Draco tera enterprise

KVM Matrix Switch Series 480

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Introduction

This manual contains important safety instructions as well as instructions for setting up the product and operating it. Please read the general safety instructions (see chapter 2, page 15) and additional notice in the respective chapters. Read carefully through the User Manual before you switch on the product.

Product Identification

The model and serial number of your products are indicated on the bottom of our products. Always refer to this information when you need to contact your distributor or the support of IHSE GmbH (see chapter 16, page 390).

Trademarks and Trade Names

All trademark and trade names mentioned in this document are acknowledged to be the property of their respective owners.

Validity of this Manual

This manual applies to all products of the series named on the cover page and to the firmware/software listed in chapter 1.1, page 12. Please note the change log for this manual in the chapter 20, page 402).

Differences between the various models are clearly described.

The manufacturer reserves the right to change specifications, functions or circuitry of the series described here without notice. Information in this manual can be changed, expanded, or deleted without notice. You can find the current version of the manual in the download area of our website.

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Available Documentation

Name	Format	Description	Provision
User Manual	PDF	Provides an overview of the product together with technical data and safety instructions. Contains all instructions required to operate the product to a basic level.	Download from website
Quick Setup	Print	Provides a quick installation guide and safety instructions	Contained in the scope of delivery

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1 Important Information

1.1 Firmware and Software

The release information for the firmware and software described in this user manual is listed below. The manual is updated when firmware or software changes affect user behavior or system behavior.

Firmware	Version from	Release date
MATAPP	F04.01	2021-12-17
MATLBDG	F02.01	2022-02-18
MATLOS	F01.10	2022-02-02
MATLOSD	F02.01	2022-01-24
MATLPXP	F01.11	2021-05-07
MATLVOSC	F02.02	2022-01-26
MATLVOSD	F02.05	2022-01-25
MATXDVI	F01.15	2015-03-12
MATXHID	F04.03	2021-05-21
MATXLNK	F01.05	2020-01-16
MATXOSD	F03.50	2022-01-28
MATXOSL	F03.15	2020-05-11
MATXVOSD	F04.05	2022-01-28
MATXVOSL	F03.06	2019-04-30

Please contact the manufacturer's technical support for further information about firmware to enter Chinese characters in the OSD.

Software	Version from	Release date
Tera Tool	V5.1.0.0	2022-01-17

1.2 Symbols for Warnings and Helpful Information

The meaning of the symbols used for warnings and helpful information in this manual is described below:

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE identifies information, if not observed, endangers the functionality of your device or the security of your data.

This symbol indicates information about special features on the device or when using device and function variants.

This symbol indicates instructions for procedures recommended by the manufacturer for an effective utilization of the device potential.

1.3 Terms and Spellings

Uniform terms are used in this manual for better readability or easier assignment.

The following terms are used for products and descriptions:

Term	Description
Matrix	Draco tera enterprise/flex/compact
Tera Tool	Management software
Source	Computer, graphics card (USB, video, audio, data)
Sink	Console (monitor, keyboard, mouse, video, audio, data)
CPU Unit	Encoder to connect to the source.
CON Unit	Decoder to connect at the console peripherals.
EXT Unit	Logical object for representing a CPU or CON Unit in the matrix.
CPU Device	Logical object for switching EXT Units of CPU Units via matrix.
CON Device	Logical object for switching EXT Units of CON Units via matrix.

The following spellings are used for keyboard commands:

Keyboard command	Description
key	Key on the keyboard.
key + key	Press keys simultaneously.
key, key	Press keys successively.
2x key	Press key quickly, twice in a row (like a mouse double-click).
Number/number on the keyboard	Numeric key at the top end of the alphanumeric keyboard usually used for described operations.
Number on the numerical pad	Numeric key on the numeric pad. If the use of the numeric pad is required, it is explicitly described.

The following spelling is used for, e.g., descriptions of editing files or updating firmware:

Keyboard command	Description
`Config.txt`	For instance, file name.
`#CFG`	For instance, file content.

The following spellings are used for software descriptions:

Spelling	Description
Bold print	Description of terms that are used in the device firmware or the management software
Bold print > Bold print	• OSD: selection of a in a menu in the working area, e.g., **Configuration > System** • Management software: selection of a menu item in the working area, the menu bar, or the toolbar, e.g., **Extras > Options**

Mouse button	Description
Left mouse button	Primary mouse button* (default in most operating systems)
Right mouse button	Secondary mouse button*
* Unless you have customized your mouse settings in the used operating system.	
Descriptions containing "click...", "mouse click" or "double-click" each means a click with the primary (left) mouse button. If the right mouse button has to be used, this is explicitly declared in the description.	

1.4 EU Declaration of Conformity

Please find the EU Declaration of Conformity for the product series under:
www.ihse.com/eu-declaration-of-conformity

A copy of the original, product-specific EU Declaration of Conformity can be provided upon request. For contact details, see page 2 of this manual.

2 Safety Instructions

To ensure reliable and safe long-term operation of your device, please note the following guidelines:

- ➡ Read this user manual carefully.
- ➡ Only use the device according to this user manual. Failure to follow the instructions described can damage the device or endanger the security of your data.
- ➡ Take any required ESD precautions.

⚠ WARNING

Risk of electric shock due to freely accessible power connections when the chassis is open

Risk of bruising, abrasion or shearing of fingertips due to rotating fan when the chassis is open

If the chassis is opened while power is supplied to the device, electric shock may occur if the internal wiring is touched. If a running fan is touched while the case is open, bruises, abrasions or shearing of fingertips may occur.

There are no necessary maintenance procedures that require opening the chassis.

- ➡ Do NOT remove the cover of the chassis.
- ➡ Do NOT install the device in environments where children are likely to be present.

⚠ CAUTION

Risk of burns due to tremendously heated chassis surface after a long period of operation

The surface of the chassis can become very warm after a long period of operation. If the chassis surface is touched after a long period of operation, this can cause skin burns.

- ➡ Protective gloves must be worn to transport a fully equipped chassis after a long period of operation.
- ➡ Ensure that there is sufficient distance from the operator.
- ➡ Do NOT install the device in environments where children are likely to be present.

Installation location

While operating, the device and the power supply units can get warm. Damage to the device can occur in a damp environment.

- ➡ Use the device only in dry, indoor environments.
- ➡ Use the device only in a room with adequate ventilation.
- ➡ Existing ventilation openings on the device must always be free (lateral and rear).
- ➡ Do not place the power supply units directly on top of the device.
- ➡ For rack-mount installations, at least 0.5 RU (rack unit) is required above the device for ventilation.
- ➡ Place all power sockets including the sockets for the supplied external power supply units easily accessible and directly next to each other.

Connection

- ➡ Check the device and the power supply units for visible damage before connecting it.
- ➡ Only connect the device or the power supply units without any visible damage at the chassis or the cable.
- ➡ Only use power supply units originally supplied with the product or manufacturer-approved replacements.
- ➡ Connect all power supplies to grounded outlets.
- ➡ Ensure that the ground connection is maintained from the outlet socket through to the power supply unit's AC power input.
- ➡ Only connect the device to KVM devices using the interconnect cable - not to other devices, particularly not to telecommunications or network devices.

Disconnect the Device from the Circuit

NOTICE
The cable plugs on the device side can contain a lock. In the event of a necessary quick and complete disconnection from the external electric circuits: ➡ Remove all corresponding cable plugs from the socket, ➡ Or set the power switch of the power outlets (if available) to the “Off” position.

3 Description

3.1 Intended Use

The Draco tera matrix is used to establish connections from consoles (monitor, keyboard, mouse, and other peripheral devices) to various sources.

In its maximum configuration, up to 576 independent ports can be defined and switched either as a CON Device or a CPU Device.

The Draco tera matrix is designed to operate with extender modules that transmit KVM, audio and data signals.

The connection between the matrix and the peripheral devices, such as KVM extender modules or video sources, can be made by Cat X, fiber, or coaxial cables.

The matrix serves as a repeater and can be run at a maximum distance of 10 km from the consoles and 10 km from the sources.

NOTICE

Interferences when the immunity limit values are exceeded

If the limit values listed in EN 55024 are exceeded, reliable and accurate functioning of the devices cannot be guaranteed.

NOTICE

Possible radio interference in a domestic environment

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

- ➡ Follow the safety and installation instructions given in this manual.
- ➡ Use connection cables according to the specifications for the length and type given in this manual.

3.2 System Overview

A Draco tera matrix system consists of a Draco tera matrix and, for KVM applications, one or more CPU Units/CON Units. The Draco tera matrix is connected to the CPU Units/CON Units by interconnect cables or directly to the video devices when used as a video matrix. All available ports of the matrix can be used either as input or output port depending on components and equipment. Non-blocking access is available for all users, i.e., a user's access is not limited by the activities of another.

CPU Units are connected directly to the sources by the provided cables. Monitor(s), keyboards, and mice are connected to the CON Units. The communication between the Draco tera matrix and the CPU Units/CON Units occurs over the respective interconnect cables.

The Draco tera matrix supports a wide and flexible range of system configurations:

A part of the Draco tera can be configured, e.g., as a Single-Head workstation, a part as Dual-Head workstation, or even as Quad-Head workstation. In addition, there are configurations with KVM and USB 2.0 available.

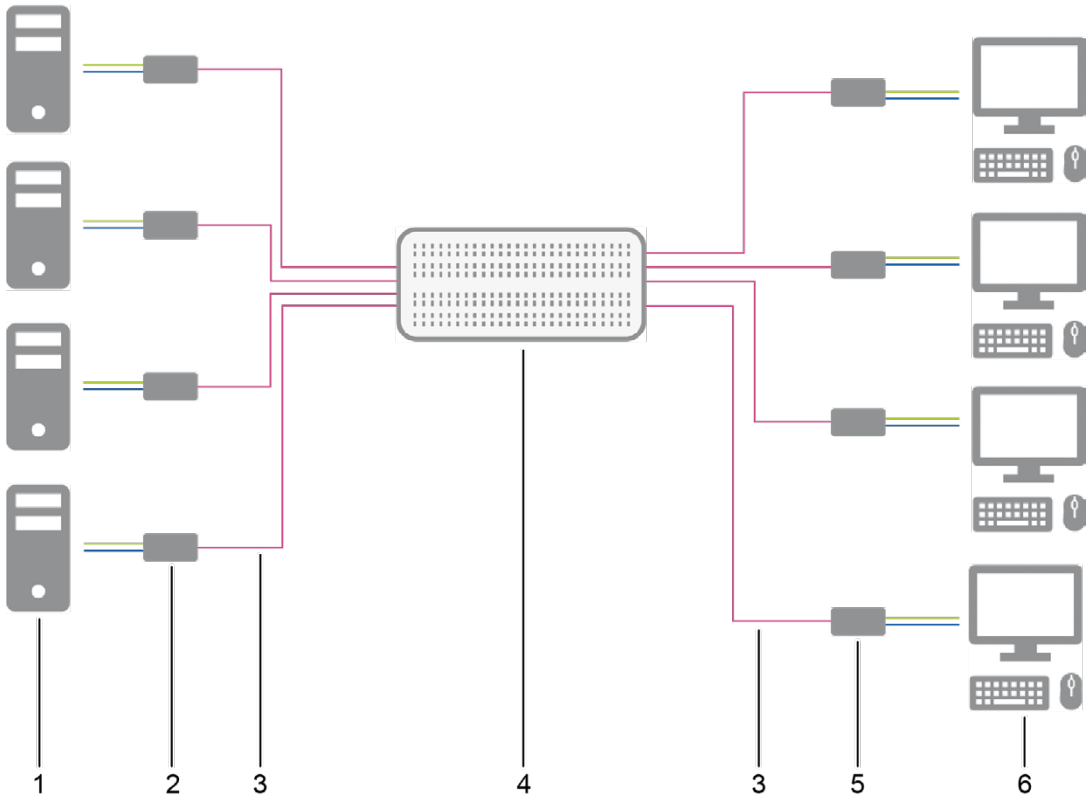


Fig. 1 Example - Single-Head installation

1 Single-Head sources
2 Single-Head CPU Units
3 Interconnect cable
4 Draco tera matrix
5 Single-Head CON Units
6 Consoles (monitor, keyboard, mouse)

If you have a Single-Head console, e.g., you can also get access to a Dual-Head or Quad-Head source. However, control is only possible at monitor 1 and only one video signal is displayed.

Any signal source can be switched to any number of monitors that will show the video signal at the same time. Audio may also be switched if required.

See chapter 3.7, page 38 for further installation examples.

3.2.1 Matrix System Hardware and Logical Objects

On all Draco tera matrices, switching extender modules follows the same principle:

- A CON/CPU Unit (hardware) is represented by an EXT Unit (logical object) in the matrix.
- This EXT Unit needs to be assigned to a CON or CPU Device (logical object).
- The actual switching takes place on the level of the CPU and CON Devices.

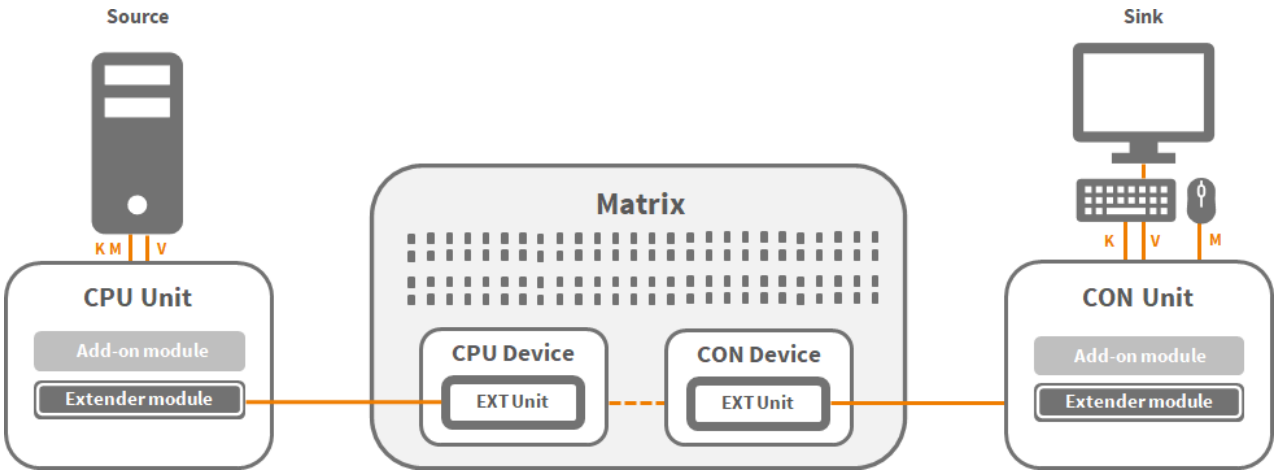


Fig. 2 Example - Matrix system with connected hardware and logical objects

3.2.2 Matrix Switching Possibilities

There are several possibilities to switch CON Devices to CPU Device depending on the access rights of the user or CON Device and the configuration.

- Full Access (FA): The video is displayed on the monitor of the associated CON Device with USB-HID control of the switched CPU Device. With enabled Sharing option, several users may have Full Access, but only one at a time. Others will remain in video only.
- Video only (VO): The video is displayed on the monitor connected to the switched CON Device without USB-HID control of the switched CPU Device.
- Private Mode (PM): With enabled Private Mode, only one CON Device can be switched to the respective CPU Device. The CPU Device is not available for other connections.

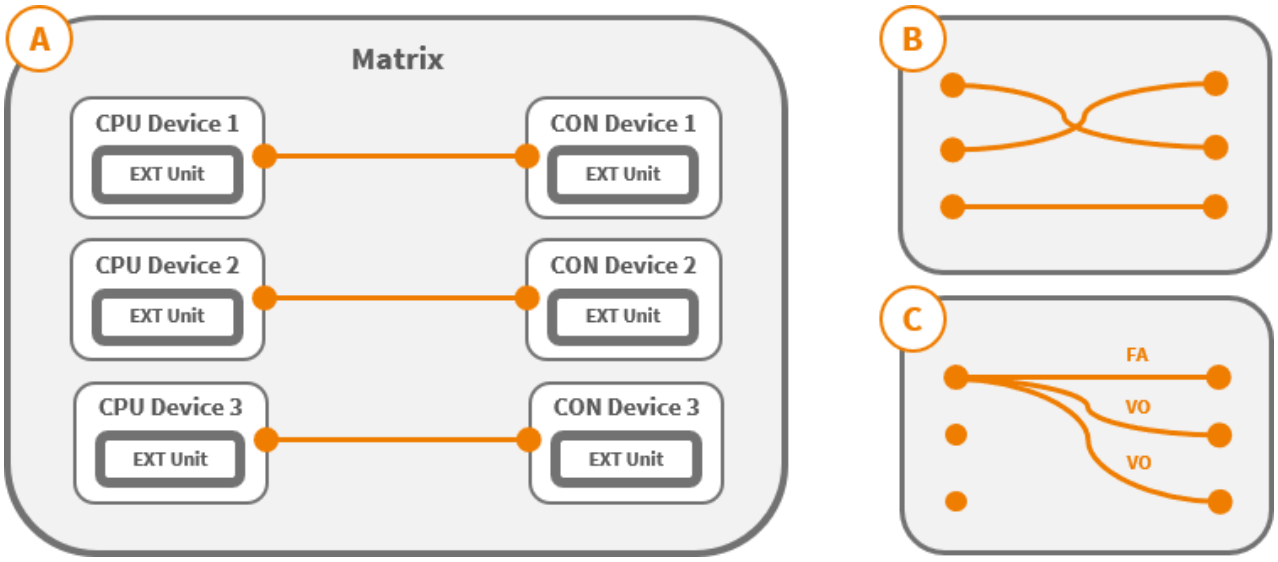


Fig. 3 Example - Matrix switching possibilities

3.3 Product Range

3.3.1 Matrix Chassis

The matrix chassis include one or two controller boards, fan trays, an exchangeable filter pad and one or two power supply units depending on the product model.

		I/O Boards		Controller boards		Satellite boards		Power supply units	
Type	Ports	Slots	Incl.	Slots	Incl.	Slots	Incl.	Slots	Incl.
K480-048-R1	48	6	0	2	1	0	0	2	1
K480-080-R1	80	10	0	2	1	0	0	2	1
K480-152-R1	152	19	0	2	1	0	0	3	2
K480-160-R1	160	20	0	1	1	0	0	3	2
K480-288-R1	288	36	0	2	1	0	0	3	2
K480-576-R1	576	72	0	2	2	0	0	4	2
K480-576S-R1*	576	72	0	2	2	0	0	4	2
K480-576-R2**	576	72	0	2	1	1	1	4	2
K480-576S-R2*/**	576	72	0	2	1	1	1	4	2

* 288x288: switchable from one 288-port unit to the other 288-port unit, not switchable in between a 288-port unit.

** Available on demand from Q2/2022.

3.3.2 Accessories for Chassis

Part No.	Description
PC-TYP-E/C13-020	Power cord IEC Schuko 90° Type-E/C13 2.0 m lockable
PC-TYP-B/C13-020	Power cord IEC US Type-B/C13 2.0 m lockable
480-RED-048-80	Draco tera enterprise 48/80-Port Spare/Redundancy PSU
480-RED-160	Draco tera enterprise 152/160-Port Spare/Redundancy PSU
480-RED-288	Draco tera enterprise 288-Port Spare/Redundancy PSU
480-RED-288-AR	Draco tera enterprise 288-Port Spare/Redundancy PSU, reverse airstream
480-RED-576	Draco tera enterprise 576-Port Spare/Redundancy PSU
480-RED-576-AR	Draco tera enterprise 576-Port Spare/Redundancy PSU, reverse airstream
480-FAN-048	Draco tera enterprise 48-Port fan cartridge
480-FAN-080	Draco tera enterprise 80-Port fan cartridge
480-FAN-160/288	Draco tera enterprise 152/160/288-Port fan cartridge
480-FAN-288-AR	Draco tera enterprise 152/160/288-Port fan cartridge, reverse airstream
480-FAN-576	Draco tera enterprise 576-Port fan cartridge
480-FAN-576-AR	Draco tera enterprise 576-Port fan cartridge, reverse airstream
480-FLTR-048	Draco tera enterprise 48-Port air filter cartridge
480-FLTR-080	Draco tera enterprise 80-Port air filter cartridge
480-FLTR-160	Draco tera enterprise 152/160/288-Port air filter cartridge
480-FLTR-576	Draco tera enterprise 576-Port air filter cartridge

3.3.3 I/O Boards and Controller Boards

Part No.	Description	Interface
480-C8R1	Draco tera enterprise I/O-Board 8-Port, Cat X, Rev. 1	Cat X
480-C8X	Draco tera enterprise I/O-Board 8-Port, Cat X 3G, Rev. 1	Cat X
480-C8BDG	Draco tera enterprise I/O-Board 8-Port Bridge 1G/3G, Cat X 1G	Cat X
480-S8R1	Draco tera enterprise I/O-Board 8-Port, SFP Fiber SM, Rev. 1	Fiber
480-S8X	Draco tera enterprise I/O-Board 8-Port, SFP Fiber SM 3G	Fiber
480-S8BDG	Draco tera enterprise I/O-Board 8-Port Bridge 1G/3G, SFP Fiber SM 1G	Fiber
480-UNI16	Draco tera enterprise I/O-Board 8-Port, SFP cages universal, free configuration	USB 3.0, SDI and HDMI
480-GRD-S8-R1	Draco tera enterprise GRID-Board, Fiber SM 10G, 8x1G >1 Port	Grid
480-CTRL2	Draco tera enterprise Controller Board version 2 for 48-576 ports versions	Controller
480-576-SC*	Draco tera enterprise 576 satellite controller module	Satellite Card

* Available on demand from Q2/2022.

3.3.4 Accessories for I/O Boards and Controller Boards

Part No.	Description	Interface
459-1C	SFP, bidirectional, 1G	Cat X, 1G
459-1S	SFP single-mode, LC duplex, bidirectional, 1G	Fiber 10G
459-10X	SFP single-mode, LC duplex, bidirectional, 10G, compatible with grid board 480-GRD-S8-R1	Fiber 10G
SDI/HDMI Connectors for 480-UNI16 on demand		

3.4 Scope of Delivery

The scope of delivery contains the following items:

Product type	Scope of delivery
K480-48-R1	• Draco tera enterprise • 1x Programing cable (RJ10 to D-Sub 9) • 1x IEC country-specific power cord C13, 2.0 m, lockable • Quick Setup
K480-80-R1	
K480-152-R1	• Draco tera enterprise • 1x Programing cable (RJ10 to D-Sub 9) • 2x IEC country-specific power cord C13, 2.0 m, lockable • Quick Setup
K480-160-R1	
K480-288-R1	
K480-576-R1	
K480-576S-R1	
K480-576-R2*	
K480-576S-R2*	

* Available on demand from Q2/2022.

If anything is missing, please contact your distributor.

3.5 Device Views

The following views of the Draco tera matrix illustrate the various available chassis types.

3.5.1 Chassis

3.5.1.1 Draco tera 48 Port, Revision 1

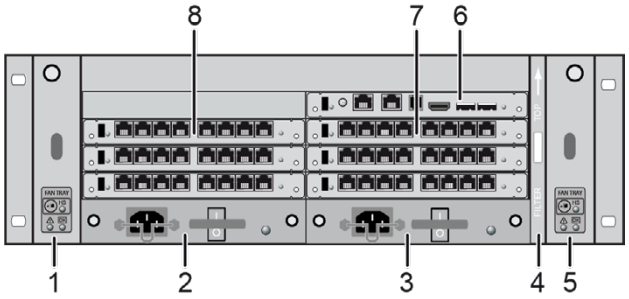


Fig. 4 Interface side - Example for Draco tera 48 port, revision 1

1 Slot for fan tray 1
2 Slot for power supply unit 1
3 Slot for power supply unit 2 (optional)
4 Slot for air filter
5 Slot for fan tray 2
6 Slot for controller board
7 Slots for I/O boards 1 to 3
8 Slots for I/O boards 4 to 6

3.5.1.2 Draco tera 80 Port, Revision 1

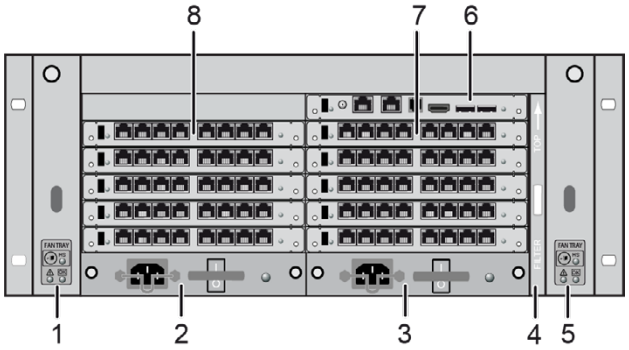


Fig. 5 Interface side - Example for Draco tera 80 port, revision 1

1 Slot for fan tray 1
2 Slot for power supply unit 1
3 Slot for power supply unit 2 (optional)
4 Slot for air filter
5 Slot for fan tray 2
6 Slot for controller board
7 Slots for I/O boards 1 to 4
8 Slots for I/O boards 5 to 8

The grounding screws is located on the rear side of the chassis.

3.5.1.3 Draco tera 152 Port, Revision 1

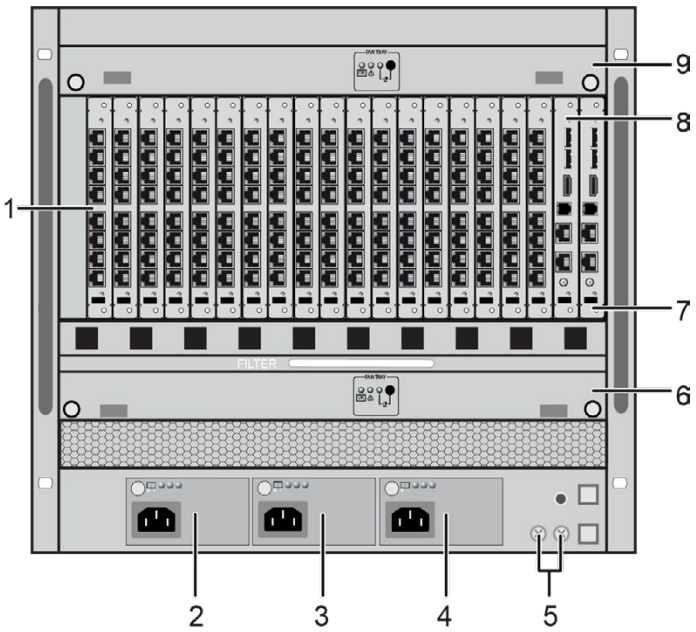


Fig. 6 Interface side - Example for Draco tera 152 port, revision 1

1 Slots for I/O boards 1 to 19
2 Slot for power supply unit 1
3 Slot for power supply unit 2 (optional)
4 Slot for power supply unit 3 (optional)
5 Grounding (2x)
6 Slot for fan tray 1
7 Slot for controller board
8 Slot for controller board (redundancy)
9 Slot for fan tray 2

3.5.1.4 Draco tera 160 Port, Revision 1

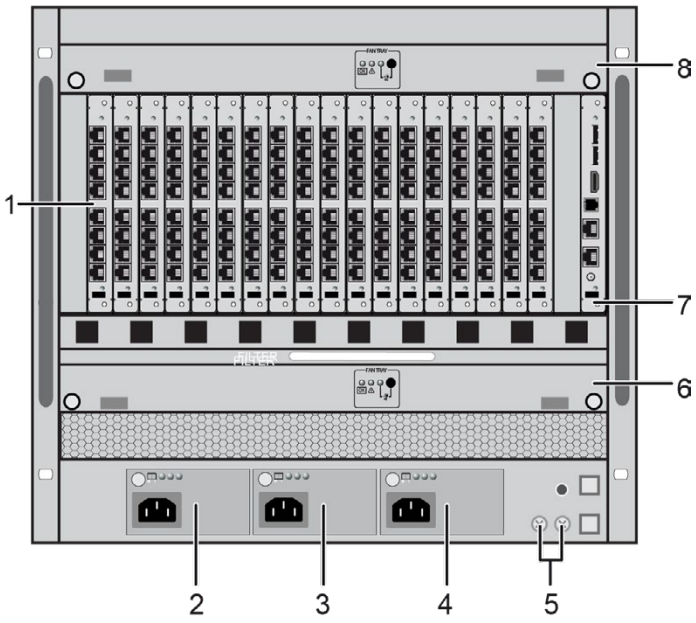


Fig. 7 Interface side - Example for Draco tera 160 port, revision 1

1 Slots for I/O boards 1 to 20
2 Slot for power supply unit 1
3 Slot for power supply unit 2 (optional)
4 Slot for power supply unit 3 (optional)
5 Grounding (2x)
6 Slot for fan tray 1
7 Slot for controller board for I/O boards 1 to 20
8 Slot for fan tray 2

3.5.1.5 Draco tera 288 Port, Revision 1

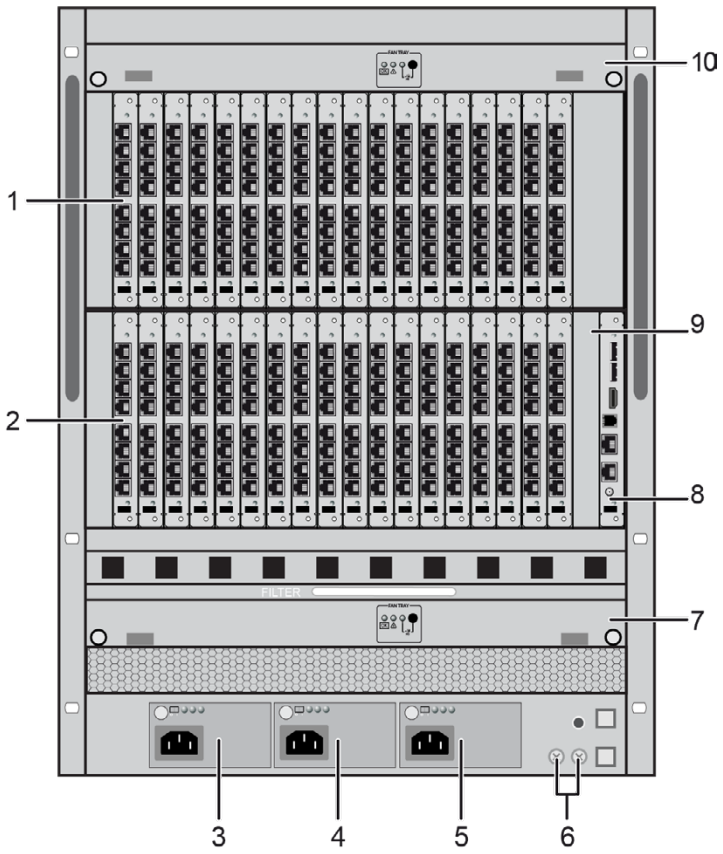


Fig. 8 Interface side - Example for Draco tera 288 port, revision 1

1 Slots for I/O boards 1 to 18
2 Slots for I/O boards 19 to 36
3 Slot for power supply unit 1
4 Slot for power supply unit 2 (optional)
5 Slot for power supply unit 3 (optional)
6 Grounding (2x)
7 Slot for fan tray 1
8 Slot for controller board for I/O boards 1 to 72
9 Slot for controller board for I/O boards 1 to 72 (redundancy)
10 Slot for fan tray 2

3.5.1.6 Draco tera 576 Port, Revision 1

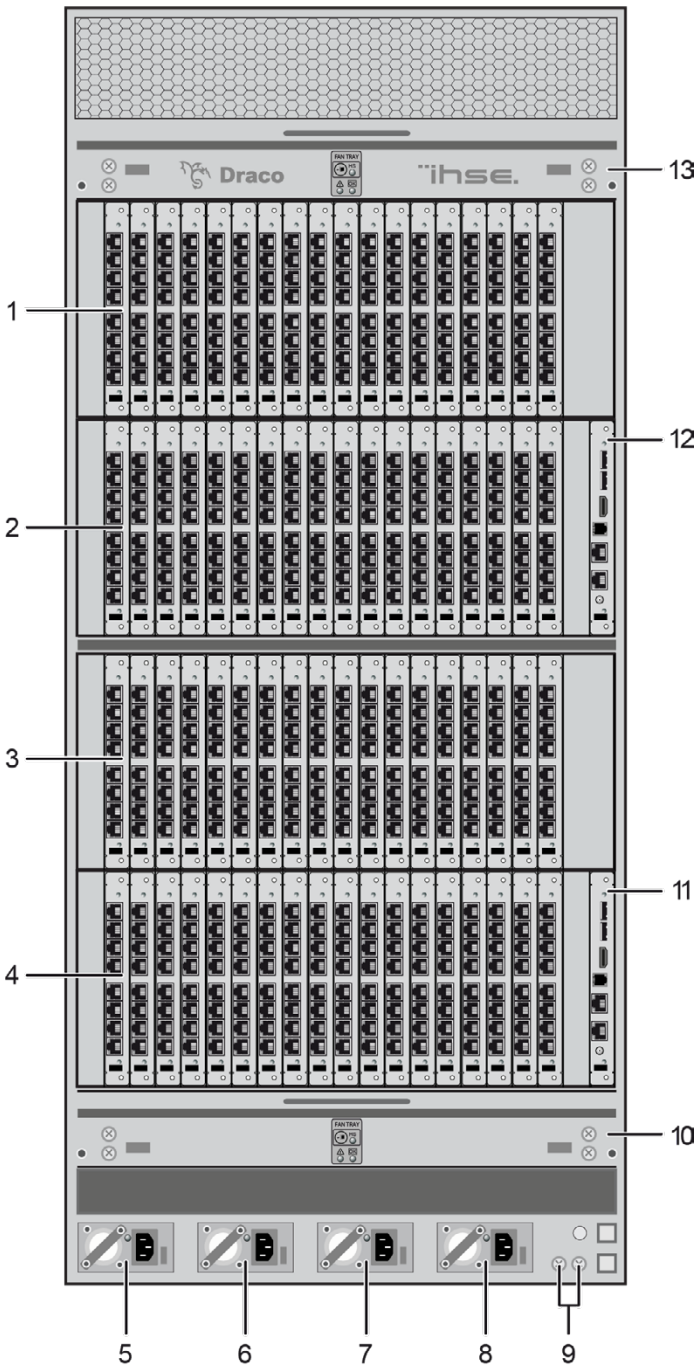


Fig. 9 Interface side - Example for Draco tera 576 port, revision 1

1 Slots for I/O boards 1 to 18
2 Slots for I/O boards 19 to 36
3 Slots for I/O boards 37 to 54
4 Slots for I/O boards 55 to 72
5 Slot for power supply unit 1
6 Slot for power supply unit 2
7 Slot for power supply unit 3 (optional)
8 Slot for power supply unit 4 (optional)
9 Grounding (2x)
10 Slot for fan tray 1
11 Slot for controller board for I/O boards 54 to 72
12 Slot for controller board for I/O boards 1 to 36
13 Slot for fan tray 2

The illustration for K480-576-R2 will be included in the next manual version.

3.5.2 Boards

3.5.2.1 Draco tera Controller Board 480-CTRL2

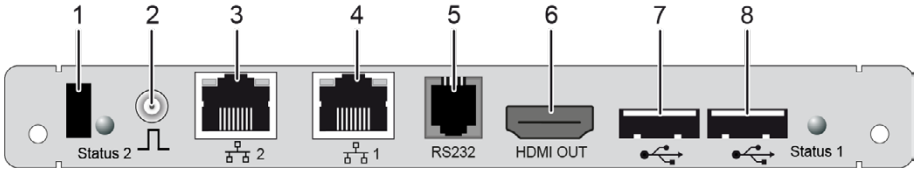


Fig. 10 Interface side - Draco tera controller board 480-CTRL2

1 Locking pin
2 GenLock (not used)
3 Network port 2
4 Network port 1
5 RJ10, RS232 serial
6 HDMI port (output)
7 USB Type A, USB-HID 1 USB-HID device 1
8 USB Type A, USB-HID 1 USB-HID device 2

3.5.2.2 I/O Boards

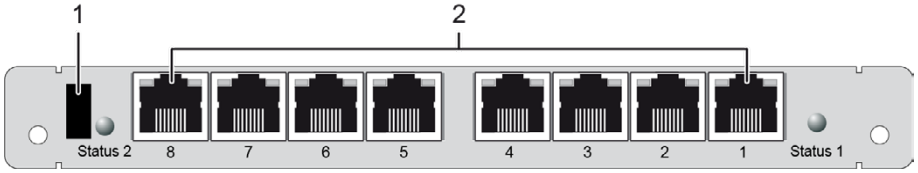


Fig. 11 Interface side - Draco tera I/O board 480-C8x (1G and 3G)

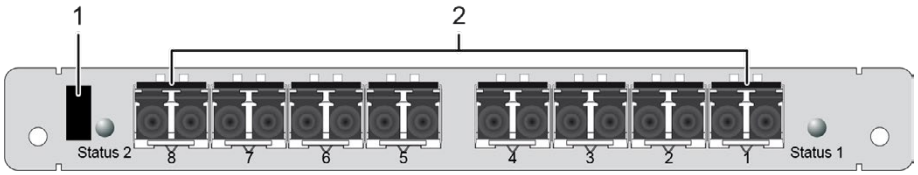


Fig. 12 Interface side - Draco tera I/O board 480-F8x

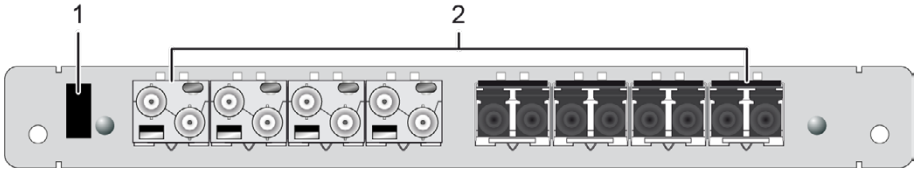


Fig. 13 Interface side - Draco tera I/O board 480-UNI16

1 Locking pin
2 Ports 1 to 8 (right to left)

3.5.2.3 Grid Board

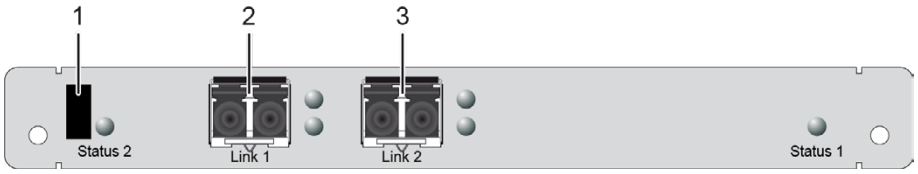


Fig. 14 Interface side - Draco tera grid board 480-GRD-S8-R1

1 Locking pin
2 Interconnect port 1
3 Interconnect port 2

3.6 Status Indication at the Device

Due to variations in LED type "white" might also appear as light purple or light blue.

3.6.1 Draco tera Controller Board 480-CTRL2

3.6.1.1 LEDs for Board Status

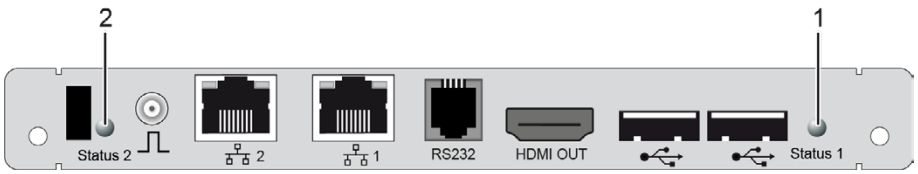


Fig. 15 Interface side - Status LEDs, Draco tera controller board 480-CTRL2

1 Controller board status LED 1 2 Controller board status LED 2

Status LEDs of the Primary Controller Board

The column designation has been chosen according to the LED position numbers of the controller board.

LED 2	LED 1	Description
White	White	System check while booting or running an update process.*
Flashing red	Flashing blue	Registration of the controller board has started.
Flashing blue	Flashing red	Controller board registration in progress.
Off	Flashing green	Operating condition, controller board registered at the matrix.
Flashing blue	Flashing green	Operating condition with communication between controller board and I/O board.
Flashing red	Flashing green	The matrix shutdown is finished (locking pin plugged in).
Flashing red	Green	The controller board is de-registered and/or the matrix shutdown is finished (locking pin pulled out).
	Flashing yellow	Matrix shutdown or restart in progress.*

* These LED colors indicate very sensitive processes, see chapter 9.2, page 308 and chapter 12.2, page 318.

Status LEDs of the Secondary Controller Board

LED 2	LED 1	Description
Off	Flashing red	Secondary controller board in stand-by mode.

LED status/colors when using the second controller card alone, see table for first controller card.

3.6.1.2 LEDs for Network Connection

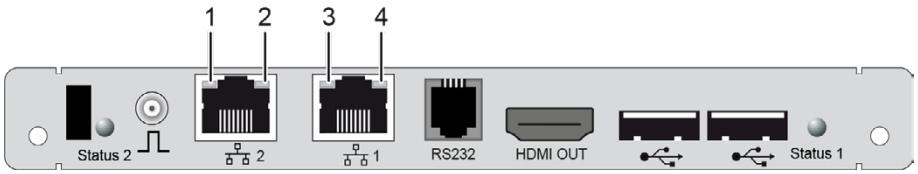


Fig. 16 Interface side - Network Connection LEDs, Draco tera controller board 480-CTRL2

1 Link status LED network connection 1
2 Activity status LED network connection 1
3 Link status LED network connection 1
4 Activity status LED network connection 1

Status LEDs for the Network Connection

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the ports.

The following tables show the respective LED states/colors of the network connection LED (Pos. 1/3) and activity LED (Pos. 2/4) for the respective situation.

LED 1/3	LED 2/4	Description
Off	Off	No network connection available.
Green	Off	Network connection available, no data traffic available.
Green	Orange	Network connection available, data traffic active.

3.6.2 Draco tera I/O Boards and Grid Board

3.6.2.1 LEDs for Board Status

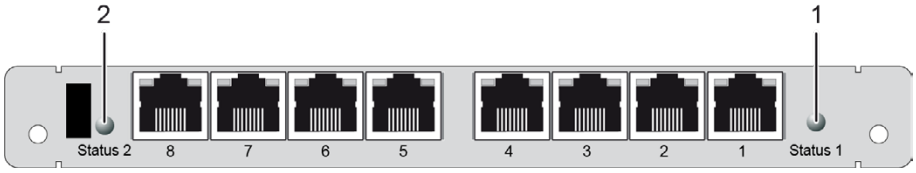


Fig. 17 Interface side - Status LEDs, Draco tera I/O board 480-C8x (1G and 3G)

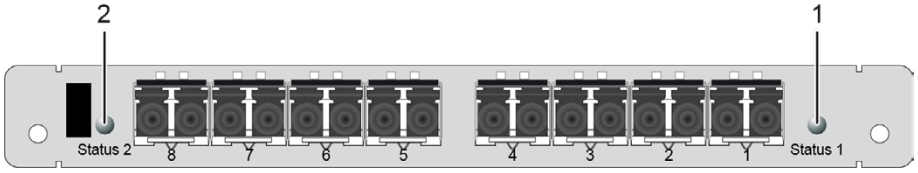


Fig. 18 Interface side - Status LEDs, Draco tera I/O board 480-F8x

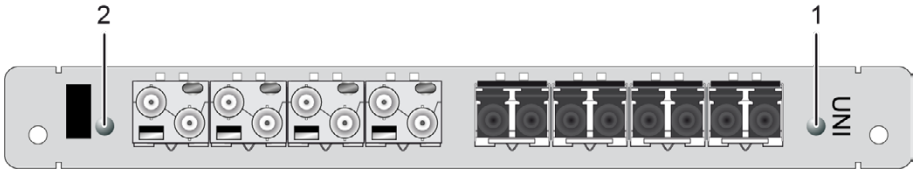


Fig. 19 Interface side - Status LEDs, Draco tera I/O board 480-UNI16

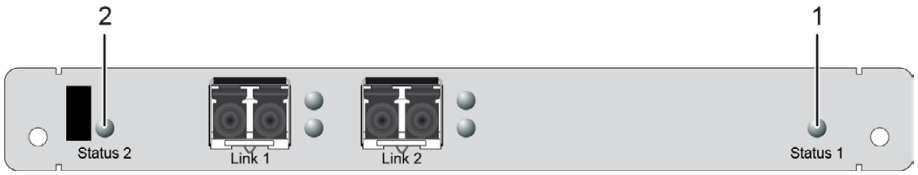


Fig. 20 Interface side - Status LEDs, Draco tera grid board 480-GRD-S8-R1

1 Status LED 1 I/O board

2 Status LED 2 I/O board

Status LEDs of the I/O Board

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the controller board.

LED 2	LED 1	Description
White	White	System check while booting or running an update process.*
Flashing red	Flashing blue	Registration of the I/O board has started.
Flashing blue	Flashing red	I/O board registration in progress.
Off	Flashing green	Operating condition, I/O board registered at the matrix.
Flashing blue	Flashing green	Operating condition with communication between controller board and I/O board.

LED 2	LED 1	Description
Flashing red	Flashing green	Matrix shutdown is finished (locking pin plugged in).
Blue	Flashing red	I/O board firmware conflict with controller board with chosen option Invalid IO-Boards
	Flashing yellow	Matrix shutdown or restart in progress.*

* These LED colors indicate very sensitive processes, see chapter 9.2, page 308 and chapter 12.2, page 318.

3.6.2.2 LEDs for Link Connection 1G and 3G Cat X Board

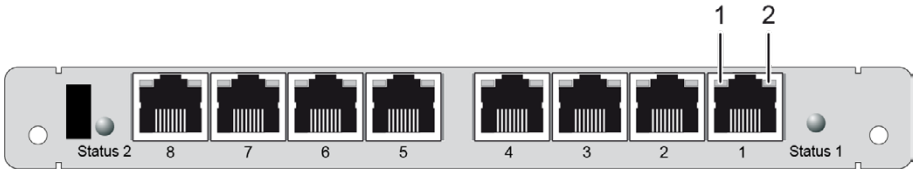


Fig. 21 Interface side - Link Connection LEDs, Draco tera I/O board,1G Cat X

1 Link Status LED 2 Activity Status LED

Status LEDs at the I/O Ports, 1G Cat X

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the controller board.

LED 1	LED 2	Description
Off	Off	No link connection available.
Off	Flashing orange	No link connection available, extender module is not detected.
Green	Orange	Link connection available, extender module detection is running.
Green	Off	Operating status, link connection available, data traffic is active.

Status LEDs at the I/O Ports, 3G Cat X

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the controller board.

LED 1	LED 2	Description
Off	Off	No link connection available.
Off	Flashing red	No link connection available, extender module is not detected.
Green	Flashing red	Link connection available, extender module detection is running.
Green	Off	Operating status, link connection available, data traffic is active.

3.6.2.3 LEDs for Link Connection 1G and 3G Fiber Board

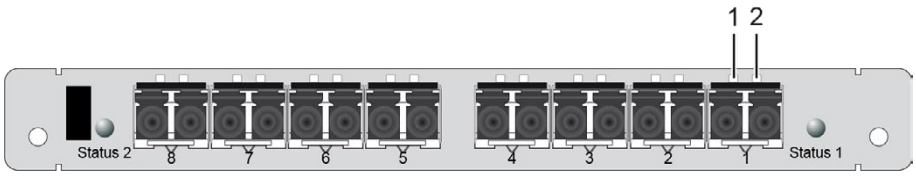


Fig. 22 Interface side - Link Connection LEDs, Draco tera I/O board,1G and 3G fiber

1 Link Status LED 2 Activity Status LED

Status LEDs at the I/O Ports, 1G and 3G Fiber

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the controller board.

LED 1	LED 2	Description
Off	Off	No link connection available.
Off	Flashing red	No link connection available, extender module is not detected.
Green	Red	Link connection available, extender module detection is running.
Green	Off	Operating status, link connection available, data traffic is active.

3.6.2.4 LEDs for Link Connection UNI Board

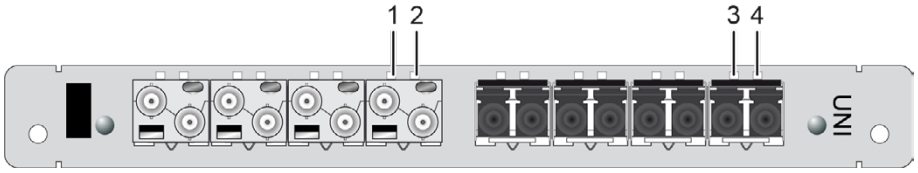


Fig. 23 Interface side - Link Connection LEDs, Draco tera I/O board, UNI

1 Link Status LED
2 Activity Status LED
3 Link Status LED
4 Activity Status LED

Status LEDs at the I/O Ports, UNI Board

For an easier identification, the LED representation and column designation in the table was selected analogously to the LED position on the controller board.

LED 1/3	LED 2/4	Description
Off	Off	Port not activated.
Off	Flashing red	No link connection available, extender module is not detected.
Green	Flashing red	Link connection available, extender module detection is running.
Green	Off	Operating status, link connection available, data traffic is active.

3.6.2.5 LEDs for Link Connection Grid 10G Board

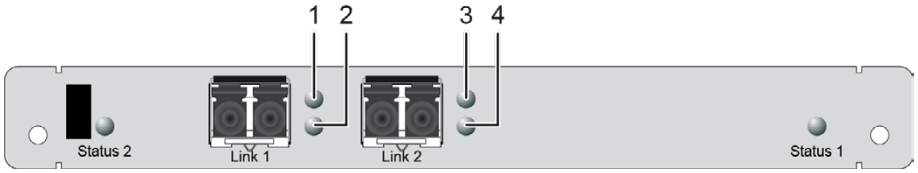


Fig. 24 Interface side - Link Connection LEDs, Draco tera board, Matrix Grid

1 Activity Status LED
2 Link Status LED
3 Activity Status LED
4 Link Status LED

Status LEDs of the I/O Ports, Matrix Grid

The following tables show the respective LED states/colors of the left LED 1 and right LED 2 of the I/O board for the respective situation.

Pos.	LED	Description
1/3	Off	Port not activated.
2/4	Off	
1/3	Flashing orange	No link connection available, extender module is not detected.
2/4	Off	
1/3	Flashing orange	Link connection available, extender module detection is running.
2/4	Flashing green	
1/3	Off	Operating status, link connection available, data traffic is active.
2/4	Green	

3.6.3 Power Supply Units

3.6.3.1 Draco tera 48/80 Port, Status LEDs for Power Supply Voltage

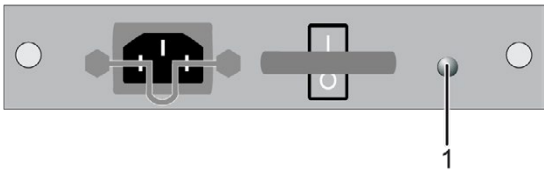


Fig. 25 Status LEDs for power supply voltage, Draco tera 48/80 port

1 LED for power supply voltage

LEDs for Power Supply Voltage

LEDs	LED Status	Description
1	Green	Operating condition
	Red	No power supply voltage available. The matrix is powered by a second power supply unit.
	Off	No power supply voltage available.

3.6.3.2 Draco tera 152/160/288 Port

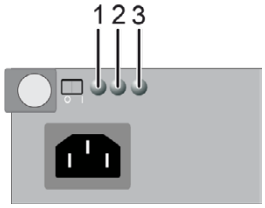


Fig. 26 Status LEDs for power supply voltage, Draco tera 152/160/288 port

1 LED for AC input
2 LED for AC output
3 LED for temperature

LEDs for Power Supply Voltage

LEDs	LED Status	Description
1	Green	Operating condition
2	Green	Operating condition
3	Off	Normal temperature
	Yellow	High temperature

3.6.3.3 Draco tera 576 Port, Revision 1

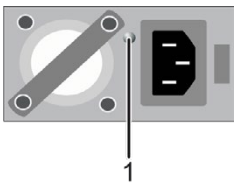


Fig. 27 Status LEDs for power supply voltage, Draco tera 576 port, revision 1

1 LED for power supply voltage

LEDs for Power Supply Voltage

LEDs	LED Status	Description
1	Flashing green	Stand-by on; main output off, AC input power on.
	Green	Stand-by on; main output on, no fault detected.
	Flashing orange	Fault detected: main output OCP (over current protected) or UVP (under voltage protected) or OVP (over voltage protected).
	Orange	Fan fault or OTP (over temperature protected) or stand-by on with OCP/UVP.
	Off	AC input power off.

3.6.3.4 Draco tera 576 Port, Revision 2

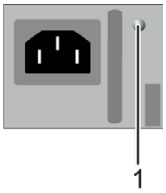


Fig. 28 Status LEDs for power supply voltage, Draco tera 576 port, revision 2

1 LED for power supply voltage

LEDs for Power Supply Voltage

LEDs	LED Status	Description
1	Flashing green	Stand-by on; main output off, AC input power on.
	Green	Stand-by on; main output on, no fault detected.
	Flashing orange	Power supply warning event
	Orange	Fault detected: main output stand-by output, fan, overtemperature, input OVP.
	Off	AC input power off.

3.6.4 Fan Trays

3.6.4.1 Draco tera 48/80 Port

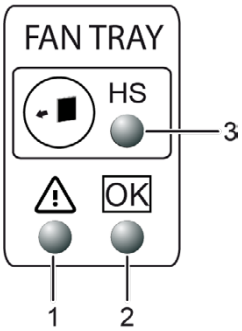


Fig. 29 Fan tray status LEDs, Draco tera 48/80 Port

1 Operation LED
2 Alarm LED
3 Hot-Swap LED

Pos.	LED	Description
1	Off	No power to the fan tray
	Green	Normal operation
2	Red	Attention status (error condition)
3	Off	In use
	Flashing blue	Preparing for extraction
	Blue	Ready to remove

3.6.4.2 Draco tera 152/160/288/576 Port

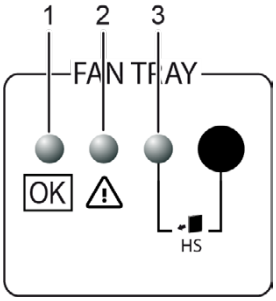


Fig. 30 Fan tray status LEDs, Draco tera 152/160/288/576 Port

1 Operation LED
2 Alarm LED
3 Hot-Swap LED

Pos.	LED	Description
1	Off	No power to the fan tray
	Green	Normal operation
2	Red	Attention status (error condition)
3	Off	In use
	Flashing blue	Preparing for extraction
	Blue	Ready to remove

3.7 Installation Examples

Additionally, to the Single-Head installation, described in chapter 3.2, page 18, this chapter shows typical exemplary installations of the Draco tera:

3.7.1 Dual-Head Installation

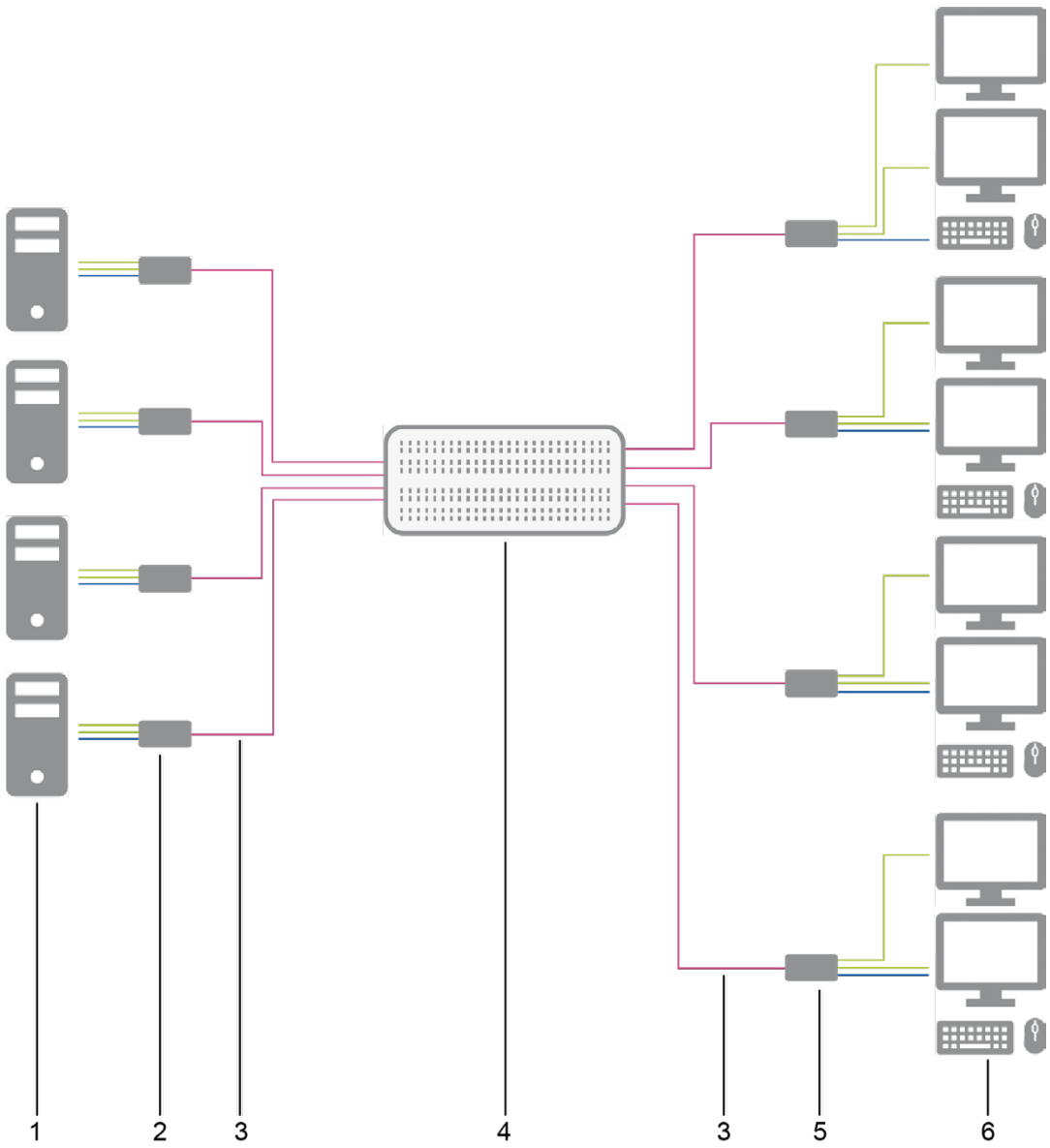


Fig. 31 Example - Dual-Head installation

1 Dual-Head sources
2 Dual-Head CPU Units
3 Interconnect cable
4 Draco tera matrix
5 Dual-Head CON Units
6 Consoles (2x monitor, keyboard, mouse)

3.7.2 Single-Head Installation with Multi-Screen Control

When using Multi-Screen Control (below referred to as “MSC”), switching the USB-HID control between up to eight connected sources can be performed at one sink with only one connected mouse or keyboard. In a Single-Head installation, the sink can consist of up to eight monitors. In a matrix system, MSC can be set up at multiple sinks.

