VisionXS-IP 2.0).

Both interfaces are combined into a group 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* überwacht. 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 **KVM extender**.
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 **Parameter**:

Primary follower:	Select whether data traffic should preferably be transmitted via the interface **Transmission 1** or the interface **Transmission 2**. 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.

6. 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 **KVM extender**.
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 **Transmission** and **Interface A** 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**).
	NOTE: The following information is only displayed for CAT variants and **Interface A**.
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 **Close**.

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 extender**.
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** ▪ **Transmission**
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 **KVM extender**.
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** ▪ **Transmission**
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 **KVM extender**.
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 **KVM extender**.
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.

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 33) must be used when creating certificates for these devices.

Alternatively, the identical PEM file (see page 37) can also be used for all devices. In this 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 a 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:

Feld	Beispiel
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 certificates 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 33).

How to select the SSL certificate you want to use:

> **IMPORTANT:** Selecting and activating another certificate terminates all active sessions of the web application.

1. In the menu, click on **KVM extender**.
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: 1. 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. 2. Click on **Upload and activate** to store and activate the imported certificate for the device.

3. Click on **Save**.

Firmware update

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

Firmware update of a single KVM extender

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 KVM extender:

1. In the menu, click on **KVM extender**.
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 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 **target version** of the devices, if you selected more than one firmware files in step 5. 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 devices are being updated. Do **not** turn off the products or disconnect them 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 **target version** of the devices, if you selected more than one firmware files in step 5. 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 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 **KVM extender**.
2. Click on the desired device.
3. Open the menu **Service tools** and select the entry **Restart**.
4. Confirm the confirmation prompt with **Yes**.

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 56 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 **KVM extender**.
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 **KVM extender**.
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 date (*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
- (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 **KVM extender**.
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 **KVM extender**.
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 dialog.

How to view and store local syslog messages:

1. In the menu, click on **KVM extender**.
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* on page 51),
  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 **KVM extender**.
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 an 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 65).

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* on page 51).

6. Click on **Save**.

Setting up two-factor authentication on the device

Standard user authentication involves querying a password. To provide a greater level of security, 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* on page 66).

How to activate 2FA on the device:

1. In the menu, click on **KVM extender**.
2. Double-click the device that is to be configured (**CPU** or **CON**).
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.
	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 65).
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 be 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**
	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 42). Alternatively, you can set the time and date manually (see page 44).

Information on activating two-factor authentication is provided on page 66.

Monitoring functions

Under **KVM extender** 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:

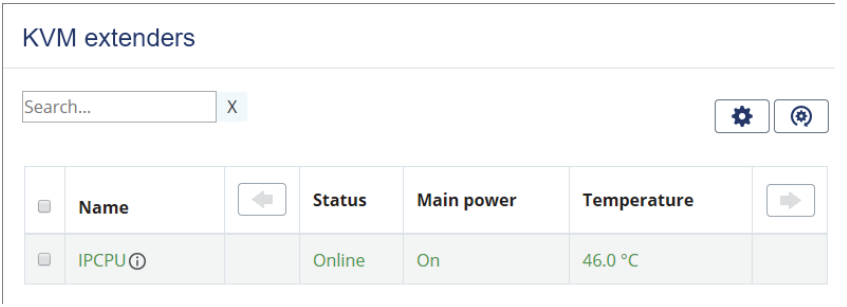


Figure 4: Detailed view of an exemplary monitoring table

The values configured for the table view (see *Configuring table columns* on page 8) 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 **KVM extender**.

How to show a list of all monitoring values:

1. In the menu, click on **KVM extender**.
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 **KVM extender**.
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 **KVM extender**.
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 6) 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 **KVM extender**.
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 **KVM extender**.
2. Click on the tab **Network**.
3. Go to the paragraph **SNMP trap**.
4. Click on **Add** or on **Edit**.
5. Enter the following 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 **KVM extender**.
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 *ComputerModuleConfig*.

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 *ComputerModuleConfig*	Effective right
Change personal profile	No	No	**Yes**	**Yes**
Change device configuration	No	**Yes**	No	**Yes**
Access to USB devices	**Yes**	No	No	**Yes**

The settings of the *Change personal profile* and *Change device configuration* rights result from the rights assigned to the user groups. The *Access to USB devices* 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 user-related settings (see *Overview of user-related settings (Personal profile)* on page 72).

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.

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 14) 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 48 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 51), the settings for the user account must be made in the next step (see page 66).

Activating two-factor authentication

NOTE: To use two-factor authentication, it first needs to be set up on the device (see page 51).

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* on page 51 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 79), or the user must be logged in with the corresponding user profile (see page 79) and have the right *Change own password* (see page 80).

IMPORTANT: Use time sync with an NTP server (see page 42). Alternatively, you can set the time and date manually (see page 44).

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**, an 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 71).

Deactivate the user *RemoteAuth* to prevent users from logging in to the KVM system without their own user account (see *Enabling or disabling a user account* on page 74).

Once 2FA has been activated in the user account, 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 4).

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 48 ff.).

Changing the password of a user account

NOTE: The activated *Superuser* right
(see *Rights for unrestricted access to the system (Superuser)* on page 79 ff.)
or the right *Change own password*
(see *Rights to change your own password* on page 80 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 14) 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 79 ff.).
New password:	Enter the new password.
Confirm new 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 51 f.) and activated (see page 66 ff.).

4. Click on **Save**.

Changing the user account rights

Any user account can be assigned with different rights.