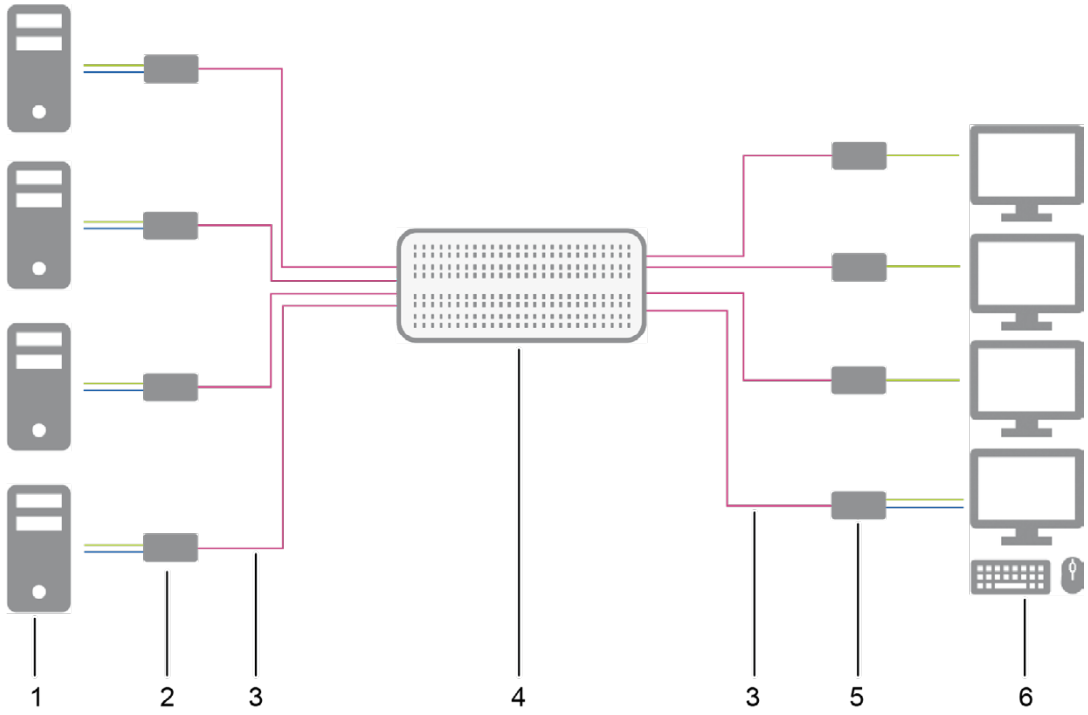


Fig. 32 Example - Single-Head installation with MSC

1 Single-Head sources
2 Single-Head CPU Units
3 Interconnect cable
4 Draco tera matrix
5 Single-Head CON Units
6 MSC console (e.g., 4x monitor, 1x keyboard, 1x mouse)

If you have a Single-Head console, e.g., you can also get access to a Dual-Head or Quad-Head source. However, control is only possible at monitor 1 and only one video signal is displayed.

Any signal source can be switched to any number of monitors that will show the video signal at the same time. Audio may also be switched if required.

3.7.3 Dual-Head Installation with Multi-Screen Control

When using MSC, switching the USB-HID control between up to eight connected sources can be performed at one sink with only one connected mouse or keyboard. In a Dual-Head installation, the sink can consist of up to sixteen monitors when operating Dual-Head Sources. In a matrix system, MSC can be set up at multiple sinks.

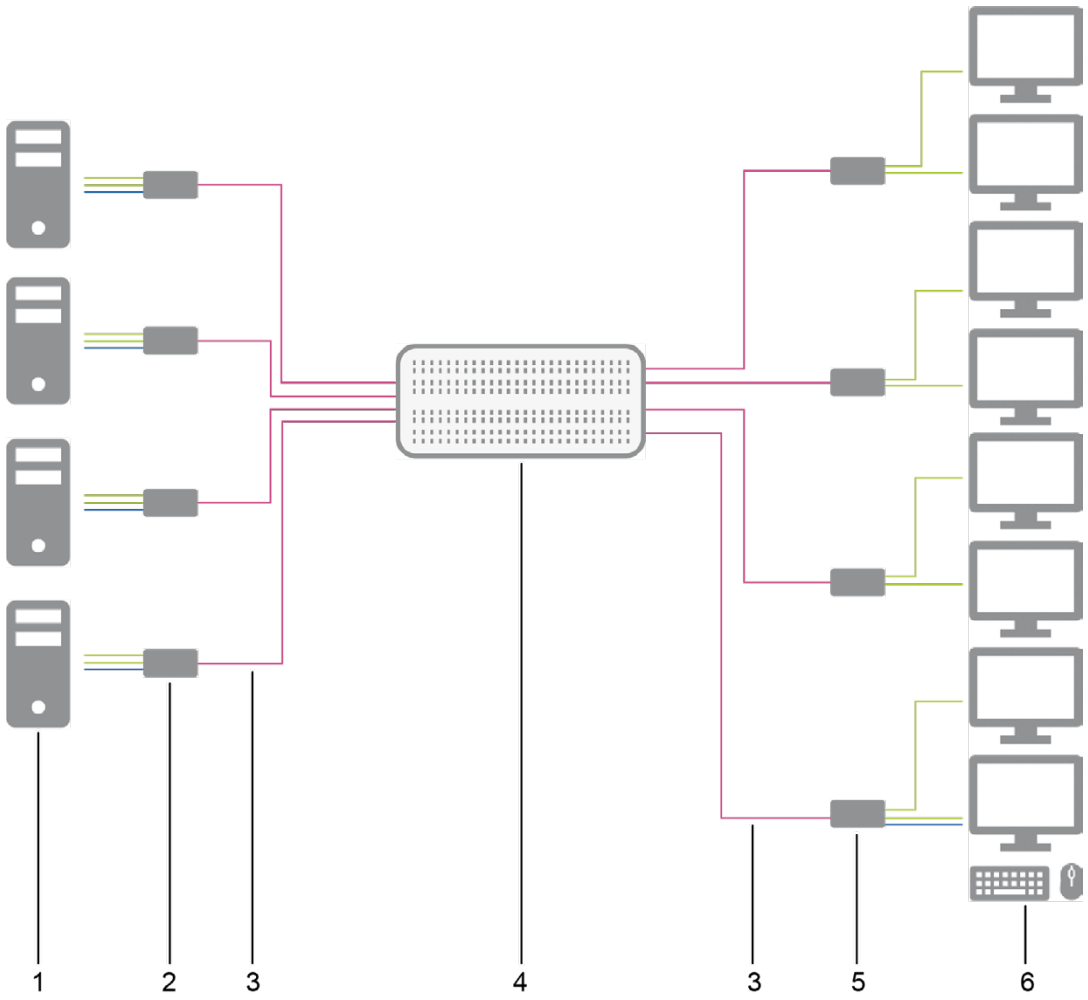


Fig. 33 Example - Dual-Head installation with MSC

1 Dual-Head sources
2 Dual-Head CPU Units
3 Interconnect cable
4 Draco tera matrix
5 Dual-Head CON Units
6 MSC console (e.g., 8x monitor, 1x keyboard, 1x mouse)

Any signal source can be switched to any number of monitors that will show the video signal at the same time. Audio may also be switched if required.

3.7.4 Single-Head, Dual-Head and Single-Head Multi-Screen Control Installation

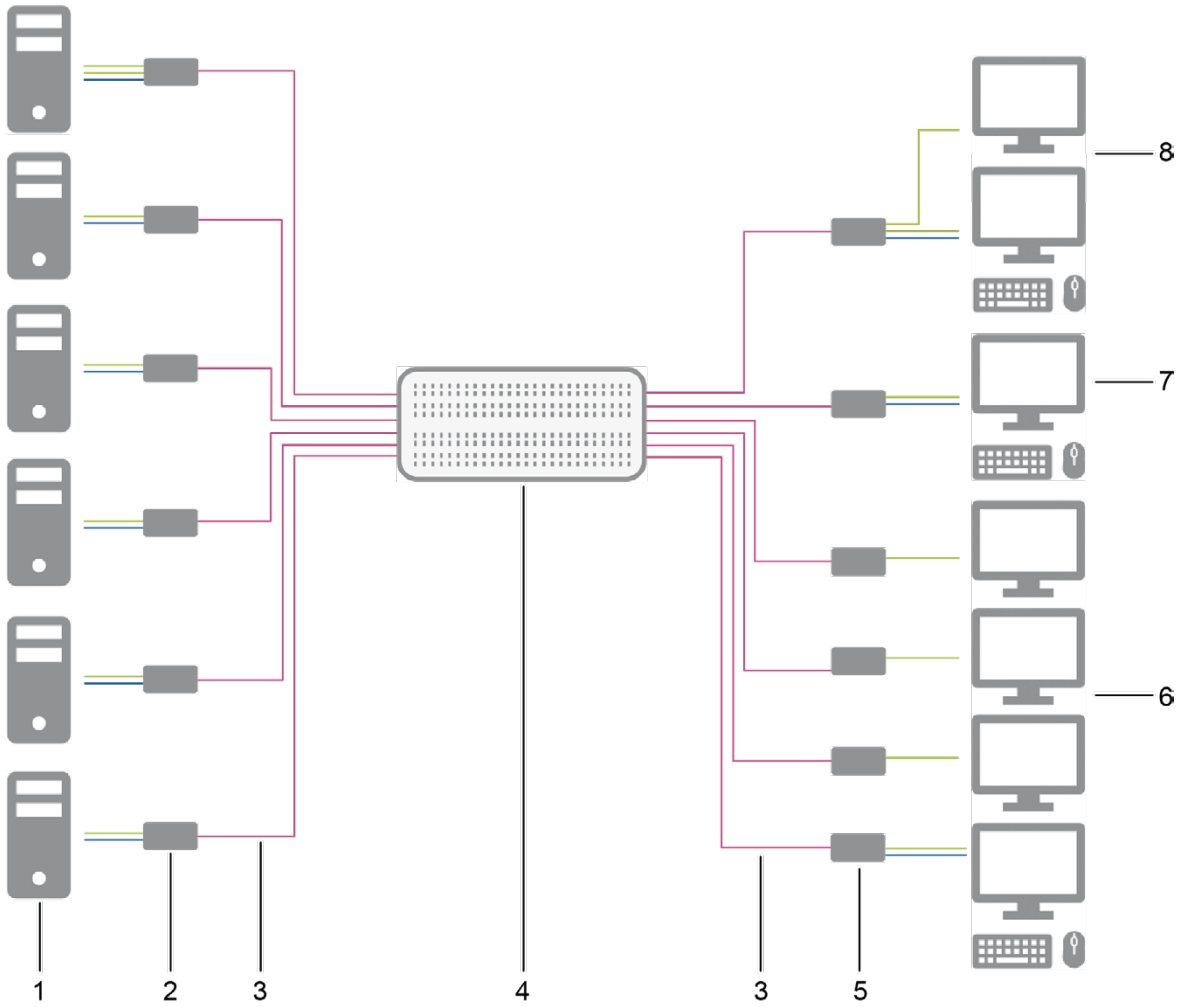


Fig. 34 Example - Single-Head, Dual-Head and Single-Head MSC Installation

1 Single-/Dual Head sources
2 Single-/Dual-Head CPU Units
3 Interconnect cables
4 Draco tera matrix
5 Single-/Dual-Head CON Units
6 Single-Head console (1x monitor, keyboard, mouse)
7 Dual-Head console (2x monitor, keyboard, mouse)
8 MSC console (e.g., 4x monitor, 1x keyboard, 1x mouse)

3.7.5 Parallel Operation (Stacking)

If you have special configurations, especially at installations with several monitors per workstation or additional support of USB 2.0 transmission paths, the number of connectable sources and sinks can be increased by a parallel operation (stacking) of several Draco tera devices.

One Draco tera matrix is defined as the **Master Matrix** and its IP address entered into the **Master IP Address** field (see chapter 6.3.1, page 72). All other matrices are defined as Sub Matrices. Sub matrices must be connected to the master matrix via network connector (RJ45) on the controller board. The **Enable LAN Echo** option has to be activated at the master matrix (see chapter 6.3.1, page 72).

If a switching command is performed using the OSD, the synchronized matrices will also switch automatically.

Switching of stacked devices might be delayed by several seconds.

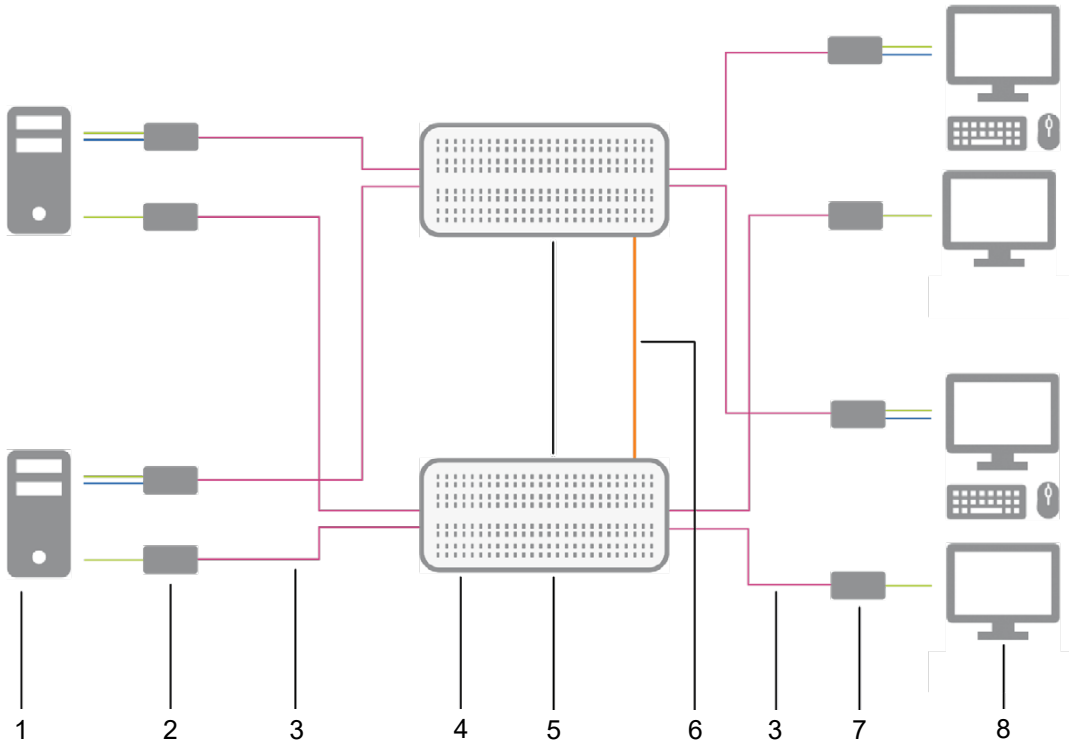


Fig. 35 Example - Parallel Operation (Stacking)

1 Dual-Head sources
2 Single-/Dual-Head CPU Units
3 Interconnect cable
4 Master matrix
5 Synchronized matrix
6 Network connection master matrix / synchronized matrix
7 Dual-Head CON Units
8 Console (2x monitor, 1x keyboard, 1x mouse)

3.7.6 Video Matrix

The matrix can be used as a video matrix. Up to 288 input ports can be switched to up to 288 output ports depending on components and equipment.

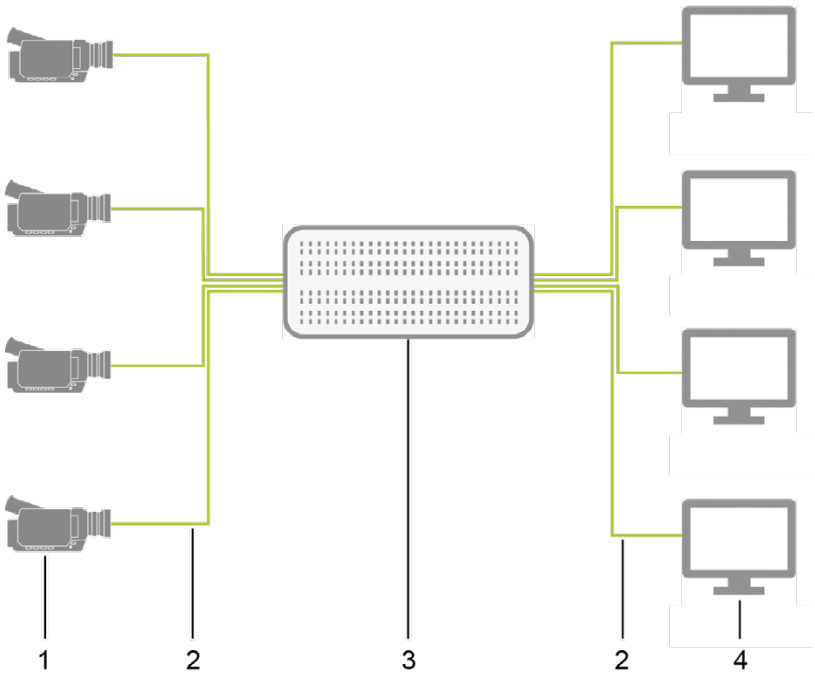


Fig. 36 Example - Video Matrix

1 Video source (e. g. SDI camera)
2 Interconnect cables
3 Matrix
4 Video sink (e.g., monitor)

3.7.7 Matrix Grid

You can use a matrix grid for applications where the required number of ports is not sufficient or important connections need to be made to several matrices to provide redundancy.

A matrix grid consists of one master matrix and at least one sub matrix. In its maximum configuration, it can consist of up to 24 matrices.

To build a matrix grid, the grid matrices are interconnected by “Grid Lines”. In this case, the sub matrices can be connected directly to the master matrix or between themselves.

When arranging the grid lines, various grid setups can be realized, for example: a ring setup, a hub & spoke setup, or a fully connected setup of matrices.

Grid lines can process signals bidirectional (**Smart Connect**). Per grid line, one KVM connection can be transmitted.

All switching operation will be exclusively performed through the Grid Master.

To configure the matrix grid, see chapter 7.10, page 272.

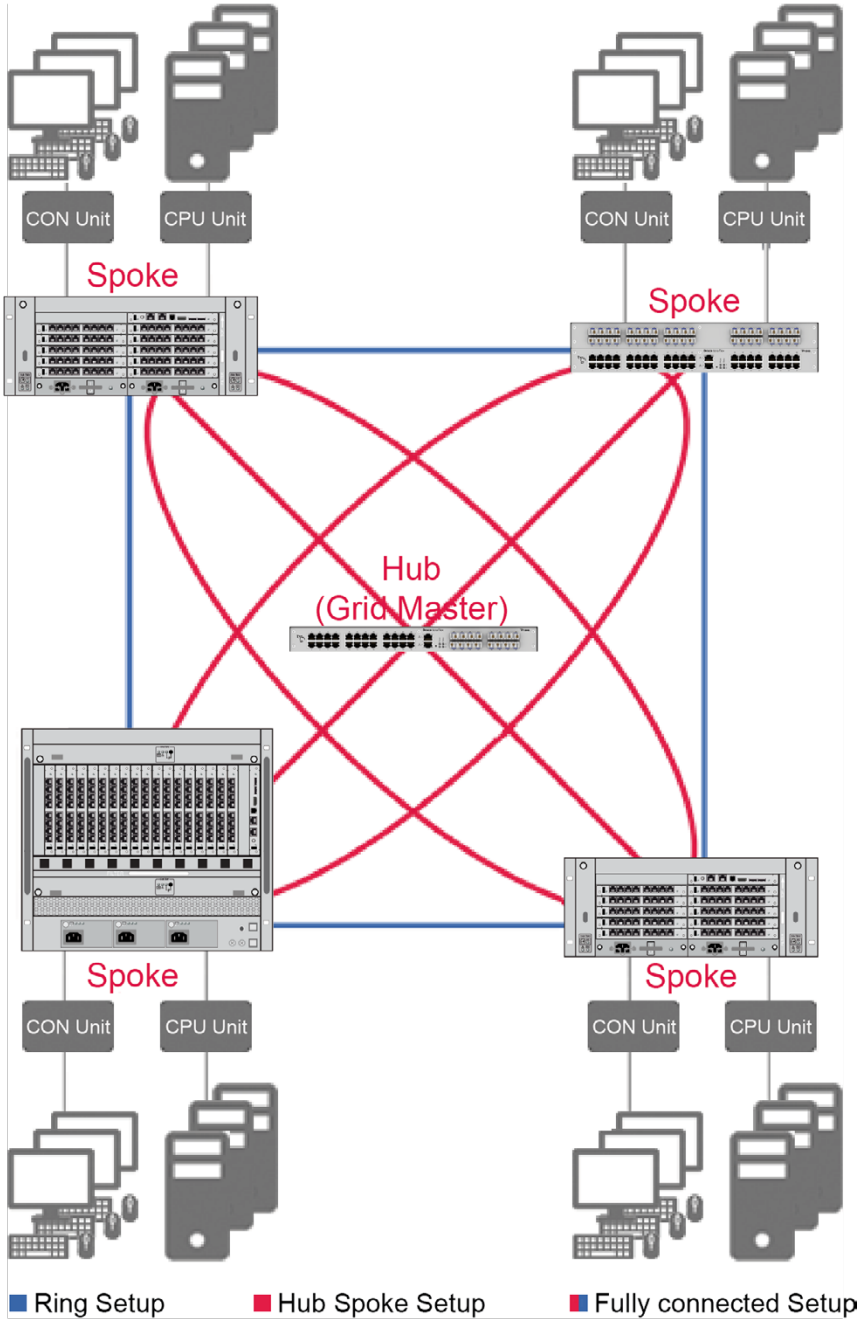


Fig. 37 Example - Matrix Grid

4 Access Options

You have the following options to configure and operate the Draco tera:

Access and operation option	Description
Command Mode and Keyboard commands	The command mode allows several functions to be controlled by keyboard commands during normal use.
OSD	The OSD (On-Screen-Display) allows to configure the basic settings of the matrix operating system, to query several states, and to control several functions by keyboard commands during normal use.
Tera Tool	The Tera Tool (management software) is available as a single executable program file that does not require an installation. The management software can be downloaded from the link https://www.ihse.com/software. Advanced settings can be configured on the Draco tera operating system using the management software: • Advanced configuration • Extended monitoring options • System update (firmware update) • Local backup option • Documentation
API	The Draco tera API (application programming interface) is used to control the matrix externally by network (TCP/IP) or serial interface connection. The Draco tera API has been successfully implemented with various common media control systems. The Draco tera API provides the full scope of switching functionality. It does not support the configuration of a Draco tera system. Detailed information about API switching commands is available upon request.

4.1 Command Mode

The extender modules include a command mode that allows to access the matrix and to control several functions by keyboard commands during normal use.

To start the command mode, use a keyboard sequence (Hot Key) at the keyboard plugged in the matrix. To exit the command mode, press Esc.

NOTICE
While in command mode, ➡ the Caps Lock and Scroll Lock LEDs on the keyboard are flashing, ➡ the USB-HID devices are not operable, mouse and keyboard functions are deactivated, ➡ only selected keyboard commands are available.

If there is no keyboard command executed within 10 seconds after activating the command mode, it will be deactivated automatically.

The following keyboard commands are used to enter, and to exit the command mode, and to change the Hot Key.

Function	Keyboard command
2x Left Shift (Hot Key, factory setting)	Start the command mode
Esc	Exit the command mode
current Hot Key, c, new Hot Key Code, Enter	Change the Hot Key

NOTICE
In a combined KVM matrix/U-Switch configuration, select different Hot Keys for extender modules connected to the KVM matrix (e.g., 2x Left Shift) and the U-Switch (e.g., 2x Right Shift).

Hot Key Code

The Hot Key to enter the command mode can be changed. The following table lists the Hot Key codes for the available Hot Keys.

Hot Key Code	Hot Key
0	Freely selectable, except ESC, Del, and Enter
2	2x Scroll
3	2x Left Shift (default)
4	2x Left Ctrl
5	2x Left Alt
6	2x Right Shift
7	2x Right Ctrl
8	2x Right Alt

Change the current Hot Key via Hot Key Code (exemplary)

To change the current Hot Key to, e.g., 2x Left Alt, enter Hot Key, c, 5, Enter.

Set a freely selectable Hot Key (exemplary)

To set a freely selectable Hot Key (e.g., 2x Space), enter Hot Key, c, 0, Space, Enter.

Keyboard commands are fixed to the position of the keys on the keyboard. Keyboard mapping tables may vary for country-specific layouts.

➥ Note the key position of a freely defined Hot Key when changing the keyboard layout, e.g., from QWERTZ to AZERTY. E.g., if defining 2x a as Hot Key on a German or US keyboard layout, the French keyboard layout (AZERTY) requires then 2x q as Hot Key to be pressed instead.

Reset the Hot Key

To set a Hot Key back to default settings, press Right Shift + Del within 5 s after switching on the CON Unit or plugging in a keyboard.

The Hot Key is set back to Left Shift.

4.2 Control Options via OSD

4.2.1 OSD Keyboard Control

There are the following options to enter the OSD of the matrix:

- via keyboard connected to the controller board
- via keyboard connected to a CON Unit of an extender module

The following keyboard commands are used to open, and to exit the OSD:

Keyboard command	Function
Hot Key, o or Hot Key, m, o.	Open the OSD of the matrix or the master matrix in a cascading matrix system.
Hot Key, s, o	Open the OSD of the sub matrix in a cascading matrix system.
Esc	Exit the OSD in the main menu or go back one step in the menu structure.
Left Shift + Esc	Exit the OSD within the menus.
Left Ctrl + Esc	

NOTICE

If the OSD is closed with one of the keyboard commands mentioned above, possible changes are not saved. For information on saving changes, see configuration descriptions from chapter 6.9, from page 139.

Entering the OSD and the Main Menu

To open the main menu, proceed as follows:

1. Press Hot Key + o or the Fast Key to open the OSD.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing, and the OSD is opened on the display showing a list of all available CPU Devices.
2. Press Esc to open the main menu.

If the **Enable CPU Selection** checkbox is ticked in the **Configuration** menu, the CPU Device selection list for switching CPU Devices will be opened initially. Pressing F7 within the selection list opens the OSD menu.

Leaving the OSD

➡ Press Esc in the main menu or press Left Shift + Esc anywhere within the OSD.

The OSD is closed without saving any changes and the signal of the currently active CPU Device connection will be displayed.

4.2.2 OSD Keyboard Commands

The following keyboard commands are available for the navigation and configuration within the menus:

Keyboard command	Function
Left Arrow	Input field: cursor left
Right Arrow	Input field: cursor right
Up Arrow	In input fields: line up (with wrap around)
	In menus: line up (without wrap around)
Down Arrow	In input fields: line down (with wrap around)
	In menus: line down (without wrap around)
Page Up	Previous page in menus with more than one page
Page Down	Next page in menus with more than one page
Tab	In menus with input fields: next input field
Left Shift + Tab	In menus with input fields: previous input field
+	Next option in selection fields
	In the CPU selection list with cursor on a CPU Device Group: expand members of a group
-	Previous option in selection fields
	In the CPU selection list with cursor on a CPU Device Group: collapse members of a group
Spacebar	Switching in selection fields between two conditions, e.g., between **ON**/**OFF** or **Y** (Yes)/**N** (No)
Enter	In menus with input fields: save data
	In menus: select menu item
	With buttons: confirm selected button
Esc	In menus with input fields: cancel data input without saving
	In menus with selection fields: go back to the superior menu

Set a Fast Key for a direct Opening of the OSD

Next to the Hot Key for starting the command mode, a Fast Key can be exclusively set for opening the OSD directly. How often the shortcut key has to be pressed depends on the specified key: 1x for function keys or print key, 2x for all other keys.

To select a Fast Key from the Hot Key Code table (see page 46), enter:

Hot Key, f, Hot Key Code, Enter

To define a freely selectable Fast Key (e.g., 2x Space), enter Hot Key, f, 0, Space, Enter.

Delete the Fast Key

To delete the Fast Key, enter Hot Key, f, 0, Del, Enter.

4.2.3 OSD Menu Structure

The general layout of the OSD is structured into three areas:

- Upper status area (topmost two text lines)
- Working area (here shown with the main menu)
- Lower status area (lowest two text lines)

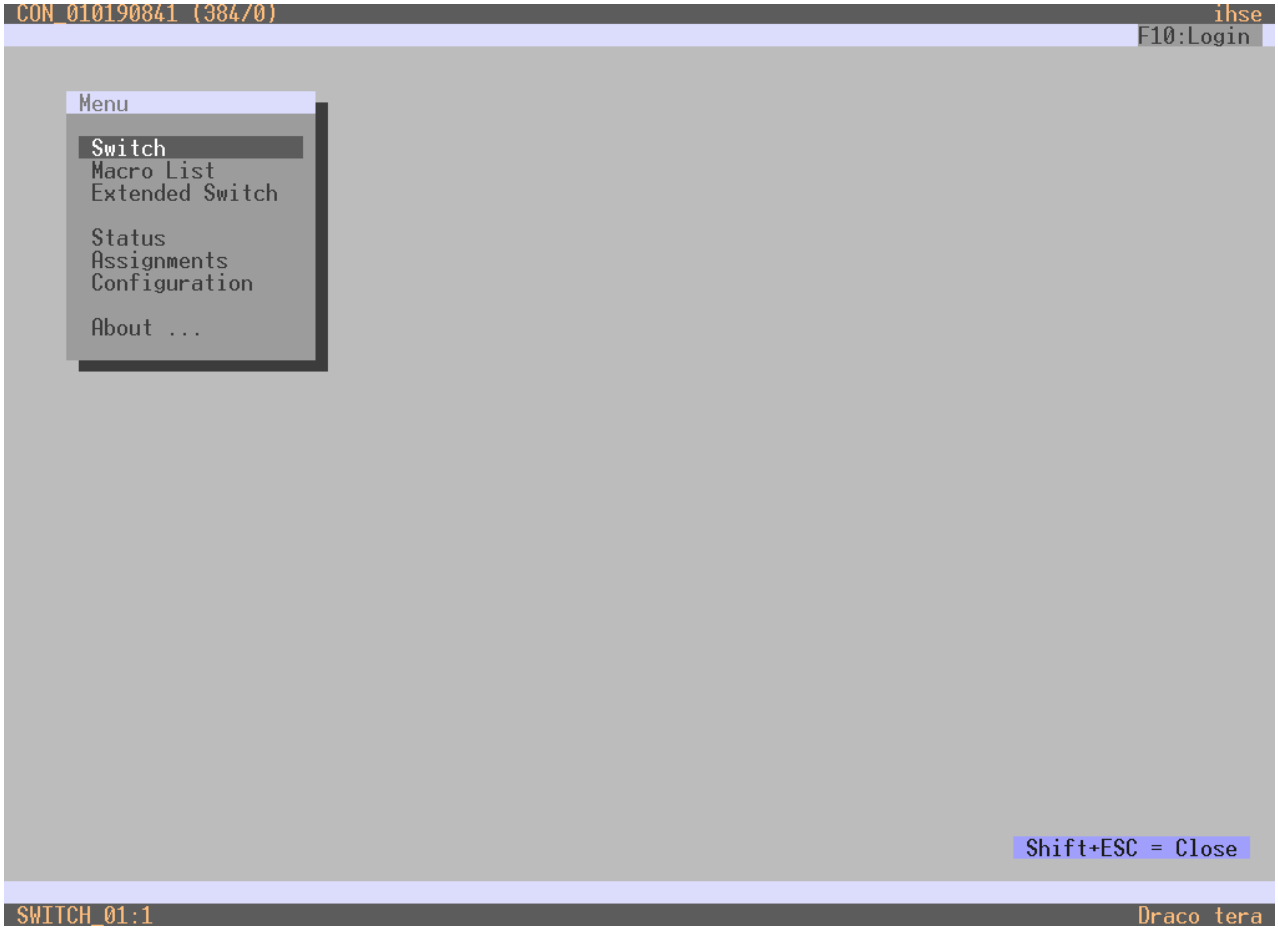


*Fig. 38 OSD **Main menu***

The following functions are available in most of the menus:

Button	Function
Cancel	Reject changes
Okay	Confirm changes (temporary storage of the active configuration in the volatile memory of the matrix).

4.2.4 OSD Sort Function

Lists and tables in the OSD offer a sorting function for fast and smooth search.

The following sorting functions are available:

Keyboard command	Function
F1	• Sort ID numbers in descending order by pressing the keyboard command once. • Sort ID numbers in ascending order by pressing the keyboard command twice (**ID**).
F2	• Sort ID names in descending order by pressing the keyboard command once. • Sort ID names in ascending order by pressing the keyboard command twice (**Name**).
F3	Go to the next result in the list of results of the search field (**Next**).
F4	Go to the previous result in the list of results of the search field (**Previous**).
F5	Refresh the currently shown list (**Refresh**).
F6	Jump between the search field and the list of results (**Find**).
F8	Show unavailable CPU Devices.
F9	Activate search function from the beginning of the name (**Compare**).

4.3 Control Options via Management Software

4.3.1 Management Software Menu Structure

The main user interface elements for options and functions of the management software are described in this chapter. This allows to keep the user manual clear. Further options and functions are explicitly declared in the respective chapters.

The menu structure of the management software is subdivided into several sections:

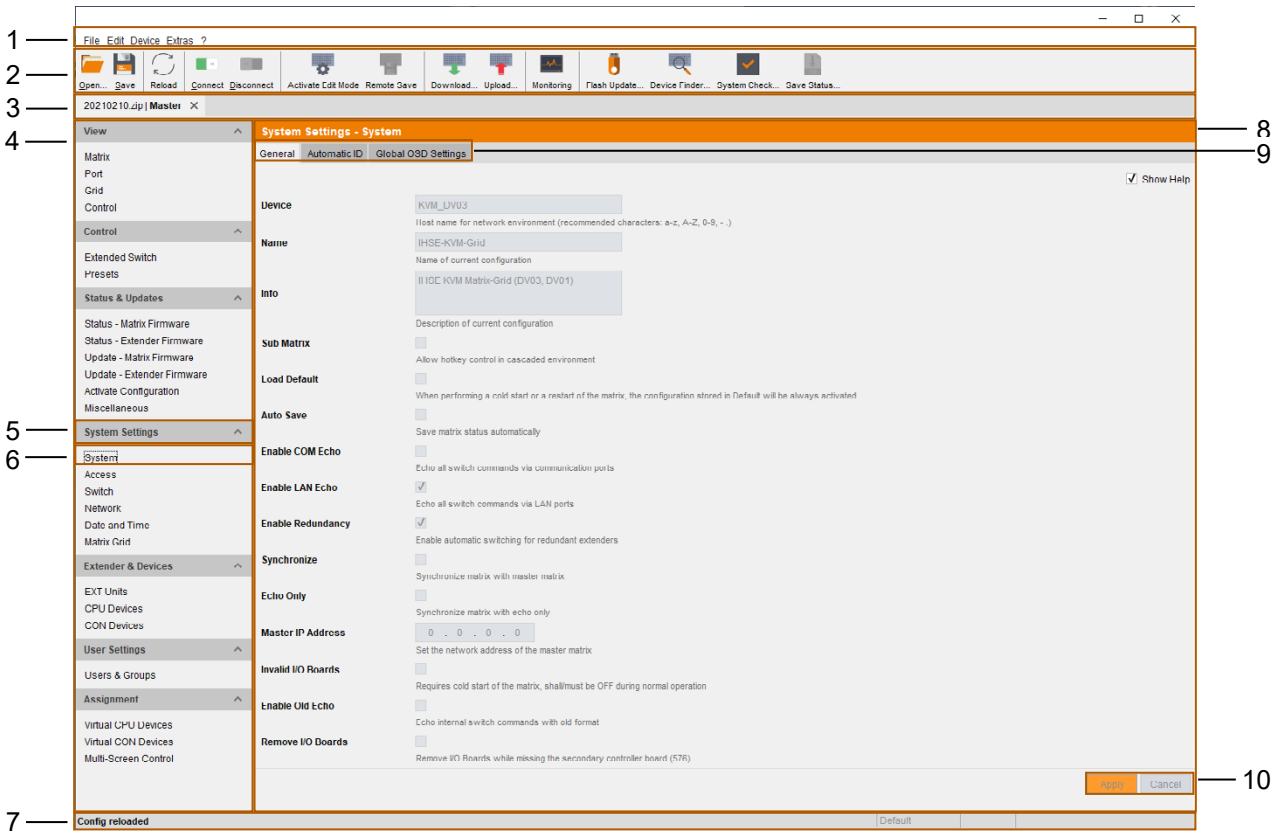


*Fig. 39 Management software **Menu structure** (Example 1)*

1 Menu bar
2 Toolbar
3 Tab bar (shows connections or configurations)
4 Task area
5 Task menu
6 Task menu item
7 Status bar (shows config version, activated Edit Mode and online mode)
8 Working area
9 Tabs (for additional menus)
10 Buttons

The following control elements are included in the menus:

Designation	Element	Description
Checkbox	☐	Function is not active, disabled by default or by mouse click
	☑	Function is active, enabled by default or by mouse click
Radio button	○	Option is not active, disabled by default or by mouse click
	◉	Option is active, enabled by default or by mouse click
Drop-down menu	---- ⌄	A selection list is opened by mouse click on the arrow
	0 ⇕	The value (+/-) is set by mouse click on the up/down arrow

The following actions are available in most of the menus:

Button	Function
Apply	Confirm changes (temporary storage of the active configuration in the volatile memory of the matrix).
Cancel	Reject changes.

Based on the following figure, basic functions are described that are available in the working area of several menus for individual tabs. Further functions are explained separately in the respective chapters.

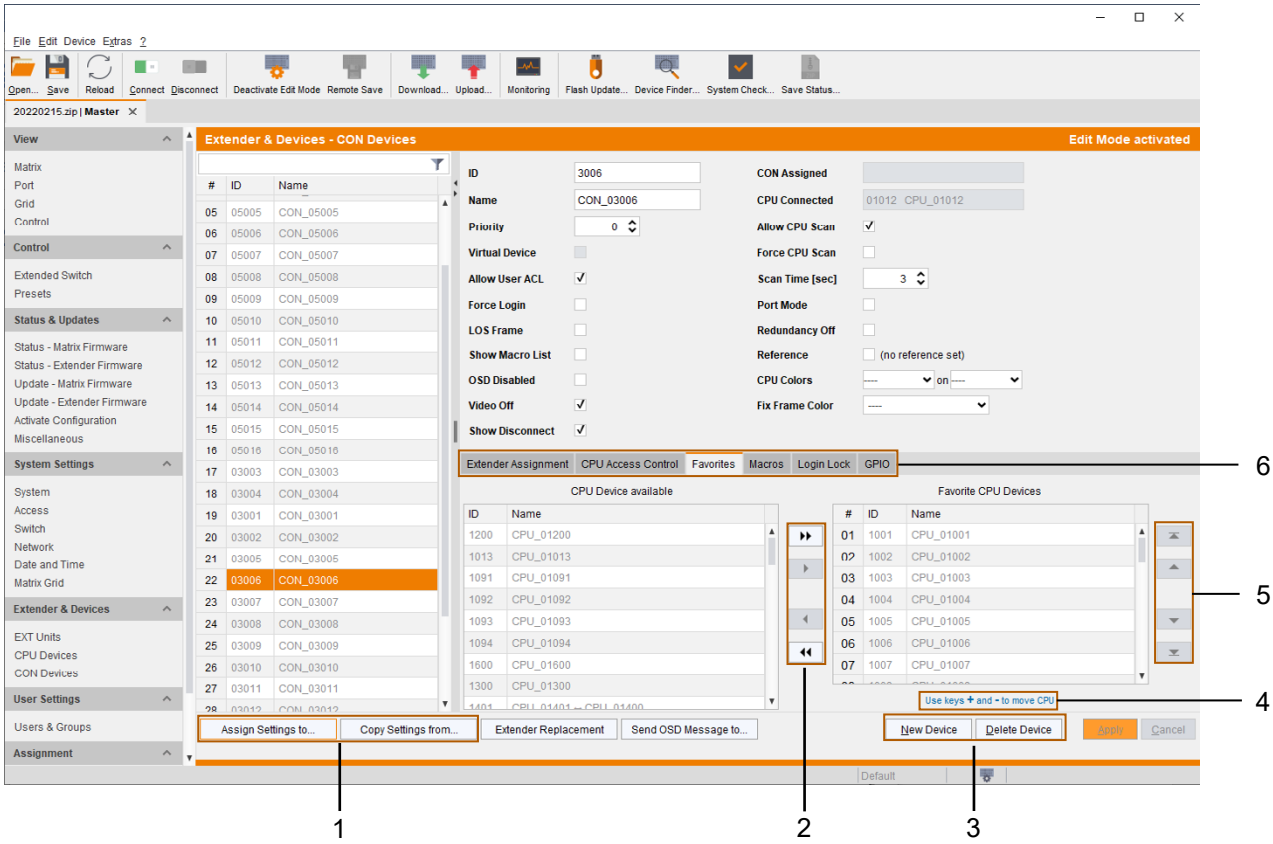


*Fig. 40 Management software **Menu structure** (Example 2)*

1 Assigning/Copying settings
2 Assigning/Removing elements* to/from an assignment or list
3 Creating/Deleting elements*
4 Keyboard commands to move elements* up/down
5 Moving elements* up/down
6 Tabs (for additional functions)

* Element is a placeholder and stands for EXT Units, CON/CPU Devices, Extender Modules, Users, or Favorites (see respective configuration chapters).

These buttons for main functions are available in the lower part of the working area of several menus.

Button	Function
Assign Settings to…	Assign settings from an element to another an element.
Copy Settings from…	Copy settings from an element to other elements.
New Element	Create a new element.
Delete Element*	Delete an element.

The following functions are available in most of the tabs or dialogs to assign elements.

Button	Function
▶	Assign the selected element to an element.
▶▶	Assign all available elements to an element.
◀	Remove the selected element from an element.
◀◀	Remove all elements from an element.
▼	Change the index number of an element upwards.
▲	Change the index number of an element downwards.
⤒	Change the index number of an element to first position.
⤓	Change the index number of an element to last position.

Keyboard Command	Function
+	Change the index number of elements upwards
-	Change the index number of elements downwards

Access Rights Menu

In menus to assign access, keyboard commands are available shown in the lower area of the tab menu.

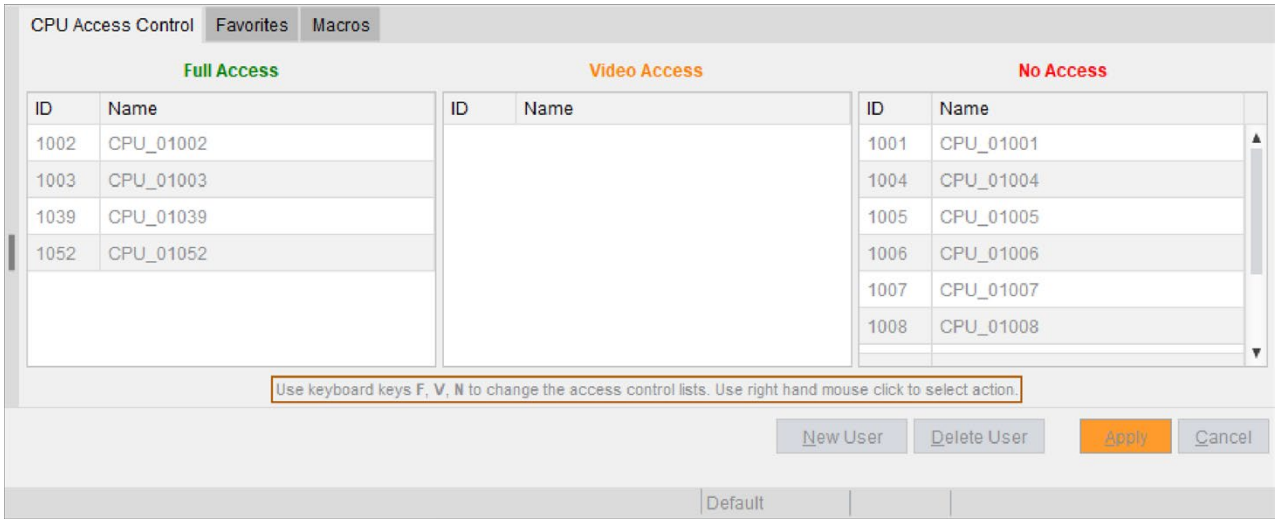


*Fig. 41 Management software **Menu structure** (Example 3)*

The following keyboard commands are available in Access assignment tabs:

Keyboard command	Function
f	Add highlighted element to **Full Access** list
v	Add highlighted element to **Video Access** list
n	Add highlighted element to **No Access** list

A context menu is available when clicking with the right mouse button on an element:

- Assign Full Access rights
- Assign Video Access rights

Information and options panel

The information and options panel displays information and offers options for the matrix system, e.g., for the Matrix Status, Routing Information, I/O Port Color Coding, I/O Port Symbols, MSC and Redundancy.

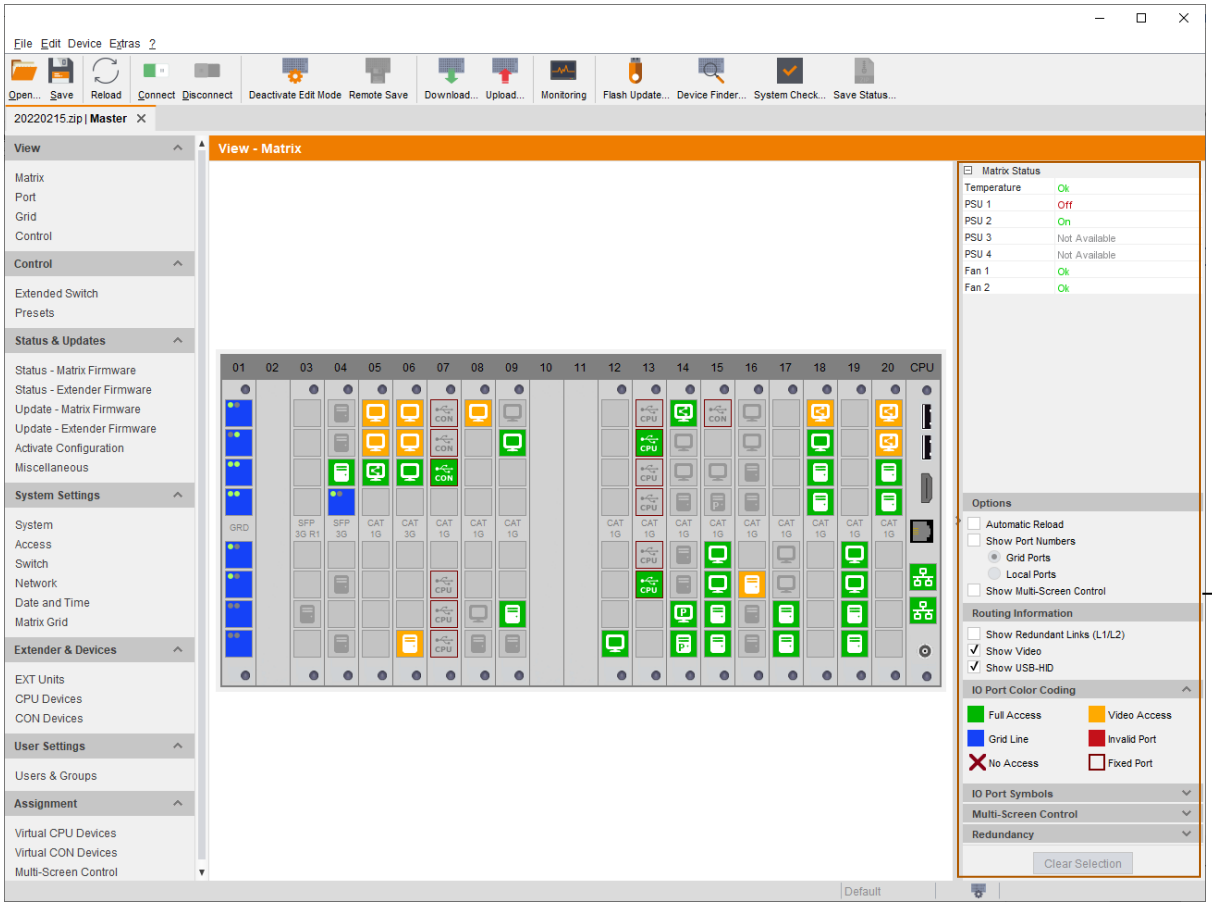


*Fig. 42 Management software **Menu structure** (Example 4)*

1 Information and options panel

Information for Operating and for Support Functions

The operation of the management software is intuitive and corresponds to the user interface of common operating systems.

The management software contains its own support function. The integrated help texts in the working area of the management software can be activated or deactivated by clicking the checkbox in the upper right corner. Auxiliary names (tooltips) for the menu items can be activated under **Extras > Options** on the **Style** tab.

4.3.2 Management Software Toolbar

Some functions are only available if a connection to the matrix has been established (online mode). The respective functions are colored if available.

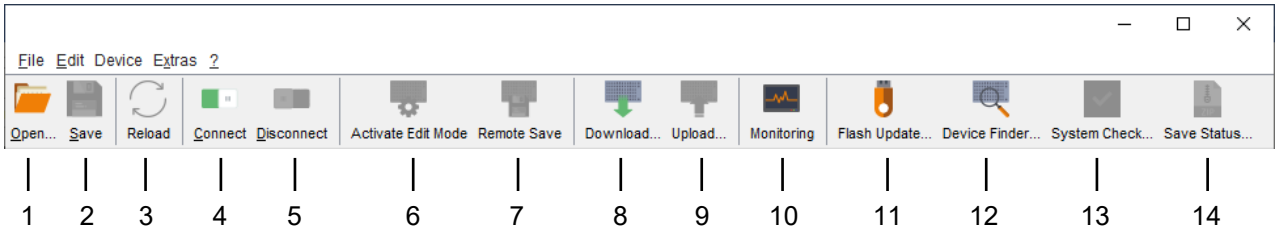


*Fig. 43 Management software **Toolbar***

1 Load a locally saved configuration
2 Save a configuration locally
3 Reload the current configuration
4 Connect to the matrix
5 Disconnect from the matrix
6 Activate/deactivate the edit mode
7 Save the active configuration on the matrix (online)
8 Download and show a predefined configuration saved on the matrix (online)
9 Upload a predefined configuration on the matrix (online)
10 Monitoring (online)
11 Flash update for single devices
12 Overview of devices in the subnet (online mode)
13 System check
14 Save status locally (online mode)

4.3.3 Management Software Mouse Control

The following mouse commands are selectable for menu functions:

Mouse command	Function
Left mouse button	Select menu, select function, open drop-down menus, enter input field, activate/deactivate option checkboxes, etc.
Double-click left mouse button	Open function specific selection menus
Right mouse button	Open context specific selection menus

4.3.4 Management Software Keyboard Control

The following keyboard commands are available for the navigation and configuration within the menus:

Keyboard command	Function
Left Arrow	Cursor to the left
Right Arrow	Cursor to the right
Up Arrow	Line up
Down Arrow	Line down
Page Up	In input or status menus with more than one page: previous page
Page Down	In input or status menus with more than one page: next page
Tab	In input menus: previous field
Left Shift + Tab	In input menus: next field
Spacebar	• Switch in selection fields between two conditions (check mark or not). • Open already marked fields with editing or selecting possibility.
Enter	• Select menu item • In menus: save data
Ctrl + Tab	• Leave tables • Jump from tables into the next field
Ctrl + Left Shift + Tab	• Leave tables • Jump from tables into the previous field

Several functions within the menus in the menu bar can be executed with the provided keyboard commands (e.g., press Ctrl + s to execute **Save**) that are listed to the right of the respective menu item.

4.3.5 Management Software Reload Options

The information about the current configuration of the matrix, shown in the management software, can be reloaded in different ways:

- Press F5 on the used keyboard.
- Click **Reload** in the toolbar.
- Click **Edit >Reload** in the drop-down menu of the menu bar.
- To activate the automatic reload option, tick the **Automatic Reload** checkbox in the right panel of the **View >Matrix** menu under **Options**.

4.3.6 Management Software Context Function

The management software offers several context functions that support user-friendly and effective operation. The context functions are described in the respective chapters.

Context function	Action	Results
Execute context function	Click with the right mouse button on a field.	A context menu opens and displays functions available for the corresponding filed (if existing).
	Click with the left mouse button on the desired function.	The desired function is executed.

4.3.7 Management Software Sort Function

Lists and tables in the management software offer a sorting function for fast and smooth search. An active filter is indicated by an arrow in the header.

Sort function	Action	Result
Ascending sort	Click with the left mouse button once on the header of the column to be sorted.	• The column is sorted in ascending order. • The sorting of status is indicated by an arrow pointing upwards.
Descending sort	Click with the left mouse button twice on the header of the column to be sorted.	• The column is sorted in descending order. • The sorting is displayed by an arrow that points downwards.
Cancel sort	Click with the left mouse button once or twice on the head of the sorted column.	The arrow displayed disappears.

4.3.8 Management Software Filter Function

Lists and tables in the management software offer a filter function that supports a fast and smooth search. The filter entry field is located above the header. An active filter is indicated by a green filter symbol in the filter entry field.

Filter function	Action	Results
Activate the filter	Click with the left mouse button in the filter entry field above the header. Write the word or part of a word to be filtered.	• The filter results are shown immediately. • The filter symbol is displayed in green.
Clear the filter	Delete the text in the filter entry field.	• The list or table shows the complete content. • The filter symbol is displayed in gray.

4.3.9 Management Software Report Function

The management software is equipped with a report function that shows the current switching status and all relevant parts of the matrix configuration in a PDF file.

The report function can be used in both online and offline mode of the management software.

To create a report, proceed as follows:

1. Select **File > Report...** in the menu bar.

   A selection dialog appears.
2. Select contents that should be included in the report (**Matrix View**, **EXT Units**, **CPU Devices**, **CON Devices** and **Users**).
3. Click **Next > >** to confirm the selection.

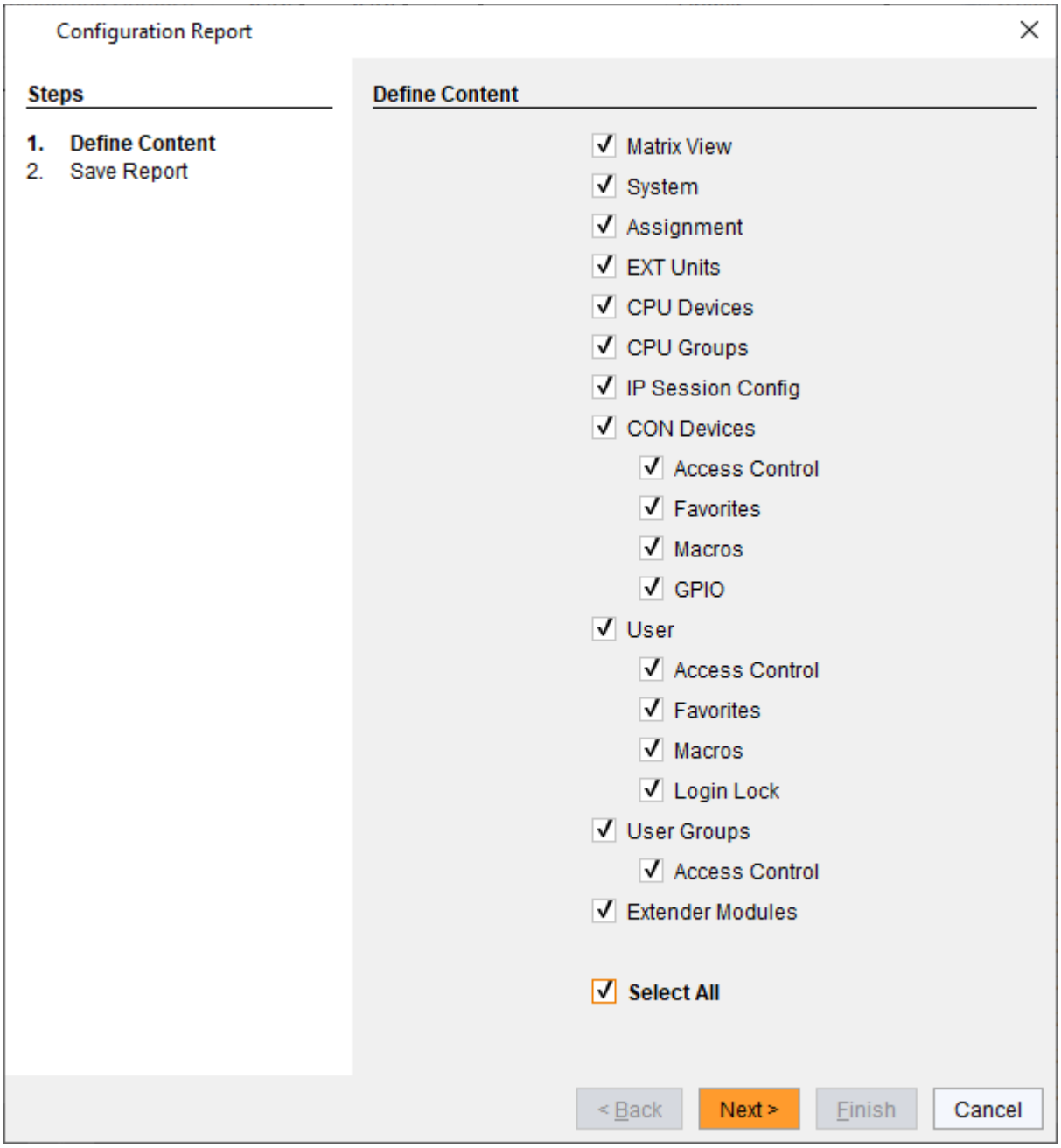


*Fig. 44 Management software **File - Report - Define Content***

4. Go to the preferred location for storage of the report.
5. Click **Finish** to confirm the report.

   The report will be created as a PDF file.

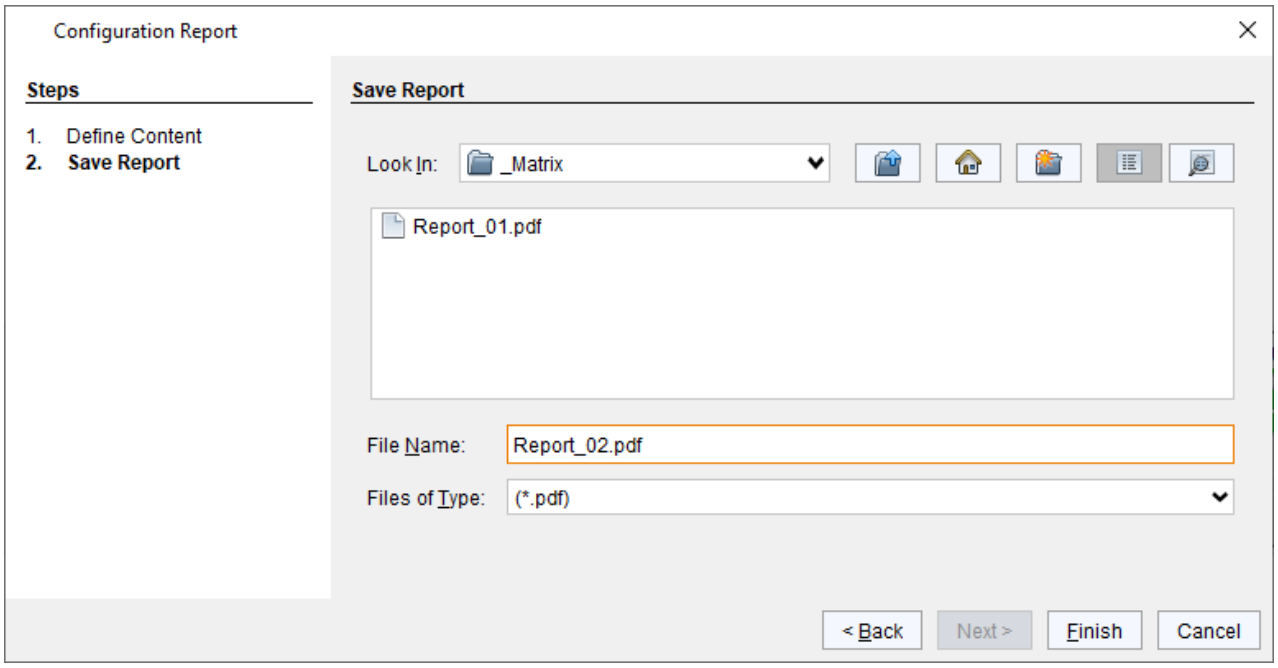


*Fig. 45 Management software **File - Report - Save Report***

4.4 Control via Serial Interface

The matrix operating system offers various functions for an operation via serial interface. There are telegrams for switching single or all connections available, both unidirectional and bidirectional. In addition, there are telegrams for an overall definition of the total switching status and for saving and loading such switching states.