The following table 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 79
Config Panel Login	Login to the *ConfigPanel* web application	page 79
Change own password	Change own password	page 80
Confirm monitoring alert	Confirmation of a monitoring alarm	page 80

Overview of user-related settings (Personal profile)

The following table provides an overview of the user-related settings. It additionally lists the *default* settings and references to detailed descriptions of the functions.

Personal profile	Field name	Page
Changing the password of a user account	New password	70
Selecting the language for a specific user account	Language	11
Displaying an information overlay	Show OSD info	137
Adjusting the transparency of the OSD	OSD transparency	138
Changing the colour of the information display	Colour of OSD info	138
Enable/disable an automatic OSD timeout	Timeout of OSD session (5-99 seconds)	139

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.

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 name of the user group.
Comment:	If desired, enter a comment regarding the user group.
Enabled:	Mark this checkbox to activate the user group.

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 table 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 79
Config Panel Login	Login to the *ConfigPanel* web application	page 79
Change own password	Change own password	page 80
Confirm monitoring alert	Confirmation of a monitoring alarm	page 80

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 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**.

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 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 **KVM extender**.
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 45 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, you receive a feature key. This file contains a key to activate the purchased function(s).

The purchased premium functions 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 **KVM extender**.
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**.

2 IP extenders

You can configure the settings of the KVM extender and view the device's status information in the web application's *KVM extender* menu,.

Basic configuration of KVM extenders

Changing the name of a KVM extender

How to change the name of a KVM extender:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Enter the name of the KVM extender in the **Name** field of the **Device** section.
5. Click on **Save**.

Changing the comment of a KVM extender

The list field of the web application displays the name of a KVM extender as well as the comment entered.

> **ADVICE:** For example, use the comment field to note the location of the KVM extender.

How to change the comment of a KVM extender:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Enter a comment in the **Comment** field of the **Device** section.
5. Click on **Save**.

Deleting a KVM extender from the KVM system

When the system is not able to find a KVM extender that has previously been integrated into the KVM system, the system assumes that the device is switched off.

When a KVM extender has been permanently removed from the system, you can manually delete it from the list of KVM extenders.

NOTE: You can delete only KVM extenders that have been *switched off*.

How to delete a KVM extender that is switched off or disconnected from the system:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Delete**.
4. Confirm the security prompt by clicking on **Yes**
   or cancel the process by clicking on **No**.

Establishing a KVM-over-IP™ connection

IMPORTANT: Change the default IP addresses before integrating several computer or console modules into the productive network.

G&D's **KVM-over-IP™** technology makes it possible to transmit signals between the computer and the console module using a Gigabit Ethernet (layer 3).

The communication between two modules requires various settings. In the default settings, the modules are configured in a way that a computer and a console module can *immediately* establish a direct connection.

All computer modules are preconfigured with the IP address **172.17.0.10,** all console modules with the IP address **172.17.0.11**. These IP addresses are preconfigured as '*fallback*' if no IP address could be obtained via a DHCP server during the boot process.

ADVICE: If you do not know the IP address of an already configured user or computer module, it can be determined via the log messages of the device. For more information, see the installation manual.

Configuring a KVM-over-IP connection of a computer module

Configuring the network interface

How to configure the settings of a network interface:

IMPORTANT: It is not possible to operate both network interfaces within one subnet.

NOTE: According to RFC 3330, the *Link Local* address space 169.254.0.0/16 is reserved for the internal communication between devices. An IP address of this address space cannot be assigned.

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **Network**.
5. Go to the paragraph **Interfaces**.

6. Use **Transmission** paragraph to enter the following data:

> **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*.

Operational mode:	Use the pull-down menu to select the operating mode: ▪ **Off:** switches off 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.

7. Click on **Save**.

Configuring the global network settings

Even in complex networks global network settings ensure that the KVM extender is available from all partial networks.

How to configure the global network settings:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **Network**.
5. Now go to **Global settings**.
6. 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).

7. Click on **Save**.

Configuring a KVM-over-IP connection

The **IP address** of the console module (host) as well as the **control port** of the computer module must be specified to establish a **KVM-over-IP** connection through the computer module.

The configuration of both the **communication ports** and the **data ports** are automatically exchanged between the two modules.

> **NOTE:** The configuration of both the **communication ports** and the **data ports** are automatically exchanged between the two modules.

How to configure a KVM-over-IP connection:

1. Start the web application of **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Enter the following data under **Configuration**:

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).
Data port (AR, V):	Enter the number of the port to be used (*default*: 18244).

6. 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 remote station uses the same certificate!

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 37).
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 32). Click **Upload certificate** and select the .pem file to import in the file dialog. Click **Upload and activate** to save and activate the certificate.

7. Click on **Save**.

Configuring a KVM-over-IP connection of a console module

Configuring the network interface

How to configure the settings of a network interface:

IMPORTANT: It is not possible to operate both network interfaces within one subnet.

NOTE: According to RFC 3330, the *Link Local* address space 169.254.0.0/16 is reserved for the internal communication between devices. An IP address of this address space cannot be assigned.

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **Network**.
5. Go to the paragraph **Interfaces**.

6. Use **Transmission** paragraph to enter the following data::

> **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*.

Operational mode:	Use the pull-down menu to select the operating mode: ▪ **Off:** switches off 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.

7. Click on **Save**.

Configuring the global network settings

Even in complex networks global network settings ensure that the KVM extender is available from all partial networks.

How to configure the global network settings:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **Network**.
5. Now go to **Global settings**.
6. 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).

7. Click on **Save**.

Configuring a KVM-over-IP connection

The **IP address** of the console module (host) as well as the **control port** of the computer module must be specified to establish a **KVM-over-IP** connection through the computer module.