The matrix optionally provides an echo of all affected switching operations via serial interface or network interface. This aids continuous tracking of a matrix configuration and enables your own applications to be updated.

As an additional application matrix clones can be parallelly switches as synchronized matrices (**Stacking**) via serial network interface.

5 Installation

NOTICE
Please verify that interconnect cables, interfaces, and handling of the devices comply with the requirements (see chapter 15, page 380). To achieve the best possible performance and results with the matrix system, we recommend using the supplied cables. If you need a replacement, please use the spare parts specified for this device, which can be requested from the manufacturer if required.

First-time users are recommended to set up the system in a test environment that is limited to a single room. This makes it easier to identify and solve any cabling problems, and experiment with your system more conveniently.

5.1 Preparing the Matrix for Rack Mounting

NOTICE
Due to the construction of a matrix with 48 ports into a 19" rack, it is recommended to use an additional subfloor below the matrix. It should be used in addition to the provided mounting brackets.

The supplied mounting brackets are required for mounting the KVM matrix switch.

1. For front rack mounting, remove the front and middle screws on both sides of the cover.
2. For rear rack mount, remove the rear and middle screws on both sides of the cover.
3. Mount the mounting bracket in the desired position using the screws on the cover/chassis.

5.2 Setting up the Matrix

5.2.1 Prerequisites for failure-free Installation of a Matrix Setup

To achieve a failure-free installation of a matrix system, we recommend to first establish a point-to-point connection between a CPU Unit and a CON Unit before connecting to the matrix as follows:

➡ Source - CPU Unit - Interconnection - CON Unit - console

➡ Ensure that this most simplistic setup works.

➡ Then continue as follows.

Establishing a Point-to-Point Connection of CON Unit and CPU Unit

1. Connect the monitor, keyboard, and mouse to the CON Unit.
2. Connect a source to the CPU Unit by using the provided connection cables.
3. Connect the CPU Unit to the CON Unit by using the interconnect cables (Cat X or fiber).
4. Connect the chassis of the CPU Unit and CON Unit to the power supply unit(s)/power socket(s).
5. Power up the system, following the recommended sequence:
   Monitor - CON Unit - CPU Unit - source
6. Boot the source and check if the video is visible and control the source can be controlled via keyboard and mouse.

5.2.2 Initial Commissioning of the Matrix

1. Connect the monitor, keyboard, and mouse to a functionally tested CON Unit.
2. Connect the CON Unit to an I/O port of the matrix by using interconnect cables (Cat X or fiber).
3. Connect the CON Unit to the power supply unit(s)/power socket(s).
4. Connect the matrix to the power sockets.
5. Establish the power supply voltage to the matrix and the CON Unit.
6. Wait until the boot process of the matrix is finished and the status LED flashes green.
7. Open the OSD via keyboard command 2x Left Shift, o.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing, and the OSD is opened with the **Switch** menu as a start page.
8. Press Esc to enter the main menu.

   The OSD can be operated via keyboard and mouse.
9. Select **Configuration** in the main menu.
10. Login with administrator rights (see chapter 6.1, page 70).
11. Configure initially as requested (see from chapter 6.2, from page 71).
12. Save the settings by selecting **Configuration > Save** (see chapter 6.10.1, page 142).
13. Restart the matrix by selecting **Configuration > Restart Matrix** (see chapter 9.2.1, page 308).

Optional: Establish a network connection between the matrix and the management software to set an extended configuration (from chapter 5.4, page 64).
The default IP address is 192.168.100.99 and DHCP is deactivated.

➡ After initial configuration of the matrix and after changing the configuration of the system or the Matrix Grid, we recommend to de-register the primary controller board and to boot the secondary controller board until the boot process is finished.

When installing several matrices at the same time, it is strongly recommended to install them in sequence and to assign unique IP addresses to avoid IP address conflicts.

5.3 Connecting the Matrix to the Sinks and the Sources

The CON Units/CPU Units can be hot plugged at the matrix.

NOTICE

Faults in redundant matrix systems or dysfunctional updates

The primary interconnect port is used for updates. With redundant extender modules, if only the secondary interconnect port is connected to the matrix, no update can be performed.

To get a correct mapping of redundant links in fully redundant matrix systems and to perform effective and complete updates, we recommend:

➡ Connect all extender modules with interconnect port 1 to one matrix and with interconnect port 2 to the other matrix.

➡ Activate the **Primary Preferred** function (see chapter 6.3.1, page 72).

Please do not connect all extender modules at once to the matrix. It is recommended to connect them one by one and then rename them directly.

Preconditions

- The matrix is initially commissioned.
- A Point-to-Point connection of each CON Unit and CPU Unit has been established.

5.3.1 Connecting a Sink (Console) to the Matrix

1. Connect the monitor(s), keyboard, and mouse to the CON Unit.
2. Connect the CON Unit to an I/O port of the matrix by using interconnect cables (Cat X or fiber).
3. Connect the CON Unit to the power supply unit(s)/power socket(s).
4. Establish the power supply voltage to the CON Unit.
5. Check the basic function of the CON Unit by opening the OSD via keyboard command Hot Key, o.

It is recommended to rename the automatically created EXT Unit directly (see chapter 6.5.1.2, page 101 or see chapter 7.6.2, page 199).

5.3.2 Connecting a Source to the Matrix

1. Connect a source to the CPU Unit by using the provided connection cables.
2. Connect the CPU Unit to an I/O port of the matrix using interconnect cables (Cat X or fiber).
3. Connect the CPU Unit to the power supply unit(s)/power socket(s).
4. Establish the power supply voltage to the CPU Unit.

It is recommended to rename the automatically created EXT Unit directly (see chapter 6.5.1.2, page 101 or see chapter 7.6.2, page 199).

5.4 Connecting the Management Software with the Matrix

NOTICE
Connection to the matrix blocked Synchronization directories or offline directories require special attention regarding the firewall settings, e.g., Windows: roaming directories. If blocked by the firewall, no connection to the matrix can be established. ➥ Save the management software in a locally available directory.

5.4.1 Installing the Management Software

The management software is available as a single executable program file that does not require an installation.

Requirements

If you want to use the management software on Windows operating systems with integrated Java Runtime, the following requirements must be fulfilled:

Computer/Software/Network		Requirements/Recommendations
Free memory	RAM	Recommended: 1 GB
Operating system	Microsoft	Windows 8, Windows 8.1, Windows 10, Windows 11
Management software with integrated Java Runtime	Tera Tool	Downloaded from https://www.ihse.com/software
Network connection	-	Available between computer and matrix.

If you want to use the management software without integrated Java Runtime, the following requirements must be fulfilled:

Computer/Software/Network		Requirements/Recommendations
Free memory	RAM	Recommended: 1 GB
Operating system	Microsoft	Windows 8, Windows 8.1, Windows 10, Windows 11
	macOS	macOS 10.14 (Mojave) or higher, Intel platform
Specification	Java	Installed: Oracle Java Runtime Environment (JRE) 1.8.x or higher Strongly recommended: Oracle Java 1.8 update 152, or higher. (https://adoptopenjdk.net, https://github.com/ojdkbuild/ojdkbuild
Management software	Tera Tool	Downloaded from https://www.ihse.com/software
Network connection	-	Available between computer and matrix

Contact your system administrator concerning JRE and network connection.

5.4.2 Setting up Network and Firewall Releases

Releasing Network Ports

The following ports are used by the matrix depending on the configuration and have to be released at the security gateway if necessary. The ports will only have to be released if you want to use the respective function.

Function	Port
FTP	21/TCP
DNS	53
SNTP	123/UDP
SNMP	161/162, both UDP
LDAP	389 (636 for SSL)
Syslog	514/UDP
API	5555/TCP (5565 for SSL)
Broadcast	5556/UDP (5566 for SSL)
Matrix Grid	5557/TCP (5567 for SSL)

Releasing Java Application in the Firewall

If using the management software, the Java application (file javaw.exe) has to be released in the firewall settings to use the management software. Contact your administrator to configure the firewall settings accordingly.

Using the management software with integrated Java Runtime, a request of the operating system could appear, e.g., if opening the Device Finder.

5.4.3 Connecting the Matrix to the Computer

NOTICE

For a connection between computer and matrix via switch or hub, parallelly assembled network cables are required.

➡ Only use a network connection between computer and the matrix that is not primarily used for streaming audio or video data.

➡ Connect the network cable to the RJ45 ports of the computer and the controller board of the matrix.

5.4.4 Starting the Management Software

➡ Run the management software by a double-click on the program icon on the desktop or the file in the directory.

The management software starts in offline mode.

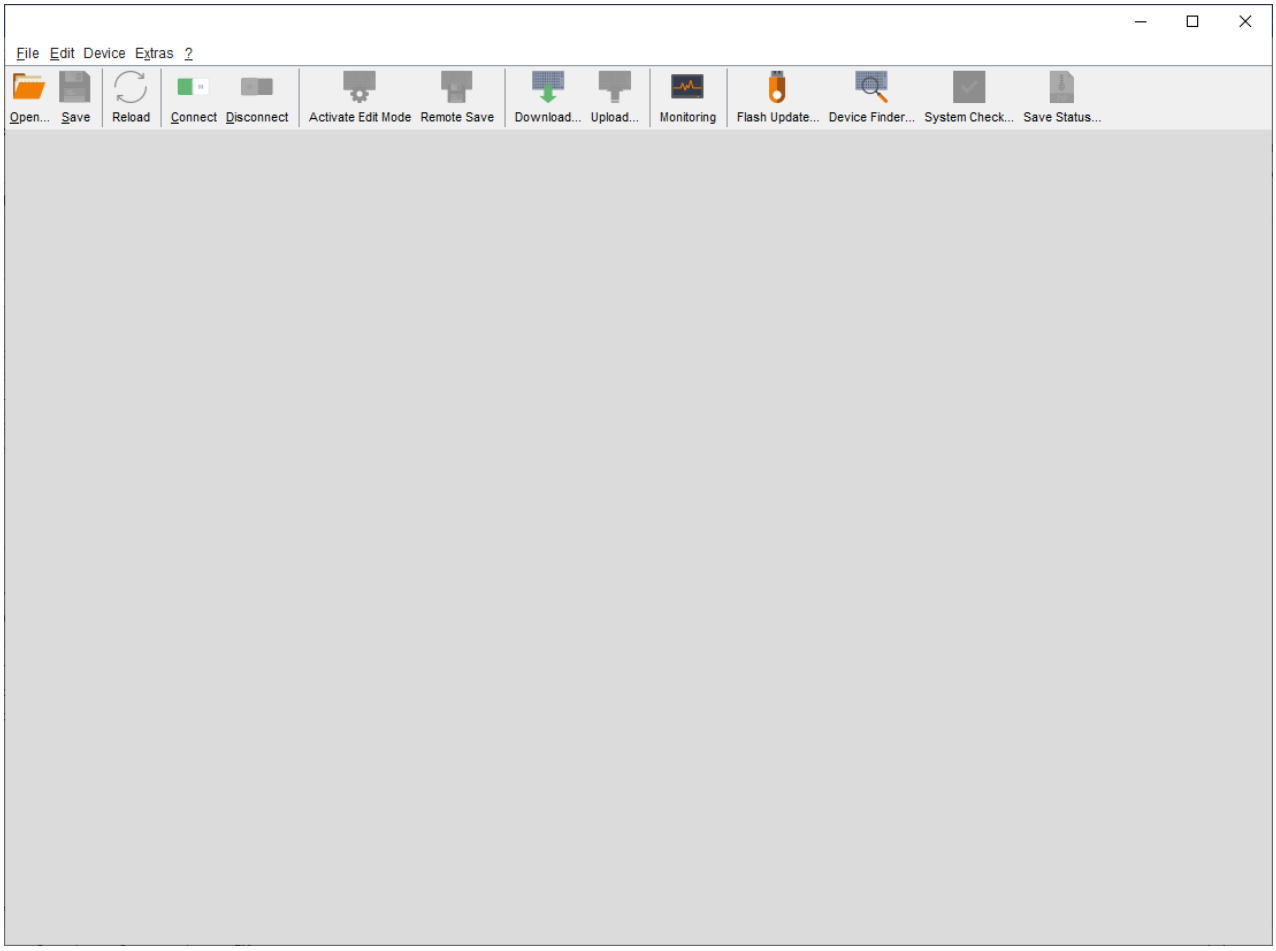


*Fig. 46 Management software **Landing page in offline mode***

There are two options to connect to a matrix.

- Via a known IP address
- Via Device Finder

5.4.5 Connecting to the Matrix with known IP Address

At least power user rights are required, and the API function have to be enabled.

Up to 16 connections between the matrix and the management software can be established at the same time due to a limitation of available sockets.

To connect to a matrix when the IP address is known, proceed as follows:

1. Run the management software.
2. Click **Connect** in the tool bar.
   A login dialog appears.
3. Enter the IP address according to the network configuration of the matrix (see chapter 7.4.8, page 166).
   By default, the IP address of the matrix is 192.168.100.99 and DHCP is deactivated.
4. Enter the username and password of the administrator (see chapter 7.5, page 182).
   By default, the username is admin, and the password of the administrator is admin.
5. Click **Login** to confirm your entries.

*Fig. 47 Management software dialog **Connect***

The data must be entered each time the network connection is re-established.
Alternately, the data can be entered and stored in the management software under **Extras > Options** (see chapter 7.3.1, page 147).

5.4.6 Connecting to the Matrix via Device Finder

At least power user rights are required, and the API function have to be enabled.

Up to 16 connections between the matrix and the management software can be established at the same time due to a limitation of available sockets.

The **Device Finder** offers the possibility to find all matrices that are in the same subnet. This is useful, e.g., if the IP address of a specific matrix is unknown and should be accessed via IP.

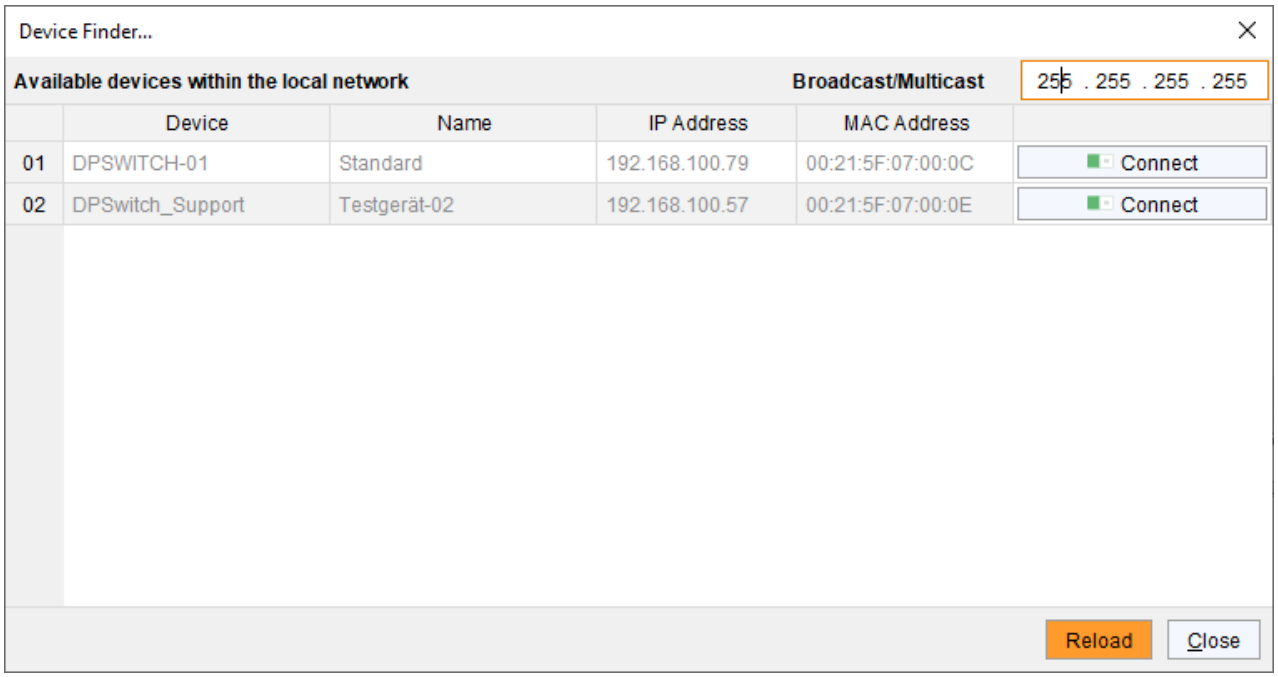


*Fig. 48 Management software menu **Device Finder***

The following device information is shown in the Device Finder:

Information	Description
Broadcast/Multicast	Search parameters for finding devices. Search via broadcast: 255.255.255.255 (default). Input for search within a multicast group: multicast address (chapter 7.4.8, page 166)
Device	Name of the device
Name	Name of the active configuration
IP Address	Current IP address of the device
MAC Address	MAC address of the device
Type	Type of the device

The last column of the **Device Finder** can be used to connect to the respective matrix directly clicking **Connect**.

To find and connect a device, proceed as follows:

1. Click **Device Finder** in the tool bar.
2. For searching within a multicast group, enter the multicast address. By default, the search is set via broadcast: 255.255.255.255.
3. Click **Connect** in the last column of the Device Finder to establish direct connection to the respective device within the same subnet.
4. Enter the username and password of the administrator (see chapter 7.5, page 182).

   By default, the username is admin, and the password of the administrator is admin.
5. Click **Login** to confirm your entries.

6 Configuration via OSD

NOTICE

Possible loss of configuration changes

By clicking **Okay**, changes are applied to the active configuration and saved in the volatile memory of the matrix. In the event of a sudden power failure, these changes are lost. To save changes permanently:

➡ save the configuration changes into the active configuration (**Save**, see chapter 6.10.1, page 142), save a predefined configuration (**Save as…**, from chapter 6.10.2, page 143), or perform a restart (**Restart Matrix** see chapter 9.2.1, page 308).

NOTICE

A change in system-relevant parameters (e.g., change of the IP address) is immediately displayed in the OSD. To initialize system-relevant configuration changes on the matrix, the matrix must be restarted. The restart of the matrix may take several minutes, and the matrix is not available during the restart.

➡ After changing the configuration of the system, we recommend to de-register the primary controller board and to boot the secondary controller board until the boot process is finished.

6.1 Password Request

All configuration or assignment settings can only be configured with administrator rights. The following login data is saved in the factory settings:

Field	Entry
User	admin
Password	admin

To access the configuration menu, proceed as follows:

1. Press F10 in the main menu of the OSD.

   The login mask appears.

2. Enter the login data of the administrator.

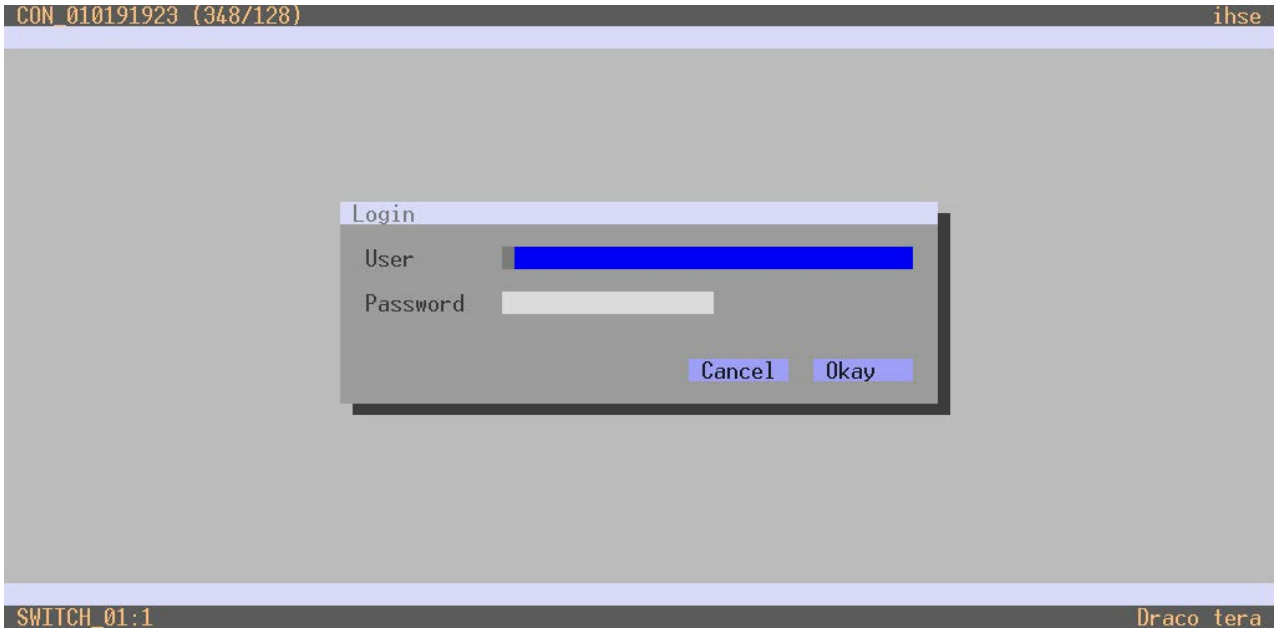


*Fig. 49 OSD Menu **Configuration - Login***

NOTICE
For security reasons, please change the administrator password as soon as possible (see chapter 6.4.1, page 92).

To log out a user, press F10 again.
When leaving the configuration or assignment menu, the administrator is logged out automatically.

6.2 Overview Configuration Menu

Various system functions and options are available in the configuration menu. In addition, the following functions can be called up here: save (as active or predefined configuration) and shut down, restart, or reset to factory settings.

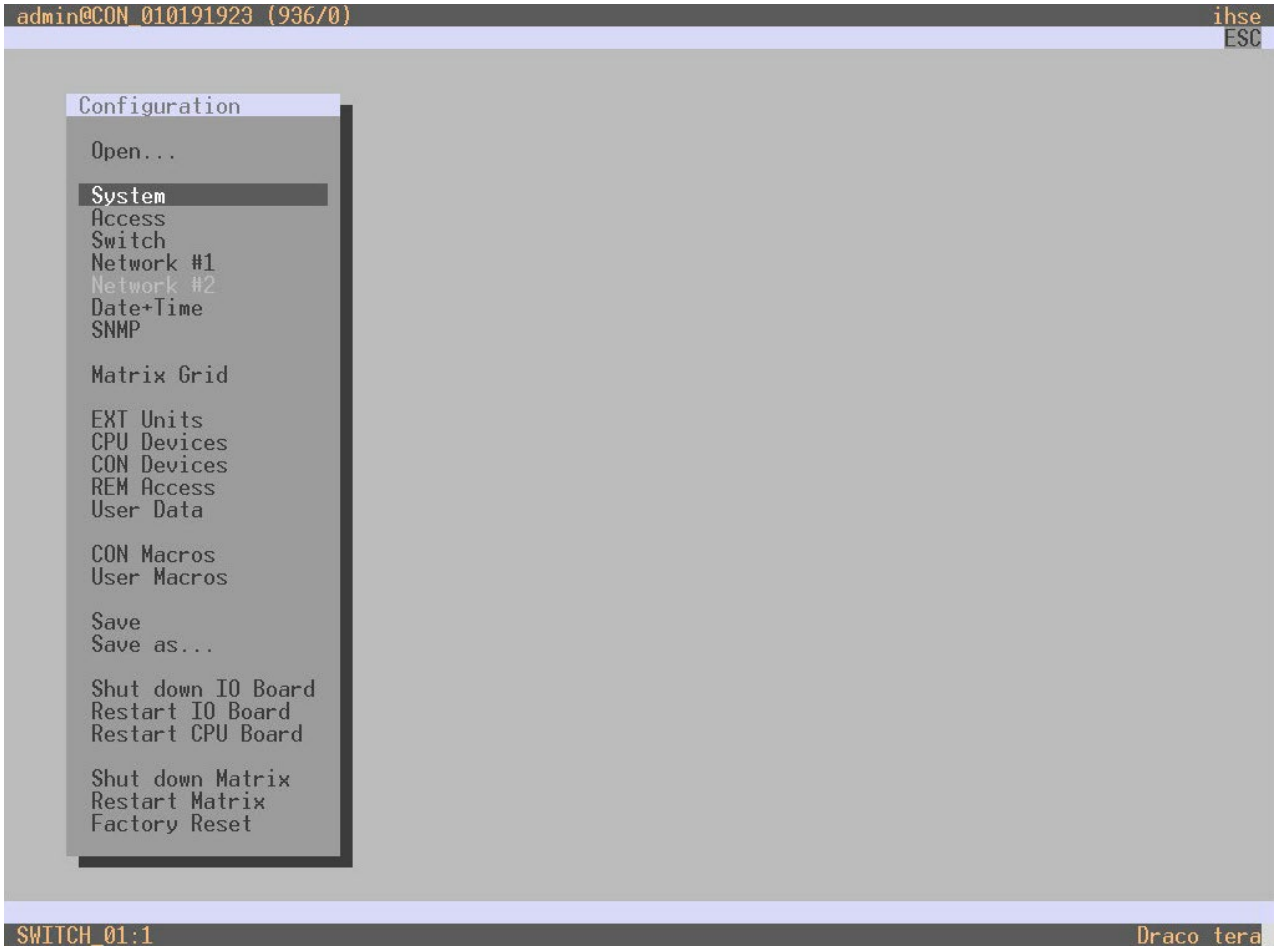


*Fig. 50 OSD Menu **Configuration***

6.3 Configuring System Settings

6.3.1 Setting System Configuration

The parameters for the system configuration are set in this menu:

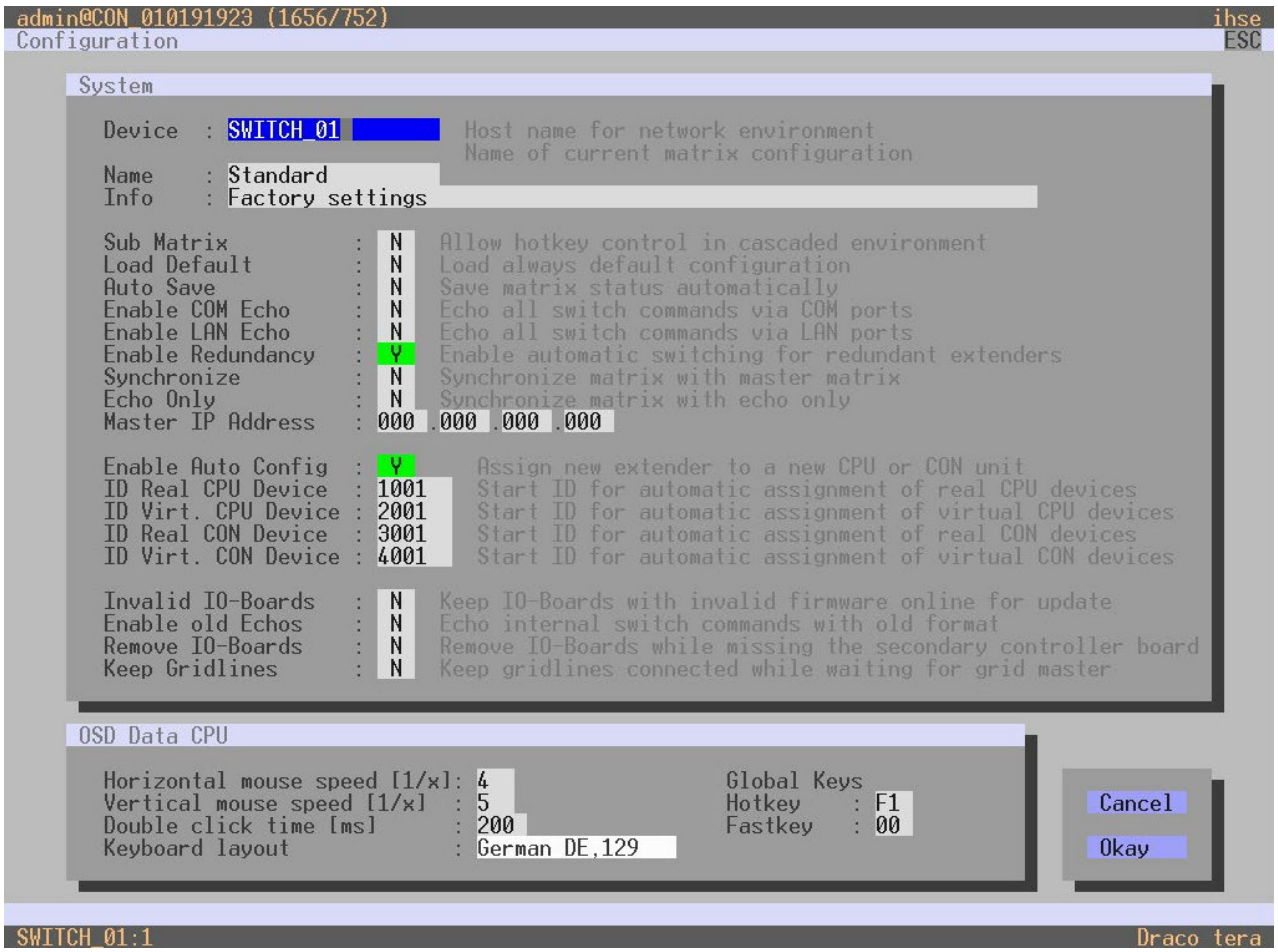


*Fig. 51 OSD Menu **Configuration - System***

The following parameters can be configured:

System

Field	Entry	Description
Device	Text	Enter the device name of the matrix (default: SWITCH_01).
Name	Text	Enter the name of the configuration that is used to save the current settings (default: Standard).
Info	Text	Enter additional text to describe the configuration if required (default: Factory settings).
Sub Matrix	Y	If the matrix is defined as a sub matrix in the OSD, the user will lose control. Control can be recovered by using the keyboard command Hot Key, s, o. The OSD for the matrix that has been defined as sub matrix will be reopened.
	N	Function not active (default).
Load Default	Y	Start the matrix after a restart or a switch-on with the default configuration.
	N	Start the matrix after a restart or a switch-on with the last saved configuration (default).

Field	Entry	Description
Auto Save	Y	Save the current configuration of the matrix in the flash memory periodically. **Note:** During the save operation, the matrix will not react to commands. Saving takes place every 600 seconds if changes of the configuration or switching operations have been executed in the meantime.
	N	Function not active (default).
Enable COM Echo	Y	Send all switching commands performed in the matrix as an echo via serial interface. **Note:** This function should be enabled when using a media controller via serial interface.
	N	Function not active (default).
Enable LAN Echo	Y	Send all switching commands performed in the matrix as an echo via LAN connection. **Note:** This function should be enabled when using a media controller via LAN connection or when using stacking with two or more matrices.
	N	Function not active (default).
Enable Redundancy	Y	Automatically switch to the second link of a connected redundant CON Unit when losing the primary link of a CPU Unit (default). **Note**: This function will have to be activated: • for a single matrix when using redundant link connections, • for both matrices in a fully redundant setup.
	N	Function not active.
Synchronize	Y	Synchronize the sub matrix to the switch status of the master matrix.
	N	Function not active (default).
Echo Only	Y	Synchronize the matrix according to the echo of a second matrix. **Note:** This is a bidirectional synchronization where both matrices have to be configured as **Synchronize** with the **Master IP** of the respective other matrix.
	N	Function not active (default).
Master IP Address	Byte	Set the network address of the master matrix (default: 000.000.000.000).
Invalid IO-Boards	Y	Keep I/O boards with incorrect or invalid firmware online in the matrix.. **Note**: To keep an I/O board with wrong or damaged firmware online in the matrix, the maintenance mode of the matrix will be activated.
	N	Shut down I/O boards with incorrect or invalid firmware automatically (default).
Enable old Echos	Y	Translate current switching command (implemented since V02.09) internally into the old, already known switching commands and send them as echo.
	N	Function not active (default).

Field	Entry	Description
Remove IO-Boards	Y	**Note:** Only for Draco tera enterprise 576: Shut down I/O boards if the second controller board is not available. Connection will be disconnected.

OSD Data CPU

Field	Entry	Description
Horizontal Mouse Speed [1/x]	1 to 9	Adjust the horizontal mouse speed with 1 = fast, 9 = slow (default: 4).
Vertical Mouse Speed [1/x]	1 to 9	Adjust the vertical mouse speed with 1 = fast, 9 = slow (default: 5).
Double-click Time [ms]	100 to 800	Adjust the time slot for a double-click (default: 200).
Keyboard Layout	Region	Set the OSD keyboard layout according to the keyboard used (default: German (DE)).
Hot Key	Keyboard command	Start the command mode via keyboard sequence.
Fast Key	Keyboard command	Open the OSD directly (default: 00). How often the shortcut key has to be pressed depends on the specified key: 1x for function keys or print key, 2x for all other keys.

Settings for Global Hot Key and Fast Key

Field	Entry	Description
Hot Key/Fast Key	00	No global Hot Key/Fast Key defined, no modification of the extender module.
	01 to FE	Overwrite the Hot Key/Fast Key of the extender module with the entered value of the global Hot Key/Fast Key.
	FF	Deactivate the Hot Key/Fast Key of the extender module.

Valid values for the Hot Key and the Fast Key are USB-HID keyboard scan codes according to US keyboard layout.

To set modifier keys for the Hot Key and the Fast Key use the following values:

Entry	Modifier Key
F0	Left Ctrl
F1	Left Shift
F2	Left Alt
F4	Right Ctrl
F5	Right Shift
F6	Right Alt

Hot Key or Fast Key set in the CON EXT Units have priority over the global settings.

To set the parameters for the system configuration, proceed as follows:

1. Select **Configuration > System** in the main menu.
2. Change the desired settings.
3. Click **Okay** to confirm your entries.

6.3.2 Enabling Automatic Creation of Real CPU and CON Devices

The assignment of EXT Units to real CON or CPU Devices can be made manually or automatically when connecting a new extender module to the matrix.

The settings for automatic creation of CPU and CON Devices and the initial values for the ID numbers of real or virtual CON or CPU Devices are set in this menu.

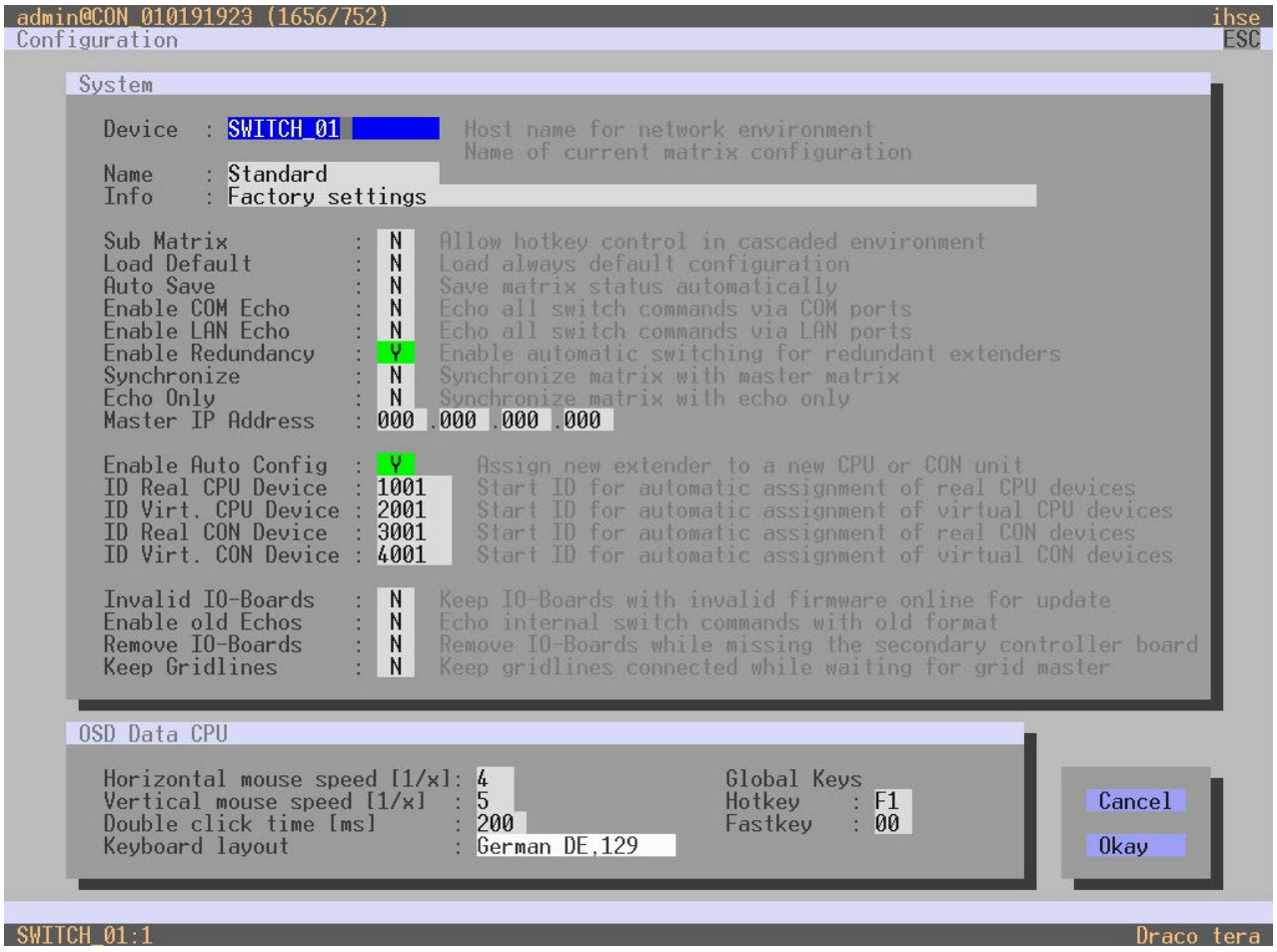


*Fig. 52 OSD Menu **Configuration - System - Automatic ID***

The following parameters can be configured:

Field	Entry	Description
Enable Auto Config	Y	Enable the automatic creation of a new CPU or CON Device if new extender modules are connected (default). The new CON or CPU Device is assigned to the automatically created EXT Unit of the extender module.
	N	Function not active.
ID Real CPU Device	Numerical	Enter the initial value for automatic assignment of real CPU Devices (default: 1001).
ID Virtual CPU Device	Numerical	Enter the initial value for created virtual CPU Devices (default: 2001).
ID Real CON Device	Numerical	Enter the initial value for automatic assignment of real CON Devices (default: 3001).
ID Virtual CON Device	Numerical	Enter the initial value for created virtual CON Devices (default: 4001).

To set up the automatic creation of CPU Devices or CON Devices, proceed as follows:

1. Click **Configuration > System** in the main menu.
2. Change the desired settings.
3. Click **Okay** to confirm your entries.

6.3.3 Setting Access Configuration

The access configuration is set in this menu.

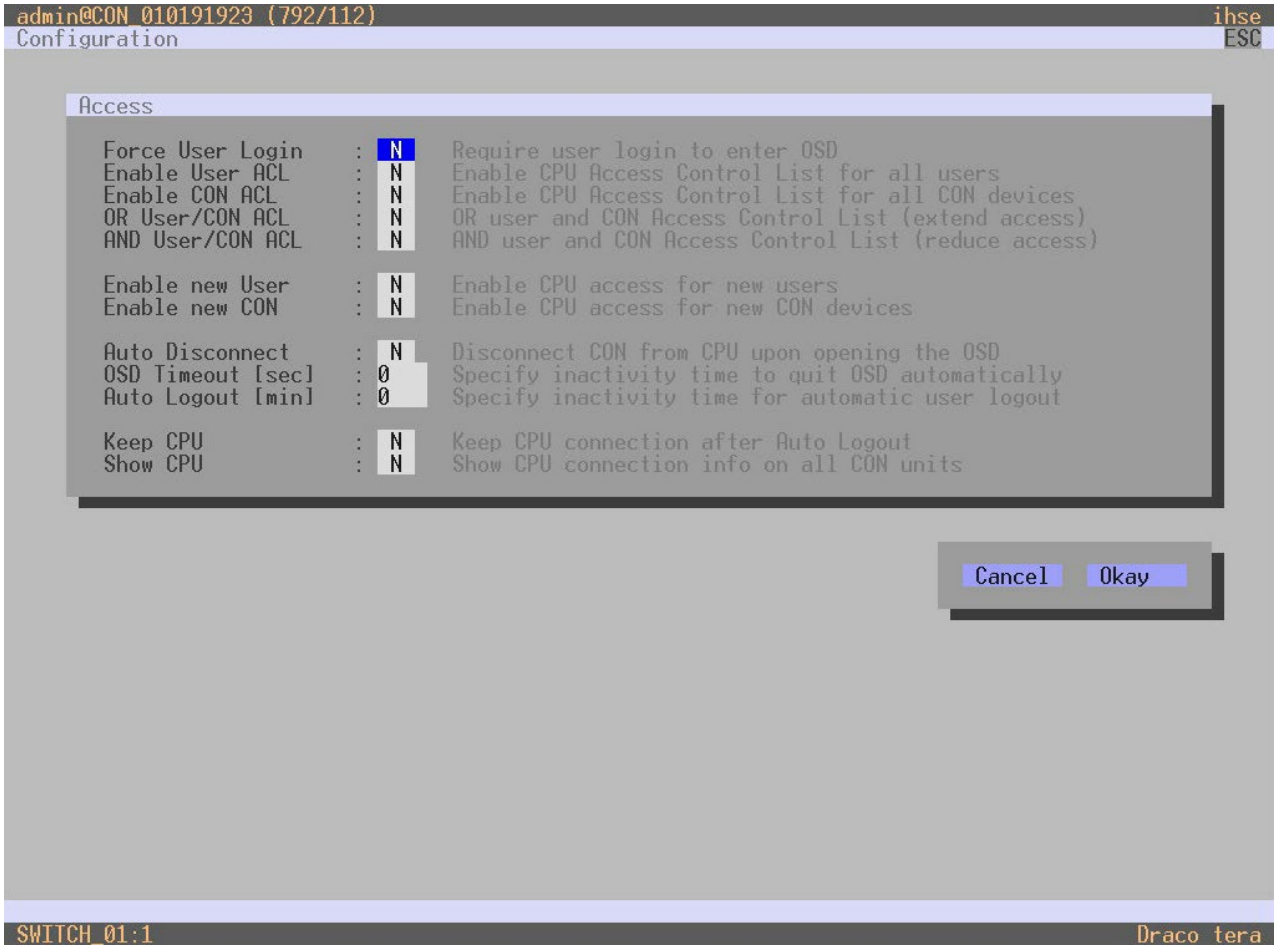


*Fig. 53 OSD Menu **Configuration - Access***

The following parameters can be configured:

Field	Entry	Description
Force User Login	Y	The user has to login with a username and a password once to enter OSD. Thereafter the user remains logged in until he explicitly logs out or an auto logout is affected. **Note:** When the **Force User Login** function is activated and a user is logged in, only the user favorites are available. The CON favorites are not accessible.
	N	Function not active (default).
Enable User ACL	Y	CPU Device access is restricted according to the permissions in the ACL (Access Control List). • User login is required. • Switching by keyboard Hot Keys requires a prior login.
	N	Function not active (default).
Enable CON ACL	Y	CPU Device access is restricted according to the permissions in the respective CON Device ACL (Access Control List). No login required.
	N	Function not active (default).

Field	Entry	Description
OR User/CON ACL	Y	The user obtains the sum of access rights from the CON Device and his personal access rights after logging in (extended access).
	N	Function not active (default).
AND User/CON ACL	Y	The user obtains the common divisor of access rights from the CON Device and his personal access rights after logging in (reduced access).
	N	Function not active (default).
Enable new User	Y	Newly created users automatically receive access to all CPU Devices.
	N	Function not active (default).
Enable new CON	Y	Newly created CON Devices automatically receive access to all CPU Devices.
	N	Function not active (default).
Auto Disconnect	Y	Upon opening the OSD, the CON Device will be automatically disconnected from the current CPU Device.
	N	Function not active (default).
OSD Timeout [sec]	0 to 999 seconds	Period of inactivity after which OSD will be closed automatically. Select 0 seconds for no timeout (default: 0 seconds).
Auto Logout [min]	0 to 999 minutes	Period of inactivity of a logged-in user at a CON Device after which he will be automatically logged out. In addition to the logout process, a complete disconnection from the connected CPU Device occurs under **Full Access** and **Private Mode**. • Select **0** minutes for an automatic user logout when leaving OSD. • Using the setting **-1** allows the user to be logged in permanently, until a manual logout is executed. • The timer is not active as long as the OSD is open (default: 0 minutes).
Keep CPU	Y	Keep the connection to the CPU Device active in the background after Auto Logout. After a new login there is no need to re-connect to the CPU Device.
	N	Function not active (default).
Show CPU	Y	Permanently show the name of the currently connected CPU Device in the **Connection Info** box.
	N	Function not active (default).

To set the access configuration, proceed as follows:

1. Select **Configuration > Access** in the main menu.
2. Change the desired settings.
3. Click **Okay** to confirm your entries.

6.3.4 Setting Switch Configuration

This menu enables shared operation of a CPU Device by two or more CON Devices. A CPU Device can be controlled by only one CON Device at a time but can be taken over successively by other CON Devices. Control of a CPU Unit by a CON Unit is relinquished after the expiration of an inactivity timer associated with the controlling CON Device. The mouse or keyboard may also be used to take over control.

To allow a smooth and accurate function of the shared operation, use identical mice and keyboards. They should be connected to the same USB-HID ports of each CON Unit.

The alternative is using the USB-HID Ghosting (see chapter 8.3.2.2, page 296).

When taking over control within 10 s, any assigned USB 2.0 extender modules if available, will not be switched due to security and stability aspects.

The shared operation will be deactivated between CON Devices with a different priority as well as the Release Time.

The switching parameters are set in this menu.

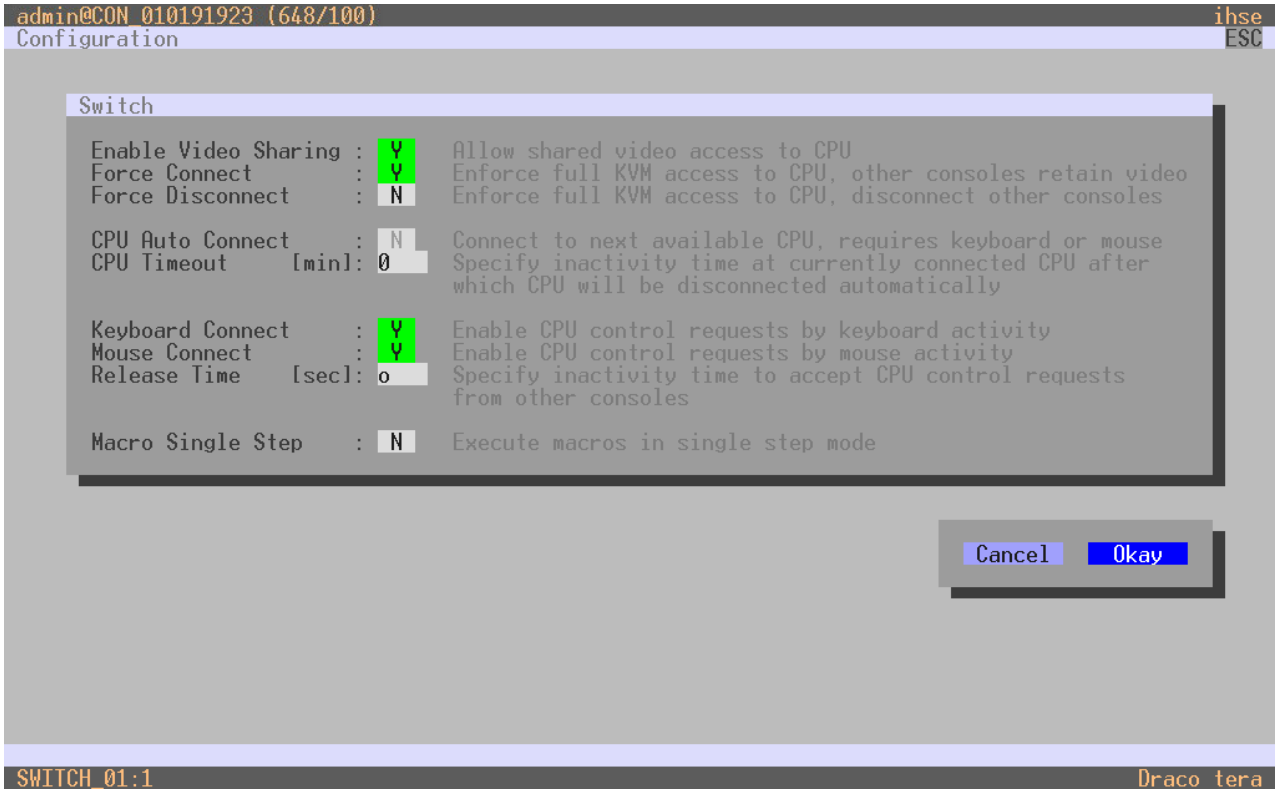


*Fig. 54 OSD Menu **Configuration - Switch***

The following parameters can be configured:

Field	Entry	Description
Enable Video Sharing	Y	The user can switch to any CPU Device as an observer, including ones that are already assigned to another user (observer without keyboard/mouse access). **Note:** The switching has to be performed by pressing Space, not Enter. The operator only will be informed if further users connect as an observer to the CPU Device that is connected to his CON Device, if the option **Update Connection Info** is activated for his CON EXT Unit (see chapter 6.7.2, page 117).
	N	Function not active (default).

Field	Entry	Description
Force Connect	Y	The user can connect to every single CPU Device as an operator, including those that are related to another user. **Note:** The previous user is set to Video Only status. To share K/M control, **Force Connect** has to be activated.
	N	Function not active (default).
Force Disconnect	Y	Extension of **Force Connect**: If the user connects as an operator to a CPU Device already related to another user, the previous user will be disconnected. **Note:** To share K/M control **Force Disconnect** has to be deactivated and **Enable Video Sharing** has to be activated.
	N	Function not active (default).
CPU Auto Connect	Y	If a CON Device is not connected to a CPU Device, you can establish an automatic connection to the next available CPU Device by typing any key or clicking a mouse button.
	N	Function not active (default).
CPU Timeout [min]	0 to 999 minutes	Period of inactivity after which a CON Device will be automatically disconnected from its current CPU Device (default: 0 minutes).
Keyboard Connect	Y	Activate request of K/M control by keyboard event (key will be lost).
	N	Function not active (default).
Mouse Connect	Y	Activate request of K/M control by mouse event.
	N	Function not active (default).
Release Time [sec]	0 to 999 seconds	Period of inactivity of a connected CON Device after which K/M control can be requested by other CON Devices connected to the CPU Device. **Note:** Set **0** for an immediate transfer in real-time. Only one CON Device can have keyboard and mouse control at a time. The other CON Devices that are connected to the same CPU Device have a Video Only status (default: 10 seconds).
Macro Single Step	Y	Execute macro commands sequentially.
	N	Function not active (default).

To configure shared operation, proceed as follows:

1. Select **Configuration > Switch** in the main menu.
2. Activate the **Enable Video Sharing** function.
3. Activate the **Force Connect** function.
4. Activate the **Keyboard Connect** function if taking over control by a keyboard event should be possible.
5. Activate the **Mouse Connect** function if taking over control by a mouse movement should be possible.
6. Define a **Release Time** of inactivity (0 to 999 seconds) after which KVM control can be taken over.
7. Click **Okay** to confirm your settings.

Keyboard Connect and/or **Mouse Connect** are only effective if **Force Connect** and/or **CPU Auto Connect** are activated.
If the **Keyboard Connect** and/or **Mouse Connect** options are enabled, the **Keyboard Connect** and/or **Mouse Connect** will not take effect until the time interval entered in the **Release Time** has elapsed.

6.3.5 Setting Network Configuration

NOTICE

To initialize system-relevant configuration changes, the matrix must be restarted. Restarting the matrix may take several minutes, and the matrix is not available during the restart.

NOTICE

Consult your system administrator before changing the network parameters. Otherwise, unexpected results and failures can occur in combination with the network.

NOTICE

If the syslog function is activated, the logging will be started after restarting the matrix or controller card.

The parameters for the network configuration are set in this menu.

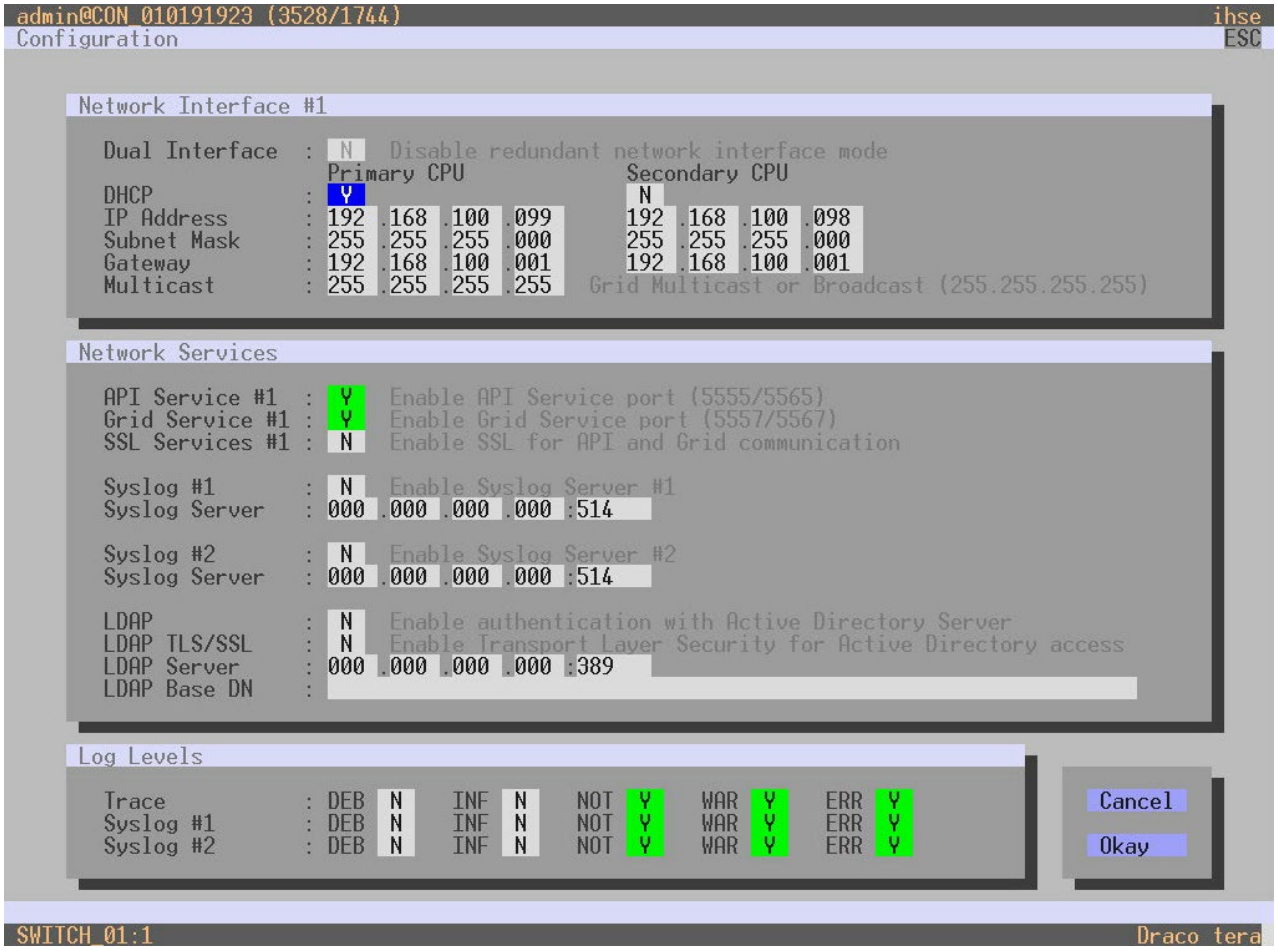


*Fig. 55 OSD Menu **Configuration - Network***

The following parameters can be configured:

Network Interface #1

Field	Entry	Description
Dual Interface	Y	Redundant network connection is deactivated.
	N	Redundant network connection is activated (default).
DHCP	Y	The network settings are automatically supplied by a DHCP server. **Note:** If DHCP is activated and there is no physical network connection available, the boot times might increase.
	N	Function not active (default).
IP Address	Byte	Enter the IP address if DHCP is not active (default: 192.168.100.99).
Subnet Mask	Byte	Enter the subnet mask in the form "255.255.255.0" if DHCP is not active (default: 255.255.255.0).
Gateway	Byte	Enter the gateway address in the form "192.168.1.1" if DHCP is not active.
MAC Address	Byte	Unchangeable, is retrieved automatically.
Multicast	Byte	Enter the Multicast address if there is a Matrix Grid in use within a Multicast group (default: 255.255.255.255).

Network Services

Field	Entry	Description
API Service #1	Y	Activate the LAN interface at the matrix for access via management software (default, API service port 5555/5565).
	N	Function not active.
Grid Service #1	Y	Activate Grid interface at the matrix for access via management software (Grid Service Port 5557/5567).
	N	Function not active (default).
SSL Services #1	Y	Activate SSL encryption for API, management software (API), management software API, management software and Matrix Grid communication.
	N	Function not active (default).
Syslog #1/#2	Y	Syslog server for status request is active.
	N	Function not active (default).
Syslog Server #1/#2	Byte	Input of the IP address of the Syslog servers in the form “192.168.1.1” and of the Syslog port (default: 514).

The LDAP settings are explained in the chapter 6.3.6, page 85.

Log Levels

Field	Entry	Description
Trace	DEB	Activate debug messages in trace (default: N). **Note:** The debug messages are exclusively for matrix diagnostics. They only should be activated after consultation with the manufacturer. Otherwise, an increased traffic of data might limit the performance of the controller board.
	INF	Activate information messages in trace (default: N).
	NOT	Activate notification messages in trace (default: Y).
	WAR	Activate warning messages in trace (default: Y).
	ERR	Activate error messages in trace (default: Y).
Syslog #1/#2	DEB	Activate debug messages in Syslog (default: N). **Note:** The debug messages are exclusively for matrix diagnostics. They only should be activated after consultation with the manufacturer. Otherwise, an increased traffic of data might limit the performance of the controller board.
	INF	Activate information messages in Syslog (default: N).
	NOT	Activate notification messages in Syslog (default: Y).
	WAR	Activate warning messages in Syslog (default: Y).
	ERR	Activate error messages in Syslog (default: Y).

To set parameters for the network configuration, proceed as follows:

1. Select **Configuration > Network** in the task area.
2. Change the desired settings.
3. Click **Okay** to confirm your entries.

6.3.6 Setting LDAP Configuration (Active Directory)

NOTICE
To initialize the LDAP configuration changes, the matrix must be restarted. Restarting the matrix may take several minutes, and the matrix is not available during the restart.

The KVM matrix can be synchronized with the directory service Active Directory with regard to user authentication. This allows the user to login at the KVM matrix using login information from the Active Directory service and to contact the Active Directory Server for each authentication that does in fact the proper authentication.
The connection between KVM matrix and the Active Directory server is established via OpenLDAP and periodically synchronized every 5 minutes.
The search of users to be synchronized and automatically added to the KVM matrix configuration can either be based on a **group** or **organizational unit (OU)**. In both cases a user requires to be at least assigned to one group:

- In case of the group, all users belonging to a previously defined group on the active directory server are added to the KVM matrix and synchronized. In this alternative, the organizational structure of the organizational units (OUs) is added as matrix user group to the KVM matrix configuration. This means that the organizational unit (OU) that includes the user can be found as a matrix user group in the KVM matrix configuration after the synchronization. A user can be member of up to 8 groups.
- In case of the organizational unit, all users belonging to groups that are located directly under this organizational unit are added and synchronized. The groups can also include subgroups. The structure of the groups is added to the KVM matrix configuration as user group. Each group will be represented in the KVM matrix as a user group after the synchronization. Groups that are located in sub organizational units will be ignored.

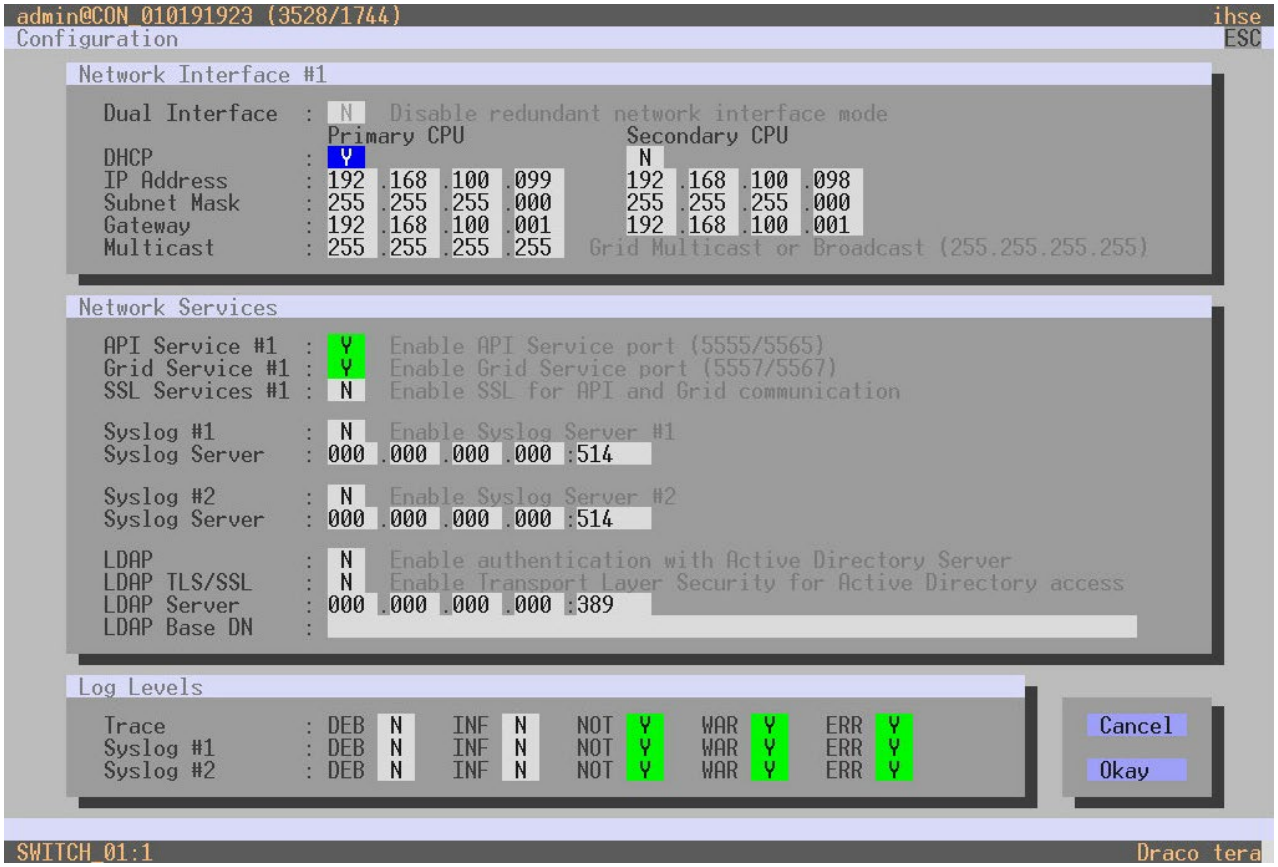


*Fig. 56 OSD Menu **Configuration - Network***

The following parameters can be configured:

Field	Entry	Description
LDAP	Y	LDAP for the request of information from a user administration is active.
	N	Function not active (default).
LDAP TLS/SSL	Y	Enable a secured transmission (transport layer security) for the Active Directory access.
	N	Function not active (default).
LDAP Server	Byte	Input of the IP address for the LDAP-Servers in the form "192.168.1.1" and the LDAP port (Default: 389/636).
LDAP Base DN	Text	Input of the LDAP Base DN according to the existing structure of the user directory.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: no restart of the matrix is required.

To configure and enable the synchronization to the Active Directory server, there are three steps required:

- Configuring the LDAP settings.
- Creating an LDAP User (see page 94).
- Creating an LDAP Group (see page 99).

To configure the LDAP settings, proceed as follows:

1. Select **System Settings > Network** in the task area.
2. Set the **LDAP** option to **Y** (Yes) within **Network Services**.
3. Optionally set the **LDAP TLS/SSL** option to **Y** (Yes) within **Network Services**.
4. Enter the appropriate IP address and the port number in the field **LDAP Server** (default port number: 389 (636 for SSL)).
5. Enter the **LDAP Base DN** into the appropriate field (e.g., dc=example, dc=com).
6. Click **Okay** to confirm the settings.
7. Restart the matrix.

Changes done in step 2 to 7 only come into effect after a restart of the matrix.

8. Create an LDAP User (see page 94).
9. Create an LDAP Group (see page 99).

6.3.7 Setting SNMP Function

The SNMP function allows all function-critical and safety-critical elements of the matrix to be monitored and queried. This function complies with the RFC 1157 conformal standard. Two SNMP servers can be used at the same time.

Enabling the SNMP function, the unencrypted SNMP monitoring (SNMPv2) is activated. An SNMPv3 User for encrypted SNMP monitoring (SNMPv3) can be set in the user settings (see chapter 7.5.1, page 182) and the login data for an SNMPv3 User at the SNMP server can be set in the default settings (see section on page 176).

NOTICE
When using SNMP monitoring, for reasons of access security, the use of a dedicated network according to the IT-Grundschutz-Kompendium (IT Baseline Protection) is recommended. The read only community for the MIB file is **kvm**.

NOTICE
For an activation of the SNMP agent function or the SNMP server function, a restart of the matrix or the controller board is necessary. Restarting the matrix or the controller board may take several minutes, and the matrix is not available during the restart.

The settings for the SNMP monitoring are set in this menu:

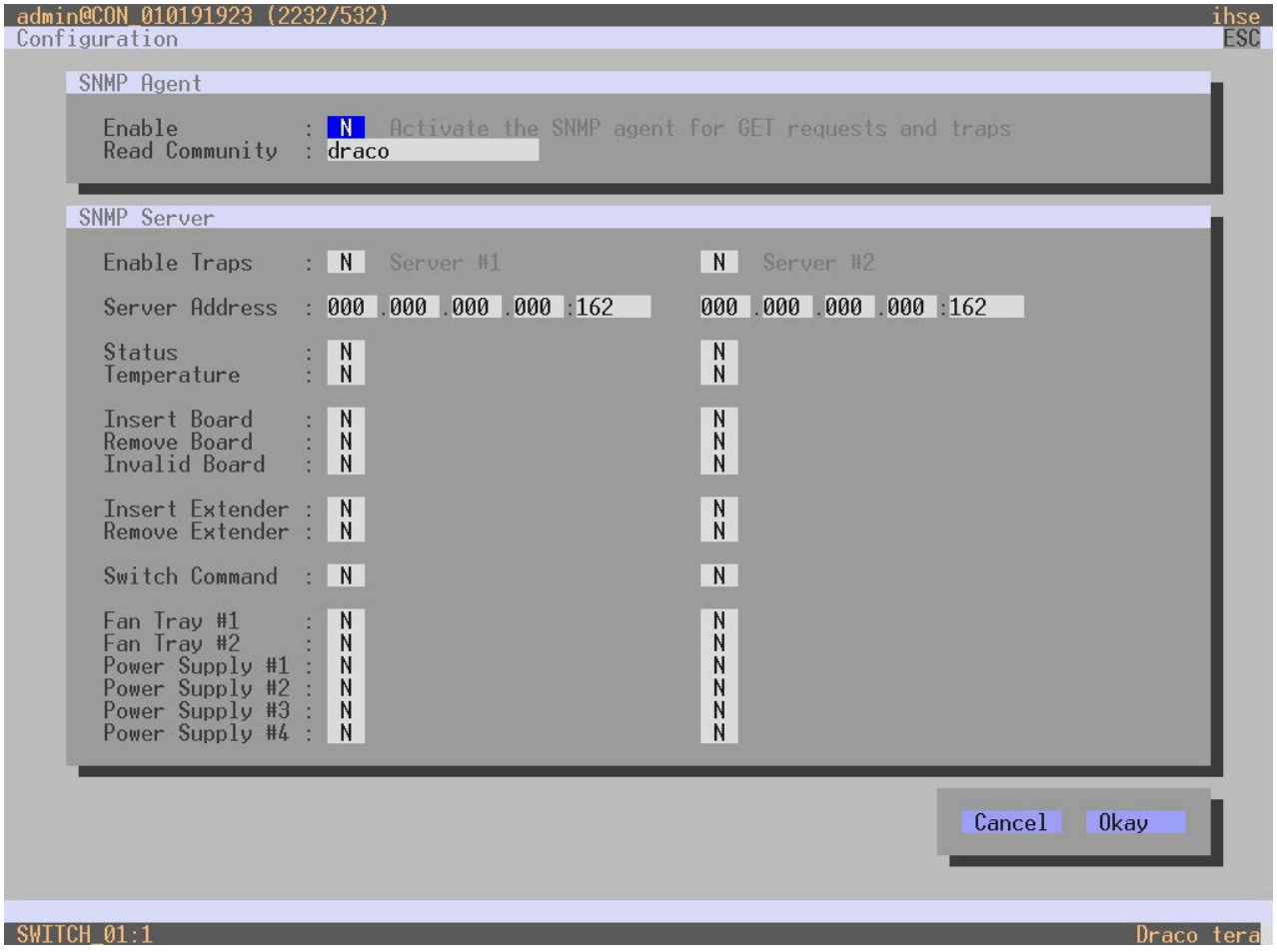


*Fig. 57 OSD Menu **Configuration - SNMP***

The following parameters can be configured:

SNMP Agent

Traps	Description
Enable	Permission for an active query of the SNMP agent for traps is granted. This activation is a prerequisite for using the SNMP server.
Read Community	The read only community for the MIB file is **kvm**.

SNMP Server

The SNMP agent must be activated to enable SNMP traps.

Traps	Description
Enable Traps	Sending of trap messages from the SNMP agent to the SNMP server.
Server Address	IP address of the SNMP server in the form “192.168.1.1” and of the SNMP port (default: 162).
Status	Notification about matrix status.
Temperature	Notification about temperature within the matrix.
Insert Board*	Notification about insertion of a new I/O board into a slot.
Remove Board*	Notification about removal of an I/O board out of a slot.
Invalid Board*	Notification about a faulty I/O board.
Insert Extender	• Notification about a newly connected extender module to the matrix, notification about a switched-on extender module. • Notification about a newly established link between extender module and matrix.
Remove Extender	• Notification about a removed extender module from the matrix. • Notification about a switched off extender module. • Notification about an interrupted link between extender module and matrix.
Fan Tray #1	Notification about the fan status on the left side of the matrix (interface view).
Fan Tray #2	Notification about the fan status on the right side of the matrix (interface view).
Power Supply #1	Notification about the status of power supply unit 1.
Power Supply #2	Notification about the status of power supply unit 2.
Power Supply #3*	Notification about the status of power supply unit 3.
Power Supply #4*	Notification about the status of power supply unit 4.

* Only for Draco tera enterprise

Activating the SNMP Agent

To activate the SNMP agent, proceed as follows:

1. Select **Configuration > SNMP** in the main menu.
2. Set the **Enable** option to **Y** (Yes) within **SNMP Agent**.
   By activating this option, the permission for an active query of the SNMP agent is granted.
3. Click **Okay** to confirm the changes.

Activate SNMP Traps

To activate active reporting of the SNMP traps, proceed as follows:

1. Set the **Enable Traps** option to **Y** (Yes) within **SNMP Server**.

   This function allows an active transmission of trap messages from the SNMP agent to the SNMP server.
2. Set the IP address of the SNMP server within **Server Address**.
3. Activate the requested traps by enabling them to **Y** (Yes).
4. Click **Okay** to confirm the changes.

6.3.8 Date and Time

The parameters for the system configuration are set in this menu, based on Simple Network Time Protocol (SNTP):

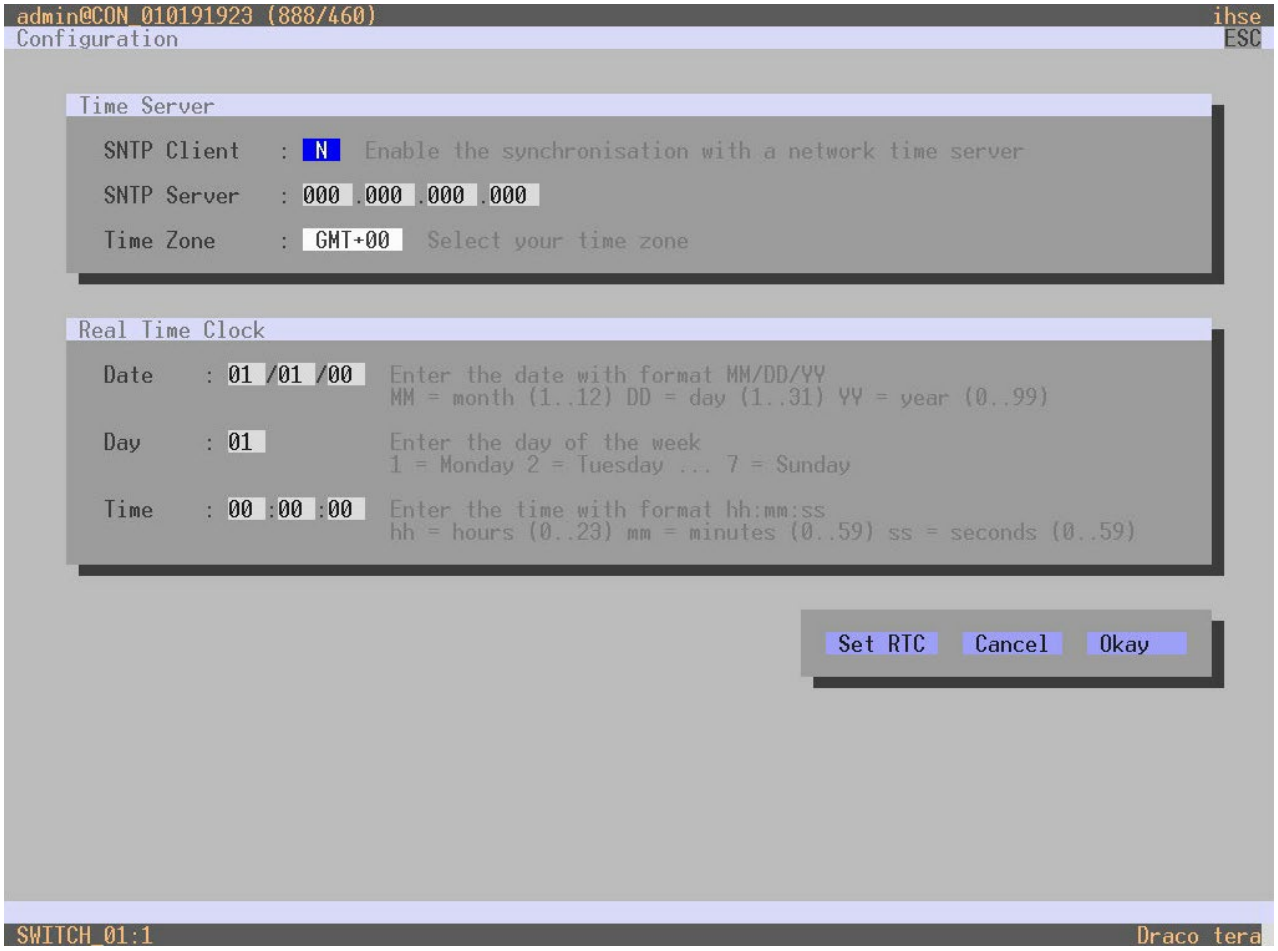


*Fig. 58 OSD Menu **Configuration - Date+Time***

The following parameters can be configured:

Time Server

Field	Entry	Description
SNTP Client	Y	Enable the network time server synchronization.
	N	Function not active (default).
SNTP Server	Byte	Enter the SNTP server IP address (default: 000.000.000.000).
Time Zone	Region	Set your specific time zone (default: GMT + 00).

Real Time Clock

Field		Entry	Description
Date*	**MM**	1 to 12	Enter the month.
	DD	1 to 31	Enter the day.
	YY	1 to 99	Enter the year.
Day		1 to 7	Enter day of the week.
Time	**hh**	0 to 23	Enter the hour.
	mm	0 to 59	Enter the minute.
	dd	0 to 59	Enter the second.

* Date format according to the English notation.

Configuring the Time Server

To configure a time server, proceed as follows:

1. Select **Configuration > Date+Time** in the main menu.
2. Set the SNTP Client option to **Y** (Yes).
3. Enter the IP address of your SNTP server into the **SNTP Server** field.
4. Select your time zone in the **Time Zone** field.
5. Click **Okay** to confirm your settings.
6. Restart the matrix.

   The system time will now be provided by the SNTP server.

Configuring the Real Time Clock without Time Server

To set the real time clock without using SNTP, proceed as follows:

1. Select **Configuration > Date+Time** in the main menu.
2. Set the current date in the **Date** field.
3. Set the current Day in the **Day** field.
4. Set the current time in the **Time** field.
5. Click **RTC** to confirm your settings.

   The real time clock is now provided.

6.4 Configuring User Settings

You have the option to configure the following user settings:

6.4.1 User Settings

New users and their user settings and permissions are set in this menu.

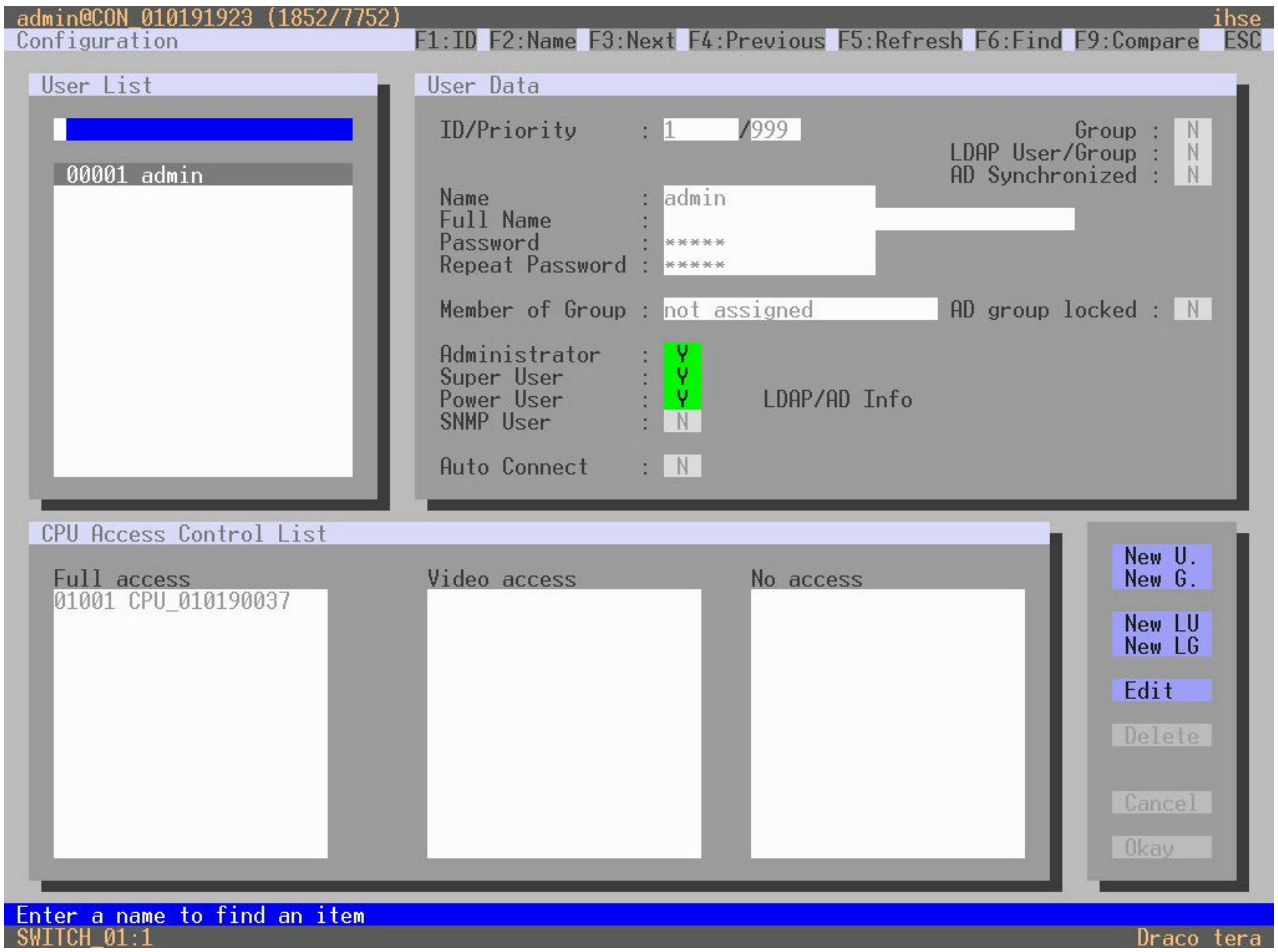


*Fig. 59 OSD Menu **Configuration - User Data***

The following functions are available:

Button	Function
New U.	Create a new user.
Edit	Edit an existing user.
Delete	Delete an existing user.
Cancel	Reject changes.
Okay	Confirm the changes of an existing user or the creation of a new user account.

The following keyboard commands are available:

Keyboard command	Function
f	Add highlighted CPU Device to **Full access** list.
v	Add highlighted CPU Device to **Video access** list.
n	Add highlighted CPU Device to **No access** list.

The following parameters can be configured:

Field	Entry	Description
ID/Priority	Numerical	User ID/User priority.
Name	Text	For standard users it is the login name (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
		For LDAP Users it is the name (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
		For users synchronized via LDAP, it is the sAMAccountName, automatically retrieved from the LDAP server. Can be used to log in to the OSD.
Full Name/ Login Name/ AD CN=	Text	For standard users it is the full name (optional input of up to 32 characters). Can be used to log in to the OSD.
		For LDAP Users it is the login name (case sensitive, input of minimum 1 character up to 32 characters). Can be used to log in to the OSD.
		For users synchronized via LDAP, it is the userPrincipalName, automatically retrieved. Can be used to log in to the OSD.
Password	Text	For standard users (optional input of up to 16 characters). Can be used to log in to the OSD.
		For LDAP Users (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
Repeat Password	Text	Repeat user password (case sensitive).
Member of Group	Selection	Define the assignment to a user group.
Administrator	Y	Permission for system configuration and all switching operations.
	N	Function not active (default).
Super User	Y	Permission to switch any CON Device to any CPU Device in **Extended Switching**.
	N	Function not active (default).
Power User	Y	Permission to switch CON Devices to CPU Devices in **Extended Switching** according to the **CON** or **User ACL**, but not in Private Mode.
	N	Function not active (default).
SNMP User	Y	Permission to use SNMPv3 (encrypted).
	N	Function not active (default).
Auto Connect	Y	Re-establish the previous user connection after login
	N	Function not active (default).
AD group locked	Y	Lock synchronization of group attribute for an Active Directory user. This setting is required for a manual change of user groups for a specific Active Directory user.
	N	Function not active (default).

Creating a new Standard User Account

To create a new user, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Click **New U.**.
3. Enter a name.
4. Optionally enter a full name and a password.
5. Set user permissions for CPU DEVICE access.
6. Click **Okay** to confirm the new user settings.

Creating a new LDAP User Account

To change settings, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Click **New LU** to create a new LDAP user. This user functions as a bind user.
3. Enter the name of the bind user from the Active Directory into the field **Name**.
4. Enter the Common Name (CN) of the bind user from the Active Directory into the field **Login Name**.
5. Enter the password of the bind user from the Active Directory into the fields **Password** and **Repeat Password**.
6. Click **Okay** to confirm the creation of the user.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: No restart of the matrix is required.

Changing a User Account

To change user settings, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Select a user in the **User List**.
3. Click **Edit**.
4. Change the desired settings.
5. Click **Okay** to confirm the changes.

6.4.2 User Favorite List

Individual favorite lists of CPU Devices that will be switched frequently can be created for different users in this menu. A favorite list can contain up to 32 different CPU Devices (from firmware V3.05).

The switching of the favorites is done via keyboard commands (see chapter 8.1.1, page 290).

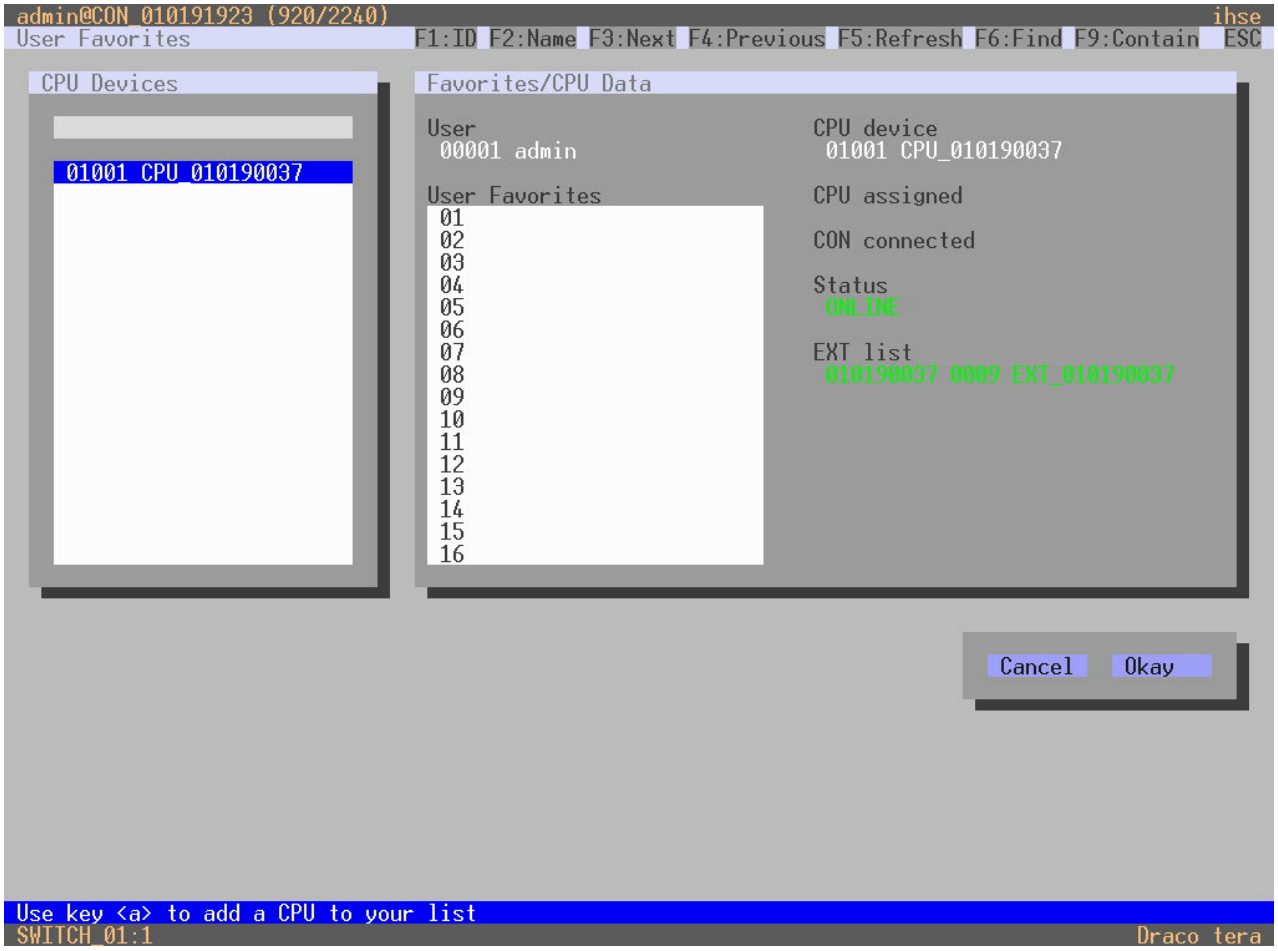


*Fig. 60 OSD Menu **Assignments - User Favorites***

To create a favorites list for your own user, proceed as follows:

1. Select **Assignments > User Favorites** in the main menu.
2. Select a CPU Device to be moved to the favorites list on the **User Favorites** list.
3. Press a to move a CPU Device to the favorites list.
   To remove a CPU Device from the favorite list, press r.
4. Optional: press + or - to change the order of the CPU Devices within the favorites list.
5. Click **Okay** to confirm the settings.

6.4.3 User Macros

In this menu macro commands for switching, disconnection or user administration can be created. Macro commands are created for each user separately.

A macro can execute up to 16 switching commands successively.

The execution of the macros is done via Hot Key and the F1 to F16 function keys (see chapter 8.1.4, page 293).

To execute user macros the user has to be logged in to the matrix.

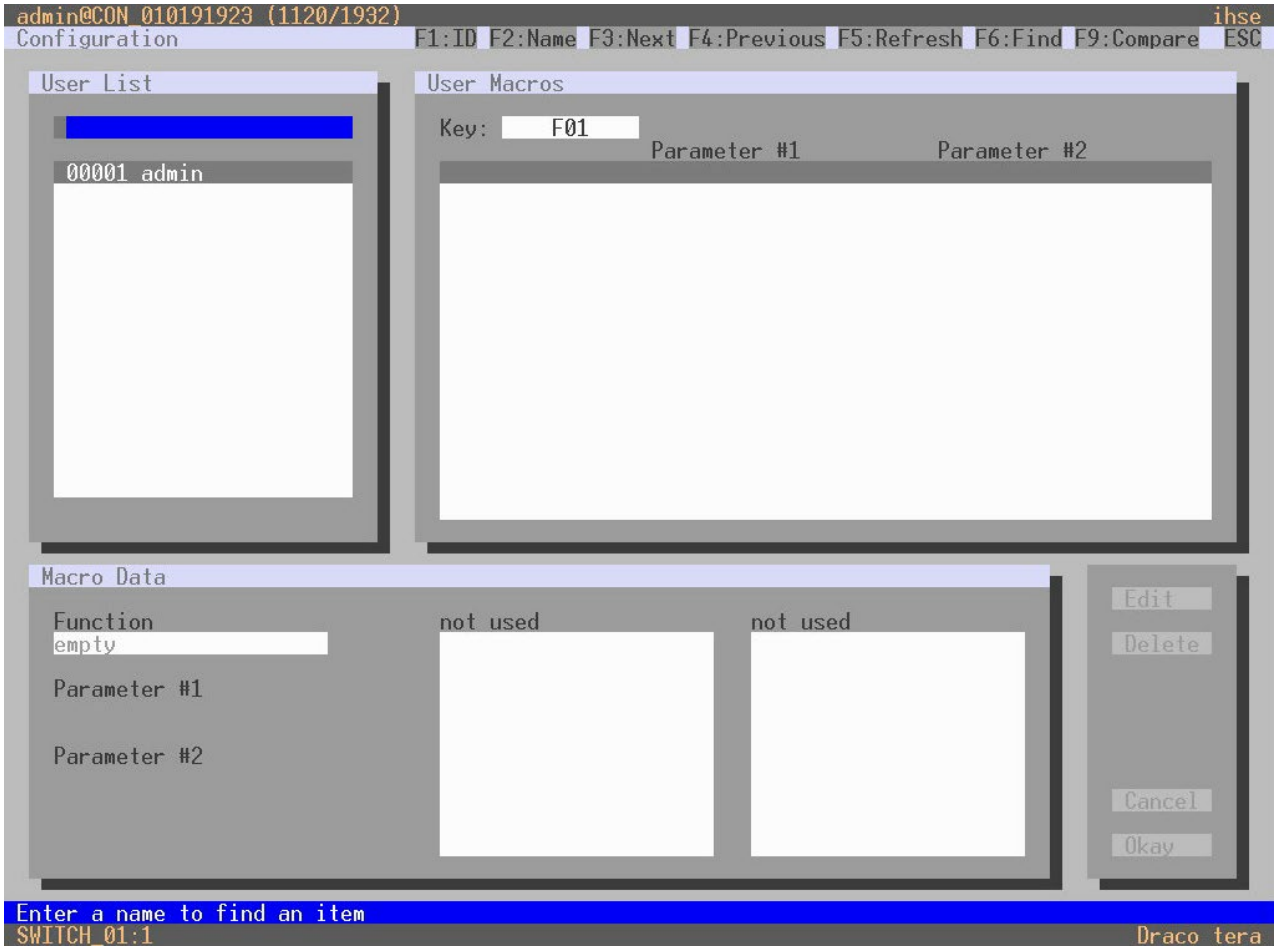


*Fig. 61 OSD Menu **Configuration - User List - User Macros***

The following parameters can be configured:

Field	Selection	Description
Function (01 to 16)	**Connect (P1=CON, P2=CPU)**	Set a bidirectional connection from CON Device P1 to CPU Device P2.
	Connect Video (P1=CON, P2=CPU)	Set a Video Only connection from CON Device P1 to CPU Device P2.
	Disconnect (P1=CON)	Disconnect the CON Device P1.
	Logout User	Logout the current user.
	Assign CPU (P1=VCPU, P2=RCPU)	Assign a virtual CPU Device to a real CPU Device.

Field	Selection	Description
Function (01 to 16)	**Assign CON (P1=RCON, P2=VCON)**	Assign a real CON Device to a virtual CON Device.
	Push (P1=CON)	The user's Full Access connection is forwarded to CON Device P1 and is changed into a Video Only connection.
	Push Video (P1=CON)	The video signal of the current connection (Full Access or Video Only) is forwarded to CON Device P1. The user's connection remains unchanged (Full Access or Video Only).
	Get (P1=CON)	The user's CON Device gets a Full Access connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 is changed into a Video Only connection.
	Get Video (P1=CON)	The user's CON Device gets a Video Only connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 remains unchanged (Full Access or Video Only).
	Login User console P2	Login a certain user P1 at CON Device P2.
P1	**CON or CPU Device**	Name of CON Device or CPU Device.
P2	**CON or CON Device**	Name of CON Device or CPU Device.

The macros can also be used to switch to CPU Device groups.

To create a macro for the selected user, proceed as follows:

1. Select via **Configuration > User Macros** in the main menu the user for which a user macro has to be created.
2. Select in the **Key** field the function key for which a macro has to be created.
3. Select the position in the **Key** list where a macro command is to be inserted.
4. Select a macro command in the **Macro Data** field.
5. Set the necessary parameters **P1** and **P2** (e.g., CON Devices or CPU Devices) for the selected macro command.
6. Click **Okay** to confirm your selection.
7. Repeat the process for further macro commands if necessary.

6.4.4 User Groups

The matrix allows to bundle the users of a configuration into User Groups. The groups can be used to subdivide the users logically or thematically. As an application example you can group all power users together. The configuration of User Groups at the same times increases the clarity of the configuration.

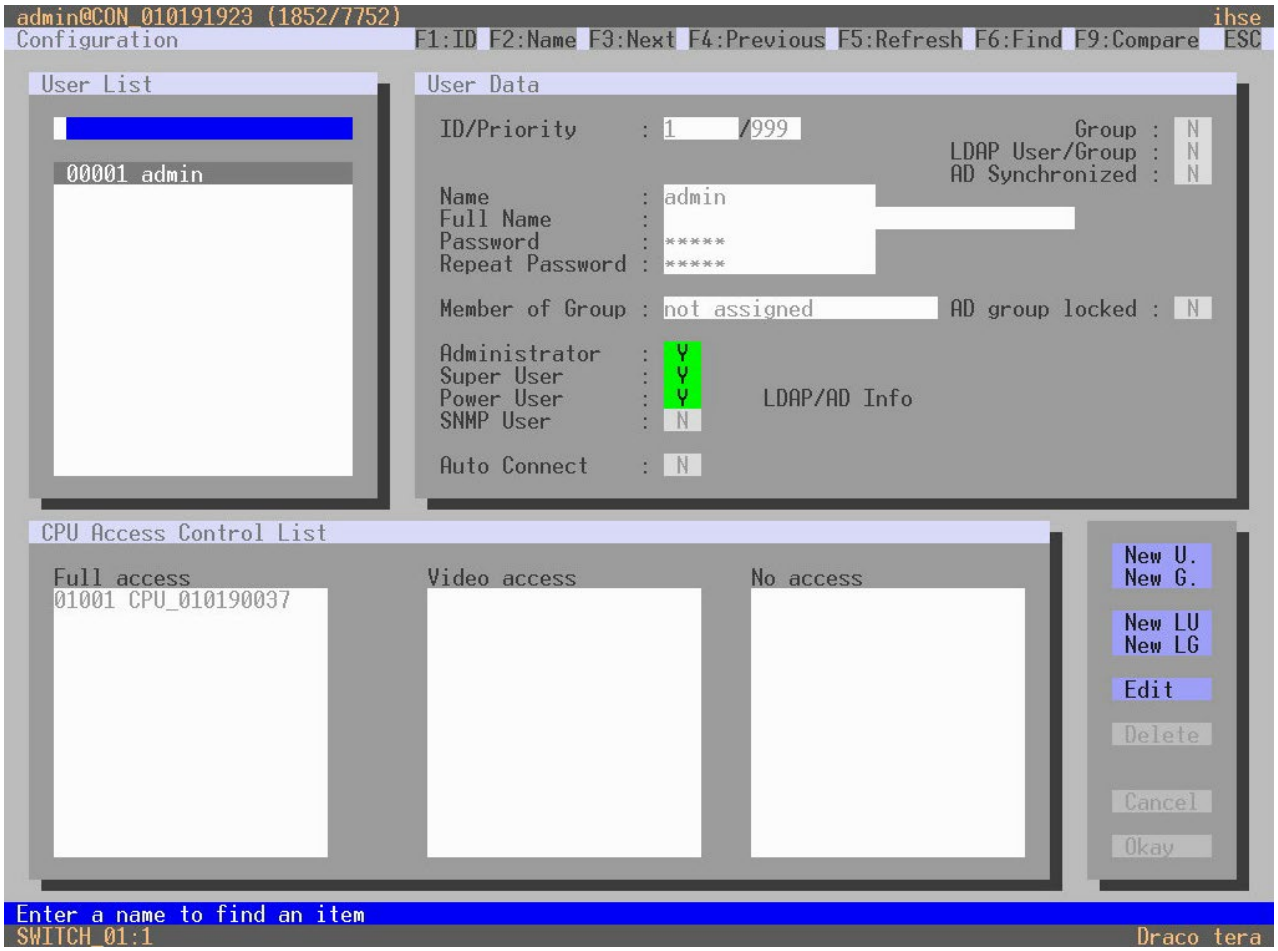


*Fig. 62 OSD Menu **Configuration - User Data***

The following functions are available:

Button	Function
New G.	Create a new group.
Edit	Edit an existing user.
Delete	Delete an existing user.
Cancel	Reject changes.
Okay	Apply changes.

The following keyboard commands are available:

Keyboard command	Function
f	Add highlighted CPU Device to **Full access** list.
v	Add highlighted CPU Device to **Video access** list.
n	Add highlighted CPU Device to **No access** list.

Creating and Configuring a Standard User Group

To create and configure a Standard User Group, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Click **New G.**.
3. Enter a group name into the field **Name**.
4. Click **Okay** to confirm the group creation.

Creating and Configuring an LDAP Group

1. Select **Configuration > User Data** in the main menu.
2. Click the **Groups** tab in the working area.
3. Click **New LG** to create a new LDAP group.

   The group determines which users of the Active Directory server should be synchronized.
4. Enter a name into the field **Name**.
5. Enter either the Common Name (CN) of a group or the Common Name (CN) of an organizational unit into the field **LDAP OU=/CN=** as shown below:
   - OU= name of the organizational unit
   - CN= name of the group

   Note: The field entry must include either OU= or CN=.
6. Click **Okay** to confirm the creation of the group.

   The Active Directory synchronization can be used now.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: No restart of the matrix is required.

Assigning a User to a Group

To assign a user to a group, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Select the user to be assign to a User Group.
3. Select the User Group for the assignment in the field **Member of Group** using the cursor up and down keys.
4. Click **Okay** to confirm the group creation.

6.5 Configuring Extender Settings

6.5.1 Main Extender Module and EXT Unit Settings

6.5.1.1 Extender Module and EXT Unit Settings

The matrix automatically recognizes every extender module, physically connected to the matrix with a direct cable connection, reads out its serial number and creates EXT Units automatically. This is the Flex Port function of the matrix. Dual-Head extender modules will be recognized as two independent EXT Units.

Add-on modules are not created as independent EXT Units. The data of add-on modules is included in one EXT Unit together with the associated extender module.

All EXT Units are managed in this menu. This includes the creation of new EXT Units and the deletion of existing EXT Units.

NOTICE

The connection of a fixed port extender module (e.g., USB 2.0) to a Flex Port can cause unintended results. EXT Units for USB 2.0 extender modules have to be created manually (see chapter 6.5.2, page 102).

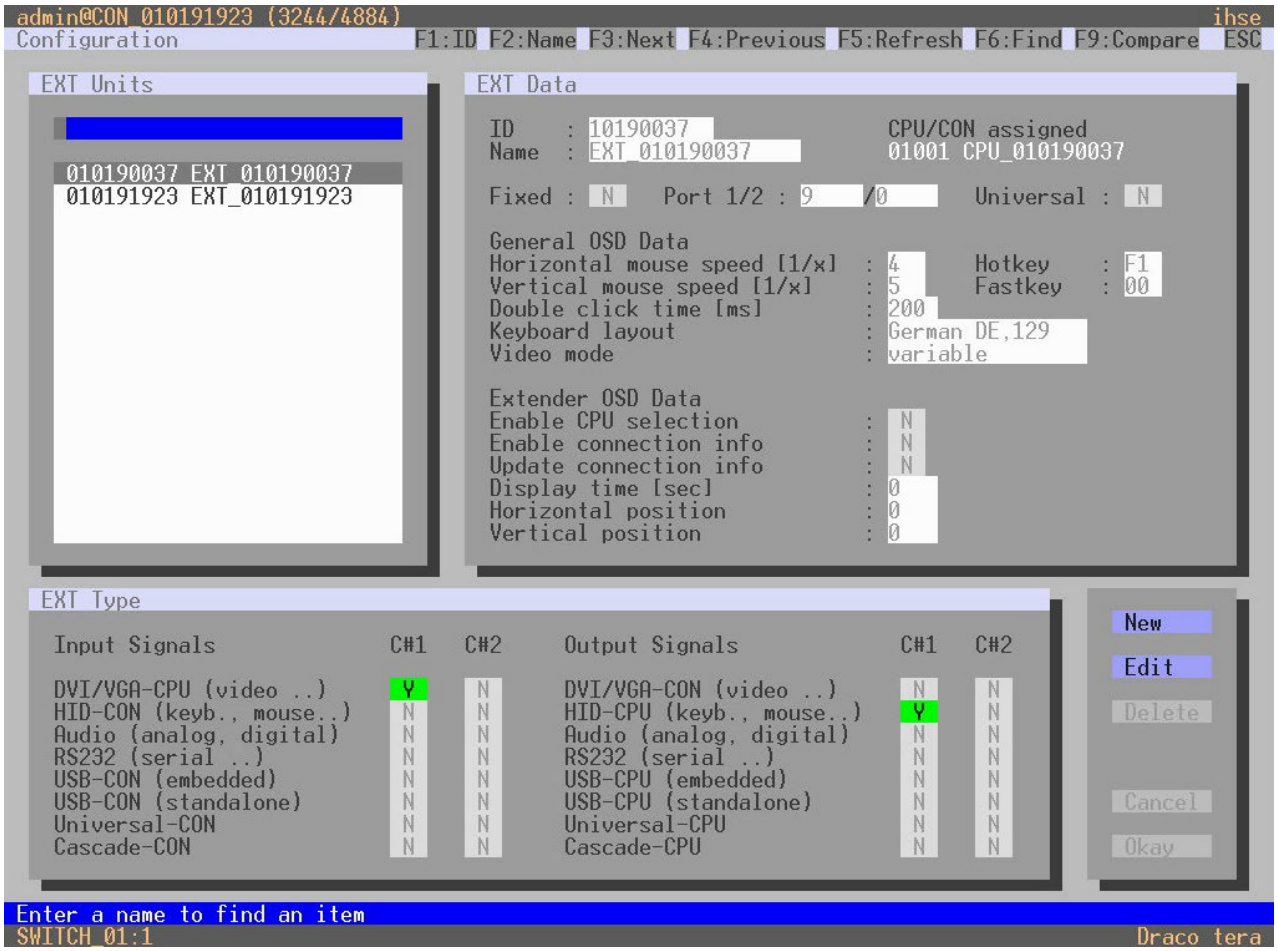


*Fig. 63 OSD Menu **Configuration - EXT Units***

The following functions are available:

Button	Function
New	Create a new EXT Unit.
Edit	Edit an existing EXT Unit.
Delete	Delete an existing EXT Unit.

Button	Function
Cancel	Reject changes.
Okay	Apply changes.

The following parameters can be configured:

Field	Entry	Description	
ID	-	Numerical value of the KVM extender module ID. The ID is provided by the extender module (serial number) and cannot be changed.	
Name	Text	Name of the EXT Unit.	
Fixed	Y	Create an EXT Unit with a fixed port assignment (default)	
	N	Function not active (default).	
Port 1/2	0 or 1 to 2032 Up to 576 ports if using a single matrix or up to 2032 ports within a matrix grid.	Port 1	• **0** if the primary interconnect port of the extender module is currently not connected to the matrix. • **1 to 2032** if the primary interconnect port of the extender module is currently connected to a matrix within a matrix grid.
		Port 2	• **0** if there is no redundant port or if the redundant interconnect port of the extender module is currently not connected to the matrix. • **1 to 2032** if the redundant interconnect port of the extender module is currently connected to the matrix or to a matrix grid.

The settings for the **General OSD Data** are described in chapter 6.7.2, page 117.

6.5.1.2 Renaming an EXT Unit

To rename an EXT Unit after initially connecting an extender module to the matrix, proceed as follows:

1. Select **Configuration > User Data** in the main menu.
2. Select the EXT Unit of an extender module to be renamed.
3. Click **Edit**.
4. Delete the name in the **Name** field and enter the new name.
5. Click **Okay** to confirm the changes.

6.5.2 Configuring EXT Units for USB 2.0 Extender Modules

To use USB 2.0 extender modules, the respective EXT Unit has to be configured as fixed port in this menu. USB 2.0 EXT Units can be configured for independent switching or can be assigned to already existing CON Devices or CPU Devices.

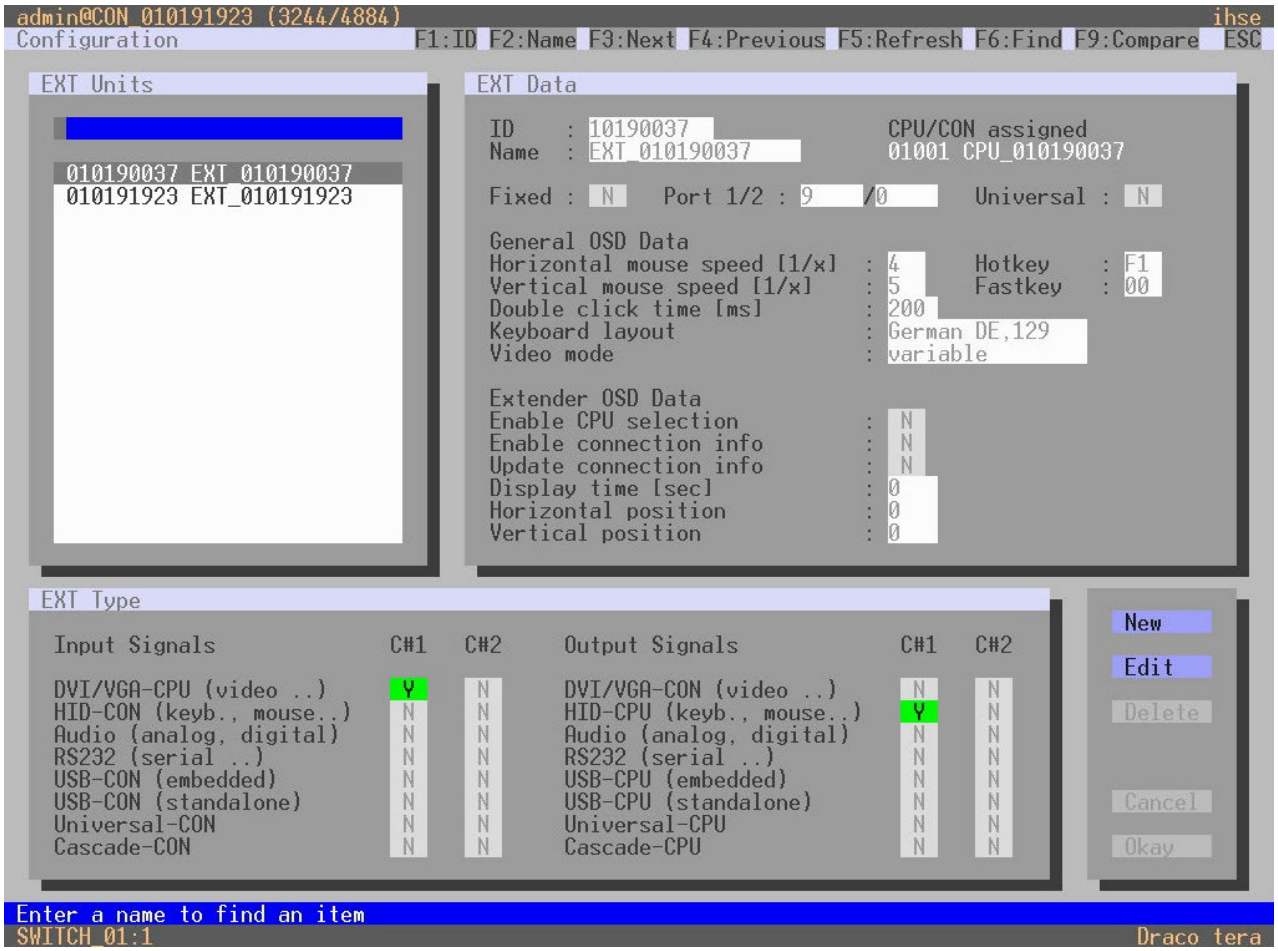


*Fig. 64 OSD Menu **Configuration - EXT Units***

To configure a USB 2.0 EXT Unit, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Click **New**.

   An EXT Unit with an eight-digit ID will be created, starting with digit **9**.
3. Enter an appropriate name for the EXT Unit in the **Name** field.
4. Enter the port number of the matrix the USB 2.0 extender module is currently connected into the **Port** field.
5. To configure the created EXT Unit as a CON Unit:

   5.1. Set the **USB-CON** (**standalone**) option to **Y** (**C#1** in the **Input Signals** column).

   5.2. Click **Okay** to confirm the setting.
6. To configure the created EXT Unit as a CPU Unit:

   6.1. Set the **USB-CPU** (**standalone**) option to **Y** (**C#1** in the **Output Signals** column).

   6.2. Click **Okay** to confirm the setting.
7. Click **Okay** to confirm the settings.
8. Restart the I/O board to activate the USB fixed port for the new EXT Unit.

   After restart of the I/O board, the parameters and settings of the USB 2.0 extender module are shown in the respective EXT Unit.

9. The USB 2.0 CPU/CON EXT Unit has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 6.6.1, page 108,
   - for a **CON Device** see chapter 6.7.3, page 119
10. If you use parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to **10 s** or more (see chapter 6.3.4, page 80).
11. Restart all I/O boards on which USB 2.0 EXT Units have been configured or alternatively restart the matrix.

    The USB 2.0 EXT Units are now configured and can be used.

Manually created EXT Units are always set as fixed port EXT Units. This configuration is necessary if you want to switch, e.g., USB 2.0 connections via the matrix.
To make a fixed port available again for Flex Port EXT Units after deleting a fixed port EXT Unit, a restart of the I/O board is necessary.

6.5.3 Configuring EXT Units for USB 3.0/USB 2.0 Extender Modules

To use USB 3.0/USB 2.0 extender modules connected to a UNI I/O board, SFP modules based on 6.25 Gbit/s are required. The configuration of EXT Units for USB 2.0/USB 3.0 extender modules is set in this menu.

USB 2.0 extender modules can also be used with UNI I/O boards and SFP modules based on 6.25 Gbit/s or can be connected to fixed ports of I/O boards (see chapter 6.5.1.2, page 101).

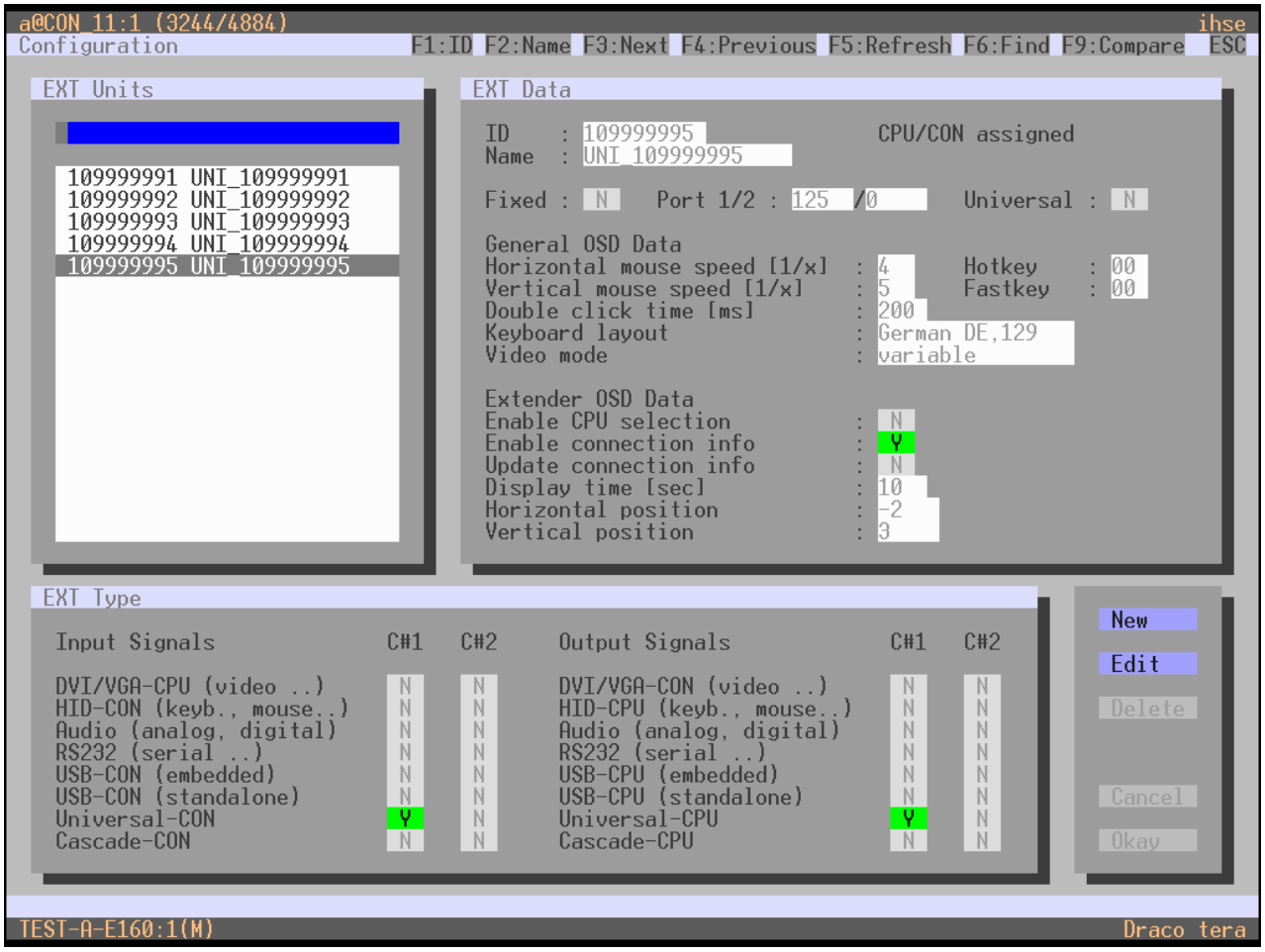


*Fig. 65 OSD Menu **Configuration - EXT Units - Uni board - Configuring USB3.0/USB 2.0***

To configure an SFP for using with USB 2.0/USB 3.0 extender modules, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Insert the SFP modules into the matrix and connect the extender module according to the required application.

   One EXT Unit will be created for each SFP module in the **EXT Units** list. The appropriate names always start with “UNI”.
   In the sub menu **EXT Type**, **Universal-CON** and **Universal-CPU** are set to **Y**.
3. To configure an EXT Unit as a USB CON Unit:
   - 3.1. Select one of the EXT Units in the **EXT Units** list that are physically connected to a USB CON Unit.
   - 3.2. Set the **USB-CON** (**standalone**) option to **Y** (**C#1** in the **Input Signals** column).
   - 3.3. Set additionally the **Universal-CPU** option to **N** (**C#1** in the **Output Signals** column).
   - 3.4. Click **Okay** to confirm the setting.

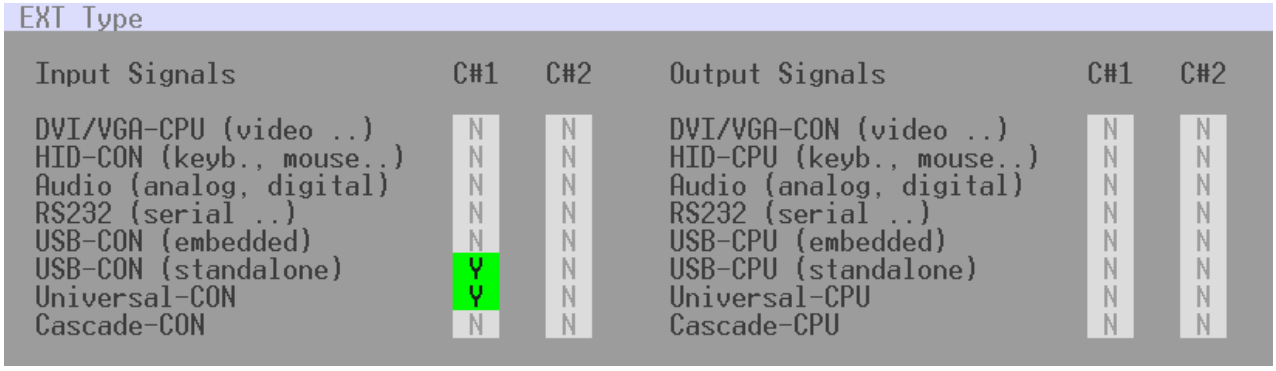


*Fig. 66 OSD Menu **Configuration - EXT Units - Setting a USB CON EXT Unit***

4. To configure an EXT Unit as a USB CPU Unit:
   4.1. Select one of the EXT Units in the **Ext Units** list that are physically connected to a USB CPU Unit.
   4.2. Set the **USB-CPU** (**standalone**) option to **Y** (**C#1** in the **Output Signals** column).
   4.3. Set additionally the **Universal-CON** option to **N** (**C#1** in the **Input Signals** column).
   4.4. Click **Okay** to confirm the setting.