The configuration of both the **communication ports** and the **data ports** are automatically exchanged between the two modules.

> **NOTE:** The configuration of both the **communication ports** and the **data ports** are automatically exchanged between the two modules.

How to configure a KVM-over-IP connection:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Enter the following data under **Configuration**:

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).
Data port (AR, V):	Enter the number of the port to be used (*default*: 18244).

6. 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 remote station uses the same certificate!

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 37).
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 32). Click **Upload certificate** and select the .pem file to import in the file dialog. Click **Upload and activate** to save and activate the certificate.

7. Click on **Save**.

IP-MUX functionality

The console modules of the **VisionXS-IP** series offer with the **IP-MUX** functionality the possibility to access different computer modules (one after the other).

IMPORTANT: A console module can only be connected to one computer module at a time!

To use this function, you can connect a maximum of 20 computers to separate computer modules and configure these computer modules as counterparts in the console module.

The configured counterparts can be connected via the local OSD of the console module (see separate manual *Installation and Operating*).

Add, edit or delete a counterpart

How to add a new counterpart:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. In the *Counterpart for IP-MUX function* section, click **Add** and specify the following data in the table:

Name:	Enter the name of the counterpart to be displayed in the *Select* menu (OSD).
Hostname:	Enter the IP address of the counterpart.
Control port:	Enter the number of the **Control port** configured in the counterpart.

6. Click on **Save**.

How to edit a counterpart:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. In the *Counterpart for IP-MUX function* section, click the counterpart you want to configure, and then click **Edit**.
6. Enter/edit the following data:

Name:	Enter the name of the counterpart to be displayed in the *Select* menu (OSD).
Hostname:	Enter the IP address of the counterpart.
Control port:	Enter the number of the **Control port** configured in the counterpart.

7. Click the green **Save** icon below the table.
8. Click on **Save**.

How to delete a counterpart:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the console module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. In the *Counterpart for IP-MUX function* section, click the counterpart you want to delete, and then click **Delete**.
6. Confirm the security prompt.

Extended settings of KVM-over-IP connection

Limiting the bandwidth

By default, the KVM extender uses the maximum available bandwidth of a Gigabit or 10-Gigabit Ethernet. 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. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Under **Max. bandwith** in the **Connection Settings** section you can set the bandwidth limit of a KVM-over-IP connection in MBit/sec.

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

6. 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.

You can define a DSCP for the IP packets of the keyboard, mouse and control data (**Communication** data packets), as well as the IP packets of the video, audio and RS232 data (**Data** data packets).

How to configure the DSCPs of the IP data packets:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Enter the following data under **Connection settings**:

DiffServ Communication:	Define the **Differentiated Services Codepoint** (DSCP) to be used for the classification of the IP packets of the **Communication** data packets.
DiffServ Data:	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 service class **Network Control** (DSCP name: **CS6**) for *all* data packets.

In such environments, the **DSCP 48** option must not be selected!

6. 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. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Enter the following data under **Deactivatable signals**:

Audio:	Select **Enabled** or **Disabled**.
RS232:	Select **Enabled** or **Disabled**.

6. Click on **Save**.

Resetting the KVM-over-IP connection of the computer module

A computer module connected to an IP matrix *permanently* stores the pairing data of the IP matrix.

IMPORTANT: To use such a module directly with a console module in extender mode at a later time, first delete the stored pairing data.

How to delete the pairing data of the computer module

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Under **Remote**, click on **Reset connection**.

Restricting KVM-over-IP remote stations (UID locking)

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

ADVICE: Activate the function **UID locking** if you want to *specify* which IP matrix switches or console modules should be able to connect to the computer module.

How to enable/disable UID locking:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the computer module and then click on **Configuration**.
4. Click on the tab **KVM connection**.
5. Enter your setting in the paragraph **UID locking**:

UID locking:	Only the remote stations specified in the list may establish a KVM-over-IP connection (**Enabled**), or all remote stations 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 computer module.
Add IP matrix:	Click this button and enter the UID of the IP matrix that is allowed to connect to this computer module. Click on **Save**.
Add console module:	Click this button and enter the UID of the console module that is allowed to connect to this computer module. Click on **Save**.
Remove:	Click on a permitted IP matrix or a permitted console module and then on **Remove** to revoke the permission.

6. 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.

NOTE: It is possible that additional ports are used.

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
67	DHCP	UDP	DHCP server	not changeable
68	DHCP	UDP	DHCP client	not changeable
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 42)
161	SNMP	UDP	optional SNMP agent	changeable (see page 56)
162	SNMP-Traps	UDP/ TCP	optional SNMP agent	changeable (see page 59)
389	LDAP	UDP/ TCP	optional communication authentication service	not changeable (see page 48)

443	https	SSL/ TCP	for opening the web application	not changeable (see page 25)
445	CIFS	TCP	for auto-backup function	changeable (see page 83)
514	Syslog	UDP/ TCP	optional Syslog server 1/ Syslog server 2	changeable (see page 45)
636	Active Directory	UDP/ TCP	optional communication authentication service	not changeable (see page 48)
1812	Radius	UDP/ TCP	optional communication authentication service	not changeable (see page 48)
2049	NFS	UDP/ TCP	for auto-backup function	changeable (see page 83)
3389	RDP	TCP	optional communication RemoteAccess-IP-CPU and RemoteTargets	changeable
5900	VNC	TCP	optional communication RemoteAccess-IP-CPU	changeable
6137	U2-LAN	UDP	optional communication U2-LAN	not changeable
18244	KMV-over-IP	TCP	KVM-over-IP: Data-Port (video)	changeable (see page 90)
18245	KVM-over-IP	TCP	KVM-over-IP: Communication Port (K, M, misc)	changeable (see page 90)
18246	KVM-over-IP	TCP	KVM-over-IP: Control Port and IPSec Internet Key Exchange (IKE)	changeable (see page 90)
27994	Remote-Port	UDP/ TCP	optional Remote control access, for example IP Control API	changeable
27996	Database communica-tion	TCP	optional Remote control access, for exsample MatrixGuard	changeable