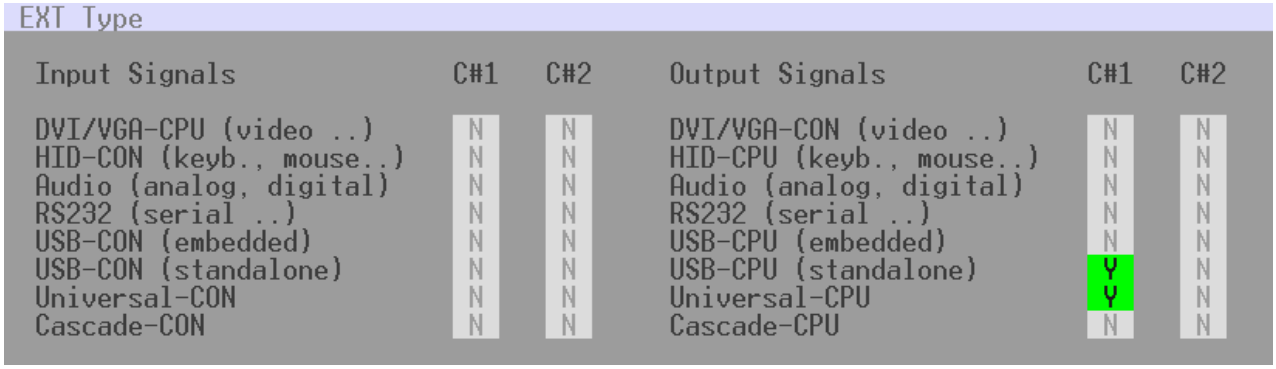


*Fig. 67 OSD Menu **Configuration - EXT Units - Setting a USB CPU EXT Unit***

5. The USB 2.0/USB 3.0 CPU/CON EXT Unit has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 6.6.1, page 108,
   - for a **CON Device** see chapter 6.7.3, page 119

   After assigning EXT Units to CON/CPU Devices, the USB 2.0/USB 3.0 CON/CPU Ext Units are configured and can be used.
6. If you use parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to **10 s** or more (see chapter 6.3.4, page 80).
7. Restart all I/O boards on which USB 2.0/USB 3.0 EXT Units have been configured or alternatively restart the matrix.

If changing an EXT Unit from a USB CON to a USB CPU, a restart of the I/O board is necessary.

6.5.4 Configuring EXT Units for SDI Usage

For the use of SDI, the matrix is to be configured in this menu. Using SDI requires at least one UNI I/O board and appropriate SFP modules according to the SDI video signal to be used.

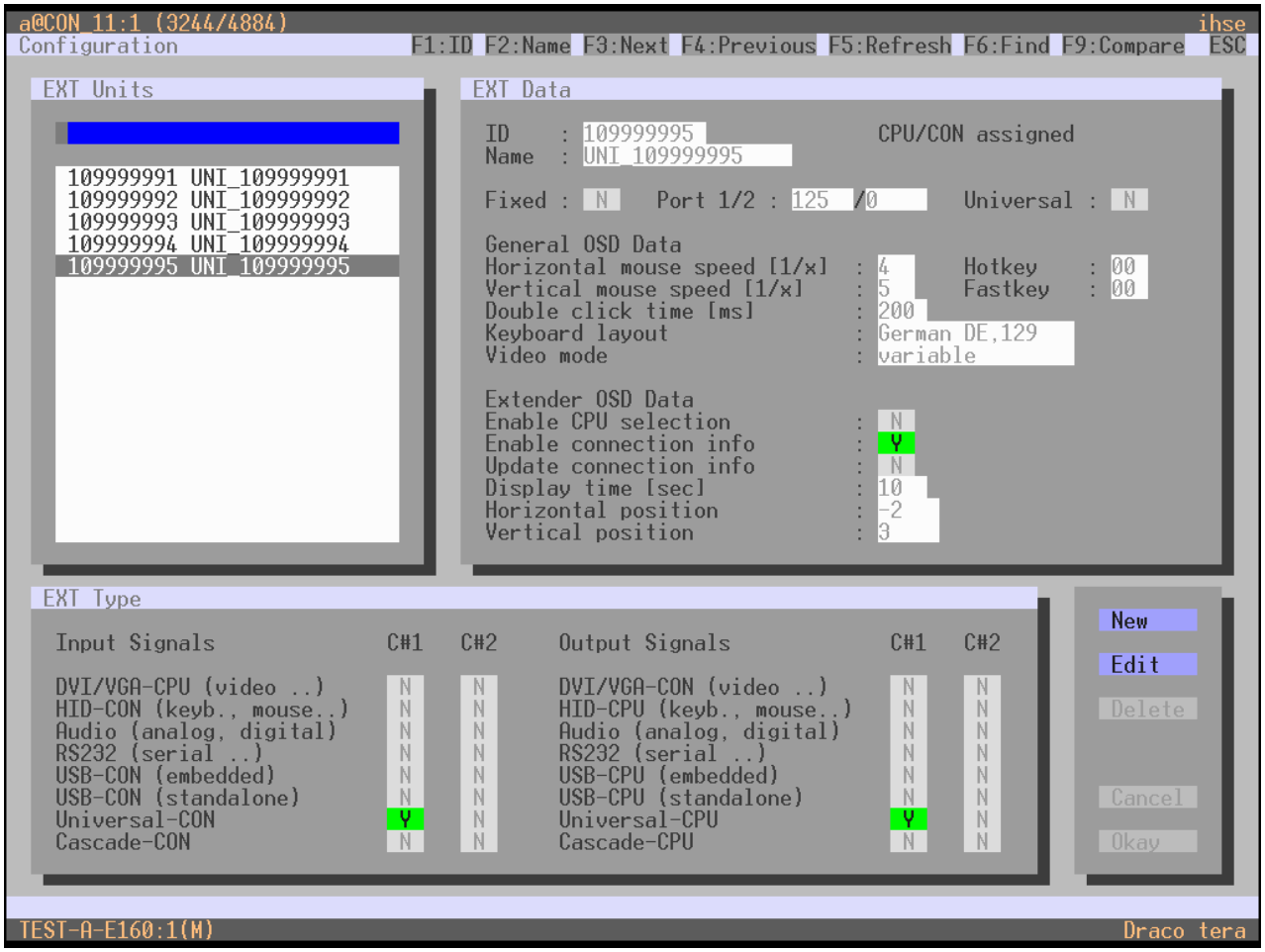


*Fig. 68 OSD Menu **Configuration - EXT Units - Uni board - Configuring SDI***

To configure an SFP for using as an SDI input/output, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Insert the SFP modules into the matrix and connect the extender module according to the required application.
   One EXT Unit will be created for each SFP module in the **EXT Units** list. The appropriate names always start with “UNI”.
   In the sub menu **EXT Type**, **Universal-CON** and **Universal-CPU** are set to **Y**.
3. To configure an EXT Unit as an SDI input:
   3.1. Select one of the extender modules in the **EXT Units** list that corresponds to the respective SFP and is intended to be used as input.
   3.2. Set the **Universal-CPU** option to **Y** (**C#1** in the Output **Signals** column.
   3.3. Set additionally the **Universal-CON** option to **N** (**C#1** in the **Input Signals** column.
   3.4. Click **Okay** to confirm the setting.

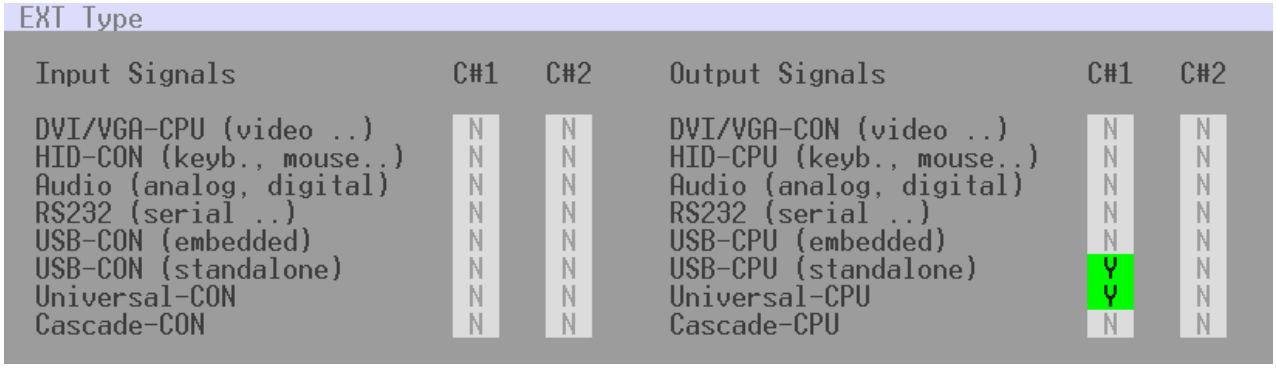


*Fig. 69 OSD Menu **Configuration - EXT Units - Setting an EXT Unit as an SDI input***

4. To configure an EXT Unit as an SDI output:
   4.1. Select one of the extender modules in the **EXT Units** list that corresponds to the respective SFP and is intended to be used as output.
   4.2. Set the **Universal-CON** option to **Y** (**C#1** in the **Input Signals** column.
   4.3. Set additionally the **Universal-CPU** option to **N** (**C#1** in the **Output Signals** column.
   4.4. Click **Okay** to confirm the setting.

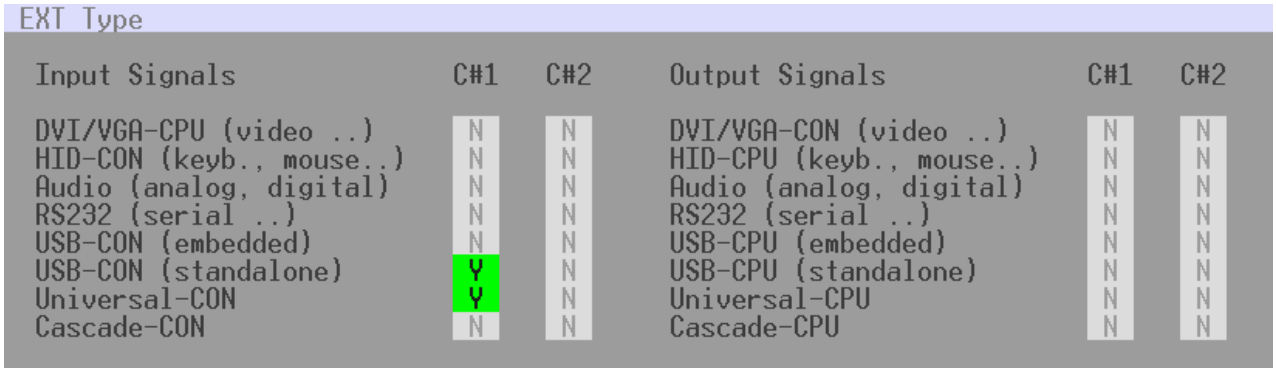


*Fig. 70 OSD Menu **Configuration - EXT Units - Setting an EXT Unit as an SDI output***

5. The edited EXT Units for the SDI inputs and outputs has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 6.6.1, page 108,
   - for a **CON Device** see chapter 6.7.3, page 119

   After assigning EXT Units to CON/CPU Devices, the SDI inputs and outputs are configured and can be used.
6. Restart all I/O boards on which EXT Units for SDI input/output have been configured or alternatively restart the matrix.

If changing an EXT Unit from a UNI CON to a UNI CPU, a restart of the I/O board is necessary.

6.6 Configuring Source Side Settings

6.6.1 Setting CPU Devices

New CPU Devices are configured in this menu including their assignment to EXT Units.

The assignment helps to describe and switch more complex computer configurations (e.g., Quad-Head with USB 2.0) in the matrix.

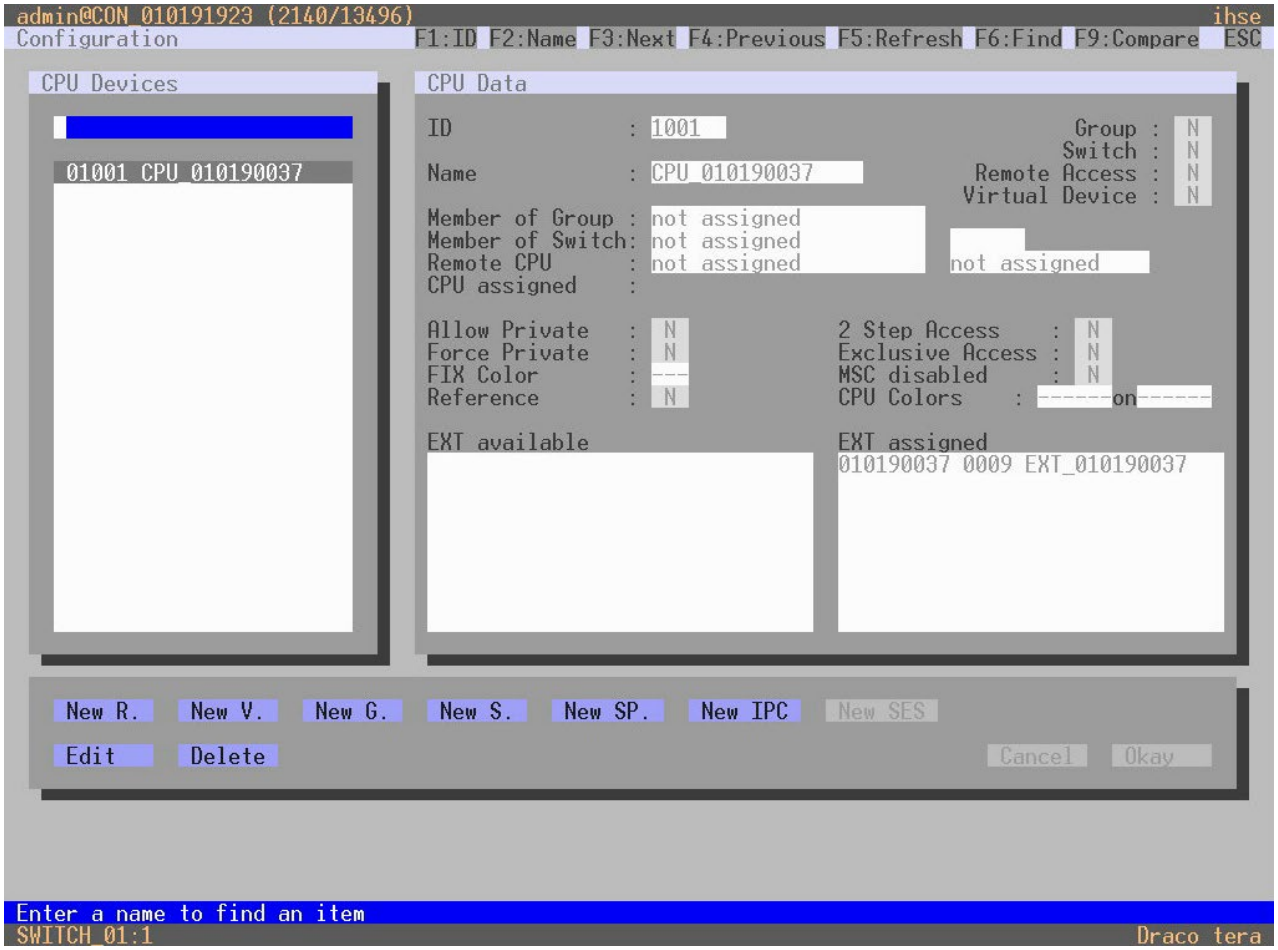


*Fig. 71 OSD Menu **Configuration - CPU Devices***

The following functions are available:

Button	Function
New R.	Create a new real CPU Device.
Edit	Edit an existing CPU Device.
Delete	Delete an existing CPU Device.
Cancel	Reject changes.
Okay	Apply changes.

The following parameters can be configured:

Field	Entry	Description
ID	Text	Ident number of the CPU Device.
Name	Text	Name of the CPU Device.
Member of Group	Selection	Assign the CPU Device to a group.
Member of Switch	Selection	Assign the CPU input to the respective CPU Switch.

Field	Entry	Description
Remote CPU	Selection	Assign an IP CPU Device to the respective IP CPU EXT Unit.
CPU assigned	-	ID and name of the assigned virtual CPU Device, cannot be changed, is retrieved automatically.
Group	Y	Automatically set if the CPU Device is assigned to a CPU DEVICE Group.
	N	Function not active (default).
Switch	Y	Automatically set for a CPU Switch (484 Series).
	N	Function not active (default).
Remote Access	Y	Automatically set for an IP CPU Device.
	N	Function not active (default).
Virtual Device	Y	Automatically set for a virtual CPU Device.
	N	Function not active (default).
Allow Private	Y	Allow switching to the respective CPU Device in Private Mode.
	N	Function not active (default).
Force Private	Y	Force switching to the respective CPU Device only in Private Mode.
	N	Function not active (default).
Fix Color	Selection list	Show a colored frame at the CPU Device. You can select between 7 colors.
Reference	Y	Activate a reference CPU Device that inherits both Device and EXT Unit settings to any CPU Unit that is connected to the matrix for the first time. **Note**: It is recommended to activate the reference setting for one single CPU Device only.
	N	Function not active (default).
2 Step Access	Y	Open a pop-up window after switching to the particular CPU Device. In the background a Video Only connection will be established. A confirmation in the pop-up window is required to establish a Full Access connection to the CPU Device.
	N	Function not active (default).
Exclusive Access	Y	Activate an access limitation for the case that a CPU Device is already connected via Full Access connection. When having the same priorities, any additional access to the CPU Device can only be established with a Video Only connection. Having a lower priority any additional connection is not possible. Only when having a higher priority, an additional Full Access connection can be established, and K/M control can be taken over.
	N	Function not active (default).
MSC disabled	Y	Deactivate the MSC function.
	N	Activate the MSC function.
CPU Colors	Selection list	The CPU Device name will be highlighted according to the color setting for text and background. You can select between 16 colors.

To create a CPU Device, proceed as follows:

1. Select **Configuration > CPU Devices** in the main menu.
2. Click **New R.** to create a new real CPU Device or click **New V.** to create a new virtual CPU Device.
3. Enter a CPU Device name into the field **Name**.
4. Click **Okay**.

   The CPU Device is created now.

To assign an EXT Unit to a CPU Device, proceed as follows:

1. Select **Configuration > CPU Devices** in the main menu.
2. Select the CPU Device you want to assign an EXT Unit.
3. Select the EXT Unit for the assignment in the **EXT available** list.
4. Click **Okay**.

   The EXT Unit is assigned to the CPU Device now.

6.6.2 Setting CPU Groups

The KVM matrix allows to bundle the CPU Devices of a configuration into CPU groups. The groups can be used to subdivide the CPU Devices logically or thematically. As an application example you can group all CPU Devices together that are connected to a specific matrix in a matrix grid. The configuration of CPU groups at the same times increases the clarity of the configuration.

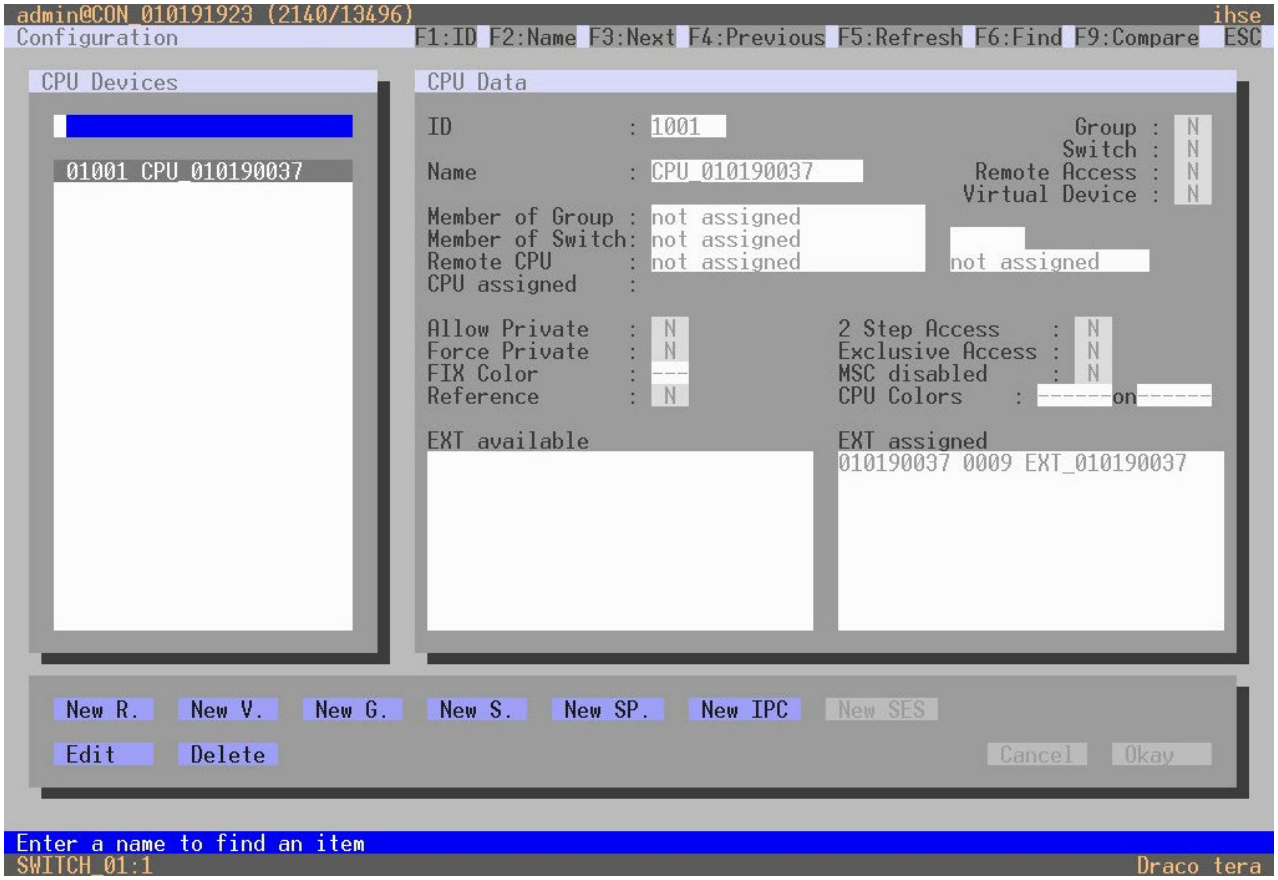


*Fig. 72 OSD Menu **Configuration - CPU Devices***

The following functions are available:

Button	Function
New G.	Create a new CPU Group.
Edit	Edit an existing CPU Group.
Delete	Delete an existing CPU Group.
Cancel	Reject changes.
Okay	Apply changes.

The following parameters can be configured:

Field	Entry	Description
ID	Text	Ident number of the CPU Group.
Name	Text	Name of the CPU Group.
Member of Group	Selection	Assign the CPU Device to a CPU Group.
Group	Y	Automatically set if the CPU Device is assigned to a CPU Group.
	N	Function not active (default).
Further parameters are described in chapter 6.6.1, page 108.		

To create a CPU Group, proceed as follows:

1. Select **Configuration > CPU Devices** in the main menu.
2. Click **New G.**.
3. Enter a CPU Group name into the field **Name**.
4. Click **Okay**.

   The CPU Group is created now.

To assign a CPU Device to a group, proceed as follows:

1. Select **Configuration > CPU Devices** in the main menu.
2. Select the CPU Device you want to assign to a CPU group.
3. Select the CPU Group for the assignment in the field **Member of Group** using the cursor up and down keys.
4. Click **Okay**.

   The CPU Device is assigned to the CPU Group now.

6.6.3 Configuring CPU Switch (484 Series)

The CPU Switch (484 Series) is an 8:1 port concentrator for up to eight sources attached via VGA and USB-HID (K/M).

This CPU Switch can be specifically configured for a use with a KVM matrix. The configuration allows to individually switch the up to eight input signals via OSD.

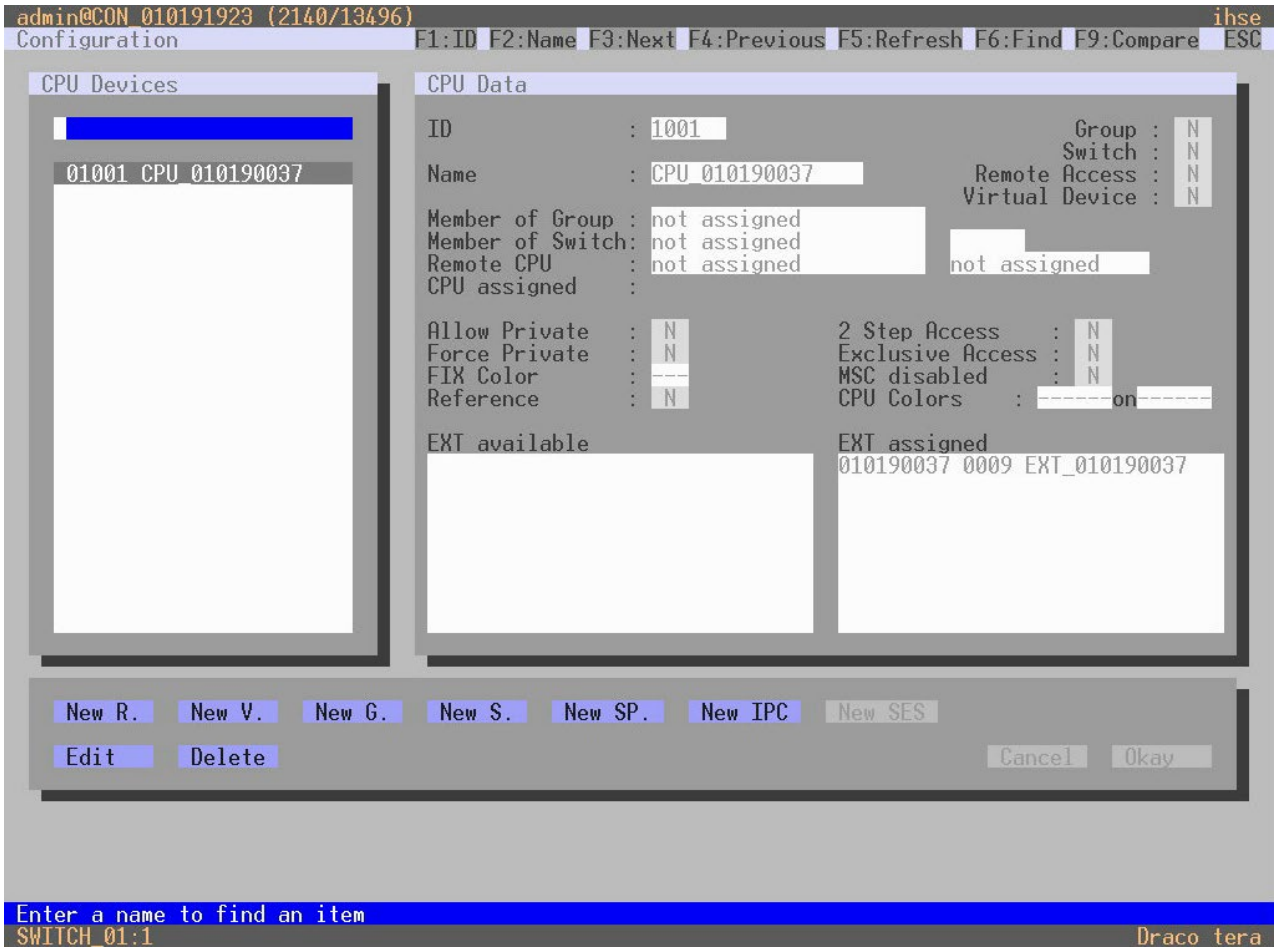


*Fig. 73 OSD Menu **Configuration - CPU Devices***

The following functions are available:

Button	Function
New S.	Create a new CPU Switch (484 series).
New SP.	Create a CPU EXT Unit for a CPU Switch.
Edit	Edit an existing CPU Device.
Delete	Delete an existing CPU Device.
Cancel	Reject changes.
Okay	Apply changes.

The following parameters can be configured:

Field	Entry	Description
ID	Text	Ident number of the CPU Device.
Name	Text	Name of the CPU Device.
Member of Switch	Selection	Assign the CPU Device input to the respective CPU Switch.
Switch	Y	Automatically set for a CPU Switch (484 Series).
	N	Function not active (default).
Further parameters are described in chapter 6.6.1, page 108.		

To configure the CPU Switch for an individual switching of the single inputs, proceed as follows:

1. Select **Configuration > CPU Devices** in the main menu.
2. Click **New S.**.
   A new CPU Switch will be created.
3. Enter a CPU Switch name into the field **Name**.
4. Assign an EXT Unit to the CPU Switch into the field **EXT assigned**.
5. Click **New SP.**.
   A new CPU Device (input) for a CPU Switch will be created (Port 1).
6. Assign the created CPU input to a CPU switch in the field **Member of Switch**.
7. Repeat the steps 5. and 6. for each input port in use at the CPU Switch.
8. Click **Okay**.
   The CPU Switch is now configured and can be individually switched via OSD.

6.6.4 Assigning Virtual CPU Device

In this menu, either one or more virtual CPU Devices can be assigned to a real CPU Device.

With a virtual CPU Device, the effort of switching several CON Devices to the same CPU Device can be reduced. If several CON Devices are connected to a virtual CPU Device that is assigned to a real CPU Device, you only have to change the real CPU Device once and all CON Devices will receive the video signal of the new real CPU Device.

One real CPU Device can be assigned to several virtual CPU Devices.

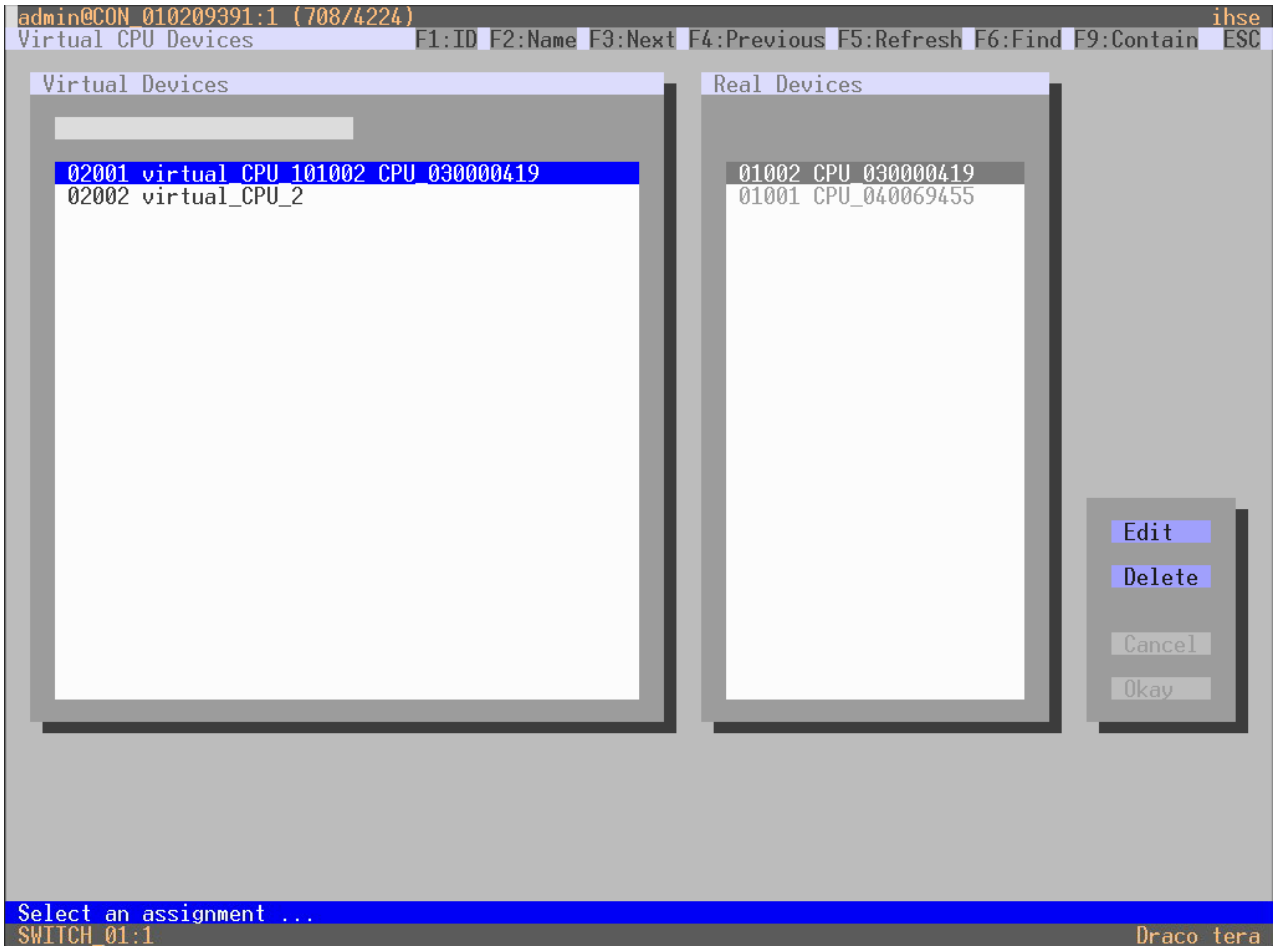


*Fig. 74 OSD Menu **Assignments - Virtual CPU Devices***

The following functions are available:

Button	Function
New V.	Create a new virtual CPU Device.
Edit	Edit an existing CPU Device.
Delete	Delete an existing CPU Device.
Cancel	Reject changes.
Okay	Apply changes.

To assign virtual CPU Devices to real CPU Devices, proceed as follows:

1. Select **Assignments > Virtual CPU Devices** in the main menu.
2. Select the virtual CPU Device in the **Virtual Devices** list that has to be assigned to a real CPU Device.
3. Click **Edit**.
4. Select the real CPU Device in the **Real Devices** list that has to be assigned to the selected virtual CPU Device.
5. Click **Okay** to confirm the assignment.

   The selected virtual CPU Device is assigned to the real CPU Device.

6.7 Configuring Console Side Settings

Connecting a CON Unit to the matrix creates an EXT Unit in the matrix, reading the serial number of the CON Unit. An EXT Unit has to be assigned to a CON Device. Switching operation is only possible between CON Device and CPU Device. All steps to create switchable CON Devices are described in this chapter. Several real CON Devices can be assigned to a virtual CON Device to reduce operation efforts (see chapter 6.7.6, page 125).

6.7.1 OSD Configuration for Mouse and Keyboard

The OSD configuration for mouse and keyboard is made in this menu. The settings for mouse and keyboard are CON Device-specific and can be set separately for each CON Device.

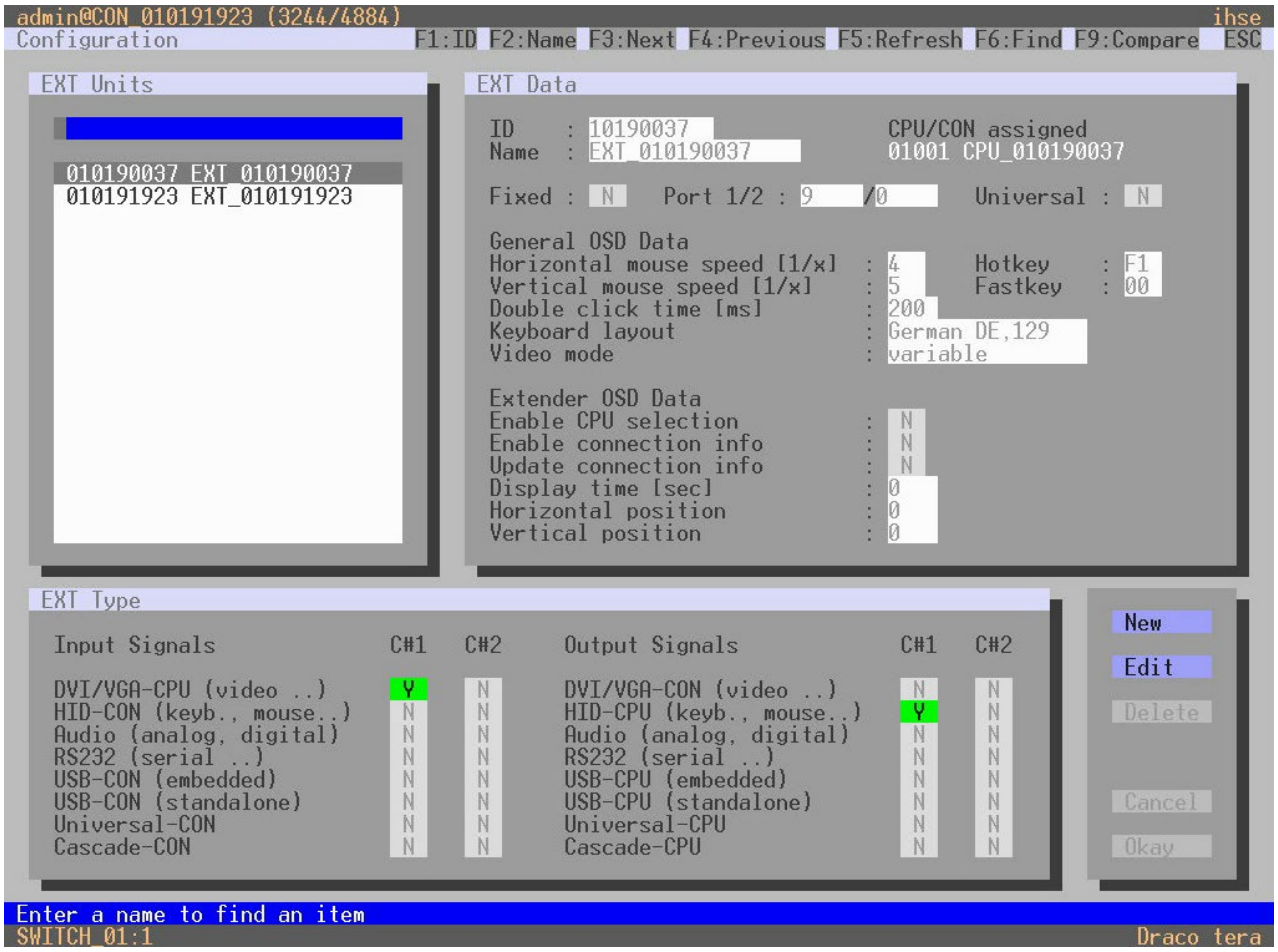


*Fig. 75 OSD Menu **Configuration - EXT Units***

The following parameters can be configured:

Field	Entry	Description
Hor. Speed 1/x	1 to 9	Adjustment of the horizontal mouse speed, 1 = slow, 9 = fast (default: 4).
Ver. Speed 1/x	1 to 9	Adjustment of the vertical mouse speed, 1 = slow, 9 = fast (default: 5).
Double-click	100 to 800	Adjustment of the time slot for a double-click (default: 200 ms).
Keyboard layout	Region	Set the OSD keyboard layout according to the used keyboard (default: German (DE)).
Video Mode	Variable or specific resolution	Resolution that is used when opening OSD.

To change the settings for mouse and keyboard, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Select the CON Unit extender module in the **EXT Units** list whose OSD settings has to be adjusted.
3. Click **Edit** or press Enter to confirm the selection.
4. Change the desired settings.
5. Click **Okay** to confirm the changes.

6.7.2 Setting Extender OSD

In this menu the parameters for the Extender OSD can be set. The settings for mouse and keyboard are CON Device-specific and can be set separately for each CON Device.

When setting the horizontal OSD position, a prefixed minus describes the orientation to the right edge of the monitor, e.g., -2 means 2 x 10 = 20 pixels to this edge. When setting a vertical position, a prefixed minus describes the orientation to the lower edge of the monitor.

If the **Update connection info** function is deactivated, the extender OSD only appears when switching via OSD.

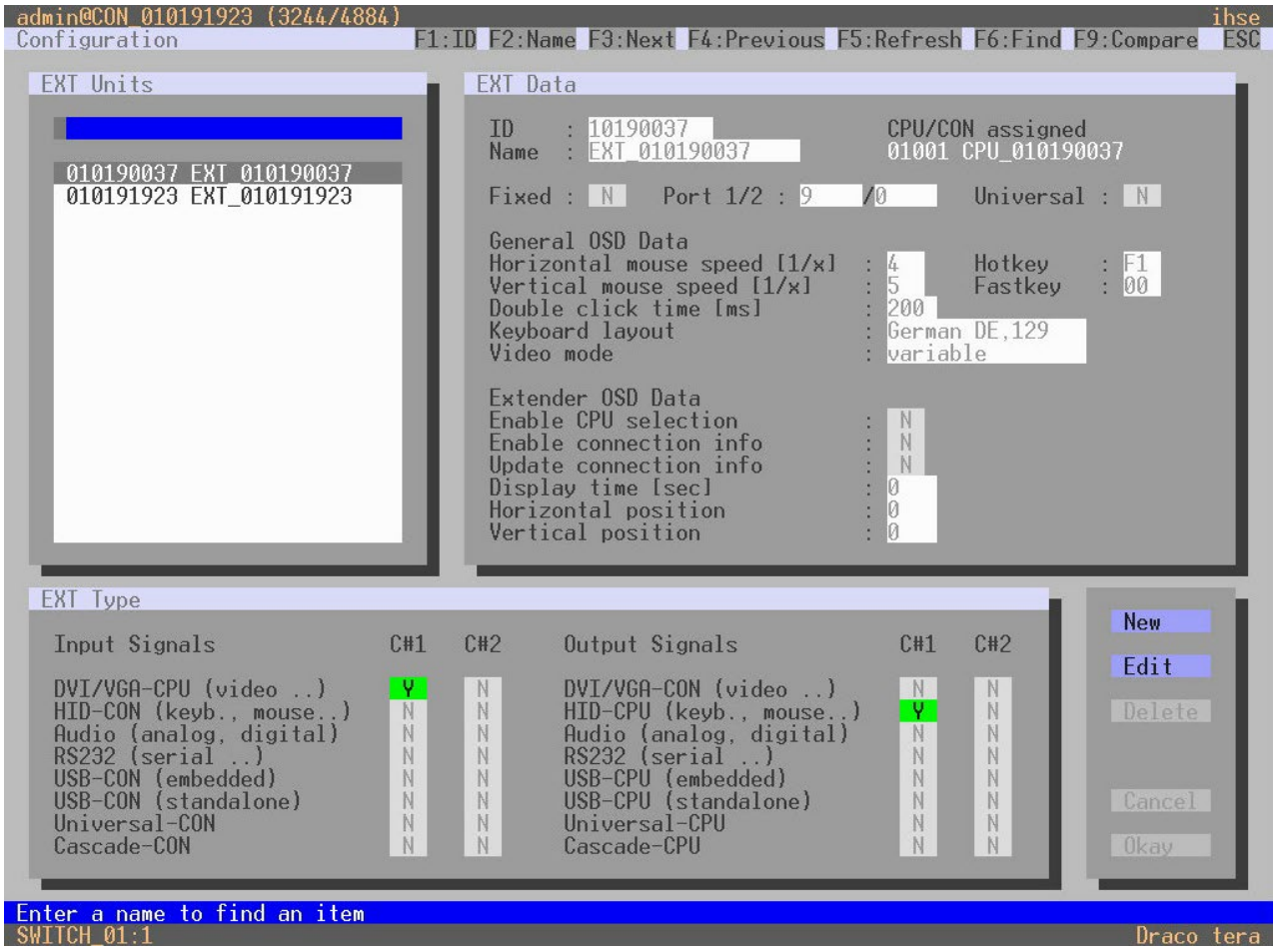


*Fig. 76 OSD Menu **Configuration - EXT Units***

The following parameters can be configured:

Field	Entry	Description
Enable CPU selection	Y	When executing the key sequence for opening the OSD, a selection list for switching CPU Devices (CPU Device selection list) will be displayed in the center of the monitor. Pressing F7 within the selection list opens the standard OSD.
	N	Function not active (default).
Enable connection info	Y	Enable Extender OSD (default: Y).
	N	Function not active.
Update connection info	Y	Update connection changes during fade-in of Extender OSD (default: Y).
	N	Function not active.
Display time [sec]	0 to 999 seconds	Duration of OSD fade-in (default: 10).
Horizontal Position	-127 to +127 pixels	Horizontal OSD position (default: -2). E.g., value 5 means 5 x 10 px distance to the left border.
Vertical Position	-127 to +127 pixels	Vertical OSD position (default: 3) E.g., value 5 means 5 x 10 px distance to the top border.

To change the Extender OSD settings, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Select the CON Unit extender module in the **EXT Units** list whose OSD settings has to be adjusted.
3. Click **Edit** or press Enter to confirm the selection.
4. Change the desired settings.
5. Click **Okay** to confirm the changes.

6.7.3 Setting CON Devices

New CON Devices are created in this menu including access rights and assignment to EXT Units.

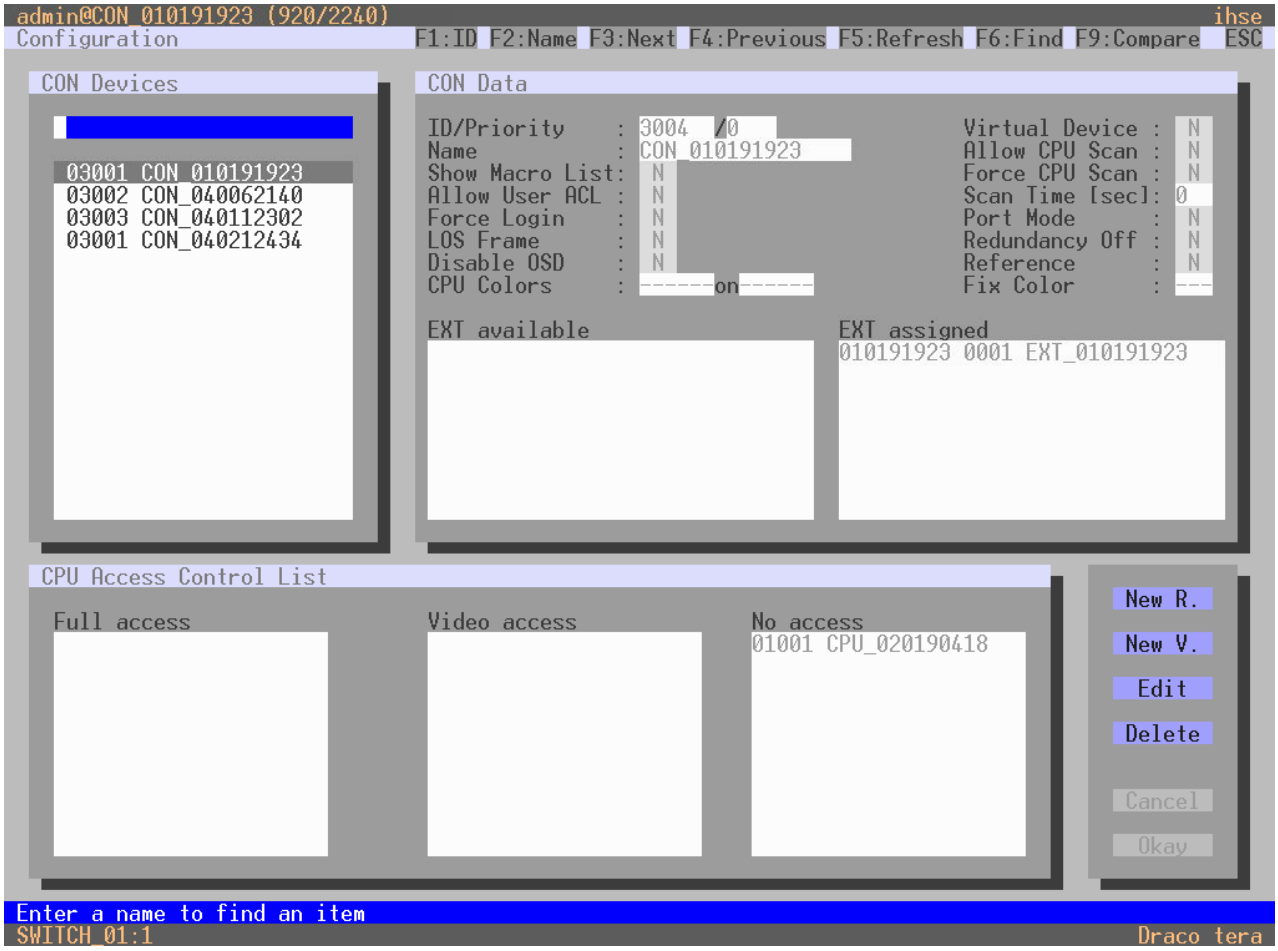


*Fig. 77 OSD Menu **Configuration - CON Devices***

The following functions are available:

Button	Function
New R.	Create a real CON Device.
New V.	Create a virtual CON Device.
Edit	Edit an existing CON Device.
Delete	Delete an existing CON Device.
Cancel	Reject changes.
Okay	Apply changes.

The following parameters can be configured:

Field	Entry	Description
ID	Text	ID of the CON Device.
Priority	0 to 999	Priority of the CON Device. **Note:** There is no K/M sharing between CON Devices with a different priority and the release time does not come into account. CON Devices only have Video Only access to a CPU Device if a CON Device with a higher priority is already switched to it.
Name	Text	Name of the CON Device.
Show Macro List	Y	Show the macro list instead of the CPU Device selection list.
	N	Function not active (default).
Allow User ACL	Y	Allow activation of the User ACL at the local CON Device.
	N	Function not active (default).
Force Login	Y	The user has to login with a username and a password once to enter OSD. Thereafter the user remains logged in until he explicitly logs out or an auto logout is affected. **Note:** When using the **Force Login** function, Console ACL are still active. When the **Force Login** function is activated and a user is logged in, only the user favorites are available. The CON favorites are not accessible.
	N	Function not active (default).
LOS Frame	Y	• When the video signal between source and the CPU Unit or the connection between matrix and the CON Unit is lost, an orange frame will be displayed. • When switching to a CPU Device without video signal, a blank screen will appear surrounded by an orange frame.
	N	Function not active (default).
Disable OSD	Y	Disable OSD access for the respective CON Device.
	N	Function not active (default).
CPU Colors	Selection list	The CPU Device name will be highlighted according to the color setting for text and background. You can select between 16 colors.
Virtual Device	Y	Automatically set for a virtual CON Device.
	N	Function not active (default).
Allow CPU Scan	Y	Allow a scan mode with an automatic change of the video signal for the favorite list (CPU Devices) of the respective CON Device or a logged in user.
	N	Function not active (default).
Force CPU Scan	Y	Force a scan mode with an automatic change of the video signal for the favorite list (CPU Devices) of the respective CON Device or a logged in user. **Note:** An active scanner can be stopped by a mouse or keyboard event. You gain Full Access for the currently switched CPU Device if Force Connect is activated.
	N	Function not active (default).
Scan Time [sec]	0 to 99 seconds	Retention period until switching to the next CPU Device.

Field	Entry	Description
Port Mode	Y	The favorite list will be replaced by a port list where the ports from 1-999 can be directly selected at each matrix or Matrix Grid. **Note:** The selection only works for CPU Devices and has to be made according to the switching of favorites. When using the Port Mode, CON and User favorites will be deactivated.
	N	Function not active (default).
Redundancy Off	Y	Function not active.
	N	Automatically switch to the second link of a connected redundant CON Unit when losing the primary link of a CPU Unit (default).
Reference	Y	Activate a reference CON Device that inherits both Device and EXT Unit to any CON Unit that is connected to the matrix for the first time. **Note**: It is recommended to activate the reference setting for one single CON Device only.
	N	Function not active (default).
Fix Color	Selection list	Show a colored frame when being connected to the respective CPU Device. You can select between seven colors. The colored frame of the CPU device is displayed with priority to the one of the CON Device.

To create a CON Device, proceed as follows:

1. Select **Configuration > CON Devices** in the main menu.
2. Click **New R.** to create a new real CON Device or click **New V.** to create a new virtual CON Device.
3. Enter a CON Device name into the field **Name**.
4. Click **Okay**.

   The CON Device is created now.

To assign an EXT Unit to a CON Device, proceed as follows:

1. Select **Configuration > CON Devices** in the main menu.
2. Select the CON Device you want to assign an EXT Unit.
3. Select the EXT Unit for the assignment in the **EXT available** list.
4. Click **Okay**.

   The CON Device is assigned to the EXT Unit now.

6.7.4 Setting CON Device Favorites

Individual favorite lists of CPU Devices to be switched frequently can be created for all CON Devices in this menu. A favorite list can contain up to 32 different CPU Devices (from firmware V3.05).

The switching of the favorites is done via Hot Key using the keyboard (see chapter 8.1.1, page 290).

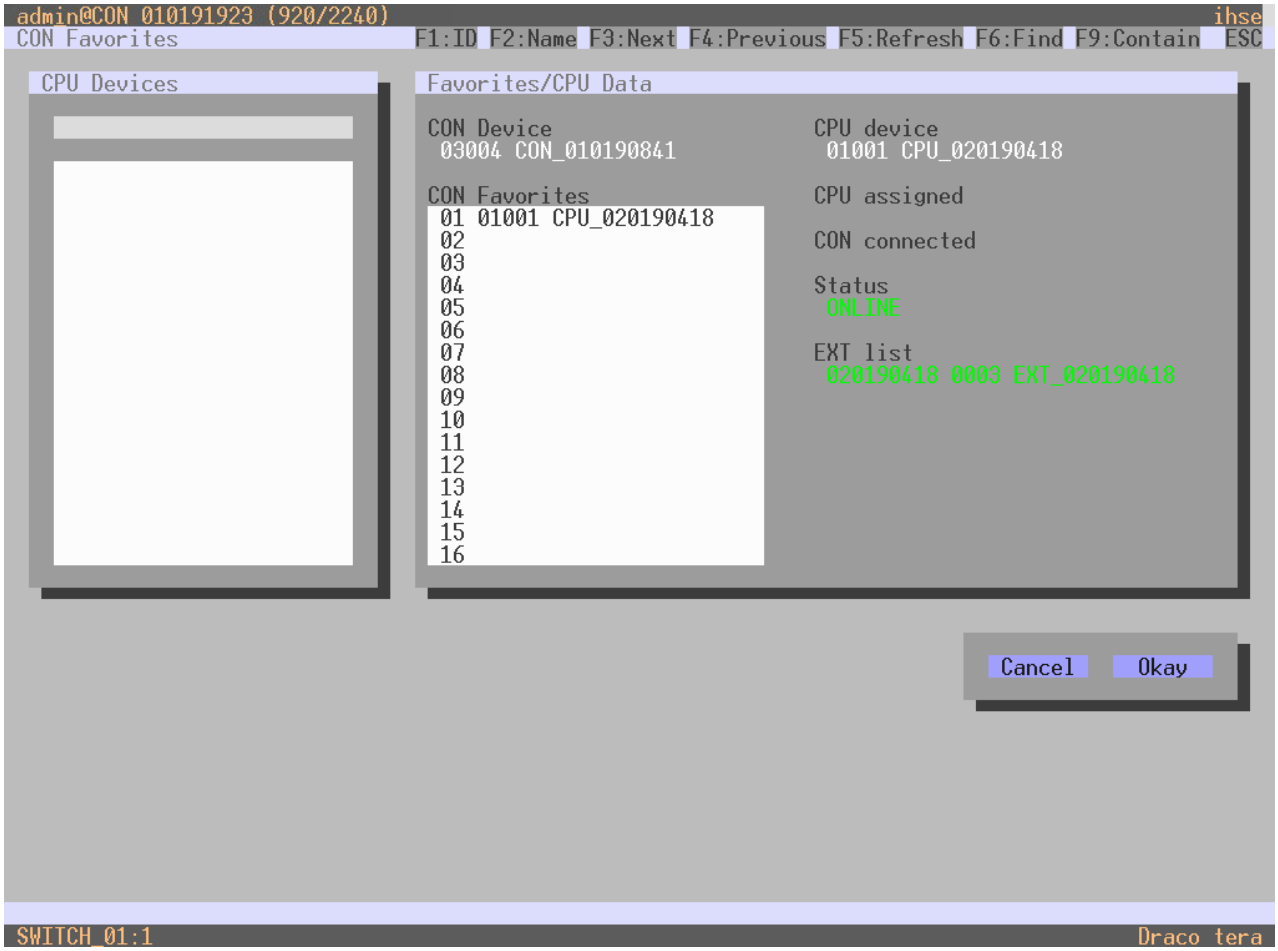


*Fig. 78 OSD Menu **Assignments - CON Favorites***

To create a favorite list for your own CON Device, proceed as follows:

1. Select **Assignments > CON Favorites** in the main menu.
2. Select a CPU Device to be moved to the favorite list on the **CPU Devices** list.
3. Press a to move a CPU Device to the favorites list.
   To remove a CPU Device from the favorite list, press r.
4. Optional: press + or - to change the order of the CPU Devices within the favorites list.
5. Click **Okay** to confirm the settings.

6.7.5 Setting CON Device Macros

In this menu macro commands for switching, disconnection or user administration can be created. The macro commands are created for each CON Device separately. Up to 32 macros can be configured for each CON Device. A macro can execute up to 16 switching commands successively.

The execution of the macros is done via Hot Key and the function keys F1 to F16 (see chapter 8.1.4, page 293).

The macros can also be used to switch to CPU groups.

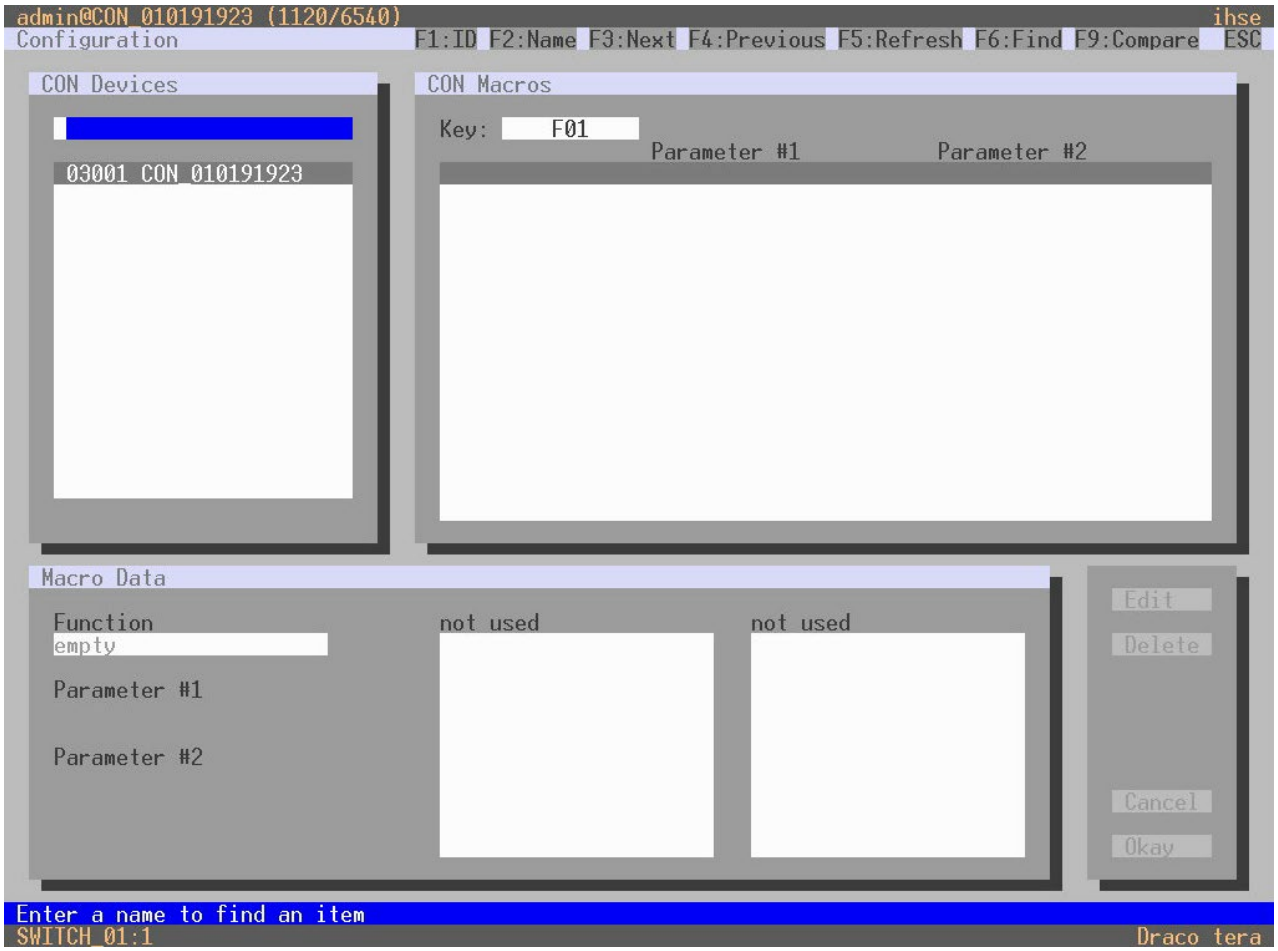


*Fig. 79 OSD Menu **Configuration - CON Macros***

The following parameters can be configured:

Field	Selection	Description
Function (01 to 16)	**Connect (P1=CON, P2=CPU)**	Set a bidirectional connection from CON Device P1 to CPU Device P2.
	Connect Video (P1=CON, P2=CPU)	Set a Video Only connection from CON Device P1 to CPU Device P2.
	Disconnect (P1=CON)	Disconnect the CON Device P1.
	Logout User	Logout the current user.
	Assign CPU (P1=VCPU, P2=RCPU)	Assign a virtual CPU Device to a real CPU Device.