37996	Database communica-tion	TCP	internal communication	not changeable

Configuration settings of KVM extenders

Device configuration

Operating modes of the KVM extender

Depending on the application of the KVM extender, you can select one of the following operating modes:

- **Open Access:** In this mode, access to the KVM extender is *not* protected by authentication.

NOTE: This operating mode is set by *default*, if you use the device as an **extender**.

ADVICE: The user accounts of the *Open Access* consoles are marked with a *OAC* symbol.

The color of the symbol indicates whether the corresponding console is currently operating in *Open Access* mode (**green**) or not operating in *Open Access* mode (**gray**, the console module has been switched to *standard* operating mode).

IMPORTANT: The Standard operating mode is set by *default* for devices with *SecureCert feature* activated. In this operating mode, access to the KVM extender is protected by authentication.

You can configure the same access rights for both a KVM extender and a user account.

IMPORTANT: The configured access rights apply to all users working with this KVM extender.

- **Standard:** The standard operating mode allows access to the KVM extender only after users have been authenticated with their username, a password and, if two-factor authentication is activated (see *Setting up two-factor authentication on the device* on page 51 ff.), with an additional one-time password.

NOTE: This operating mode is set by *default*, if you use the extender as a **matrix switch module** or with *SecureCert feature* activated.

User rights can be configured in the individual user account.

How to select the operating mode of the KVM extender:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General** and then on the tab **CON**.
5. Under **Operational mode**, you can select between the following options:

OpenAccess console:	Open access mode (*default* with extender mode*)*
Standard:	Standard operational mode (*default* for devices with *SecureCert feature* activated)

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

Changing the hotkey modifier key

The hotkey to open the OSD consists of at least one hotkey modifier key and an additional hotkey that you can freely select within a given frame.

NOTE: The default hotkey modifier is set to **Ctrl**.

If many application programs on a computer are operated with key combinations or different KVM devices are used in a cascade, the number of available key combinations may be limited.

If an application program or another device within the cascade uses the same hotkey, you can change the hotkey.

NOTE: Hotkey modifiers can be one key or a combination of the keys *Ctrl*, *Alt*, *Alt Gr*, *Win* or *Shift*.

How to change the hotkey modifier:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. In the **Hotkey modifier** field of the **Configuration** section, select *at least* one of the listed modifier keys by marking the corresponding check box:

   - **Ctrl**
   - **Alt**
   - **Alt Gr**
   - **Win**
   - **Shift**

   NOTE: If you selected multiple modifier keys, press them together to trigger the hotkey.

5. Click on **Save**.

Changing the OSD key

The hotkey to open the on-screen display (OSD) consists of at least one hotkey modifier key and an additional hotkey that you can freely select within a given frame.

You can change both the hotkey modifier key **Ctrl** and the OSD key **Num**.

How to change the OSD key:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. In the **Hotkey** field, select the OSD key to open the OSD when pressed together with the hotkey modifier key(s).

   You can choose between the keys *Num, Pause*, *Copy*, *Delete*, *Home*, *End, PgUp*, *PgDn and Space.*
5. Click on **Save**.

Opening the OSD by pressing a key twice

As an alternative to opening the OSD with the key combination **Hotkey+Num** or **Double hotkey+Num**, you can open the OSD by pressing a specific key twice.

How to enable/disable opening the OSD by pressing a key twice:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. In the **OSD via double keypress** field, you can select between the following options:

Off:	Open OSD by pressing a key twice disabled (*default*)
Ctrl:	Open OSD by pressing the *Ctrl* key twice
Alt:	Open OSD by pressing the *Alt* key twice
Alt Gr:	Open OSD by pressing the *Alt Gr* key twice
Win:	Open OSD by pressing the *Windows* key twice
Shift:	Open OSD by pressing the *Shift* key twice
Print:	Open OSD by pressing the *Print* key twice
Arrow left	Open OSD by pressing the *Arrow left* key twice
Arrow right	Open OSD by pressing the *Arrow right* key twice
Arrow down	Open OSD by pressing the *Arrow down* key twice
Arrow up	Open OSD by pressing the *Arrow up* key twice

5. Click on **Save**.

Accessing a counterpart via select keys

Calling the OSD is not required when using IP-MUX functionality (see *IP-MUX functionality* on page 100) and when accessing the counterparts by using select keys. The counterparts can be accessed faster via select keys.

How to configure Select-Keys:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on **Edit Select-Keys** in the line **Select-Keys**.
5. In the Select-Key modifier fielt, you can select between the following options:

   - **Ctrl**
   - **Alt**
   - **Alt Gr**
   - **Win**
   - **Shift**

   NOTE: If you selected multiple modifier keys, press them together to trigger the Select-Key.

6. In the **Valid Select-Keys** field, you can select between the following options:

   - **Only numbers (0-9)**
   - **Only letters (a-z)**
   - **Numbers and letters (0-9, a-z)**

7. In the column **Select-Keys**, you can enter the desired select keys for each counterpart.
8. Click on **Save**.

Channel switching when using a DH computer module

You can use a console module of the **VisionXS-IP** series in combination with a DH variant of a computer module of the **VisionXS-IP** series.