Field	Selection	Description
Function (01 to 16)	**Assign CON (P1=RCON, P2=VCON)**	Assign a real CON Device to a virtual CON Device.
	Push (P1=CON)	The user's Full Access connection is forwarded to CON Device P1 and is changed into a Video Only connection.
	Push Video (P1=CON)	The video signal of the current connection (Full Access or Video Only) is forwarded to CON Device P1. The user's connection remains unchanged (Full Access or Video Only).
	Get (P1=CON)	The user's CON Device gets a Full Access connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 is changed into a Video Only connection.
	Get Video (P1=CON)	The user's CON Device gets a Video Only connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 remains unchanged (Full Access or Video Only).
	Login User console P2	Login a certain user P1 at CON Device P2.
P1	**CON or CPU Device**	Name of CON Device or CPU Device.
P2	**CON or CPU Device**	Name of CON Device or CPU Device.

To create a macro for the selected CON Device, proceed as follows:

1. Select **Configuration > CON Macros** in the main menu.
2. Select the CON Device for which a macro is to be created.
3. Select in the **Key** field the function key (F1 to F32) for which a macro should be created.
4. Select the respective place on the list (1 to 16) for the key that should be set with a macro key.
5. Select for the highlighted position on the list a macro command in the **Macro Data** field.
6. Set the necessary parameters **P1** and **P2** (e.g., CON Devices or CPU Devices) for the selected macro command.
7. Confirm your inputs by pressing Enter and repeat the process for further macro commands if necessary.

6.7.6 Assigning Virtual CON Devices

In this menu, several real CON Devices can be assigned to a virtual CON Device.

This function reflects changes in permission made to virtual CON Devices onto real CON Devices. Virtual CON Devices can be switched in the same way as real CON Devices. Real CON Devices that are assigned to a virtual CON Device that is connected to a CPU Device will receive the video signal. The last assigned CON Device will also have control of the keyboard and mouse.

A virtual CON Device can be assigned to more than one real CON Devices.

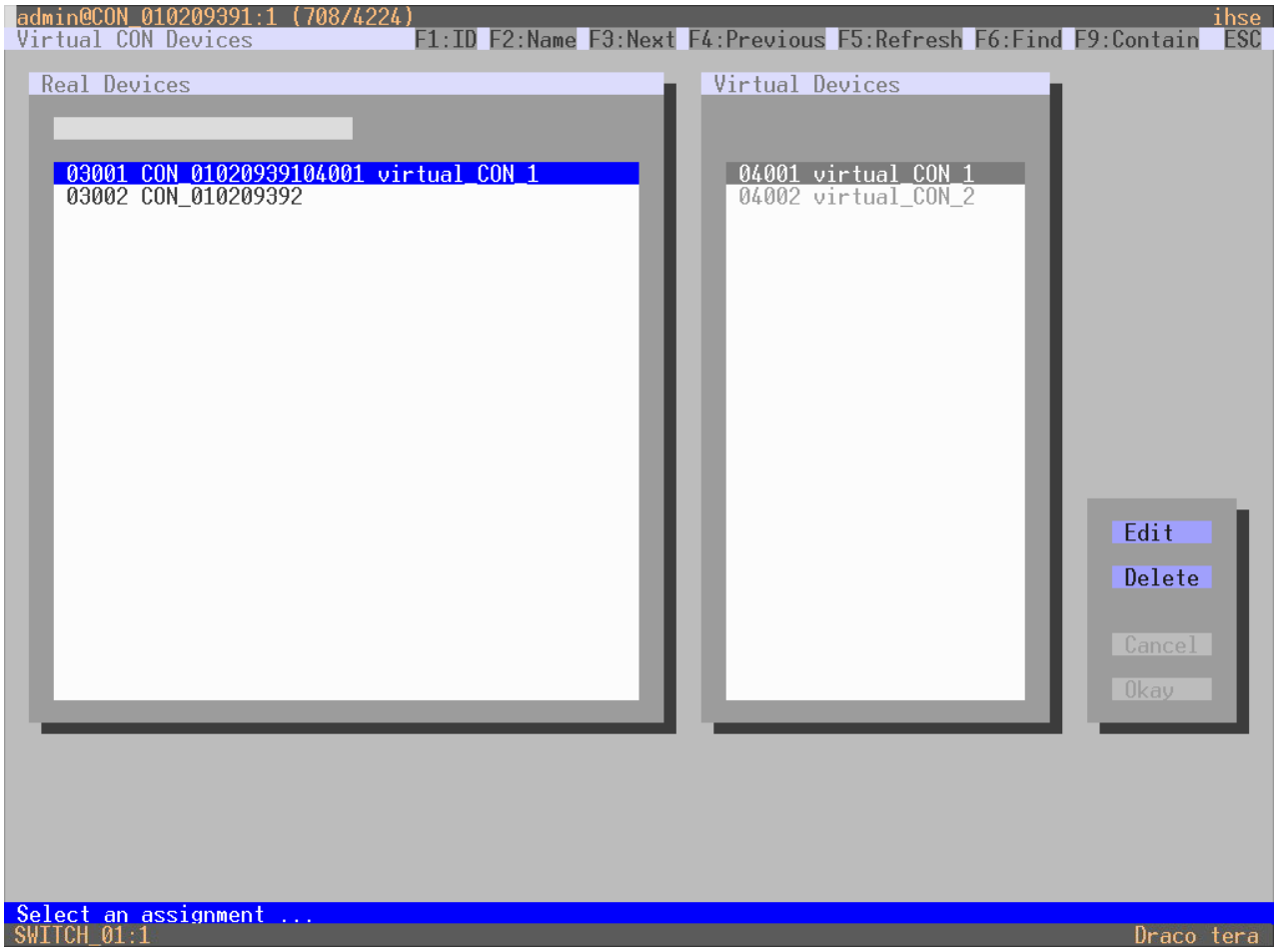


*Fig. 80 OSD Menu **Assignments - Virtual CON Device***

For an assignment, proceed as follows:

1. Select **Assignments > Virtual CON Devices** in the main menu.
2. Select the real CON Device in the **Real Devices** list that has to be assigned to a virtual CON Device.
3. Click **Edit**.
4. Select the virtual CON Device in the **Virtual Devices** list that has to be assigned to the selected real CON Device.
5. Click **Okay** to confirm the assignment.

   The selected virtual CON Device is assigned to the real CON Device.

6.7.7 Enabling Multi-Screen Control

Due to limited options via OSD, we recommend configuring the MSC only via management software to carry out the extended configuration options (from firmware V03.08), see chapter 7.8.11, page 257.

When using MSC, switching up to eight connected sources can be performed at one sink with only one connected mouse and/or keyboard. The sink can consist of up to eight CON Units and accordingly up to eight monitors, or up to sixteen monitors when using Dual-Head extender modules. In a matrix system, MSC can be set up at multiple sinks. The CON Units of a sink with MSC must all be physically connected to the same block of 8 ports on the I/O board. When using one of these I/O boards (480-C8, 480-S8 or 480-V8), the block size is limited to 4 ports (port 1 to 4, or port 5-8).

One of the CON Devices is designated for USB-HID control of the connected sources, below referred to as “Control CON Device”. Control CON Devices are referred to the extender modules/EXT Units within the MSC that are connected to keyboard and mouse for operation. If the USB-HID control has to be performed via several USB-HID devices, several CON Devices have to be defined as Control CON Device.

Smooth switching of sources with the mouse is performed by dragging the mouse pointer beyond the respective display to an adjacent display in an arrangement of displays. The displays can be arranged side by side, in a grid layout, or completely freely. Alternatively, switching can be performed via keyboard commands according to the ID number in the MSC setup.

NOTICE

When using CON Units with the possibility to connect a local source in a MSC environment, the local switching will be disabled.

When configuring MSC via OSD, the number of supported displays is limited to four.

➥ To configure more than four displays (up to eight with Single-Head and up to sixteen with Dual-Head installation), you have to configure the MSC only via management software.

The connected sources need to support absolute mouse mode. Else a specific mouse driver needs to be installed.

CON Units that have been already configured for MSC can be connected all together to other blocks of 8 ports. In this case any further configuration is not necessary, their functionality will remain as set previously.

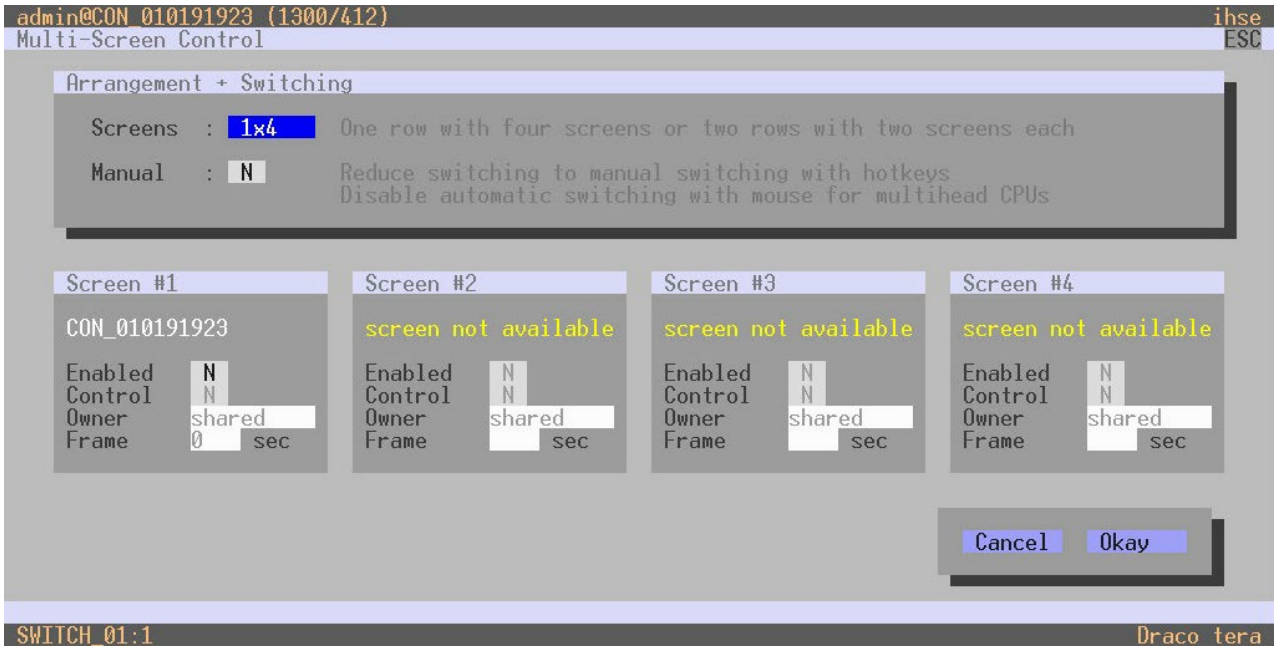


*Fig. 81 OSD Menu **Assignments - Multi-Screen Control***

The following parameters can be configured:

Field	Entry	Description
Enable	Y	Activate the respective display for MSC.
	N	Function not active (default).
Control	Y	Enable the CON Device for USB-HID control of other CON Devices if access is permitted.
	N	Function not active (default).
Owner	Selection	• Shared (default) permits the access from a Control CON Device to all other CON Devices except to another Control CON Device. • Name of the own Control CON Device to restrict access to other CON Devices.
Frame	0 to 999 seconds	Time for fading in a red frame at the display with current mouse/keyboard control.

Configure MSC at a CON Device that should be used to control USB-HID in the setup. To change or delete a MSC setup, you have to open the OSD of the defined Control CON Device.

Configuring Multi-Screen Control

To configure MSC, proceed as follows:

1. Open the OSD of a CON Unit connected to an I/O board for which the connected CON Units are to be configured for MSC.
2. Select **Assignments > Multi-Screen Control** in the main menu.
   Only the CON EXT Units connected to the selected I/O board are visible.
3. In the **Arrangement** field, select the layout for the CON Device you want to configure (**1 x 4** or **2 x 2**). The fields for the configuration of the individual displays will be arranged accordingly.
4. Activate the **Manual** option if the USB-HID switching is to be restricted to keyboard commands (see chapter 8.1.6, page 294). Manual switching allows the use of multi-head consoles.
5. Set the **Enable** option to **Y** on all CON Devices to activate the respective display for MSC.
6. Set the **Control** function to **Y** on one or more CON Devices to be enabled as Control CON Device.
7. Use the **Frame** function to configure a red frame that shows the display with current mouse control, for the duration of a specified time by flashing briefly. The frame can be activated individually for each screen by using a timer > 0 seconds.
8. Click **Okay** to confirm the changes.
9. Restart the I/O board.
10. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
11. Save the configuration changes into the active configuration.

All Control CON Devices are enabled to control USB-HID of all other CON Devices in the setup except of another Control CON Device. To restrict the access to other CON Devices, see following section.

To configure MSC for further I/O boards via OSD, connect to the I/O board at a CON Device that should be used to control USB-HID in the setup.

Access Restriction when using Multiple Control CON Devices

Dragging the mouse pointer over the display border is only permitted for those displays whose CON Device is enabled for access by the owner of the respective Control CON Device.

To enable access to a display for only one Control CON Device, proceed as follows:

1. Click in the **Owner** field of a Control CON Device and select the name of the Control CON Device.
2. Click in the **Owner** field of all Control CON Device whose display should be accessible and select the name of the respective Control CON Device.

   The mouse can now be used to access those displays whose CON Device is permitted for access by the enabled Control CON Device.
3. Click **Okay** to confirm the changes.
4. Restart the I/O board.
5. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
6. Save the configuration changes into the active configuration.

No simultaneous USB HID sharing of multiple Control CON devices.

Example: In a setup of 4 CON Devices, if CON Device 1 and 2 are each Control CON Devices and two other "non-Control CON Devices" are configured, both Control CON Devices can access the displays of CON Device 3 to 4 if they are configured with **Owner = Sharing**.
However, Control CON Device 1 and 2 cannot access the display of a "non-Control CON Device" at the same time. The Control CON Device that first had USB-HID control is reset to its "own" display when the second Control CON Device takes over.

Changing Multi-Screen Control

To change the MSC for a setup of a specific I/O board, proceed as follows:

1. Open the OSD of a Control CON Device of the specific I/O board.
2. Select **Assignments > Multi-Screen Control** in the main menu.

   Only the CON EXT Units connected to the selected I/O board are visible.
3. Make any edits at the configuration.
4. Click **Okay** to confirm the changes.
5. Restart the I/O board.
6. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
7. Save the configuration changes into the active configuration.

Deleting Multi-Screen Control

To delete the MSC for a setup of a specific I/O board, proceed as follows:

1. Open the OSD of a Control CON Device of the specific I/O board.
2. Select **Assignments > Multi-Screen Control** in the main menu.

   Only the CON EXT Units connected to the selected I/O board are visible.
3. Set the **Enable** option to **N** on all CON Devices.

   The MSC is disabled for all CON Devices of the selected I/O board.
4. Click **Okay** to confirm the changes.
5. Restart the I/O board.
6. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
7. Save the configuration changes into the active configuration.

6.8 Configuring Matrix Cascading

This simple method of cascading allows a switchable connection between two matrices via so called **Tie Lines**. The Matrix Cascading does not require **Bundle 4**.

This kind of configuration may become necessary if the number of ports in the entire system has to be increased or if certain important connections should be distributed to several matrices due to reasons of redundancy.

The Tie Lines are unidirectional and can only be used in one direction according to their configuration. For a bidirectional use of the cascading, you have to configure opposite Tie Lines.

To connect Tie Lines to the matrices, you have to create intended **Cascade CON Devices** and **Cascade CPU Devices** that have to be switched within the cascaded environment.

Define a Master Matrix. All further matrices will be configured as Sub Matrices in the configuration process. Ensure that the Tie Lines will only be connected after finishing the configuration.

6.8.1 Directing a Tie Line from the Sub to the Master

To configure settings for using Matrix Cascading and to direct the Tie Line from the Sub to the Master, proceed as follows:

1. Open the OSD of the Master Matrix.
2. Select **Configuration > EXT Units** in the main menu of the Master Matrix.
   2.1. Click **New**.
   A new EXT Unit will be created.

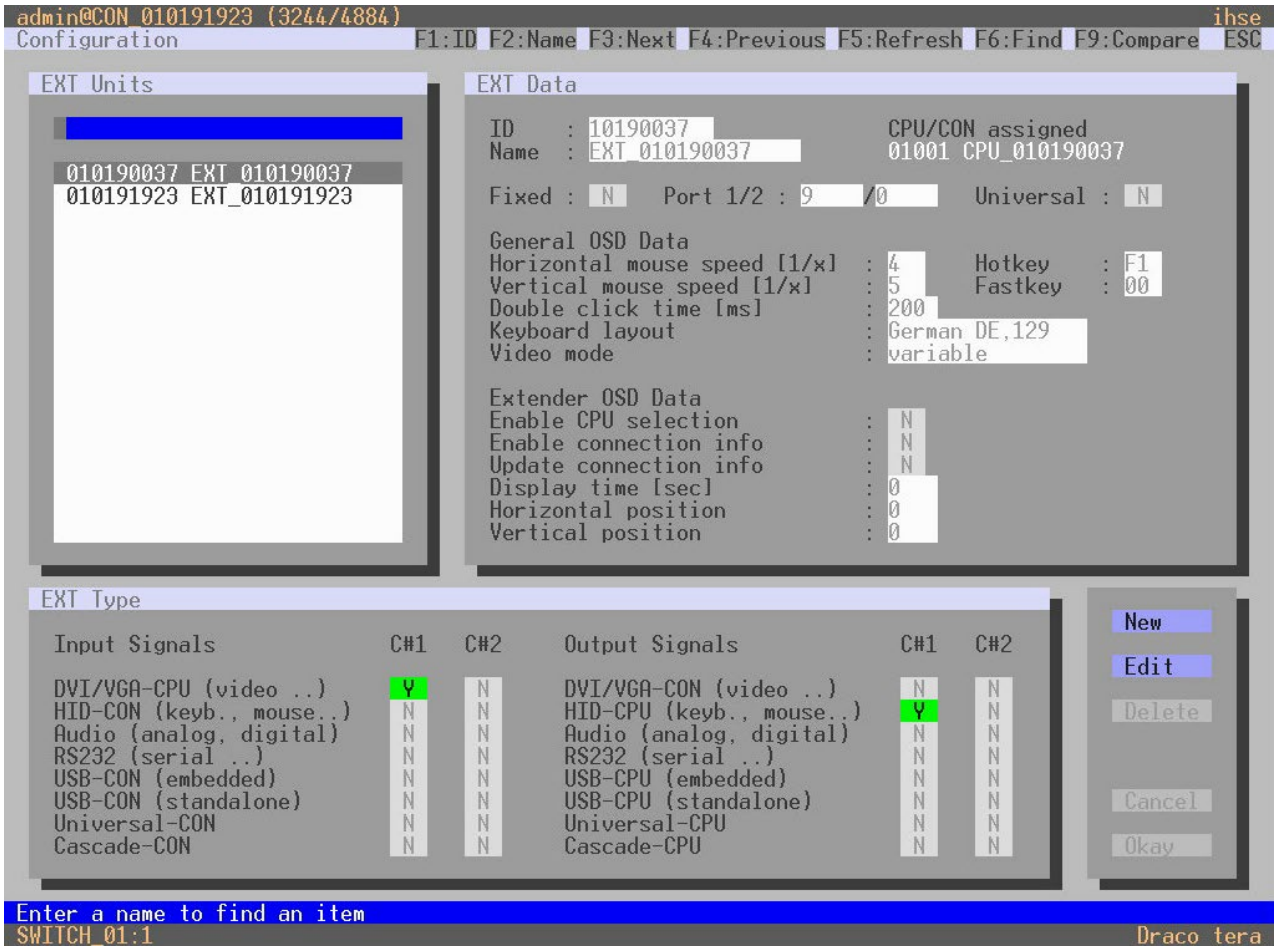


*Fig. 82 OSD Menu **Configuration - EXT Units***

2.2. Enter an appropriate name for the Cascading CPU Unit into the **Name** field.

2.3. Enter a port number into the **Port** field according to the required connection of the Tie Line.

2.4. Set the **Cascade-CPU** option to **Y** (**C#1**) in the **Output Signals** column.

2.5. Click **Okay** to confirm the creation of a Cascading CPU Unit.

3. Select **Configuration > CPU Devices** in the main menu of the Master Matrix.

3.1. Click **New R.**.

A switchable CPU Device will be created.

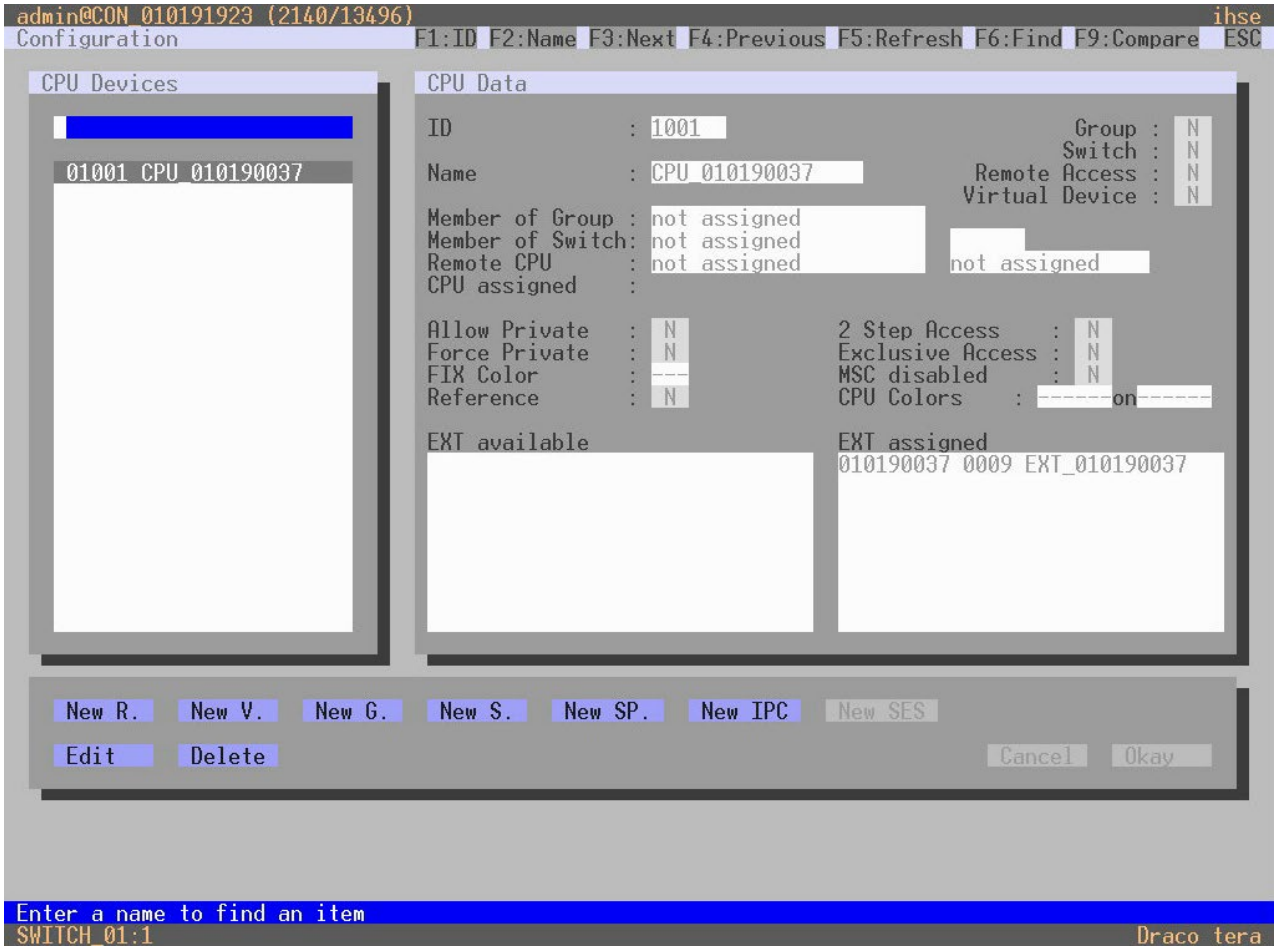


*Fig. 83 OSD Menu **Configuration - CPU Devices***

3.2. Enter an appropriate Cascading CPU Device into the Name field.

3.3. Select the previously configured Cascading CPU Unit in the **EXT available** list.

3.4. Press a to move the Cascading CPU Unit to the **EXT assigned** list.

The assignment is displayed in the **EXT assigned** list.

3.5. Click Okay to confirm the assignment.

4. Open the OSD of the Sub Matrix.
5. Select **Configuration > EXT Units** in the main menu of the Sub Matrix.
   5.1. Click **New**.

   A new EXT Unit will be created.

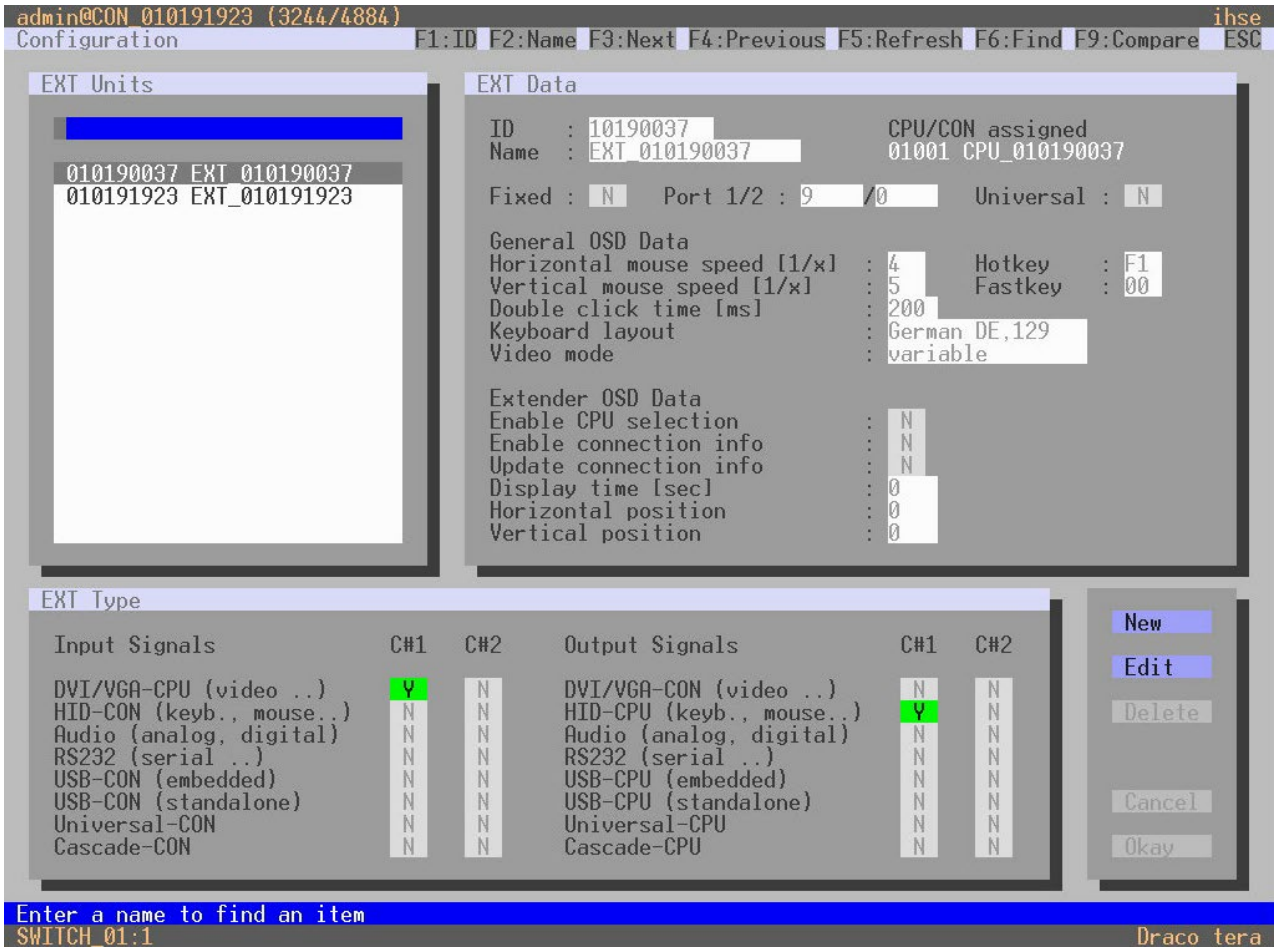


*Fig. 84 OSD Menu **Configuration - EXT Units***

   5.2. Enter an appropriate name for the Cascading CON Unit into the **Name** field.
   5.3. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   5.4. Set the **Cascade-CON** option to **Y** (**C#1**) in the **Input Signals** column.
   5.5. Click **Okay** to confirm the creation of a Cascading CON Unit.

6. Select **Configuration > CON Devices** in the main menu of the Sub Matrix.

   6.1. Click **New R.**.

   A switchable CON Device will be created.

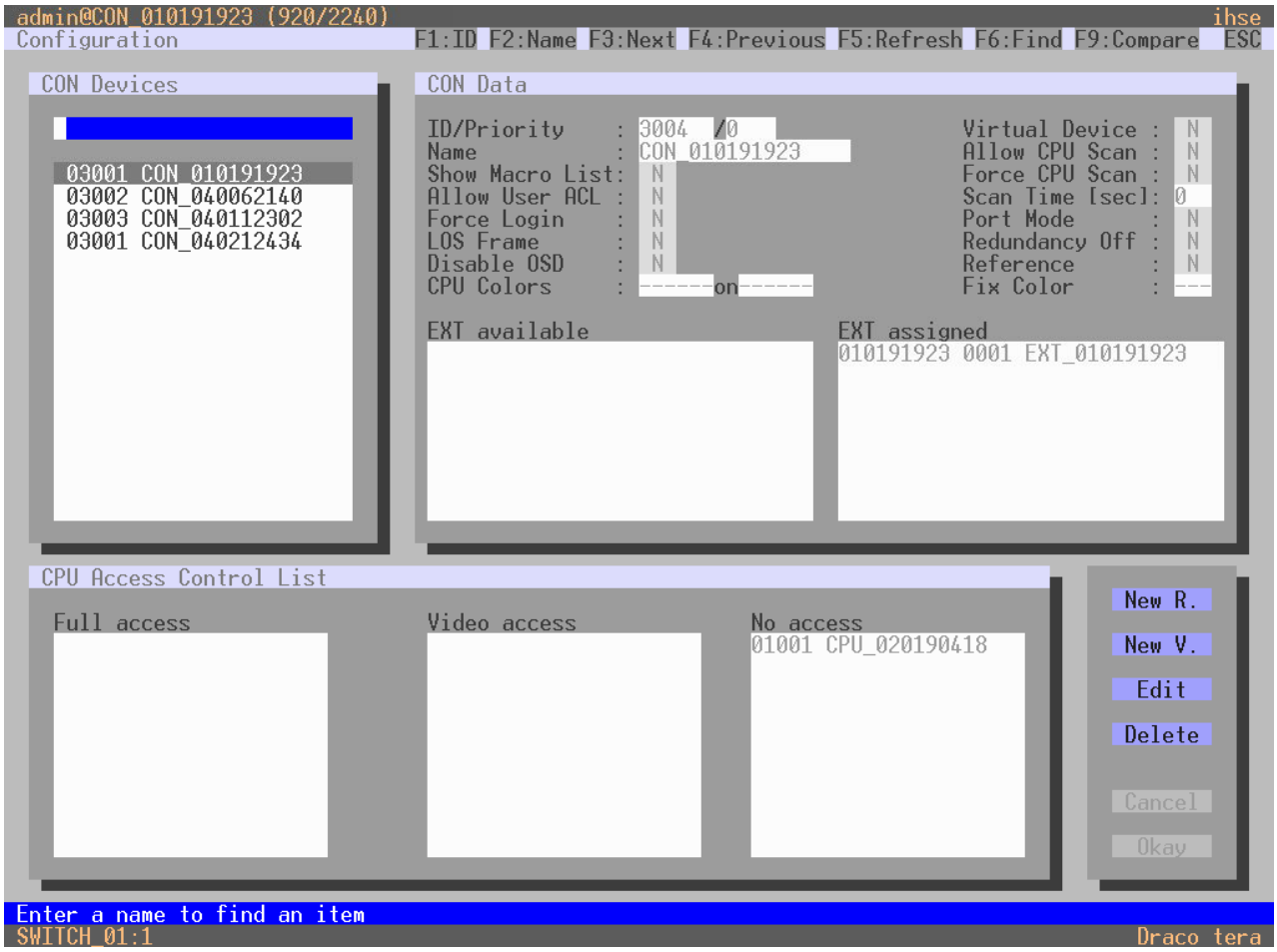


*Fig. 85 OSD Menu **Configuration - CON Devices***

   6.2. Enter an appropriate name for the Cascading CON Device into the **Name** field.

   6.3. Press a to move the Cascading CON Unit to the **EXT assigned** list.

   The assignment is displayed in the **EXT assigned** list.

   6.4. Click **Okay** to confirm the assignment.

7. Select **Configuration > System** in the main menu of the Sub Matrix.
   7.1. Set the **Sub Matrix** option to **Y**.
   7.2. Click **Okay** to confirm the Sub Matrix option.

The OSD of the Sub Matrix will immediately freeze and will be only accessible by using the keyboard command Hot Key, s, o.

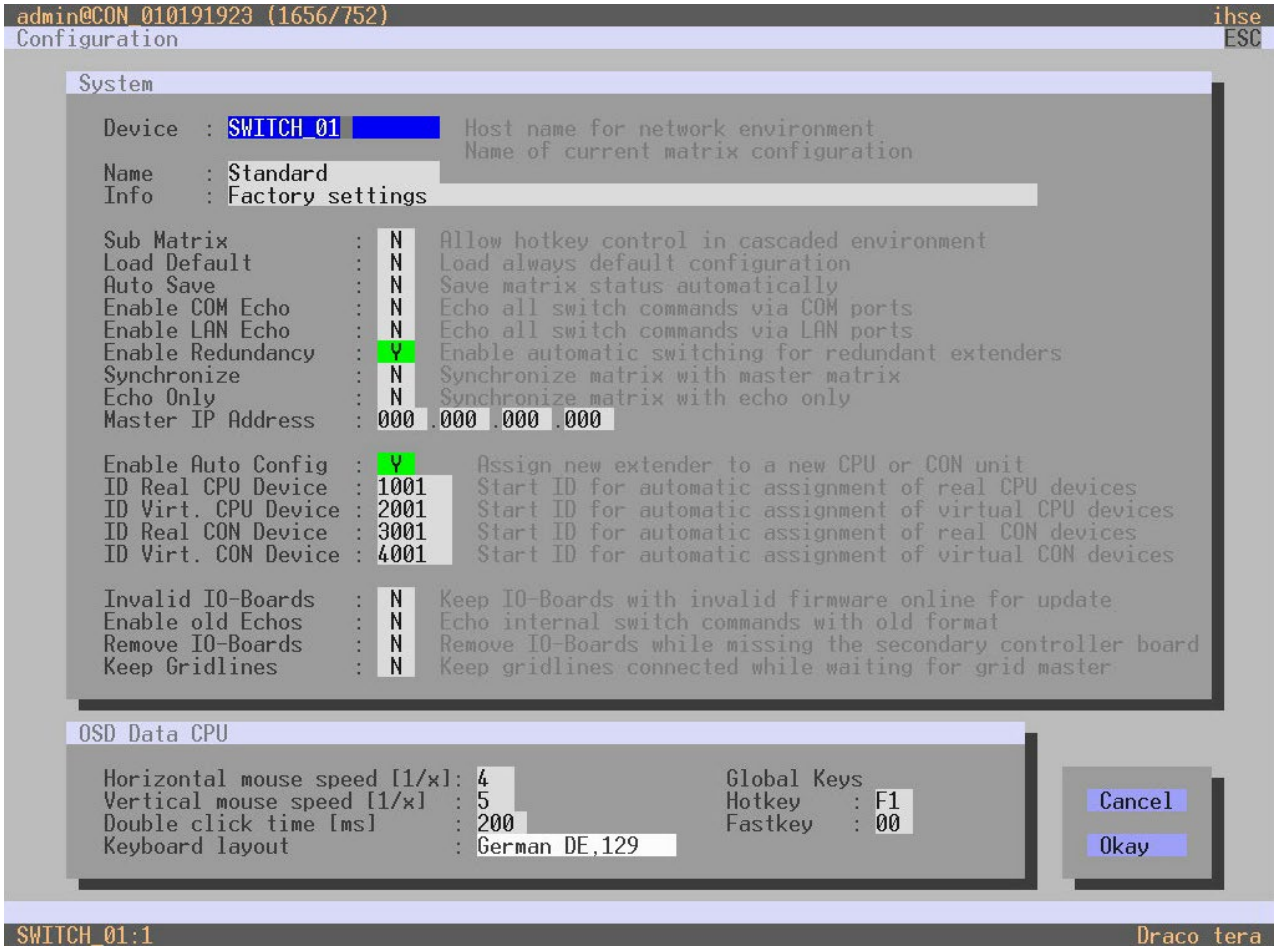


*Fig. 86 OSD Menu **Configuration - System***

8. Restart all I/O boards (see chapter 9.2.2, page 309) on which any Master/Sub CON Units or CPU Units have been configured or alternatively restart the matrix (see chapter 9.2.1, page 308).
9. Connect the Tie Lines to the matrices. Ensure that each **Cascade CON Device** on one matrix is connected to **Cascade CPU Device** on the other matrix to achieve switch ability between two matrices.

   The Matrix Cascading is now configured and can be used.

Additional Tie Lines are configured accordingly. The use of cascading is described in in chapter 8.1.1, page 290.

6.8.2 Directing a Tie Line from the Master to the Sub

To configure settings for using Matrix Cascading and to direct the Tie Line from the Master to the Sub, proceed as follows:

1. Open the OSD of the Master Matrix.
2. Select **Configuration > EXT Units** in the main menu of the Master Matrix.
   2.1. Click **New**.
   A new EXT Unit will be created.

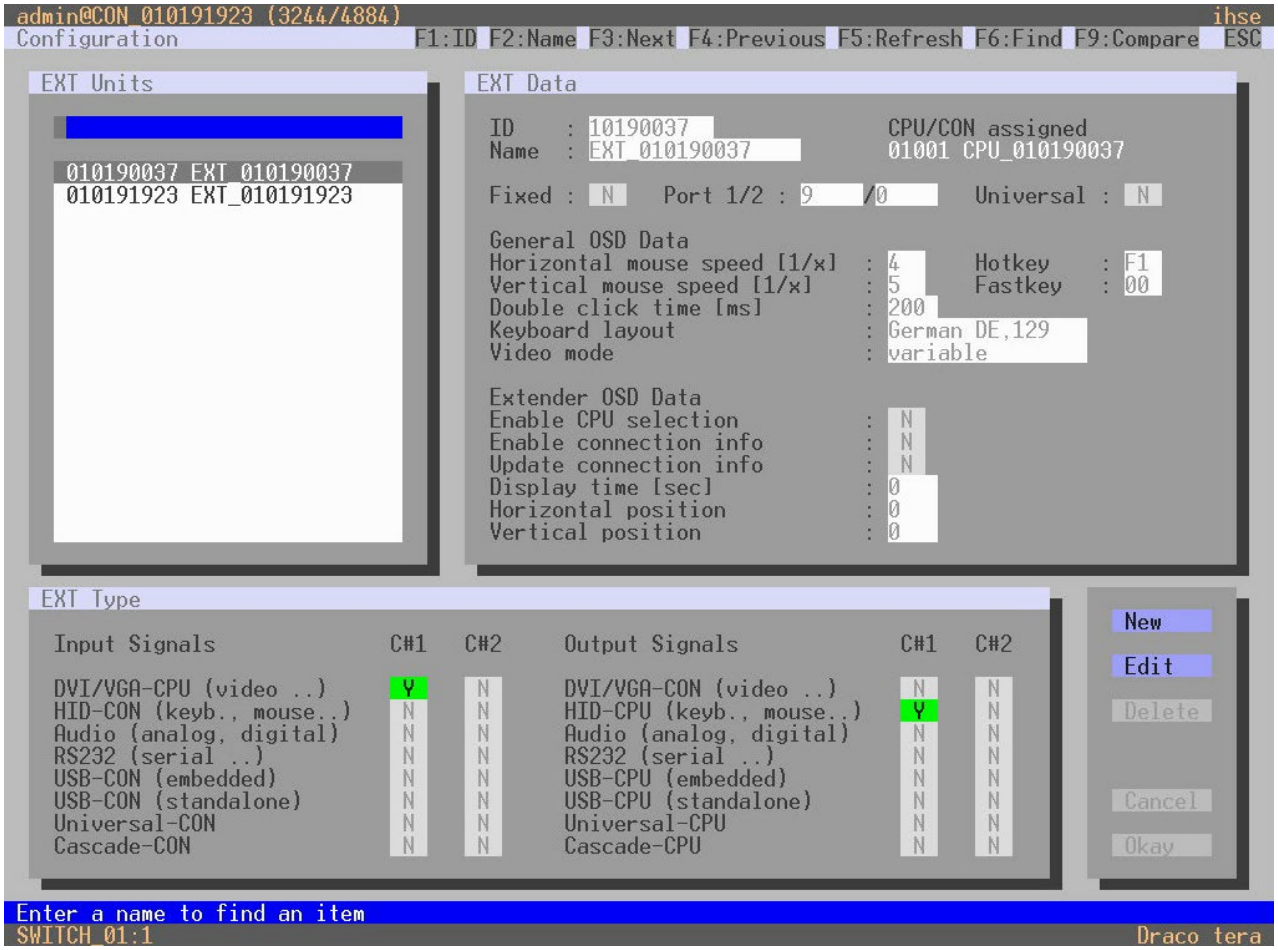


*Fig. 87 OSD Menu **Configuration - EXT Units***

   2.2. Enter an appropriate name for the Cascading CON Unit into the **Name** field.
   2.3. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   2.4. Set the **Cascade-CON** option to **Y** (**C#1**) in the **Input Signals** column.
   2.5. Click **Okay** to confirm the creation of a Cascading CON Unit.

3. Select **Configuration > CON Devices** in the main menu of the Master Matrix.

   3.1. Click **New R.**.

   A switchable CON Device will be created.

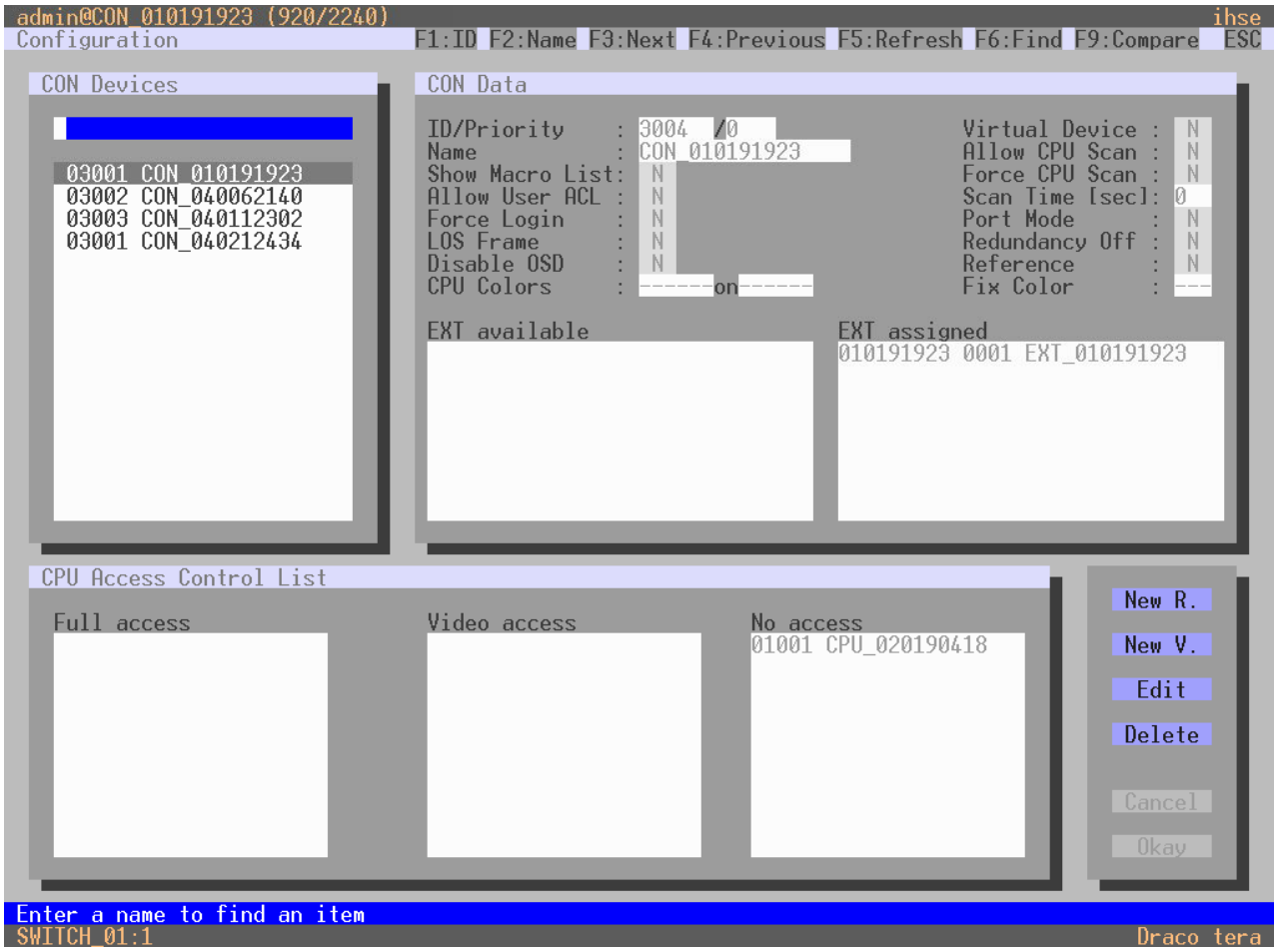


*Fig. 88 OSD Menu **Configuration - CON Devices***

   3.2. Enter an appropriate name for the Cascading CON Device into the **Name** field.

   3.3. Select the previously configured Cascading CON Unit in the **EXT available** list.

   3.4. Press a to move the Cascading CON Unit to the **EXT assigned** list.

   The assignment is displayed in the **EXT assigned** list.

   3.5. Click **Okay** to confirm the assignment.

4. Open the OSD of the Sub Matrix.
5. Select **Configuration > EXT Units** in the main menu of the Sub Matrix.
   5.1. Click **New**.

   A new EXT Unit will be created.

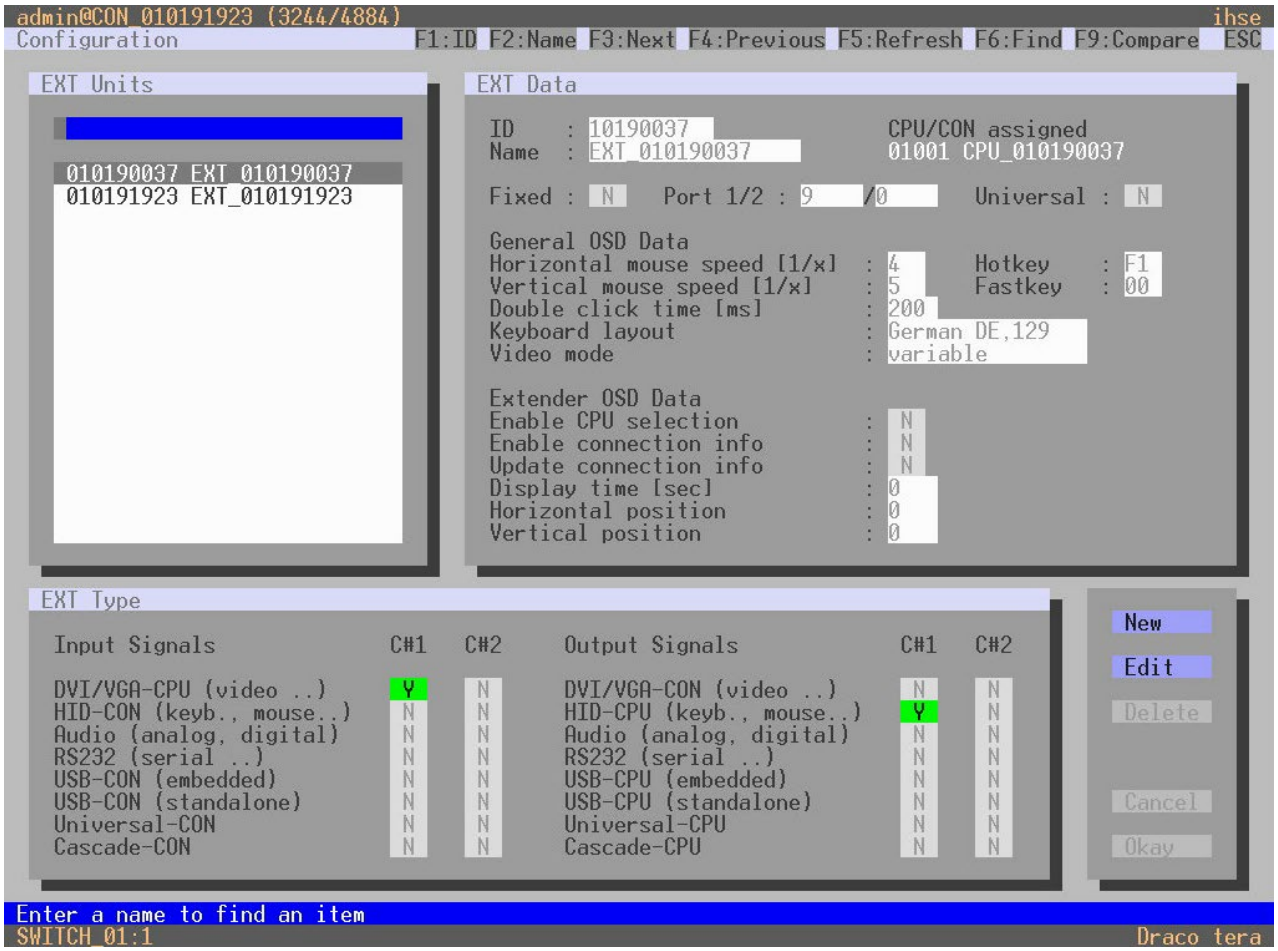


*Fig. 89 OSD Menu **Configuration - EXT Units***

   5.2. Enter an appropriate name for the Cascading CPU Unit into the **Name** field.
   5.3. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   5.4. Set the **Cascade-CPU** option to **Y** (**C#1**) in the **Output Signals** column.
   5.5. Click **Okay** to confirm the creation of a Cascading CPU Unit.

6. Select **Configuration > CPU Devices** in the main menu of the Sub Matrix.

   6.1. Click **New R.**.

   A switchable CPU Device will be created.

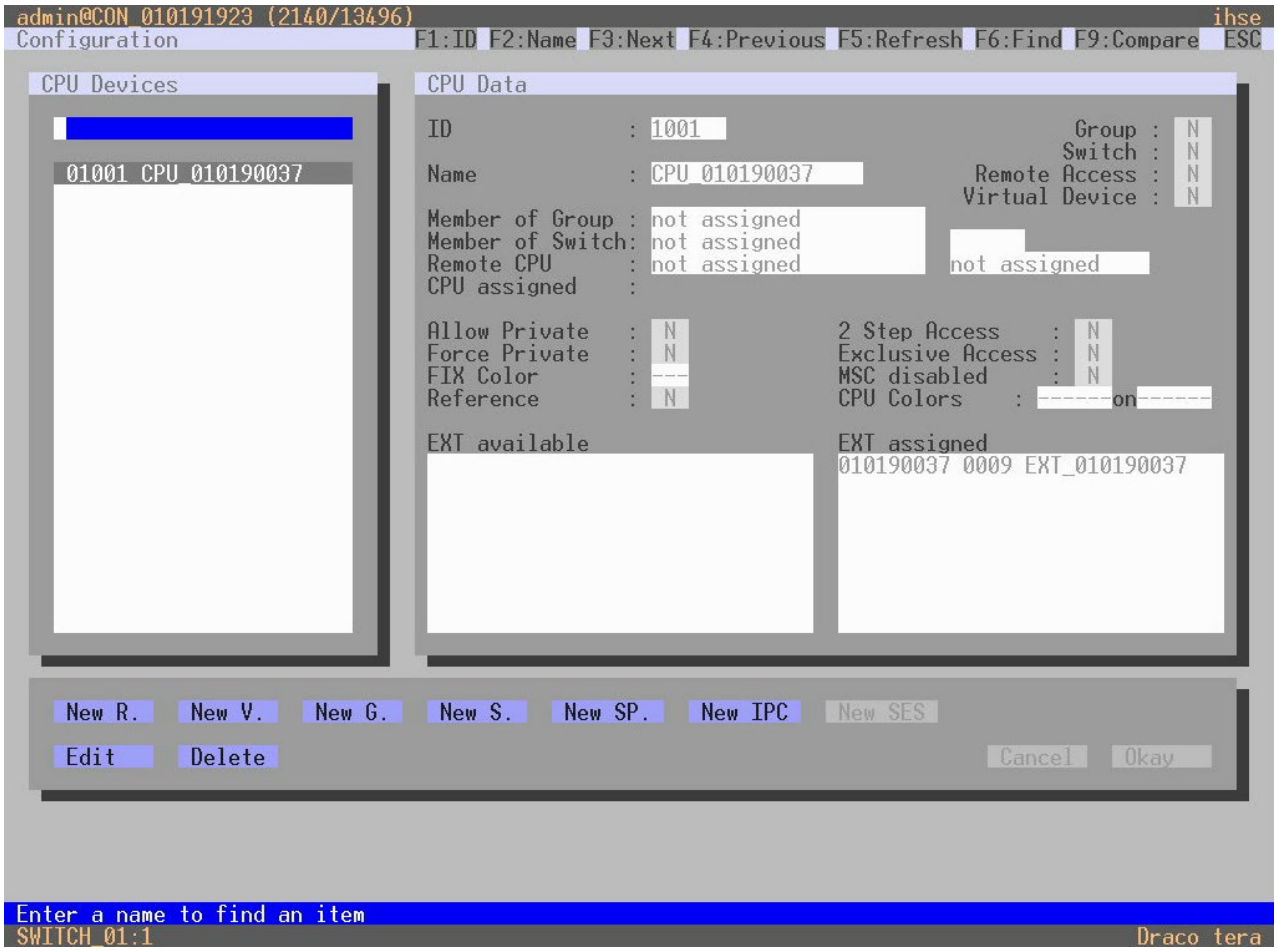


*Fig. 90 OSD Menu **Configuration - CPU Devices***

   6.2. Enter an appropriate name for the Cascading CPU Device into the **Name** field.

   6.3. Press a to move the Cascading CPU Unit to the **EXT assigned** list.
   The assignment is displayed in the **Extender assigned** list.

   6.4. Click **Okay** to confirm the assignment.

7. Select **Configuration > System** in the main menu of the Sub Matrix.
   7.1. Set the **Sub Matrix** option to **Y**.
   7.2. Click **Okay** to confirm the Sub Matrix option.

The OSD of the Sub Matrix will immediately freeze and will be only accessible by using the keyboard command Hot Key, s, o.

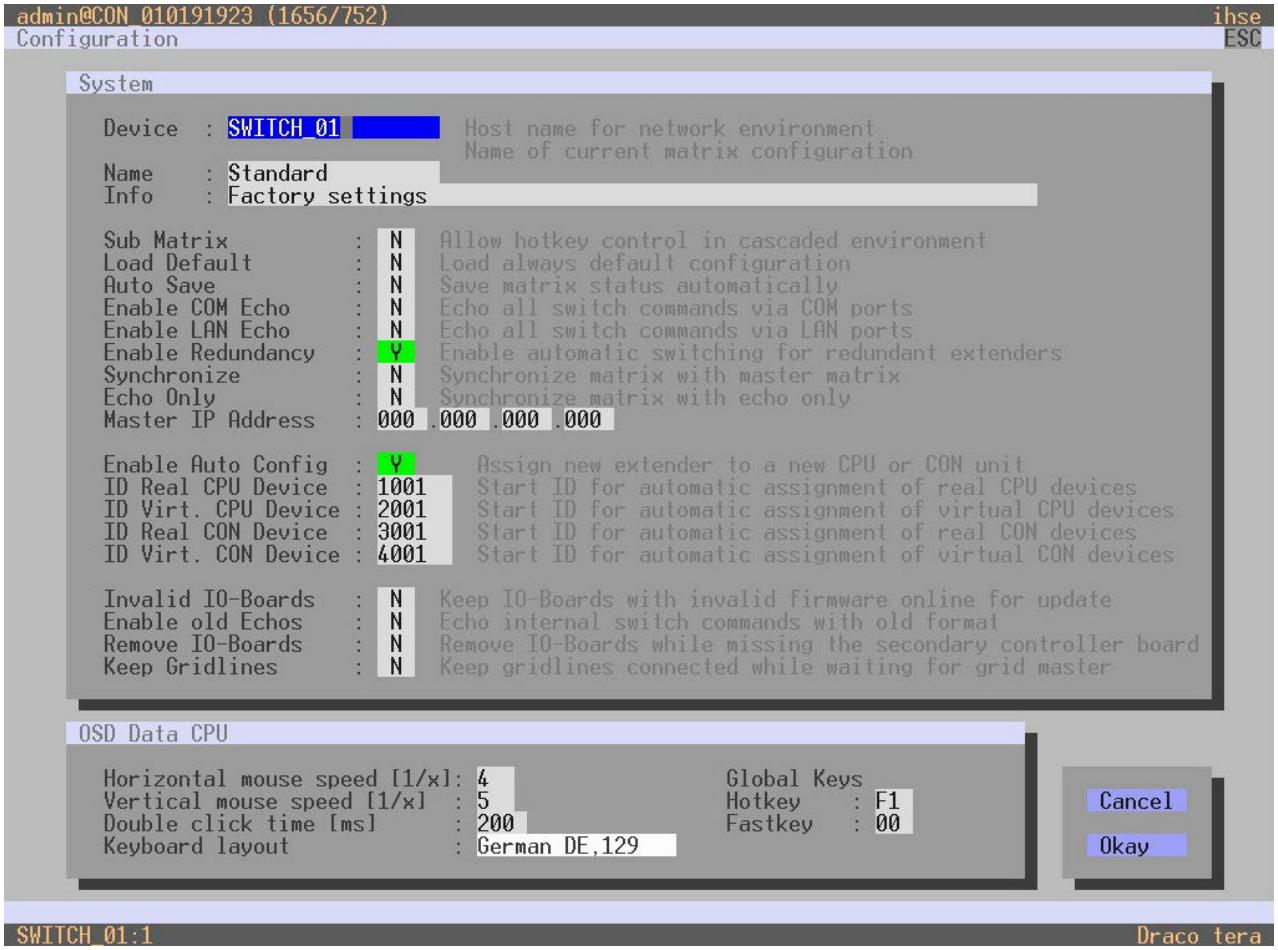


*Fig. 91 OSD Menu **Configuration - System***

8. Restart all I/O boards (see chapter 9.2.2, page 309) on which any Master/Sub CON Units or CPU Units have been configured or alternatively restart the matrix (see chapter 9.2.1, page 308).
9. Connect the Tie Lines to the matrices. Ensure that each **Cascade CON Device** on one matrix is connected to **Cascade CPU Device** on the other matrix to achieve switching ability between two matrices.