> **NOTE:** The DH variants allow the transmission of two separate video signals via one transmission cable.

To display the image of the second video output of the computer at the console, you have the possibility to switch between the video channels.

The key combination for channel switching consists of at least one modifier key and additional *Select stream* keys. Both, the modifier key and the *Select stream* keys can be changed.

How to change the Select stream keys:

1. Start the web application of the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. In the **Stream select** field, you can select between the following options:

Left arrow key, right arrow key:	*Cursor left* key and *Cursor right* key (*default*)
Num +, Num -:	*Num+* key and *Num-* key

5. Click on **Save**.

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

The KVM extender supports various USB input devices. You can use the special features of a particular 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, data of the USB device is transmitted to the computer module without being altered.

IMPORTANT: The **generic USB** mode supports USB mass storage devices and many available USB devices (including FIDO security keys and some SmartCard readers, for example). However, being able to operate particular USB device in generic USB mode can not be guaranteed.

IMPORTANT: This console module allows up to five Generic USB devices to be used simultaneously. Both the console module and the computer module must support the use of up to five Generic USB devices. For this purpose, UG variants of the compatible **VisionXS-IP** series are available.

Only up to three HighSpeed devices (e.g. USB flash drive) and two FullSpeed devices can be used. If additional HighSpeed devices are connected, they will not be accepted.

- **USB keyboards:** The preset USB keyboard mode **PC Standard** supports the standard keyboard layout.

When using *Apple keyboard* a special keyboard mode allows you to use the special keys of this keyboard.

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 the computer connected to the KVM extender with one of the supported *displays* or *tablets*:

INPUT DEVICE	SETTING
iiyama ProLite TF2415	‣ iiyama TF2415
Wacom Intuos5 S	‣ Wacom Intuos 5S
Wacom Intuos5 M	‣ Wacom Intuos 5M
Wacom Intuos5 L	‣ Wacom Intuos 5L
Wacom IntuosPro L	‣ Wacom IntuosPro L
Wacom Cintiq Pro 24 Pen	‣ Wacom CP24 Pen
Wacom Cintiq Pro 27	‣ Wacom CP27 Pen/Touch
Wacom Cintiq Pro 32 Pen	‣ Wacom CP32 Pen
Wacom Cintiq Pro 32 Touch	‣ Wacom CP32 Touch
Wacom DTK-2451	‣ Wacom DTK-2451

▪ **Generic-USB mode:** In this mode, data of the USB device 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.

▪ **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 target computer:

INPUT DEVICE	SETTING
LK463-compatible keyboard	‣ LK463

How to select a USB HID mode:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Select the desired option under **USB HID mode**.
5. Click on **Save**.

ADVICE: You can specify a USB device that should be prioritized after a reboot and should always remain accessible. You can only configure this prioritization via the OSD.

The separate manual of the device *Installation and Operation* provides more information about this option.

Selecting a keyboard layout for OSD inputs

If the characters displayed on the OSD are different from the characters entered on the workstation keyboard, the selected keyboard layout is not correct.

In this case, find out the keyboard layout of the connected keyboard and then configure it in the console module settings.

How to select the keyboard layout of the keyboard connected to the console module:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General** and then on the tab **CON**.
5. In the **Keyboard layout** field, select between the following options:

German (*default*)
English (US)
English (UK)
French
Spanish
Latin American
Portuguese
Swedish
Swiss-French
Danish

6. Click on **Save**.

Reinitialising USB input devices

Once you connect a USB keyboard or mouse to the KVM extender, the input device is initialised and can be used without restrictions.

The USB connection of some USB input devices needs to be reinitialised after a certain time. Activate the automatic reinitialisation of the USB input devices if a USB keyboard or mouse no longer reacts to your inputs during operation.

How to enable/disable reinitialisation of USB input devices:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General** and then on the tab **CON**.
5. In the **USB auto refresh** field, select one of the options listed under **Configuration**:

Only faulty devices:	The status of the USB devices is monitored. If communication to a USB device is interrupted, this device is reinitialised (*default*).
All devices:	The status of the USB devices is monitored. If communication to one USB device is interrupted, all devices are reinitialised.
Off:	The status of the USB devices is **not** monitored. If communication to a USB device is interrupted, the device is **not** reinitialised.

6. Click on **Save**.

Setting the waiting time of the screensaver

You can define a period after which the screensaver switches off the screen display at the workplace when the user is inactive.

NOTE: This setting is independent of the screensaver settings of the computer connected to the computer module.

How to set the waiting time of the screensaver:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**.
5. Click on the tab **CPU** if you want to configure the setting of the local workstation (on the computer module, for *VisionXS*, available only for *LC* variants of the *VisionXS 2.0 series*).

   Click on the tab **CON** if you want to configure the setting of the remote workstation (on the console module).
6. In the **Screensaver (minutes)** row, enter the waiting time (1 to 999 minutes) of the screensaver.

   NOTE: Entering the value **0** disables the screensaver.
7. Click on **Save**.

Automatic user logout

A console module can be configured so 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. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.Click on the tab **General** and then on the tab **CON**.
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**.

Adjusting the operating mode of the RS232 interface

In the default setting of the extender, you can connect any RS232-compatible device to the *optional* RS232 interface of the console module. The RS232 data stream is transmitted unchanged to the computer 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:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**.
5. Click on the tab **CPU** if you want to adjust the operating mode of the RS232 interface of the computer module.

   Click on the tab **CON** if you want to adjust the operating mode of the RS232 interface of the console module.
6. 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 setting*).
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.

7. Click on **Save**.

Permission for exclusive access to the workstation

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

If the user does not make an entry at the active workstation within the specified time period of the automatic input lock (*default*: 1 second), the KVM extender also allows the other workstation to operate the extender.

If the right for exclusive access to the workstation is activated in the web application, users at this workstation can use the key combination **Hotkey+Print** (*default*: **Ctrl+Print**) to exclusively operate the KVM extender.

After pressing this key combination, the input devices of the concurrent workstation are deactivated. By pressing the key combination again on the active workstation, both workstations can operate the KVM extender again.

NOTE: After activating the exclusive operation of the KVM extender at a workstation, the *Caps Lock* and the *Num* and *Scroll Lock* LEDs on the keyboard of the locked workstation flash alternately.

The active workstation indicates the exclusive operation of the KVM Extender by the blinking *Scroll Lock* LED.

How to select the right for the exclusive operation of a workstation:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**.
5. Click on the tab **CPU** if you want to configure the access to the local workstation (on the **CPU** module).

   Click on the tab **CON** if you want to configure the access to the remote workstation (on the **CON** module).
6. In the field **Permanent access mode**, select one of the following options:

Enabled:	Exclusive access permitted (*default*)
Disabled:	Exclusive access denied

7. Click on **Save**.

Changing the video operating mode of workstation

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

In the standard configuration of the KVM extender, the image of the computer is displayed both on the monitor of the active and on the monitor of the concurrent workstation.

You can also specify that the image of the other workstation is switched off as soon as an entry is made at the other workstation.

The image is displayed again on the other workstation as soon as the user's entries have been completed at the workstation.

How to select the video operating mode of the KVM extender:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**.
5. Click on the tab **CPU** if you want to configure the video operating mode of the local workstation (on the **CPU** module).

   Click on the tab **CON** if you want to configure the video operating mode of the remote workstation (on the **CON** module).
6. In the field **Image display during actions at concurrent console**, select one of the following options:

Always on:	The computer screen is displayed on both the monitor of the active and the monitor of the concurrent console (*default*).
Temporarily off:	The screen of *this* console (depending on the selection made in step 4) is *temporarily* switched off whenever an entry is made on the concurrent console. After the time period of the input lock (see below) has elapsed, the screen is *automatically* switched on again.
Permanently off:	The screen of *this* console (depending on the selection made in step 4) is *s*witched off *permanently* if an entry is made on the concurrent console. After the time period of the input lock (see below) has elapsed, you need to make an entry on this console to switch on the screen again.

7. Click on **Save**.

Changing the time period of the input lock

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

If input is made at a workstation using the keyboard or mouse, the KVM extender automatically locks the input devices of the concurrent workstation. The lock is released if no further input is made at the active workstation within the set time period of the input lock (*default*: 1 second).

After the time span of the input lock has expired, the computer can be operated again at both workstations.

You can set the time period of the input lock within the range of 1 to 300 seconds.

How to change the time period of the input lock:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General** and then on the tab **CPU**.
5. Enter the desired time period of the input lock (1 to 300 seconds) in the field **Multiuser input lock (in seconds)**.
6. Click on **Save**.

Activating a console after the permanent switch-off of the image display

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

When selecting the **Image display** option **Permanently off** (see above) the display is only switched on again after the time period of the input lock has elapsed after a user input.

In the standard setting, inputs via both keyboard and mouse cause the display to be switched on. Alternatively, you can allow *only keyboard* or *only mouse inputs* as triggers to activate a console. for picture activation.

How to select valid input device(s) to trigger the activation of a console:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**
5. Click on the tab **CPU**.
6. Select one of the options given under **Activate console via**:

Keyboard/Mouse (*default*)
Keyboard only

Mouse only

7. Click on **Save**.

Active console after starting an extender

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

When selecting the **Image display** option **Permanently off** (see above) at both the computer *and* the console module, *both* modules do not show an image after restarting the extender.

Only after an input is made at the console, its image is displayed on the monitor.

The setting **Activate console after start** allows you to define a module whose image display you want to activate *immediately* after starting the extender.

How to select whether and on which module the image display is activated after restarting the extender:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General**
5. Click on the tab **CPU**.
6. Select one of the options given under **Active console after start**:

None:	After restarting the extender, the image display of both modules is switched off (*default*).
CPU:	After restarting the extender, the image display of console connected to the computer module is activated.
CON:	After restarting the extender, the image display of the console connected to the console module is activated.

7. Click on **Save**.

Changing the exclusive mode action key

IMPORTANT: The use of a **LC** computer module (available only for the *VisionXS-IP 2.0 series*) is prerequisites for this operation option.

After pressing the key combination for the exclusive operation of the extender, the input devices of the concurrent workstation are disabled. By pressing the key combination again on the keyboard of the active workstation, both workstations can operate the KVM extender again.

The shortcut for the exclusive operation consists of at least one hotkey modifier key (see *Changing the OSD key* on page 112) and an additional *exclusive* key that you can freely select within a given frame. You can change both the hotkey modifier key **Ctrl** and the exclusive key **Print**.

How to change the exclusive key:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **General** and then on the tab **CPU**.
5. In the **Exclusive mode actionkey** field, you can select a key:

   You can choose between the keys *Backspace*, *Print*, *Scroll*, *Num*, *Pause*, *Copy*, *Delete*, *Home*, *End*, *PgUp*, *PgDn* and *Space.*
6. Click on **Save**.