   The Matrix Cascading is now configured and can be used.

Additional Tie Lines are configured accordingly. The use of cascading is described in in chapter 8.1.1, page 290.

6.9 Configuring Matrix Grids

The merging of matrix configurations within a Matrix Grid is only possibly by using the management software.

In this menu you can configure a Matrix Grid to connect two or more matrices. This kind of configuration may become necessary if the number of ports in the entire system has to be increased or if certain important connections should be distributed to several matrices due to reasons of redundancy.

The connections between two matrices have to be established by so called Grid Lines that are connected between particular I/O ports as connecting links. The Grid Lines can be used bidirectionally and can respectively handle a full access connection of a CON Device to a CPU Device.

The number of Grid Lines in the system specifies, if a CON Device can be switched to a CPU Device in Non-Blocking Access or in Blocking Access and has to be separately determined for each Grid environment.

In this case Non-Blocking Access means that a Grid Line for a cross-matrix switching operation of a CON Device to a CPU Device is available at any time.

Whereas Blocking Access means that for a certain switching operation no Grid Line may be available according to the switching status within the Grid. The result will be that no cross-matrix switching will be possible.

Administration of Settings

Within a Matrix Grid you have to differ between settings that have to be made locally for each matrix and settings that can be made globally so that they are valid for the whole Matrix Grid.

The settings in the following menus have to be made separately for each matrix or within the master matrix to affect all matrices in the Grid:

System, Access, Switch, Network, Date + Time, SNMP, Matrix Grid, Multi-Screen Control

If global settings are made in the respective menus, they will be immediately available on each matrix within the Matrix Grid.

General Preparation

The following requirements have to be fulfilled before starting the Matrix Grid configuration:

- The Matrix Grid function (Bundle 4) must be activated on all matrices to be connected to the Grid by a license key (see chapter 7.13, page 284). Please contact the technical support of the manufacturer if the Bundle 4 is missing.
- Firmware V03.10 must be installed on all matrices to be connected to the Grid, but with the same firmware on each matrix.
- All matrices to be connected to the Grid must be within the same TCP/IP network (see chapter 6.3.5, page 82).
- Port 5556/5566 needed for network communication must not be blocked by a firewall.

Configuring a Matrix Grid

➡ After changing the configuration of the Matrix Grid, it is recommended to de-register the primary controller board and to boot the secondary controller board until the boot process is finished.

The following configuration steps have to be repeated for each matrix separately.

To configure a Matrix Grid, proceed as follows:

1. Click **Configuration > System** in the main menu.
2. Enter a unique name for each matrix into the **Device** field. Each name only may exist once within the Matrix Grid.
3. Enter a unique Grid name into the **Name** field. The Grid name has to be same within all Grid matrices.
4. Select **Configuration > Matrix Grid** in the main menu.

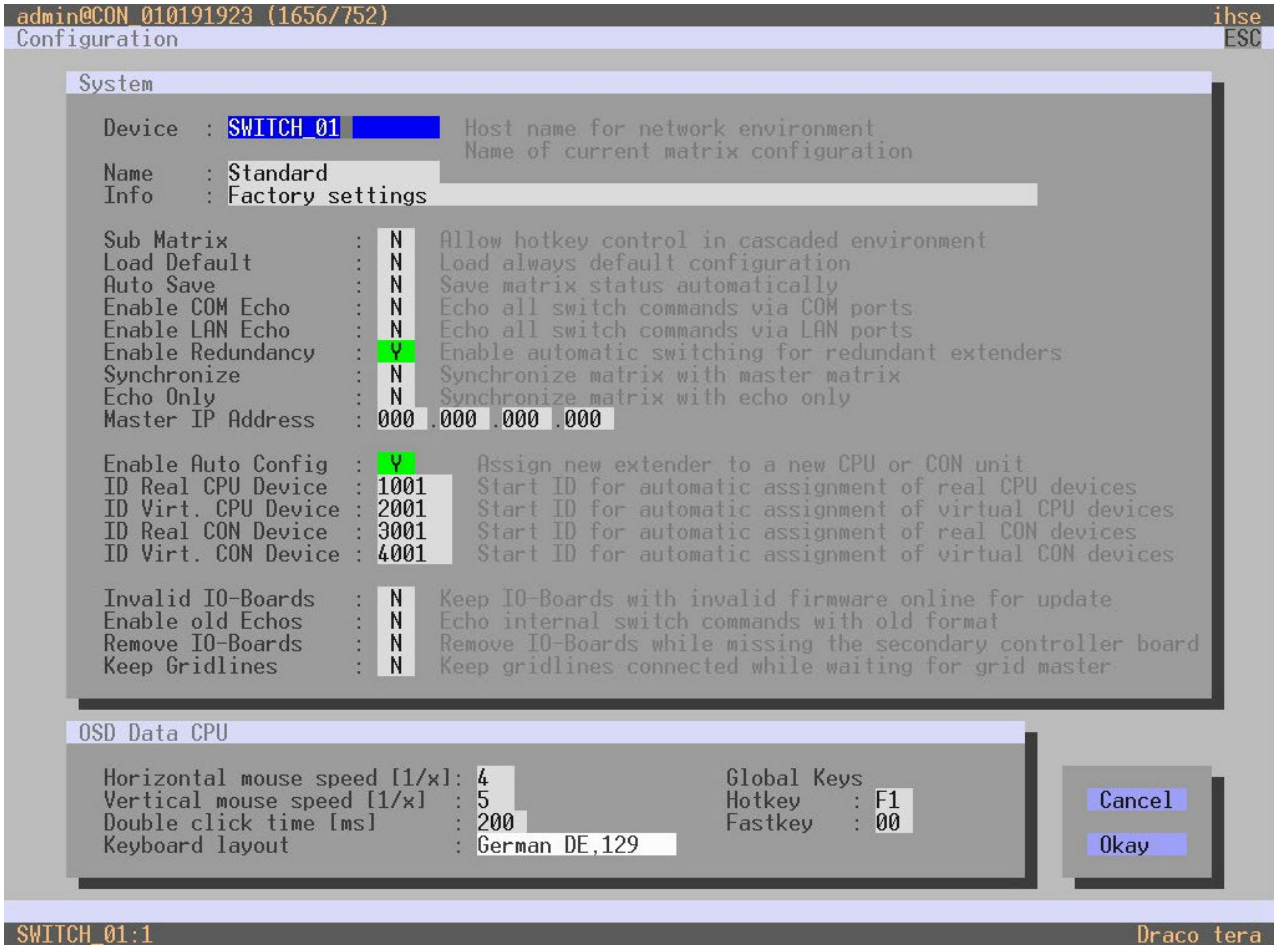


*Fig. 92 Menu **Configuration - System***

5. Activate the **Enable Matrix Grid** function.
6. Write all device names of the Grid matrices into the Matrix Grid list, starting in the left column.

   Based on the listings, a Grid master will be automatically determined for the Matrix-Grid. The more on the top a matrix is listed in the matrix Grid list, the more likely the matrix is considered in the automatic master selection, provided that certain criteria like system availability are fulfilled.
7. Activate the single matrices in the Matrix Grid list by enabling the **Y** (YES) function.
8. Enter the number of chassis ports for each matrix (**48, 80, 152, 160**, **288** or **576**).
9. Restart all matrices, beginning with the master matrix.

   The Matrix Grid can be used now and offers the possibility for a cross-matrix switching of CON Devices to CPU Devices.

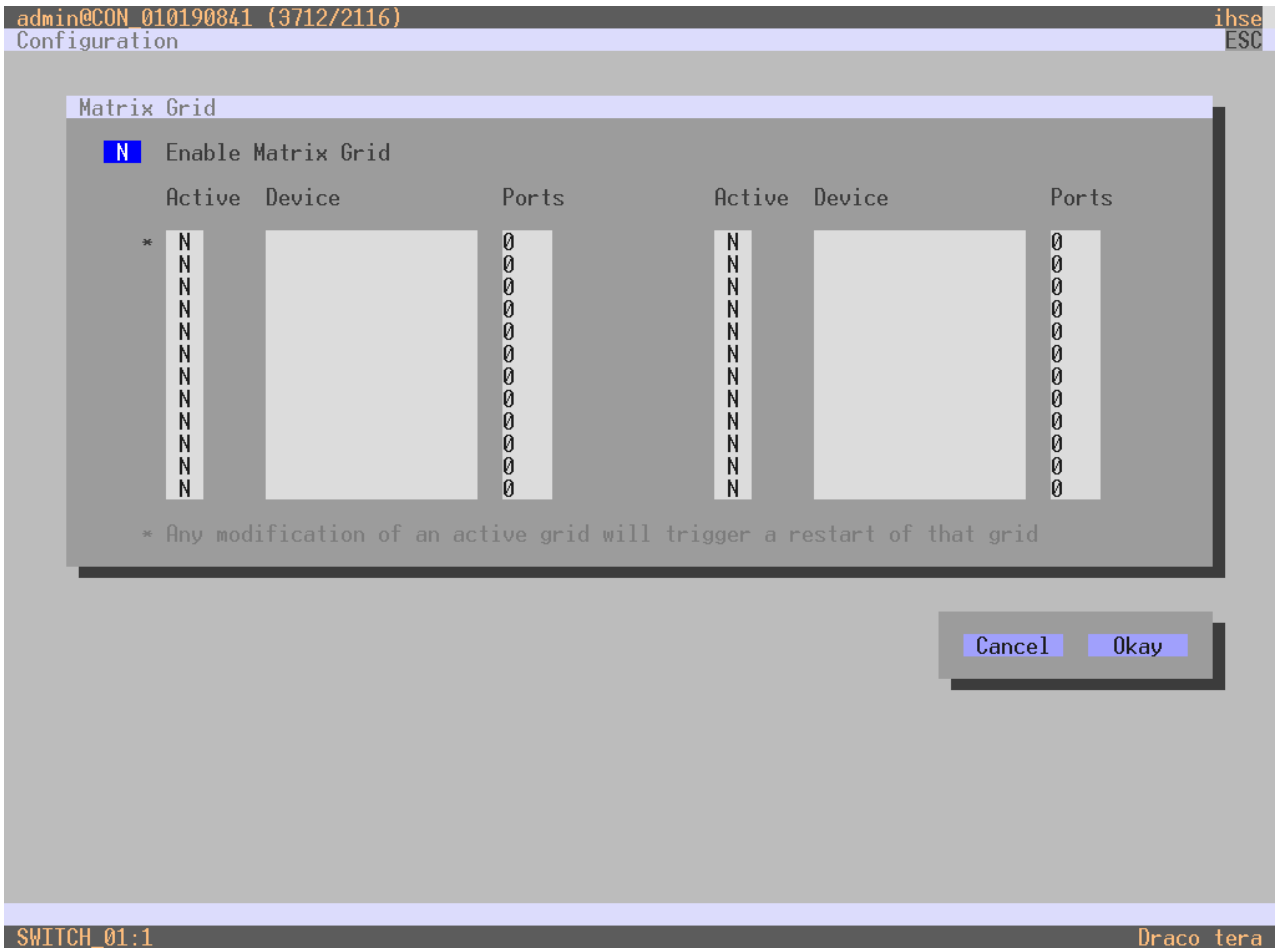


*Fig. 93 Menu **Configuration - System***

6.10 Saving and Activating a Configuration

NOTICE
By default, the last configuration that has been saved in the permanent matrix memory will be restored after a restart of the matrix.

First starting the matrix, the factory configuration will be copied into the current configuration. There are two possibilities to save configuration changes:

- Save the current configuration permanently in the matrix memory (**Save**) or
- Save the configuration in up to 8 predefined storage locations, as well as the default configuration in the memory of the matrix (**Save as…**)

6.10.1 Saving the Active Configuration

NOTICE
Changing or saving configurations blocks the matrix memory and leads to a freeze of all OSD menus for a few seconds. The switching connections are not affected by this freeze.

If you select **Auto Save** within the system settings an additional automatic saving of the configuration will be periodically performed (see chapter 6.3.1, page 72).

To save the current configuration permanently in the matrix storage, proceed as follows:

➡ Select **Configuration > Save** in the main menu.

The current configuration of the matrix is permanently saved to the matrix memory.

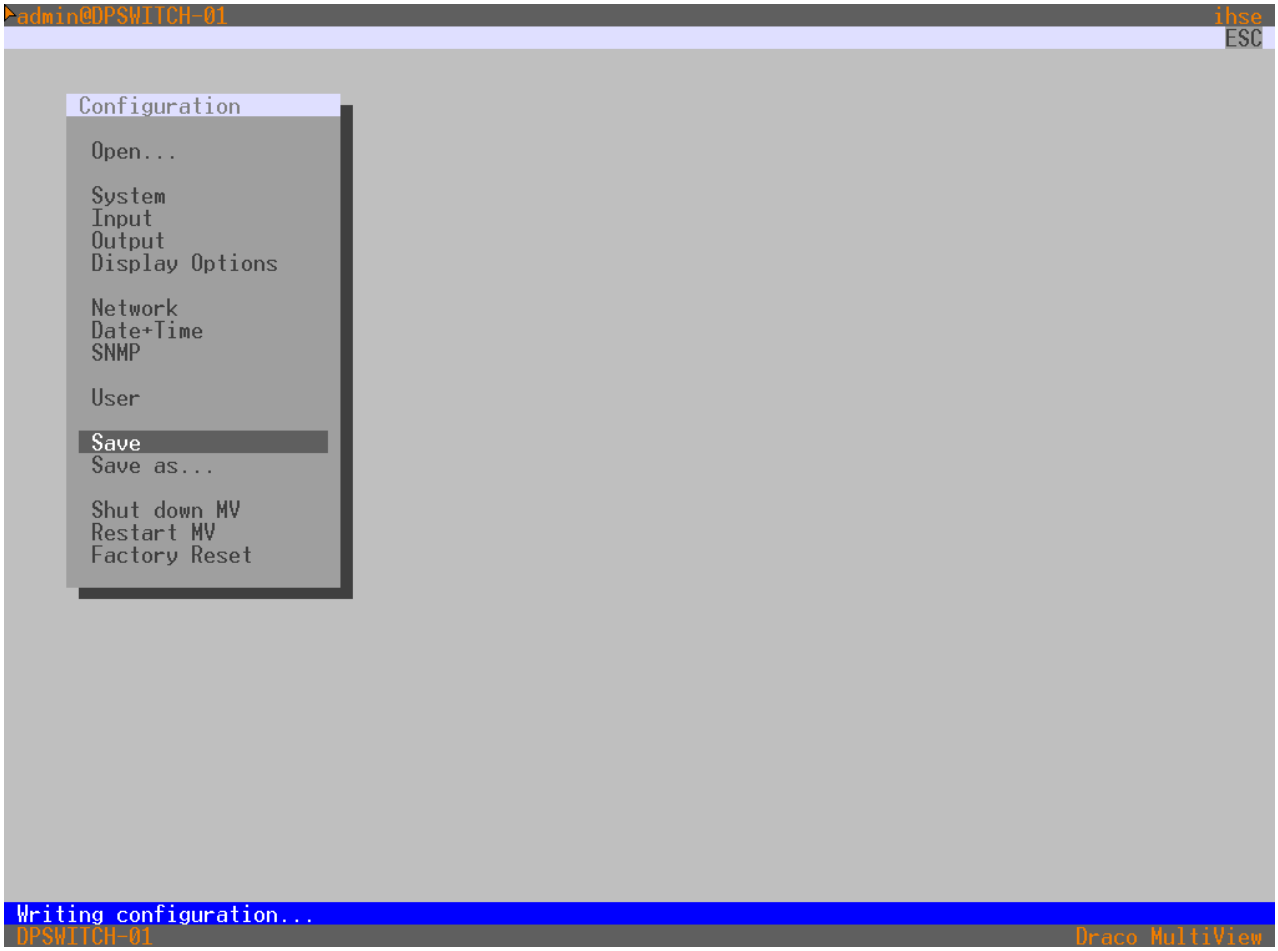


*Fig. 94 OSD Menu **Configuration - Save***

6.10.2 Saving a Predefined Configuration

In this menu, the current configuration can be saved in up to eight storage locations in the permanent memory of the matrix memory (**File #1** to **File #8**).

In addition to the eight memory locations, there is also a standard storage location (Default). A configuration stored here can be loaded automatically every time the matrix is started instead of the last active configuration (see chapter 6.3.1, page 72).

The current configuration is saved to the selected memory location and is immediately displayed in this menu. The configuration previously saved at this memory location is overwritten. However, saving predefined configurations does not replace saving the active configuration (see chapter 6.10.1, page 142).

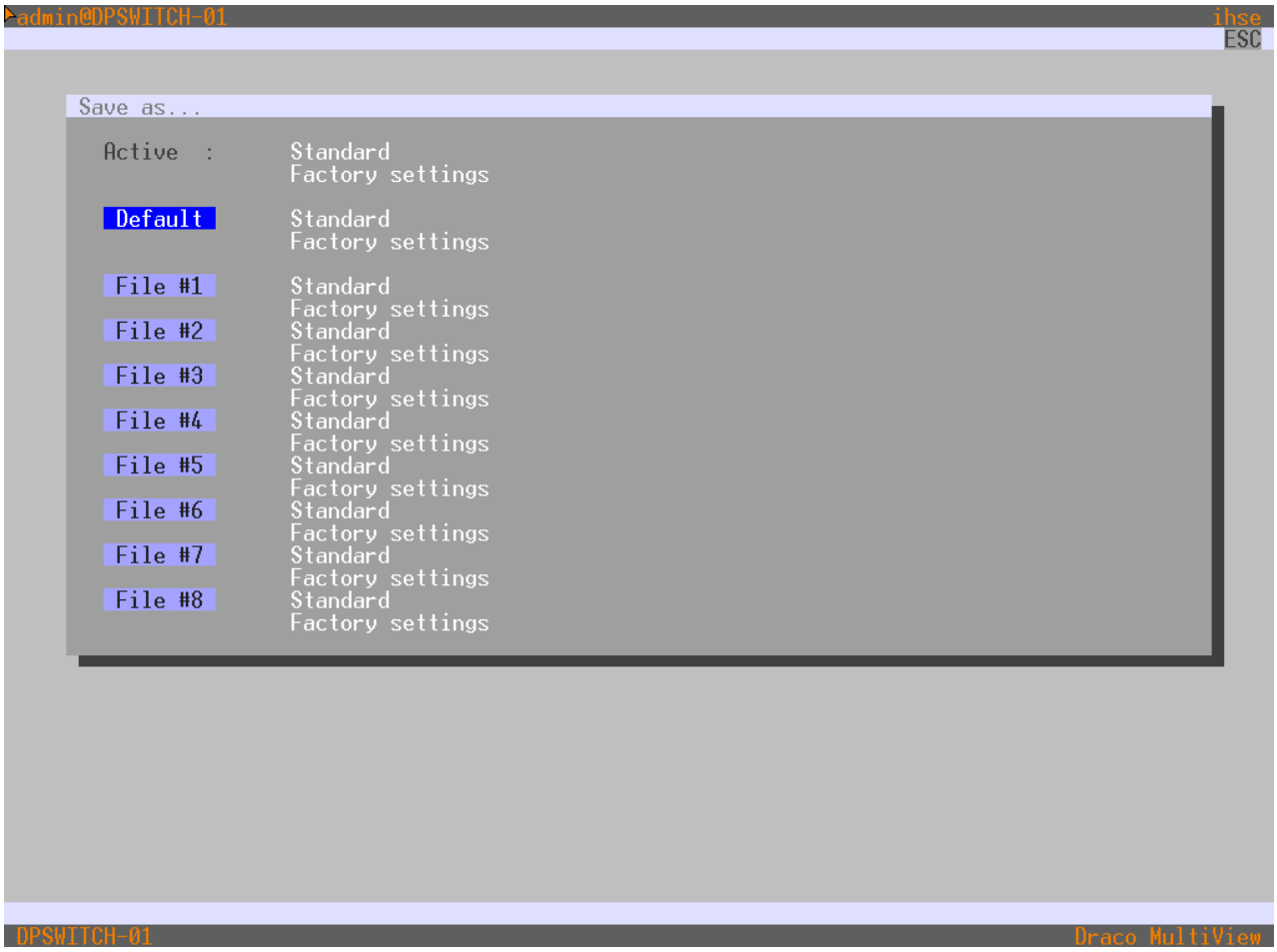


*Fig. 95 OSD Menu **Configuration - Save as…***

Saving position	Name and detailed information
Active	Name and detailed information of the current configuration are shown. This configuration can be saved (function **Save**, see chapter 6.10.1, page 142).
Default	Name and detailed information of the respective saved configuration are shown. This storage location can be overwritten.
File #1 to **File #8**	Name and detailed information of the respective saved configuration are shown. These storage locations can be overwritten.

To save the created configuration to a specific memory location, proceed as follows:

1. Select **Configuration > Save As…** in the main menu.
2. Select the required storage location (**File #1** to **File #8**) or **Default**.

   The current configuration is saved to this storage location and is shown immediately in the menu. The previously saved configuration saved to this storage location is deleted.

6.10.3 Activating a Predefined Configuration

Previously saved configurations are displayed in this menu. In **Active**, the currently loaded configuration is displayed. To replace the current configuration by another configuration, in addition to the default configuration (**Default**), one out of eight further, customized configurations (**File #1** to **File #8**) can be activated.

NOTICE
Activating a configuration will immediately disconnect and restart the matrix. The selected configuration is loaded on restart and is shown in the menu as active configuration under **Active**. The previously active configuration is overwritten. The restart of the matrix may take several minutes, and the matrix is not available during the restart.

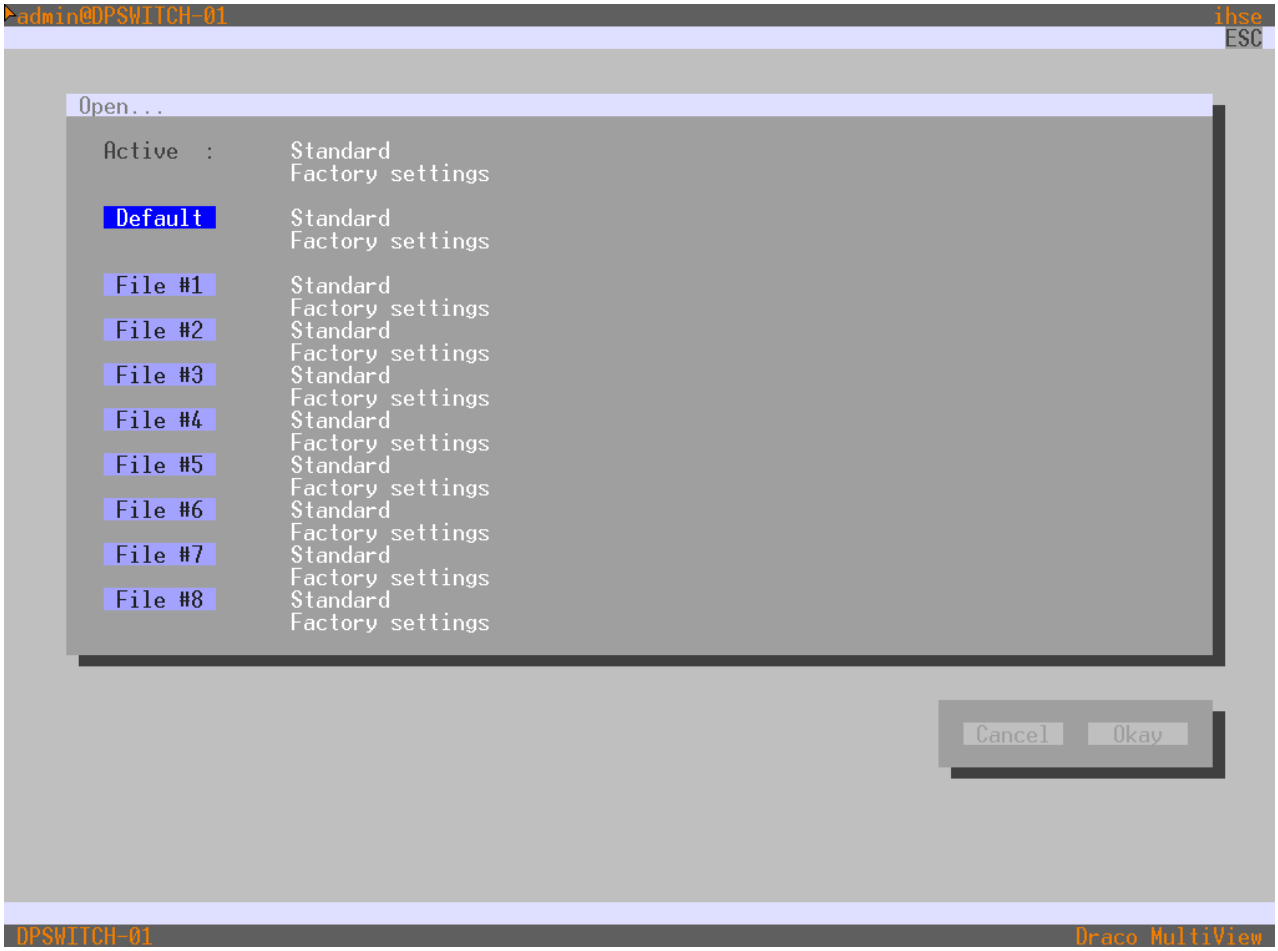


*Fig. 96 OSD Menu **Configuration - Open...***

To activate a previously saved configuration, proceed as follows:

1. Select **Configuration > Open** in the main menu.
2. Select the desired configuration.
3. Click **Okay** to activate the selected configuration.

   The selected configuration is immediately loaded and displayed in the menu as **Active**. The previously active configuration is overwritten.

7 Configuration via Management Software

NOTICE

Possible loss of configuration changes

By clicking **Apply**, changes are applied to the active configuration and saved in the volatile memory of the matrix. In the event of a sudden power failure, these changes are lost. To save changes permanently:

➡ save the configuration changes into the active configuration (**Remote Save**, see chapter 7.11.1, page 274), save a predefined configuration (**Save as…**) (see chapter 7.11.2, page 275), or perform a restart (see chapter 12.2.1, page 318).

NOTICE

A change in system-relevant parameters (e.g., change in the IP address) is immediately displayed in the management software. To initialize system-relevant configuration changes on the matrix, the matrix must be restarted. The restart of the matrix may take several minutes, and the matrix is not available during the restart.

After changing the configuration of the system, we recommend to de-register the primary controller board and to boot the secondary controller board until the boot process is finished.

Configurations can be saved as a file that can be stored independent of the matrix.
We recommend saving a matrix status every time when a configuration has been changed.

7.1 Configuring in Online Mode

Configurations and system settings can be edited via management software in online mode with an active connection between matrix and management software. Hereby, the following steps are necessary:

1. Click **Connect** to connect the management software with the matrix.

   When connecting the first time, the manufacturer-specific configuration (Factory Setting) saved on the matrix is loaded into the management software.
2. Click **Activate Edit Mode** in the toolbar.

   The edit mode is active. A symbol is shown in the status bar.
3. Make any edits in the configuration and system settings.
4. Click **Apply** to confirm the changes.

   The changes are applied immediately as the current configuration running in the volatile memory of the matrix.
5. Click **Remote Save** to save the configuration into the active configuration to the matrix.
6. Click **Deactivate Edit Mode** in the toolbar.
7. Click **Save Status** to save the matrix status (backup file).
8. Optionally: restart the system (depending on the settings made).

7.2 Configuring in Offline Mode

Configuration and system settings via management software can be changed in offline mode without a direct connection between matrix and management software. Afterwards, the configuration must be uploaded to the matrix. Hereby, the following steps are necessary:

1. Click **Connect** to connect the management software with the matrix.

   When connecting the first time, the manufacturer-specific configuration (Factory Setting) saved on the matrix is loaded into the management software.
2. Click **Download** in the toolbar to download the configuration.

   A download wizard will appear, and the downloaded configuration will be opened in a new tab.
3. Click **Disconnect** in the toolbar to close the connection from the management software to the matrix.
4. Make any edits at the configuration and system settings.
5. Click **Apply** to confirm the changes.

   The changes apply immediately in the downloaded configuration.
6. Click **Upload** in the toolbar to upload the configuration to the matrix and activate it immediately (optional) or later.

It is recommended to save the status after uploading the matrix configuration settings as a backup file.

7.3 Setting Management Software Options

The settings of the management software can be customized and optimized to support the configuration of the matrix. The settings can be set in the offline mode.

To activate changes in the options menu, the management software must be closed and restarted.

7.3.1 Setting Program Default Settings

To avoid the repeated entry of data in the management software, this data can be saved in the default settings.

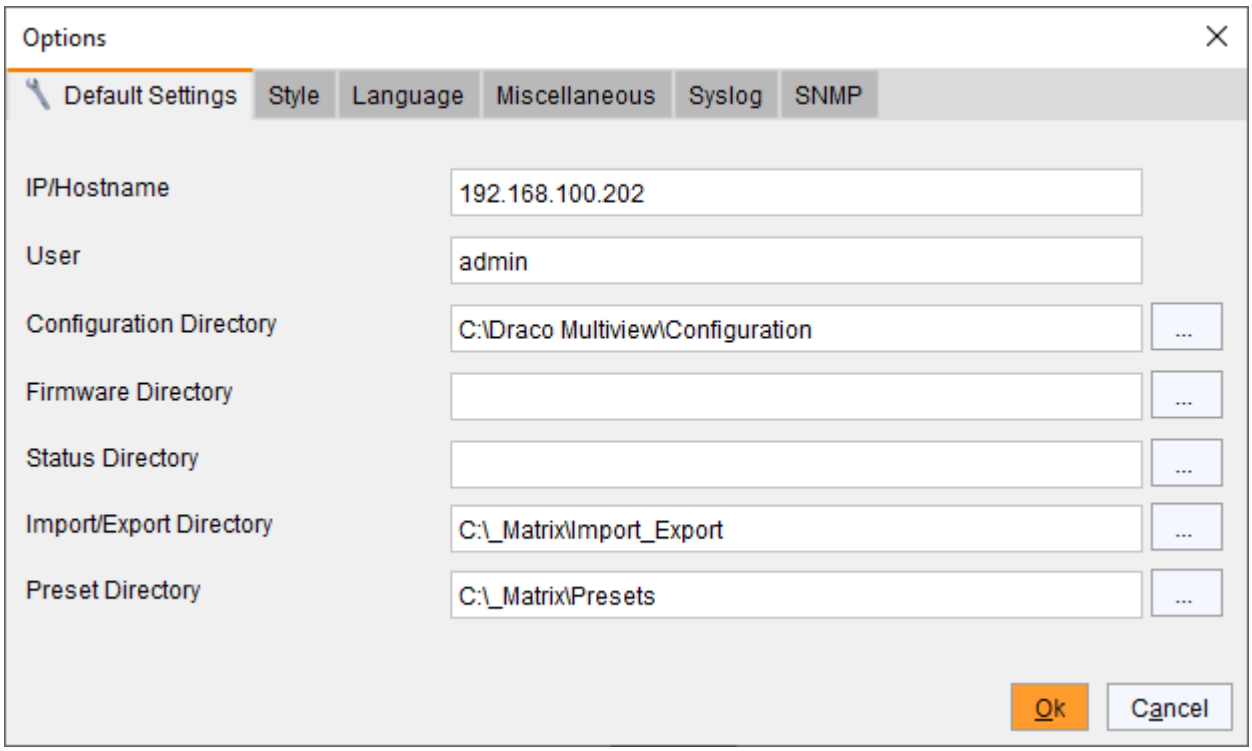


*Fig. 97 Management software menu - Example **Extras - Options - Default Settings***

The following parameters can be configured:

Option	Description
IP/Hostname	Default IP address or host name of the matrix for establishing a connection.
User	Default username for establishing a connection.
Configuration Directory	Default directory for configuration files.
Firmware Directory	Default directory for firmware files.
Status Directory	Default directory for status files.
Import/Export Directory	Default directory for import and export files.
Presets Directory	Default directory for macro files.

To activate or set the default settings, proceed as follows:

1. Select **Extras > Options** in the menu bar.
   The **Options** menu opens and shows the **Default Settings** tab.
2. Enter the appropriate data.
3. Click **Ok** to confirm the entries.
4. Close the management software and restart it.

7.3.2 Setting Font Size, Tooltip, and Theme

The font size, the theme, and the display of tooltips for the toolbar can be set in this menu.

1. Select **Extras > Options** in the menu bar and open the **Style** tab.
2. Select the desired font size (**Normal** or **Large**).
3. Tick the **Show Toolbar Button Text** checkbox to display a tooltip when hovering over a in the toolbar.
4. Select the color theme for the management software (**Default (Dark Gray)**, **Light Gray** or **Dark**).
5. Click **Ok** to confirm the changes.
6. Close the management software and restart it.

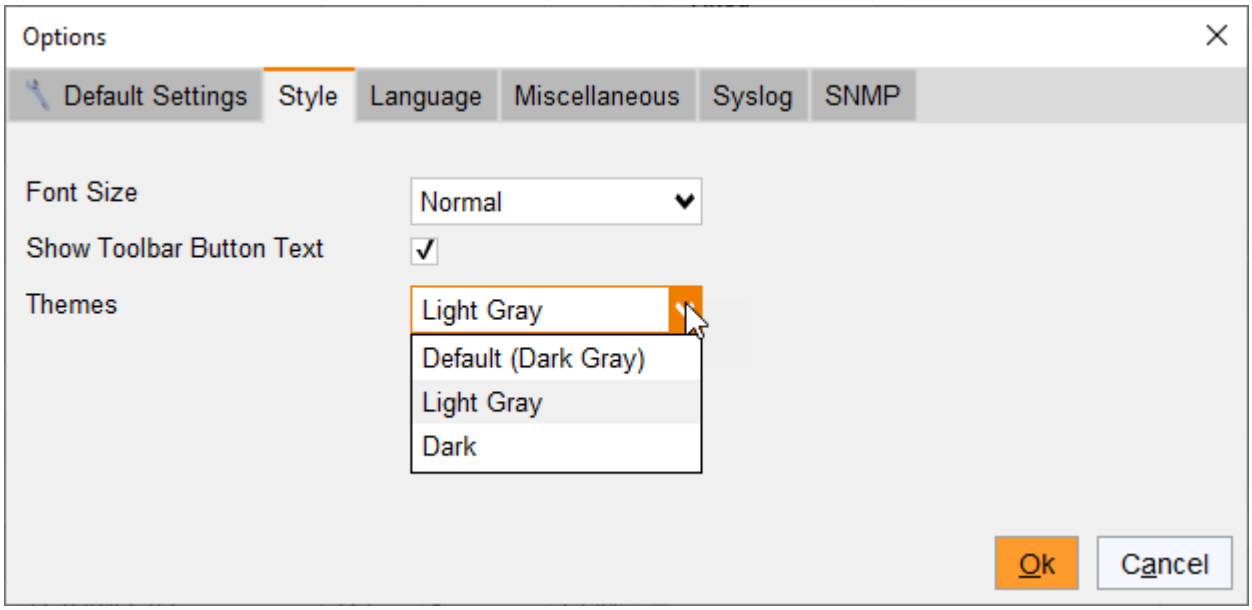


*Fig. 98 Management software menu **Extras - Options - Style***

7.3.3 Setting the Language of the Management Software

The language within the management software is set in this menu. The charset must match the selected language to ensure correct representation.

1. Select **Extras > Options** in the menu bar and open the **Language** tab.
2. Select the desired language within the management software and the corresponding charset.
3. Click **Ok** to confirm the changes.
4. Close the management software and restart it.

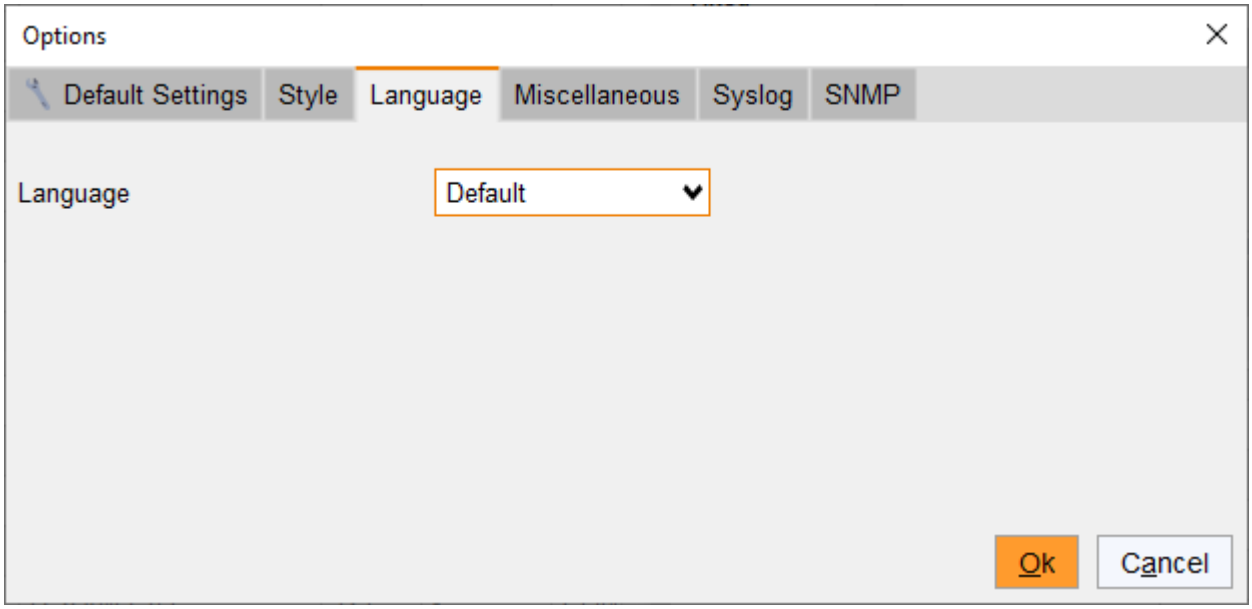


*Fig. 99 Management software menu **Extras - Options - Language***

If using only Linux-based matrix systems, it is possible to enter Chinese characters. Therefore, a respective firmware package has to be installed and the Chinese Encoding has to be enabled in the system settings. Please contact the manufacturer's technical support for further information.

7.3.4 Setting Autostart of the Device Finder

Additional options for the matrix can be enabled in this menu.

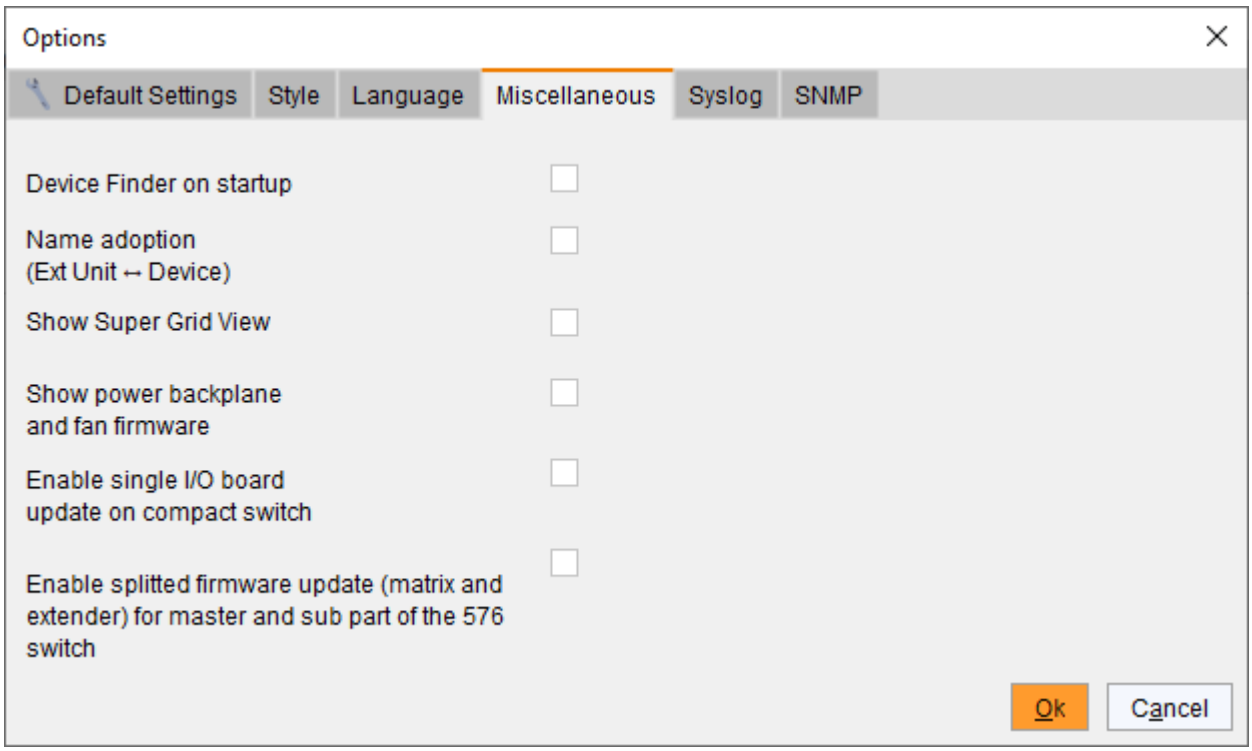


*Fig. 100 Management software menu **Extras - Options - Miscellaneous***

The following options can be enabled:

Option	Description
Device Finder on startup	Start the Device Finder automatically when starting the management software.
Name adoption	Entered name for a CON/CPU Device is also applied to the EXT Unit and vice versa.
Show Super Grid View	Show the Super Grid option in the task area.
Show power backplane and fan firmware	Show the firmware of the fans and the power backplane in the menu **Status & Updates > Status- Matrix Firmware**.
Enable single I/O board update on compact switch	Option available only for Draco tera compact and Draco tera flex.
Enable splitted firmware update (matrix and extender) for master and sub part of the 576 matrix	Option available only for Draco tera enterprise 576.

To start the Device Finder automatically when starting the management software, proceed as follows:

1. Select **Extras > Options** in the menu bar and open the **Miscellaneous** tab.
2. Tick the **Device Finder on startup** checkbox.
3. Click **Ok** to confirm the changes.
4. Close the management software and restart it.

   After restarting the management software, the **Device Finder** appears.

7.4 System Settings

7.4.1 Setting the System Configuration

The system configuration is set in this menu.

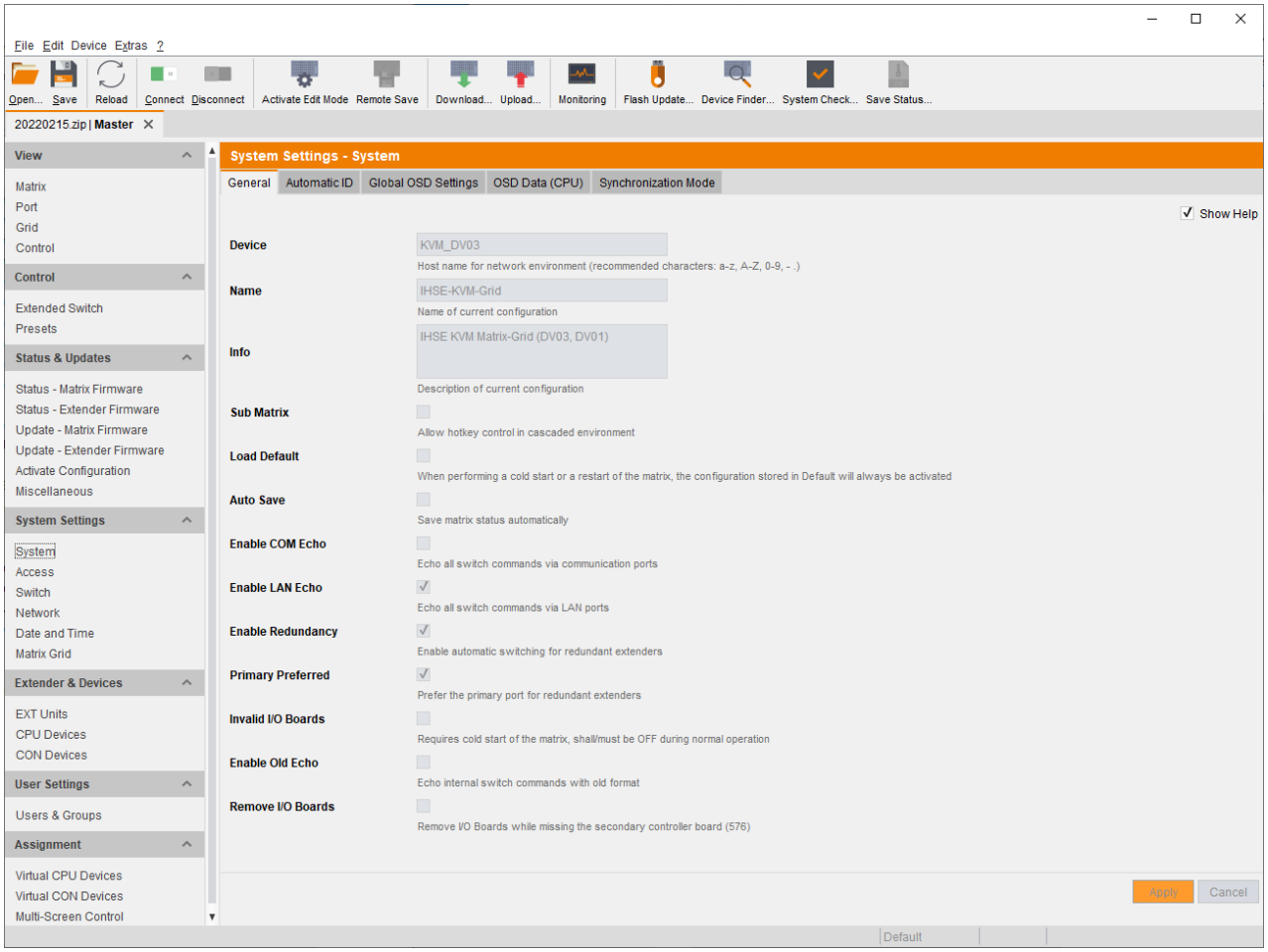


*Fig. 101 Management software menu **System Settings - System - General***

The following parameters can be configured:

System

Field	Entry	Description
Device	Text	Enter the device name of the matrix (default: SWITCH_01). The device name is used as the host name in the network.
Name	Text	Enter the name of the configuration that is used to save the current settings (default: Standard).
Info	Text	Enter additional text to describe the configuration if required (default: Factory settings).
Sub Matrix	Activated	If the matrix is defined as a sub matrix in the OSD, the user will lose control. Control can be recovered by using the keyboard command Hot Key, s, o. The OSD for the matrix that has been defined as sub matrix will be reopened.
	Deactivated	Function not active (default).

Field	Entry	Description
Load Default	Activated	Start the matrix after a restart or a switch-on with the default configuration.
	Deactivated	Start the matrix after a restart or a switch-on with the last saved configuration (default).
Auto Save	Activated	Save the current configuration of the matrix in the flash memory periodically. **Note:** During the save operation, the matrix will not be operational. Saving takes place every 600 seconds if changes of the configuration or switching operations have been executed in the meantime.
	Deactivated	Function not active (default).
Enable COM Echo	Activated	Send all switching commands performed in the matrix as an echo via serial interface. **Note:** This function should be enabled when using a media controller via serial interface.
	Deactivated	Function not active (default).
Enable LAN Echo	Activated	Send all switching commands performed in the matrix as an echo via LAN connection. **Note:** This function should be enabled when using a media controller via LAN connection or when using stacking with two or more matrices.
	Deactivated	Function not active (default).
Enable Redundancy	Activated	Automatically switch to the second link of a connected redundant CON Unit when losing the primary link of a CPU Unit (default). **Note**: This function will have to be activated for both matrices in a fully redundant setup.
	Deactivated	Function not active.
Primary Preferred	Activated	Prefer the primary interconnect port for redundant CON/CPU Units (default). It is recommended to activate this function to ensure the Link is switched back to Link 1 if, e.g., an interconnect cable at interconnection port 1 was temporarily disconnected.
	Deactivated	Function not active.
Invalid IO-Boards	Activated	Keep I/O boards with incorrect or invalid firmware online in the matrix. **Note**: To keep an I/O board with wrong or damaged firmware online in the matrix, the maintenance mode of the matrix will be activated.
	Deactivated	Shut down I/O boards with incorrect or invalid firmware automatically (default).
Enable old Echo	Activated	Translate the current switching command (implemented since V02.09) internally into the old, already known switching commands and send them as echo.
	Deactivated	Function not active (default).

Field	Entry	Description
Remove IO-Boards	Activated	**Note:** Only for Draco tera enterprise 576: Shut down I/O boards if the second controller board is not available. Connections will be disconnected.
	Deactivated	Function not active (default).

To set parameters for the system configuration, proceed as follows:

1. Click **System Settings > System** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Change the desired settings.
4. Click **Apply** to confirm your entries.
5. Click **Deactivate Edit Mode** in the toolbar.

7.4.2 Enabling the Automatic Creation of Real CPU and CON Devices

The assignment of EXT Units to real CON or CPU Devices can be made manually or automatically when connecting a new extender module to the matrix.

The settings for automatic creation of CPU and CON Devices and the initial values for the ID numbers of real or virtual CON or CPU Devices are set in this menu.

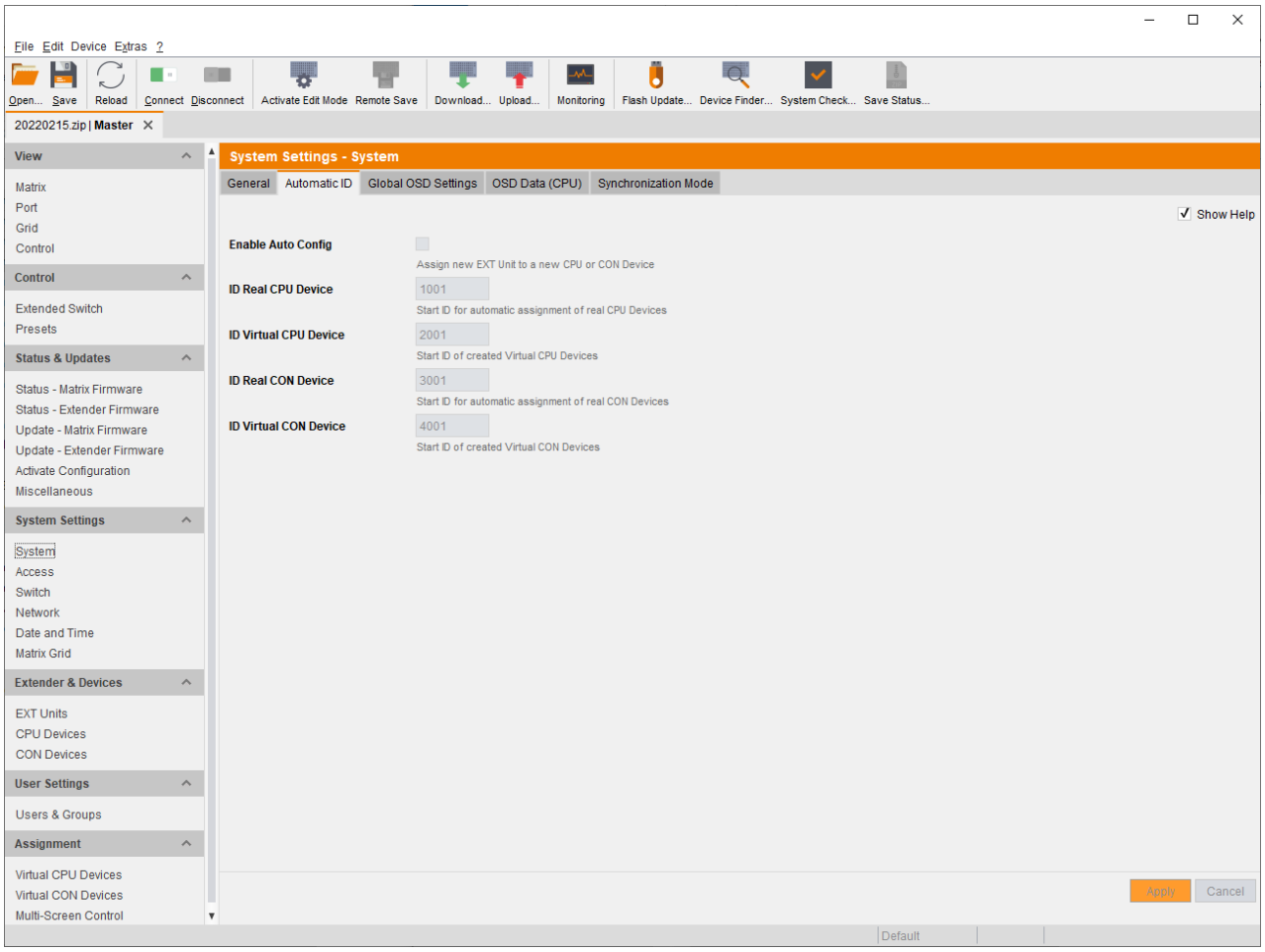


*Fig. 102 Management software menu **System Settings - System - Automatic ID***

The following parameters can be configured:

Field	Entry	Description
Enable Auto Config	Activated	Enable the automatic creation of a new CPU or CON Device if new extender modules are connected (default). The new CON or CPU Device is assigned to the automatically created EXT Unit of the extender module.
	Deactivated	Function not active
ID Real CPU Device	Numerical	Enter the initial value for automatic assignment of real CPU Devices (default: 1001).
ID Virtual CPU Device	Numerical	Enter the initial value for created virtual CPU Devices (default: 2001).
ID Real CON Device	Numerical	Enter the initial value for automatic assignment of real CON Devices (default: 3001).
ID Virtual CON Device	Numerical	Enter the initial value for created virtual CON Devices (default: 4001).

To set up the automatic creation of CPU Devices or CON Devices, proceed as follows:

1. Click **System Settings > System** in the task area.
2. Click the **Automatic ID** tab in the working area.
3. Click **Activate Edit Mode** in the toolbar.
4. Change the desired settings.
5. Click **Apply** to confirm your entries.
6. Click **Deactivate Edit Mode** in the toolbar.

7.4.3 Setting the Matrix OSD Access

The Hot Key for accessing the command mode and the Fast Key to open the matrix OSD are configured in this menu.

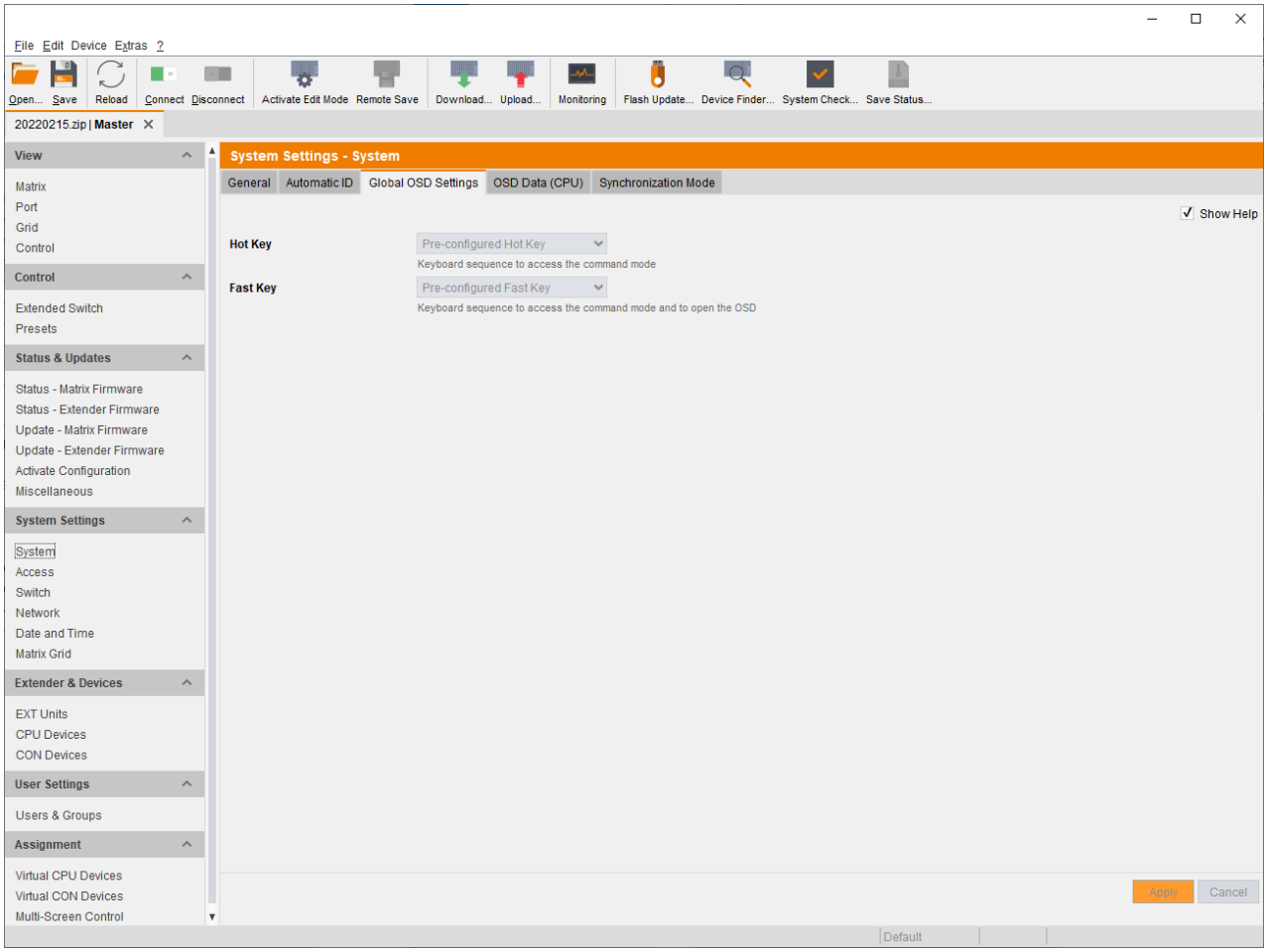


*Fig. 103 Management software menu **System Settings - System - Global OSD Settings***

The following parameters can be configured:

Field	Entry	Description
Hot Key	Keyboard command	Call the command mode via keyboard sequence.
Fast Key	Keyboard command	Open the OSD via direct access (default: 00). How often the shortcut key has to be pressed depends on the specified key: 1x for function keys or print key, 2x for all other keys.