Video channel configuration

Reading the EDID profile of a monitor

The EDID information (*Extended Display Identification Data*) of a monitor informs the graphics card of the connected computer about various technical features of the device. The KVM extender usually forwards this information unaltered to the computer via Enhanced-DDC (*Enhanced Display Data Channel*).

However, the EDID profile of a monitor can also be imported and transmitted to one (or more) of the connected computers via the KVM extender.

NOTE: You can import an EDID profile directly from a monitor connected to the KVM extender or from a bin file.

IMPORTANT: Please note that the profile selected on the computer module must also be supported by the console module and its connected monitor. Otherwise, an error message is displayed, e.g. *Pixel clock too high* (Pixel clock higher than supported by the current console module).

How to import the EDID profile of a connected monitor:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. Click on **New EDID profile**.
6. Click in the **Learn** list box and select the monitor whose EDID information you want to read in.

   NOTE: The **Name** and **Comment** fields of the profile are automatically prefilled and the contents of the EDID information are displayed.
7. Click on **Ok**.
8. If desired, change the information in the fields **Name** and/or **Comment**.
9. Click on **Save**.

How to import the EDID profile of a monitor from a file:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. Click on **New EDID profile**.
6. Click on **Choose file**.
7. Select the bin file to be imported from the file dialog and click on **Open**.

   NOTE: The **Name** and **Comment** fields of the profile are automatically prefilled and the contents of the EDID information are displayed.
8. If desired, change the information in the fields **Name** and/or **Comment**.
9. Click on **Save**.

Exporting the EDID profile of a monitor

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. Select the **EDID profile** you want to export.
6. Click on **Export EDID**.
7. If required, change the name of the file you want to export.
8. Click on **Save**.

Defining the EDID profile of a channel

How to select the EDID profile:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. In the **EDID profile** field of the **Video channel** section, select between the following options:

[Auto]:	automatic handling of EDID data (default)
Profile name:	Selection of an EDID profile previously imported by a user

6. Click on **Save**.

Reducing the colour depth of the image data to be transmitted

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

When using a high image resolution and displaying moving images, it may happen in exceptional cases that some images are "skipped" at 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. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. Select one of the options given under **Colour depth**:

24 Bit:	Image data is transmitted with a maximum colour depth of 24 Bit (*default*)
18 Bit:	Colour depth of the image data is reduced to 18 bit.

6. Click on **Save**.

Enabling/disabling DDC/CI support

The computer and console modules supported by the KVM extender are ready to support monitors with **DDC/CI** function.

After the function has been activated, the **DDC/CI** information is transparently forwarded to the monitor to support as many monitors as possible. However, support *cannot* be guaranteed for all monitors.

How to configure DDC/CI transmission of a console module:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. Select one of the options given under **DDC/CI monitor**:

Disabled:	The transmission of DDC/CI signals is disabled (default).
Computer > Monitor:	The transmission of DDC/CI signals is exclusively carried out from computer to monitor.
Bidirectional:	The transmission of DDC/CI signals is bidirectional.

6. Click on **Save**.

Use of the Freeze mode

If the cable connection between the computer module and the console module is interrupted during operation, no image is displayed on the monitor of the remote workstation in the standard setting of the KVM Extender.

Activate the *Freeze* mode if you want to display the last image received at the console module in the event of a disconnection until the connection is restored.

In order to visibly signal the disconnection, the last image received is displayed either with a coloured frame and/or the display **Frozen** and the time elapsed since the disconnection.

How to configure the Freeze mode:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.

   When using a *DH variant*, click on the desired video channel first and then click on **Configuration**.
5. In the **Freeze mode** field, select one of the following options:

Off:	Show no image if the connection is lost (*default*).
On | OSD timer + frame:	Display of a coloured frame in case of a disconnection as well as display of the warning *Frozen* and the time elapsed since the disconnection.
Frame:	A disconnection is indicated by a coloured frame.
OSD:	Display of the warning *Frozen* and the time elapsed since the disconnection.

6. Click on **Save**.

Downsampling the video input format

NOTE: This function is only supported by the **DP-UHR** variant of the **VisionXS-IP** series.

In the default setting of the KVM extender, incoming video signals at the computer module are output without modification at the video output of the console module.

If you want to connect a monitor to the console module that *does not* support the refresh rate (vertical frequency) of the input format, the KVM extender can adjust the refresh rate at the video output of the console module to a supported frequency via downsampling.

In the web application, you can configure downsampling rules for different image formats for this purpose. The frame rates of the incoming video signals for which one of the rules applies are then adjusted by downsampling.

How to create a new downsampling rule:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.
5. Click **Configure downsampling**.
6. Click **Add**.
7. Select the specific **Input format** for which you want to create a downsampling rule.
8. Click **Create**.
9. Click in the **Target format** column of the new rule and select one of the supported formats with the desired frame rate.
10. Click on **Save**.

How to change a downsampling rule:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.
5. Click **Configure downsampling**.
6. Click in the **Target format** column of the rule you want to change and select one of the supported formats with the desired frame rate.
7. Click on **Save**.

How to delete a downsampling rule:

1. Start the web application of the **computer module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on the tab **Video channels**.
5. Click **Configure downsampling**.
6. Click in the **Input format** column of the rule you want to delete.
7. Click **Delete**.
8. Click on **Save**.

Personal settings

Displaying an information overlay

You can display an information overlay temporarily (5 seconds) in the upper left corner.

ADVICE: If the temporary information overlay is active, you can show the information at any time by pressing the key combination **Ctrl+Caps Lock key**.

You can also set the information overlay to permanent or switch it off.

How to change the colour of the information overlay:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users**.
3. Click on the user account you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **Show OSD info** field, select between the following options:

Off:	Switch off information overlay
Temporary:	Temporary information overlay (5 seconds, *default*)
Permanent:	Permanent information overlay

6. Click on **Save**.

Adjusting the transparency of the OSD

By default, the OSD is displayed with medium transparency on top of the screen contents. The part of the screen that is covered by the OSD shines through the OSD.

You can adjust or disable the transparency level.

How to adjust the transparency level of the OSD:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users**.
3. Click on the user account you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **OSD transparency** field, select between the following options:

High:	High transparency of screen contents
Average:	Average transparency of the screen contents (*default*)
Low:	Low transparency of screen contents
Off:	OSD covers screen contents

6. Click on **Save**.

Changing the colour of the information display

By default, information display is shown in light green. You can adjust the colour of the information display in the personal profile.

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 setting of the information display:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users**.
3. Click on the user account you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **OSD info colour** field, you can select the desired colour.
6. Click on **Save**.

Enable/disable an automatic OSD timeout

If desired, you can define that the OSD closes automatically after a period of inactivity.

Select a time span between **5** and **99**seconds to define a period of inactivity after which the OSD closes automatically.

NOTE: Entering the value **0** disables the function.

How to change the period of inactivity after which the OSD closes:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users**.
3. Click on the user account you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. Under **Timeout of OSD session**, enter a time span between **5** and **99** seconds.
6. Click on **Save**.

Rights

Right to change the personal profile

How to change the right to change the personal profile:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users** or on **User groups**.
3. Click on the user account or the user group you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **Change personal profile** field, select one of the following options:

Yes:	Viewing and editing of own user profile allowed
No:	Viewing and editing of own user profile denied

6. Click on **Save**.

Right to view and edit the device configuration

How to change the right to view and edit the device configuration:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users** or on **User groups**.
3. Click on the user account or the user group you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **Device configuration** field, select one of the following options:

Yes:	Viewing and editing of device configuration allowed
No:	Viewing and editing of device configuration not allowed

6. Click on **Save**.

Access to USB devices

How to change USB access rights for *all* modules:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users** or on **User groups**.
3. Click on the user account or the user group you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **Access USB devices** field of the **Global device rights** section, choose one of the following options:

Yes:	Access to USB devices allowed.
No:	Access to USB devices denied.

6. Click on **Save**.

Access rights to a computer module

How to change the access rights to a computer module:

1. Start the web application of the **computer module**.
2. In the menu, click on **Users** or on **User groups**.
3. Click on the user account or the user group you want to configure and then click on **Configuration**.
4. Click on the tab **KVM extender systems**.
5. In the **Access** field of the **Individual rights** section, choose an option for each module listed:

Yes:	Full access to the computer connected to the computer module allowed
No:	Access to the computer connected to the computer module denied
View:	Screen contents of the computer connected to the computer module can be viewed

6. Click on **Save**.

Advanced features for KVM extenders

Copying the config settings (Replace device)

If a computer or a target module is replaced by another 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.

IMPORTANT: After this task is carried out, the target module whose settings you want to copy is deleted from the KVM system.

How to copy target module config settings:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the *new* device.
4. Open the menu **Service tools** and select the entry **Replace device**.
5. Choose the *old* device whose configuration settings you want to copy.
6. Click on **Save**.

Configuring monitoring values

In the *Monitoring* section, you can define values to be monitored and check the status of these values.

Selecting the values to be monitored

By default, the KVM system monitors a variety of KVM extender values.

If required, you can limit the evaluation and monitoring of properties.

How to manage the values to be monitored:

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on **Monitoring**.
5. Enable or disable individual monitoring values by sliding the slider to the *left* (**off**) or to the *right* (**on**).

   NOTE: In order to enable or disable *all* values you can use the check box in the header of the **Enabled** column.

6. Click on **Save**.

Viewing status information of a KVM extender

Using the configuration menu of a KVM extender, you can open a window displaying different KVM extender status information.

How to view the status information of a KVM extender

1. Start the web application of the **computer module** or the **console module**.
2. In the menu, click on **KVM extender**.
3. Click on the KVM extender you want to configure and then click on **Configuration**.
4. Click on **Information**.

5. The following information is displayed in the dialog box that opens now:

KVM extenders	
Name:	Name of the KVM extender
Device ID:	Physical ID of the KVM extender
Status:	Current status (**online** or **offline**) of the KVM extender
Class:	Device class of the KVM extender

Hardware information	
Firmware name:	Firmware name
Firmware rev.:	Firmware version
Hardware rev.:	Hardware revision
IP address Network A:	IP addresses of *Management* interface
IP address Transmission:	IP addresses of *Transmission* interface
MAC Management:	MAC address of *Management* interface
MAC Transmission:	MAC address of *Transmission* interface
Serial number	Serial number of the KVM switch

Active features
This area lists all activated additional functions.

Link status	
Link detected:	Connection to the network established (**yes**) or interrupted (**no**).
	NOTE: The following information is only displayed for CAT variants and **Interface A**.
Auto-negotiation:	The transmission speed and the duplex method have been configured automatically (**yes**) or manually by the administrator(**no**).
Speed:	Transmission speed
Duplex	Duplex method (**full** or **half**)

NOTE: In addition, the *monitoring* information of the device is displayed.

6. Click on **Close** to close the window.

NOTES

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