Settings for Global Hot Key and Fast Key

Field	Entry	Description
Hot Key/Fast Key	00	No global Hot Key/Fast Key defined, no modification of the extender module.
	01 to FE	Overwrite the Hot Key/Fast Key of the extender module with the entered value of the global Hot Key/Fast Key.
	FF	Deactivate the Hot Key/Fast Key of the extender module.
Valid values for the Hot Key and the Fast Key are USB-HID keyboard scan codes according to US keyboard layout.		

To set modifier keys for the Hot Key and the Fast Key use the following values:

Entry	Modifier Key
F0	Left Ctrl
F1	Left Shift
F2	Left Alt
F4	Right Ctrl
F5	Right Shift
F6	Right Alt

Hot Key or Fast Key set in the CON EXT Units have priority over the global settings.

To configure global OSD settings, proceed as follows:

1. Click **System Settings > System** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Global OSD Settings** tab in the working area.
4. Change the desired settings.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.4.4 Setting the Mouse and Keyboard for Usage at the Controller Card

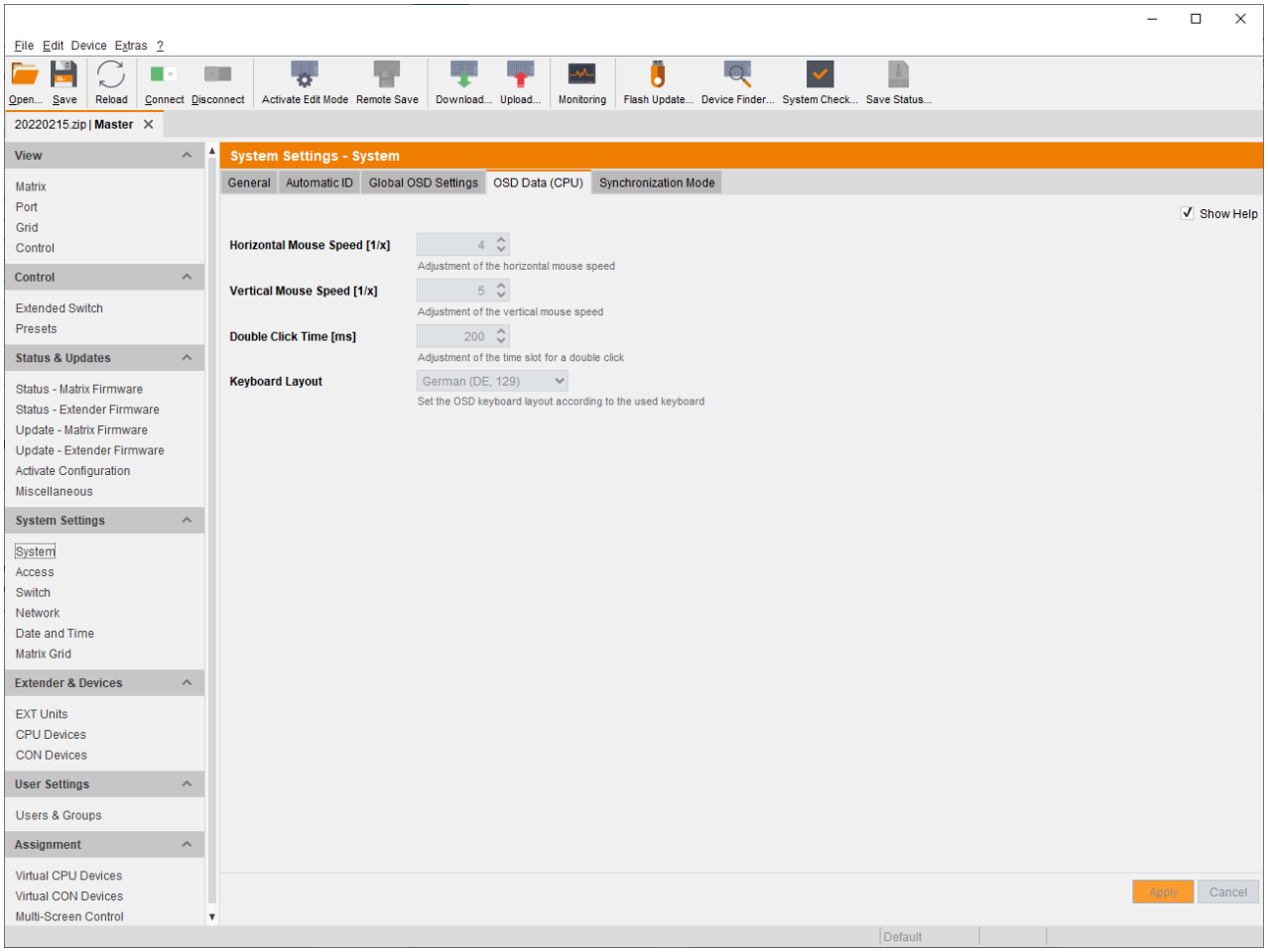


*Fig. 104 Management software menu **System Settings - System - OSD Data (CPU)***

The following parameters can be configured:

Field	Entry	Description
Horizontal Mouse Speed [1/x]	1 to 9	Adjust the horizontal mouse speed with 1 = fast, 9 = slow (default: 4).
Vertical Mouse Speed [1/x]	1 to 9	Adjust the vertical mouse speed with 1 = fast, 9 = slow (default: 5).
Double-click Time [ms]	100 to 800	Adjust the time slot for a double-click (default: 200).
Keyboard Layout	Region	Set the OSD keyboard layout according to the keyboard used (default: German (DE)).

To set up the mouse and keyboard for usage at the controller board, proceed as follows:

1. Click **System Settings > System** in the task area.
2. Click the **OSD Data (CPU)** tab in the working area.
3. Click **Activate Edit Mode** in the toolbar.
4. Change the desired settings.
5. Click **Apply** to confirm your entries.
6. Click **Deactivate Edit Mode** in the toolbar.

7.4.5 Setting the Synchronization Mode

The settings for the synchronization mode are set in this menu.

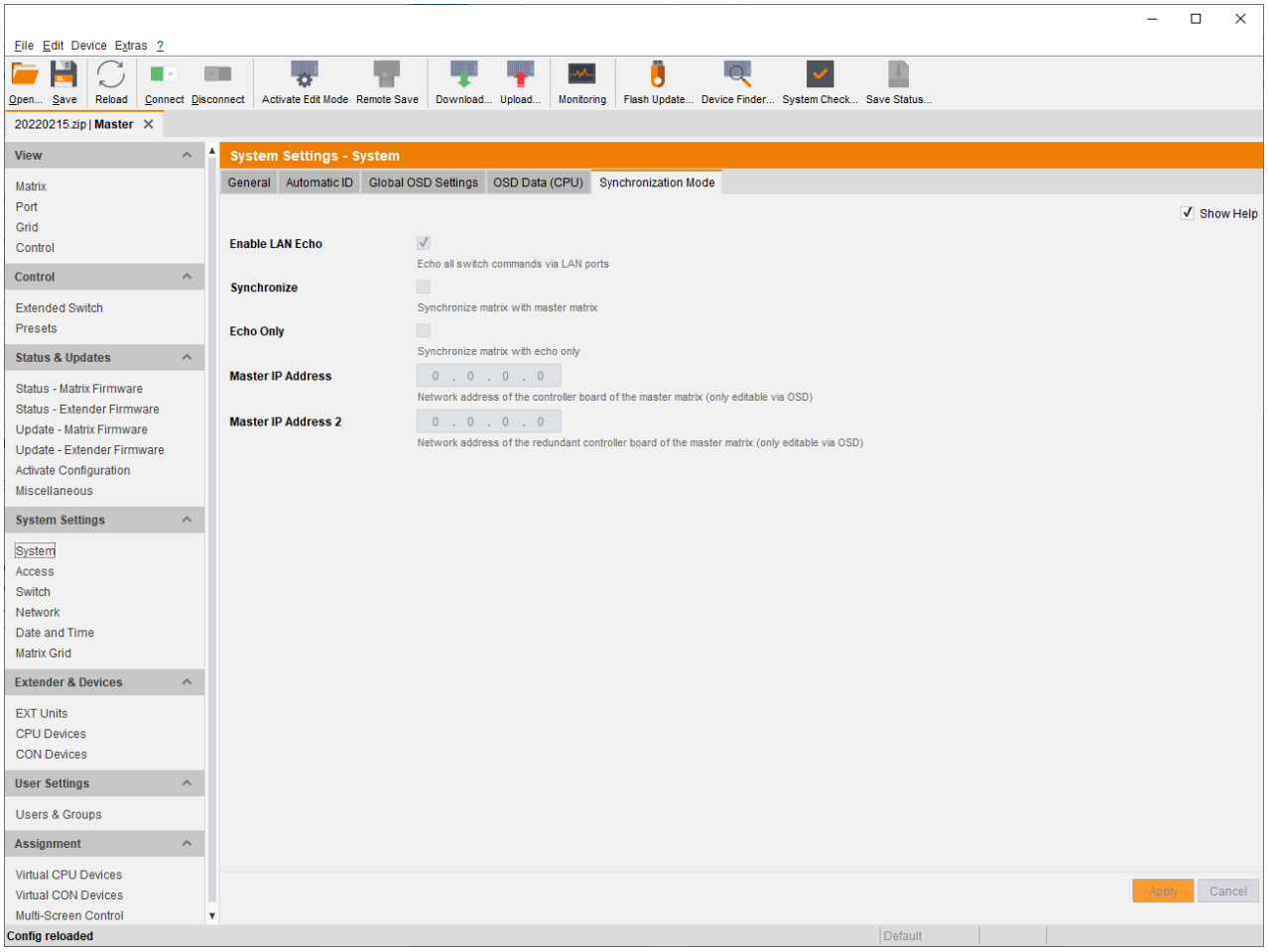


*Fig. 105 Management software menu **System Settings - System - Synchronization Mode***

The following parameters can be configured:

Field	Entry	Description
Enable LAN Echo	Activated	Send all switching commands performed in the matrix as an echo via LAN connection. **Note:** This function should be enabled when using a media controller via LAN connection or when using stacking with two or more matrices.
	Deactivated	Function not active (default).
Synchronize	Activated	Synchronize the sub matrix to the switch status of the master matrix.
	Deactivated	Function not active (default).
Echo Only	Activated	Synchronize the matrix according to the echo of a second matrix. **Note:** This is a bidirectional synchronization where both matrices have to be configured as **Synchronize** with the **Master IP** of the respective other matrix.
	Deactivated	Function not active (default).

Field	Entry	Description
Master IP Address	Byte	Set the network address of the master matrix (default: 000.000.000.000).
Master IP Address 2	Byte	Set the network address of the master matrix (default: 000.000.000.000).

To set up the synchronization of the sub and the master matrix, proceed as follows:

1. Click **System Settings > System** in the task area.
2. Click the **Synchronization Mode** tab in the working area.
3. Click **Activate Edit Mode** in the toolbar.
4. Change the desired settings.
5. Click **Apply** to confirm your entries.
6. Click **Deactivate Edit Mode** in the toolbar.

7.4.6 Setting the Access Configuration

The access configuration is set in this menu.

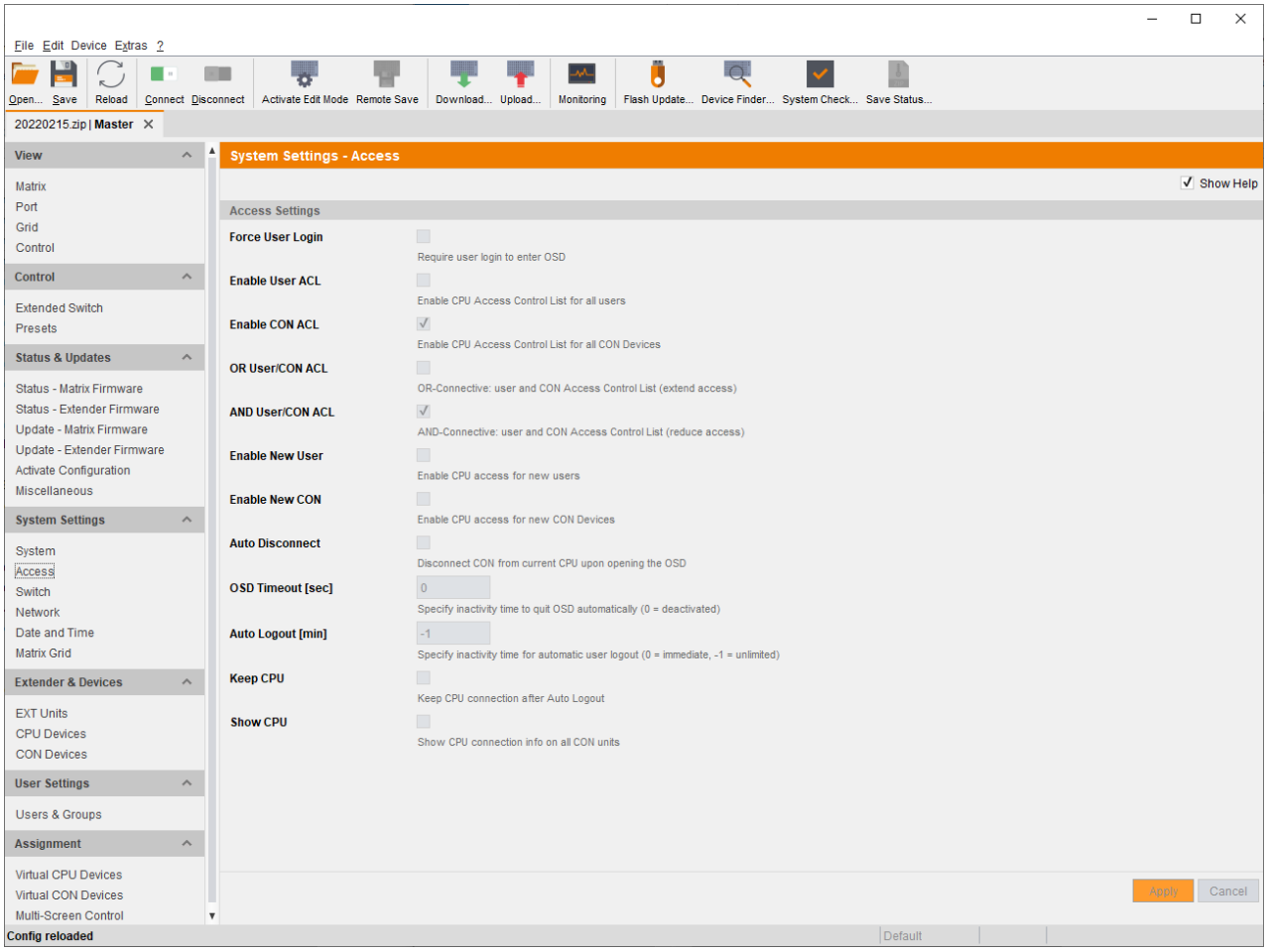


*Fig. 106 Management software menu **System Settings - System - Access***

The following parameters can be configured:

Field	Entry	Description
Force User Login	Activated	The user has to login with a username and a password once to enter OSD. Thereafter the user remains logged in until he explicitly logs out or an auto logout is affected. **Note:** When using the **Force User Login** function, CON Device ACL (Access Control List) is still active. When the **Force User Login** function is activated and a user is logged in, only the user favorites are available. The CON favorites are not accessible.
	Deactivated	Function not active (default).
Enable User ACL	Activated	CPU Device access is restricted according to the permissions in the ACL. • User login is required. • Switching by keyboard Hot Keys requires a prior login.
	Deactivated	Function not active (default).
Enable CON ACL	Activated	CPU Device access is restricted according to the permissions in the respective CON Device ACL. No login required.
	Deactivated	Function not active (default).

Field	Entry	Description
OR User/CON ACL	Activated	The user obtains the sum of access rights from the CON Device and his personal access rights after logging in (extended access).
	Deactivated	Function not active (default).
AND User/CON ACL	Activated	The user obtains the common divisor of access rights from the CON Device and his personal access rights after logging in (reduced access).
	Deactivated	Function not active (default).
Enable New User	Activated	Newly created users automatically receive access to all CPU Devices.
	Deactivated	Function not active (default).
Enable New CON	Activated	Newly created CON Devices automatically receive access to all CPU Devices.
	Deactivated	Function not active (default).
Auto Disconnect	Activated	Upon opening the OSD, the CON Device will be automatically disconnected from the current CPU Device.
	Deactivated	Function not active (default).
OSD Timeout [sec]	0 to 999 seconds	Period of inactivity after which OSD will be closed automatically. • Select 0 seconds for no timeout. • (Default: 0 seconds).
Auto Logout [min]	0 to 999 minutes	Period of inactivity of a logged-in user at a CON Device after which he will be automatically logged out. In addition to the logout process, a complete disconnection from the connected CPU Device occurs under **Full Access** and **Private Mode**. • Select 0 minutes for an automatic user logout when leaving OSD. • Using the setting **-1** allows the user to be logged in permanently, until a manual logout is executed. • The timer is not active as long as the OSD is open (default: 0 minutes).
Keep CPU	Activated	Keep the connection to the CPU Device active in the background after Auto Logout. After a new login there is no need to re-connect to the CPU Device.
	Deactivated	Function not active (default).
Show CPU	Activated	Permanently show the name of the currently connected CPU Device in the **Connection Info** box.
	Deactivated	Function not active (default).

To set the access configuration, proceed as follows:

1. Select **System Settings > Access** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Change the desired settings.
4. Click **Apply** to confirm your entries.
5. Click **Deactivate Edit Mode** in the toolbar.

7.4.7 Setting the Switch Configuration

This menu enables shared operation of a CPU Device by two or more CON Devices. A CPU Device can be controlled by only one CON Device at a time but can be taken over successively by other CON Devices. Control of a CPU Unit by a CON Unit is relinquished after the expiration of an associated inactivity timer with the controlling CON Device. The mouse or keyboard may also be used to take over control.

To allow a smooth and accurate function of the shared operation, you should use identical mice and keyboards. They should be connected to the same USB-HID ports of each CON Unit. The alternative is using the USB-HID Ghosting (see chapter 8.3.2.2, page 296).

When taking over control within 10 s, any assigned USB 2.0 EXT Unit if available, will not be switched due to security and stability aspects.

The shared operation will be deactivated between CON Devices with a different priority as well as the Release Time.

The switching parameters are set in this menu.

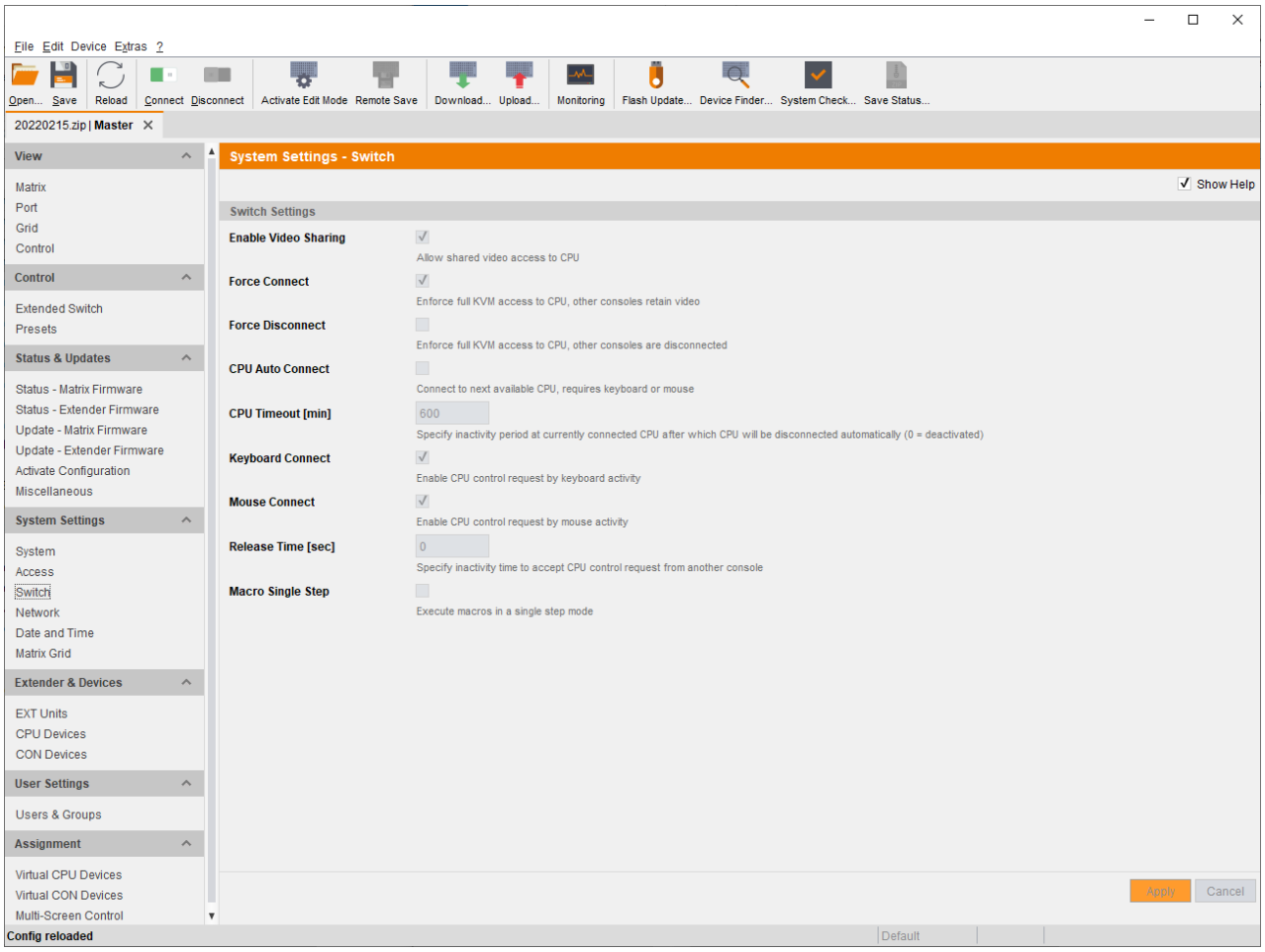


*Fig. 107 Management software menu **System Settings - System - Switch***

The following parameters can be configured:

Field	Entry/Status	Description
Enable Video Sharing	Activated	The user can switch to any CPU Device as an observer, including ones that are already assigned to another user (observer without keyboard/mouse access). **Note:** The switching has to be performed by pressing Space, not Enter. The operator only will be informed if further users connect as an observer to the CPU Device that is connected to his CON Device if the option **Update Connection Info** is activated for his CON EXT Unit (see chapter 7.8.2, page 238).
	Deactivated	Function not active (default).
Force Connect	Activated	The user can connect to every single CPU Device as an operator, including ones that are related to another user. **Note:** The previous user is set to Video Only status. To share K/M control, **Force Connect** has to be activated.
	Deactivated	Function not active (default).
Force Disconnect	Activated	Extension of **Force Connect**: If the user connects as an operator to a CPU Device already related to another user, the previous user will be disconnected. **Note:** To share K/M control **Force Disconnect** has to be deactivated and **Enable Video Sharing** has to be activated.
	Deactivated	Function not active (default).
CPU Auto Connect	Activated	If a CON Device is not connected to a CPU Device, you can establish an automatic connection to the next available CPU Device by hitting any key or mouse button.
	Deactivated	Function not active (default).
CPU Timeout [min]	0 to 999 minutes	Period of inactivity after which a CON Device will be automatically disconnected from its current CPU Device (default: 0 minutes).
Keyboard Connect	Activated	Activate request of K/M control by keyboard event (key will be lost).
	Deactivated	Function not active (default).
Mouse Connect	Activated	Activate request of K/M control by mouse event.
	Deactivated	Function not active (default).
Release Time [sec]	0 to 999 seconds	Period of inactivity of a connected CON Device after which K/M control can be requested by other CON Devices connected to the CPU Device. **Note:** Set "0" for an immediate transfer in real-time. Only one CON Device can have keyboard and mouse control at a time. The other CON Devices that are connected to the same CPU Device have a Video Only status (default: 10 sec.).
Macro Single Step	Activated	Execute macro commands sequentially.
	Deactivated	Function not active (default).

To configure shared operation, proceed as follows:

1. Click **System Settings > Switch** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Tick the **Enable Video Sharing** checkbox.
4. Tick the **Force Connect** checkbox.
5. Tick the **Keyboard Connect** checkbox if taking over control by a keyboard event is to be permitted.
6. Tick the **Mouse Connect** checkbox if taking over control by a keyboard movement should be possible.
7. Define a **Release Time** of inactivity (0 to 999 seconds) after which control can be taken over.
8. Click **Apply** to confirm the changes.
9. Click **Deactivate Edit Mode** in the toolbar.

Keyboard Connect and/or **Mouse Connect** are only effective if **Force Connect** and/or **CPU Auto Connect** are activated.

If the **Keyboard Connect** and/or **Mouse Connect** options are enabled, the **Keyboard Connect** and/or **Mouse Connect** will not take effect until the time interval entered in the **Release Time** has elapsed.

7.4.8 Setting the Network Configuration

NOTICE

To initialize system-relevant configuration changes, the matrix must be restarted. Restarting the matrix may take several minutes, and the matrix is not available during the restart.

NOTICE

Consult your system administrator before changing the network parameters. Otherwise, unexpected results and failures can occur in combination with the network.

The parameters for the network configuration are set in this menu.

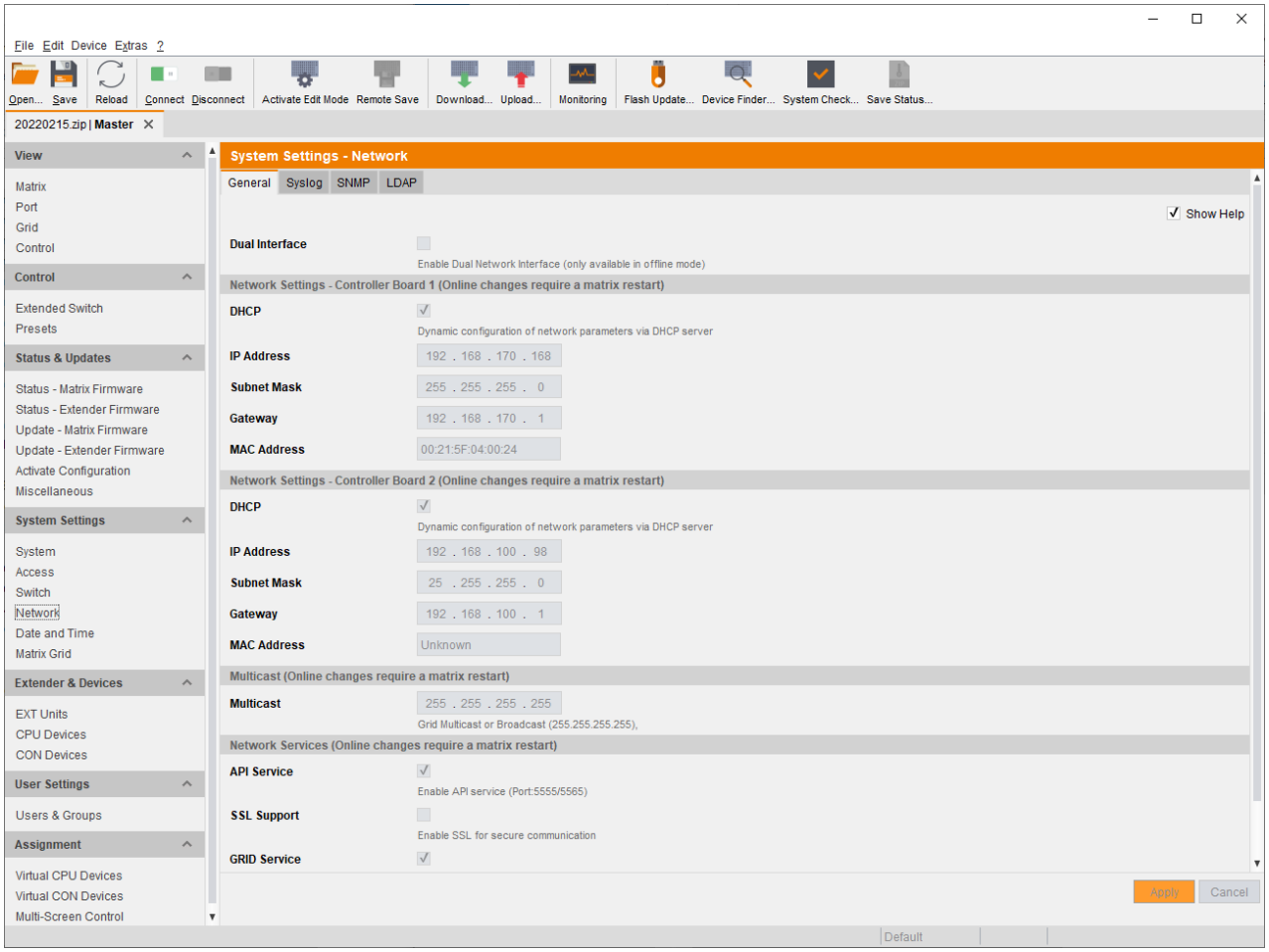


*Fig. 108 Management software menu **System Settings - Network - General***

The following parameters can be configured:

Field	Status	Description
Dual Interface	Activated	Redundant network connection is deactivated. **Note:** This option can be changed only in offline mode.
	Deactivated	Redundant network connection is activated (default).

Network Settings - Controller Board

Field	Entry/Status	Description
DHCP	Activated	The network settings are automatically supplied by a DHCP server. **Note:** If DHCP is activated and there is no physical network connection available, the boot times might increase.
	Deactivated	Function not active (default).
IP Address	Byte	Input of the IP address if DHCP is not active (default: 192.168.100.99).
Subnet Mask	Byte	Input of the subnet mask in the form "255.255.255.0" if DHCP is not active (default: 255.255.255.0).
Gateway	Byte	Input of the gateway address in the form "192.168.1.1" if DHCP is not active.
MAC Address	Byte	Unchangeable, is retrieved automatically.

Multicast

Field	Entry	Description
Multicast	Byte	Input of the Multicast address if there is a Matrix Grid in use within a Multicast group (default is broadcast: 255.255.255.255).

Network Services

Field	Status	Description
API Service	Activated	Activate the LAN interface at the matrix activated for access via management software (API service port 5555/5565) (default).
	Deactivated	Function not active.
SSL Support	Activated	Activate SSL encryption for API, management software (API), management software and Matrix Grid communication.
	Deactivated	Function not active (default).
Grid Service	Activated	Activate Grid interface at the matrix for access via management software (Grid Service Port 5557/5567).
	Deactivated	Function not active (default).

To set parameters for the network configuration, proceed as follows:

1. Click **System Settings > Network** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Change the desired settings.
4. Click **Apply** to confirm your entries.
5. Click **Deactivate Edit Mode** in the toolbar.

7.4.9 Setting the Syslog Function

NOTICE

For an activation of the Syslog function or changes of the IP address, a restart of the matrix or the controller board is necessary. Restarting the matrix or the controller board may take several minutes, and the matrix is not available during the restart.

The parameters for the Syslog function are set in this menu:

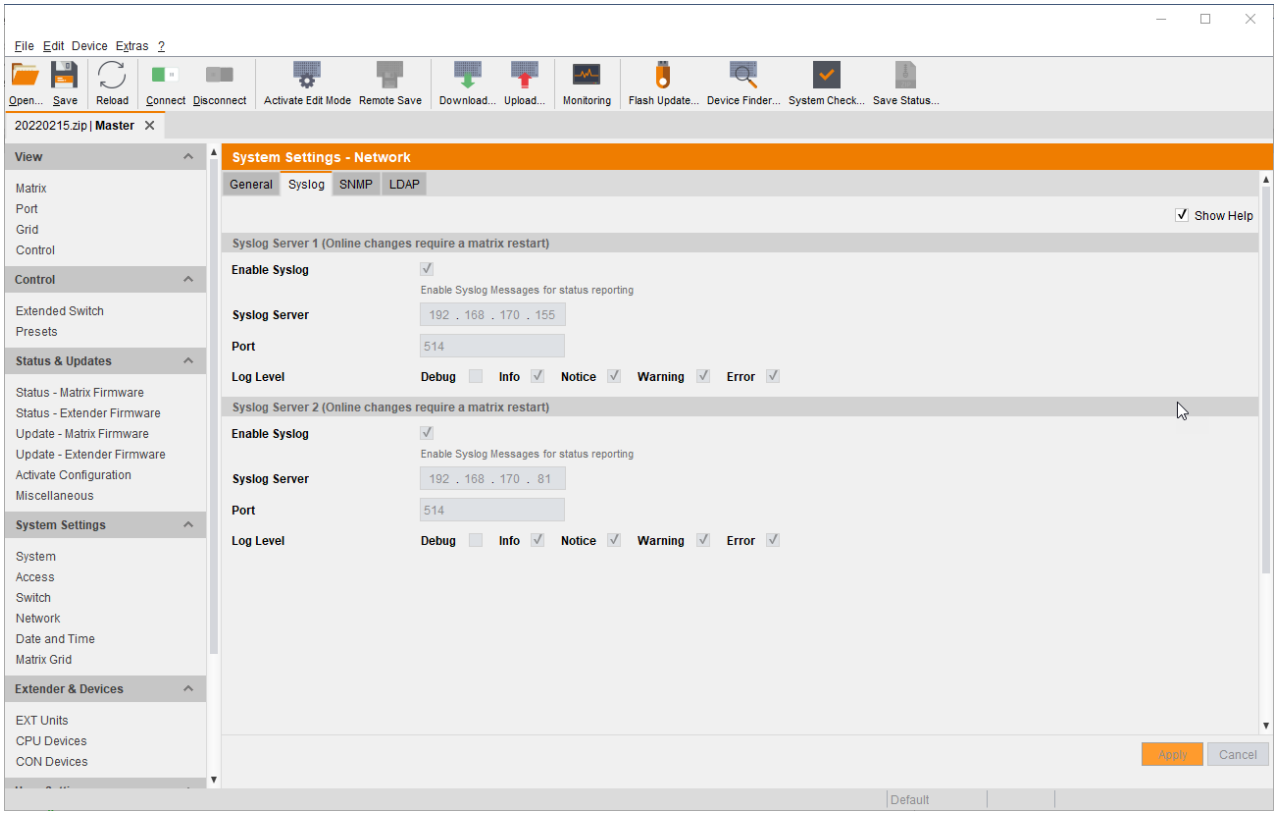


*Fig. 109 Management software menu **System Settings - Network - Syslog***

The following parameters can be configured:

Field	Entry/Status	Description
Enable Syslog	Activated	Activate the Syslog server to query status requests.
	Deactivated	Function not active (default).
Syslog Server	Byte	Enter the IP address of the Syslog servers in the form “192.168.1.1”.
Port	Byte	Enter the Syslog port (default: 514).
Log Level	Debug	Activate debug messages in Syslog (default: deactivated). **Note:** The debug messages are exclusively for matrix diagnostics. Only use this function for concrete debug cases as it is not intended for normal operation.
	Info	Activate information messages in Syslog (default: deactivated).
	Notice	Activate notification messages in Syslog (default: activated).
	Warning	Activate warning messages in Syslog (default: activated).
	Error	Activate error messages in Syslog (default: activated).

To set parameters for the Syslog function, proceed as follows:

1. Click **System Settings > Network** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Syslog** tab in the working area.
4. Change the desired settings.
5. Click **Apply** to confirm the entries.
6. Click **Deactivate Edit Mode** in the toolbar.

Setting the Syslog Options

To set or activate the presetting, proceed as follows:

1. Click **Extras > Options** in the menu bar and open the **Syslog** tab.
2. Enter the appropriate data.
3. Click **Ok** to confirm the entries.
4. Close the management software and restart it.

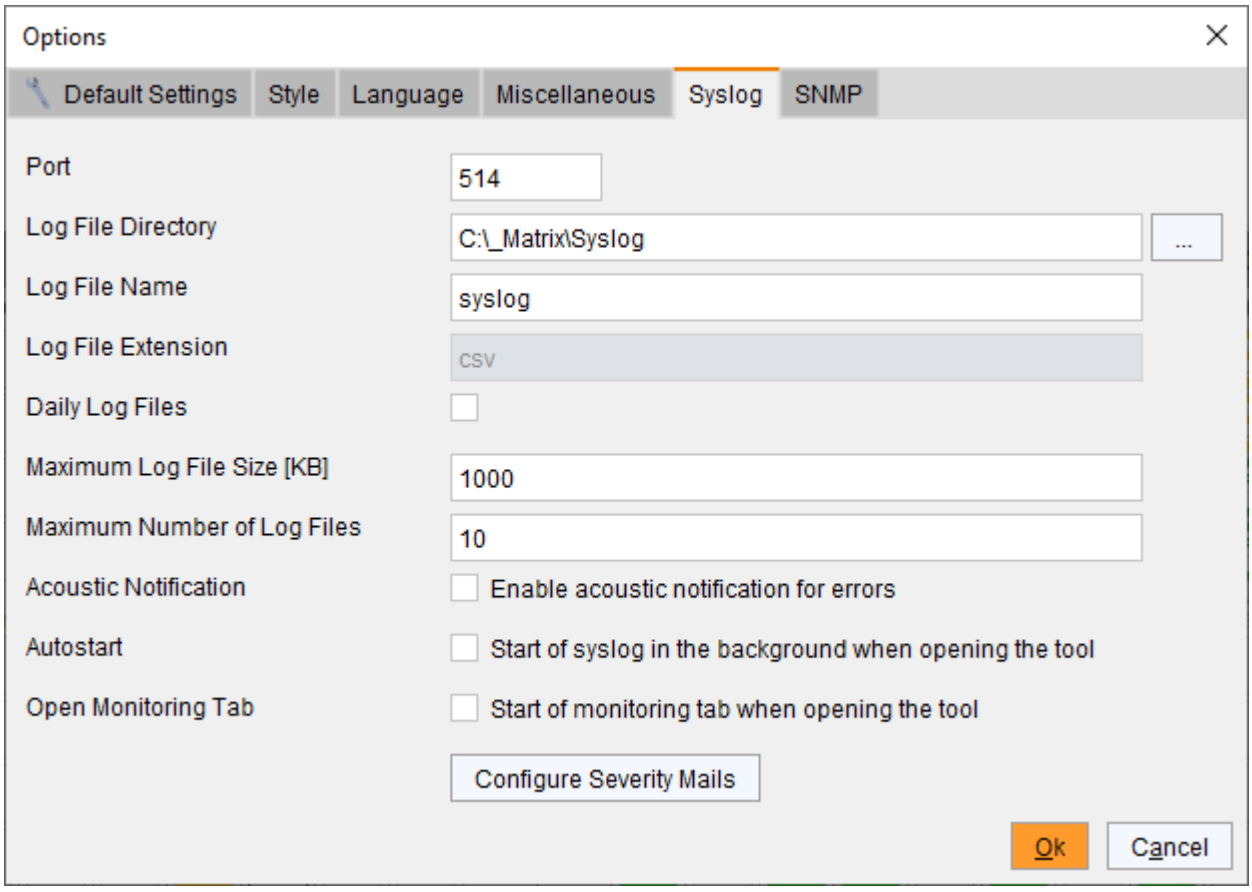


*Fig. 110 Management software menu **Extras - Options - Syslog***

The following options are available:

Option	Description
Log File Directory	Default directory to store the log files.
Log File Name	Default name of the log file.
Log File Extension	Default extension for the log file.
Daily Log Files	Log files are stored every 24 hours (daily).

Option	Description
Maximum Log File Size [KB]	Allowed maximum size of log file. When reaching the maximum log file size, a new log file will be created.
Maximum Number of Log Files	Allowed maximum number of log files. When the maximum number of log files is exceeded, the oldest logfile will be overwritten with the new information (log rotate).
Acoustic Notification	Enables acoustic notification for errors.
Autostart	When starting the management software, the Syslog logging will be started in the background.
Open Monitoring Tab	When starting the management software, the monitoring tab will be opened.

Activating I/O Board Diagnosis

For dedicated trouble shooting, Syslog can be enabled for selected I/O board in this menu.

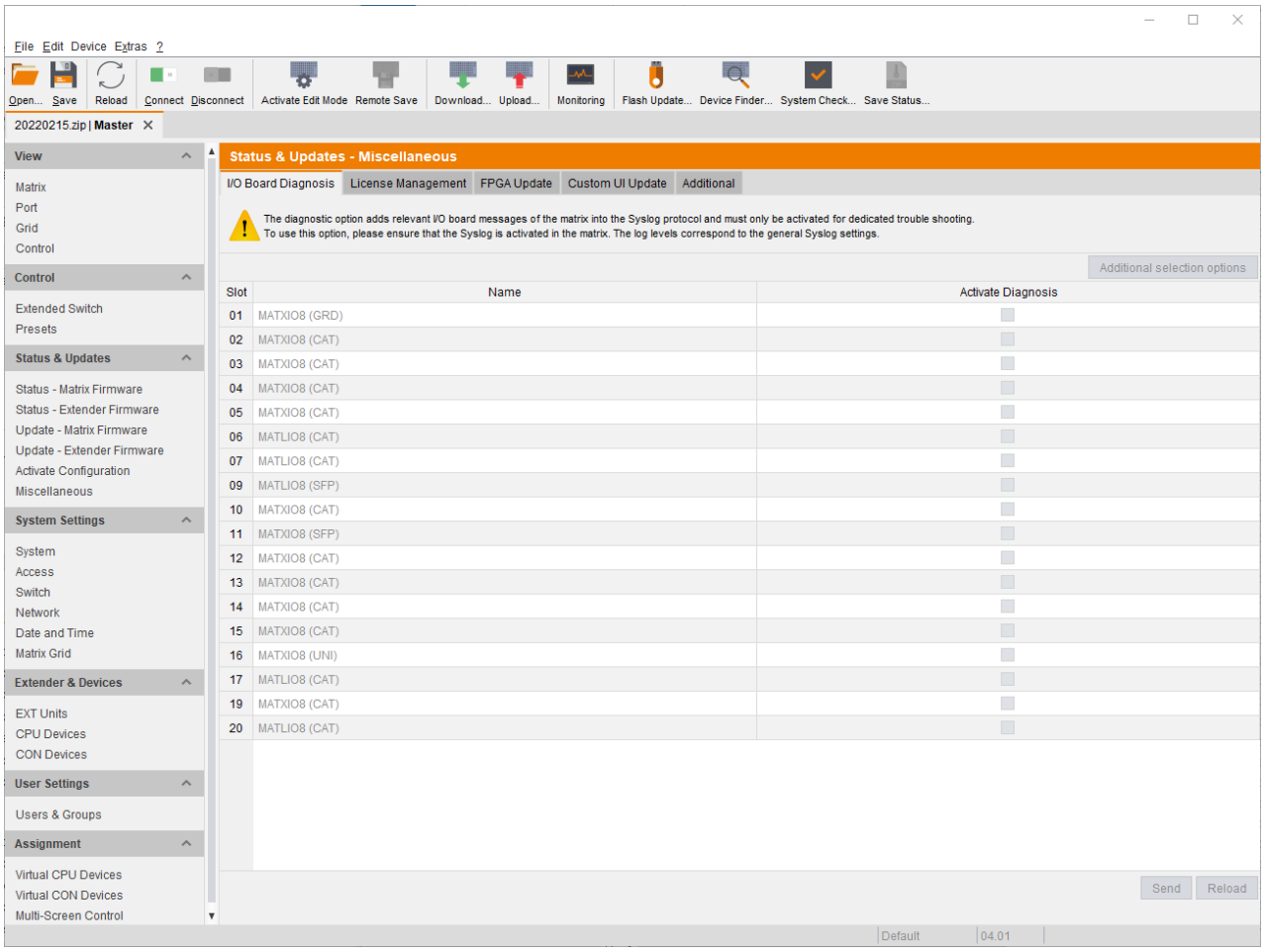


*Fig. 111 Management software menu **Status & Updates - Miscellaneous - I/O Board Diagnosis***

The following functions are available:

Button	Function
Send	Send settings to the matrix to activate the Syslog protocol for the selected I/O boards.
Reload	Reload settings.

The following options are available in the **Additional selection options** drop-down menu on the right upper side in the working area:

Option	Description
Select All	Select all I/O boards.
Deselect All	Deselect all selected I/O boards.

To activate the diagnostic option for individual I/O board messages, proceed as follows:

1. Click **Status & Updates > Miscellaneous** in the task area.
   The **I/O Board Diagnostic** tab opens in the working area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the desired I/O boards to activate the additional diagnosis.
   Messages of the selected I/O boards will be added to the Syslog protocol.
4. Click **Send** to send the settings to the matrix.
5. Click **Deactivate Edit Mode** in the toolbar.

Settings made in this menu will not be saved in the configuration. When restarting the matrix, these settings have to be set again if necessary.

7.4.10 Setting the SNMP Function

The SNMP function allows all function-critical and safety-critical elements of the matrix to be monitored and queried. This function complies with the RFC 1157 conformal standard. Two SNMP servers can be used at the same time.

Enabling the SNMP function, the unencrypted SNMP monitoring (SNMPv2) is activated. An SNMPv3 User for encrypted SNMP monitoring (SNMPv3) can be set in the user settings (see chapter 7.5.1, page 182) and the login data for an SNMPv3 User at the SNMP server can be set in the default settings (see section on page 176).

NOTICE

When using SNMP monitoring, for reasons of access security, the use of a dedicated network according to the IT-Grundschutz-Kompendium (IT Baseline Protection) is recommended. The read only community for the MIB file is **kvm**.

NOTICE

For an activation of the SNMP agent function or the SNMP server function, a restart of the matrix or the controller board is necessary. Restarting the matrix or the controller board may take several minutes, and the matrix is not available during the restart.

The settings for the SNMP monitoring are set in this menu:

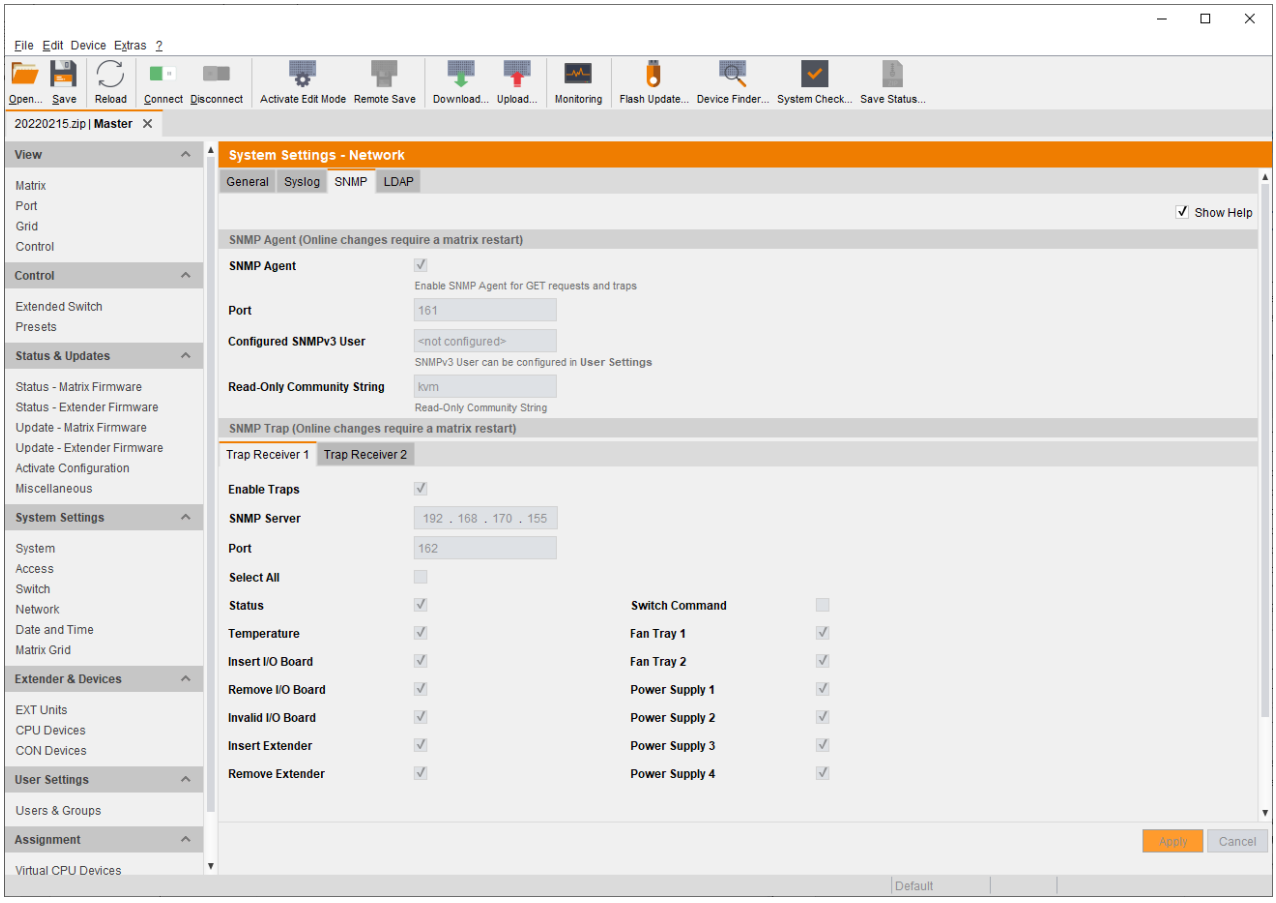


*Fig. 112 Management software menu **System Settings - Network - SNMP***

The following parameters can be configured:

SNMP Agent

Traps	Description
SNMP Agent	Permission for an active query of the SNMP agent for traps is granted. This activation is a prerequisite for using the SNMP server.
Port	The SNMP port is called up automatically (default: 161).
Configured SNMPv3 User	Name of the SNMP user (default: snmp).
Read-Only Community String	The read-only community string for the MIB file is **kvm**.

SNMP Trap

The SNMP agent must be activated to enable SNMP traps.

Traps	Description
Enable Traps	Sending of trap messages from the SNMP agent to the SNMP server.
SNMP Server	IP address of the SNMP server in the form “192.168.1.1”.
Port	SNMP port (default: 162).
Select All	Select all traps.
Status	Notification about matrix status.
Temperature	Notification about temperature within the matrix.
Insert I/O Board	Notification about insertion of a new I/O board into a slot.
Remove I/O Board	Notification about removal of an I/O board out of a slot.
Invalid I/O Board	Notification about a wrong firmware installed on the I/O board.
Insert Extender	• Notification about a newly connected extender module to the matrix, notification about a switched-on extender module. • Notification about a newly established link between extender module and matrix.
Remove Extender	• Notification about a removed extender module from the matrix. • Notification about a switched off extender module. • Notification about an interrupted link between extender module and matrix.
Switch Command	Notification about a performed switching operation at the matrix.
Fan Tray 1	Notification about the fan 1 status (interface view of the matrix: left side (K048/K080) or bottom (K152-K576).
Fan Tray 2	Notification about the fan 1 status (interface view of the matrix: right side (K048/K080) or top (K152-K576).
Power Supply 1	Notification about the status of power supply unit 1.
Power Supply 2	Notification about the status of power supply unit 2.
Power Supply 3	Notification about the status of power supply unit 3.
Power Supply 4	Notification about the status of power supply unit 4.

* Only for Draco tera enterprise matrices.

Activating the SNMP Agent

To activate the SNMP agent, proceed as follows:

1. Click **System Settings > Network** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **SNMP** tab in the working area.
4. Tick the **SNMP Agent** checkbox within the **SNMP Agent** area.
   By activating this option, the permission for an active query of the SNMP agent is granted.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

Activating SNMP Traps

To activate active reporting of the SNMP traps, proceed as follows:

1. Click **System Settings > Network** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **SNMP** tab in the working area.
4. Tick the **Enable Traps** checkbox within the **SNMP Trap** area.
5. Enter the IP address of the SNMP server under **SNMP Server**.
6. Tick the checkboxes of the desired traps to activate them.
7. Click **Apply** to confirm the changes.
8. Click **Deactivate Edit Mode** in the toolbar.

Setting up SNMP Options

Presets for an SNMPv3 user can be set up for the computer on which the management software is operated are set in this menu.

To set or activate the presetting, proceed as follows:

1. Click **Extras > Options** in the menu bar and open the **SNMP** tab.
2. Enter the appropriate data.
3. Click **Ok** to confirm the entries.
4. Close the management software and restart it.

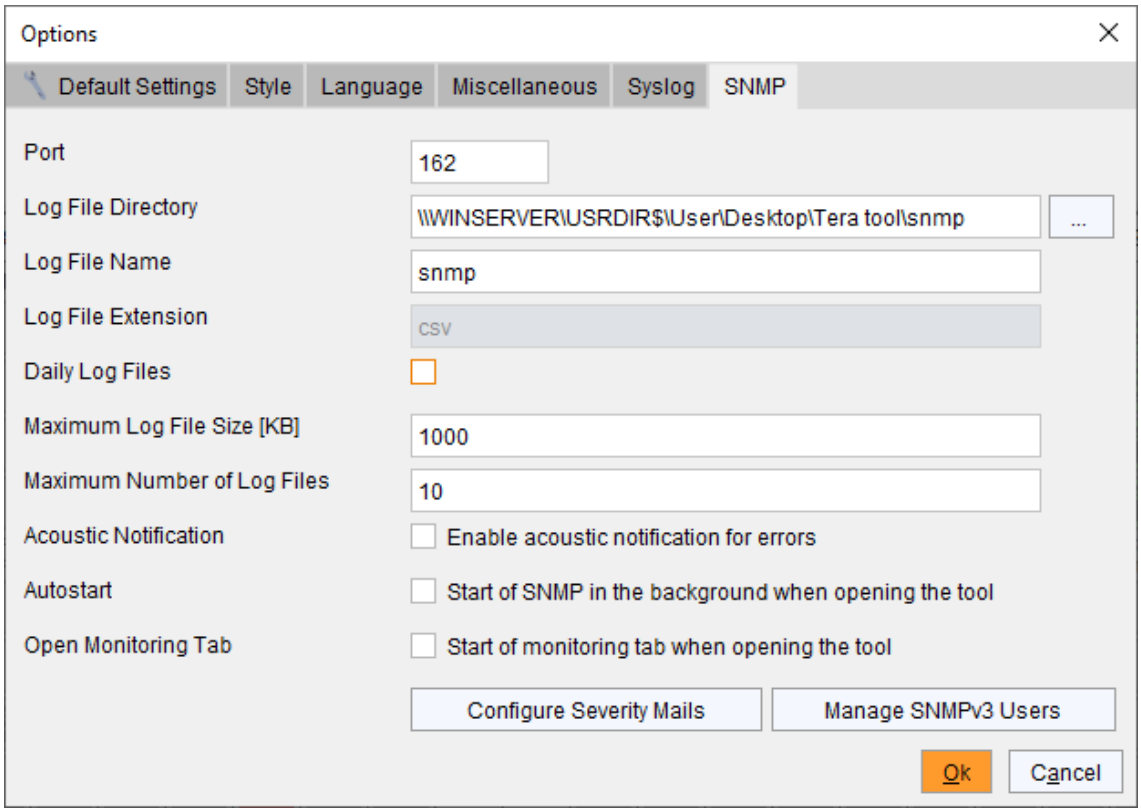


*Fig. 113 Management software menu **Extras - Options - SNMP***

The following options are available:

Option	Description
Port	SNMP port (default: 162).
Log File Directory	Default directory to store the log files.
Log File Name	Default name of the log file.
Log File Extension	Default extension for the log file.
Daily Log Files	Log files are stored every 24 hours (daily).
Maximum Log File Size [KB]	Allowed maximum size of log file. When reaching the maximum log file size, a new log file will be created.
Maximum Number of Log Files	Allowed maximum number of log files. When the maximum number of log files is exceeded, the oldest logfile will be overwritten with the new information (log rotate).
Acoustic Notification	Enables acoustic notification for errors.
Autostart	When starting the management software, the SNMP logging will be started in the background.
Open Monitoring Tab	When starting the management software, the monitoring tab will be opened.

Creating an SNMPv3 User for the SNMP Server

In the following menu, the login data for an SNMPv3 user can be set up for the computer on which the management software is operated (SNMP server). The SNMP server authenticates itself with the agent using this login data.

NOTICE

Failed SNMP logging

If the login data differs between the matrix (set up in the **User** menu) and the SNMP server, no SNMP traps are transmitted.

➡ Ensure the login data (username and password) in both settings are identical (see chapter 7.5.1, page 182).

To configure the login data for an SNMPv3 User at the SNMP server, proceed as follows:

1. Click **Extras > Options** in the menu bar and open the **SNMP** tab.
2. Click **Manage SNMPv3 Users**.

   A list appears with already created SNMPv3 users.
3. Click **Add User**.

   A dialog window appears.
4. Enter the required data and click **Ok** to confirm the entries.
5. Click **Close** to close the users list.
6. Click **Ok** in the **SNMP** tab to confirm your settings.
7. Close the management software and restart it.

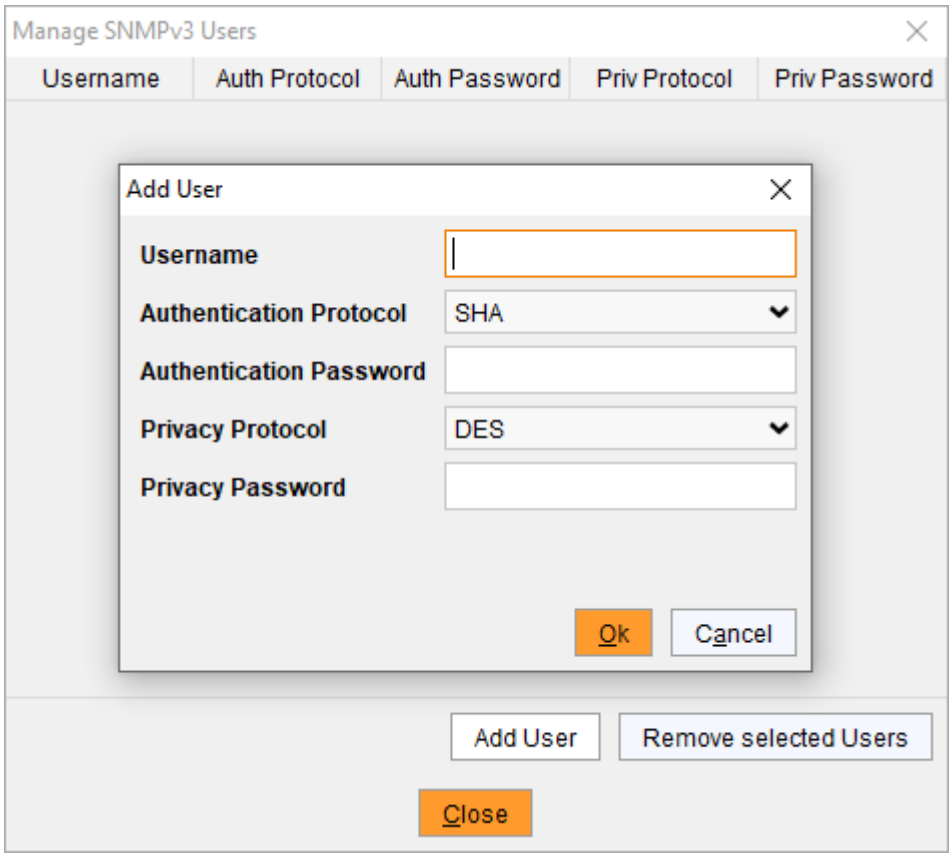


*Fig. 114 Management software menu **Extras - Options - SNMP - Manage SNMPv3 Users - Add User***

The following parameters are required to create a new SNMPv3 user on the SNMP server:

Option	Description
Username	SNMPv3 username.
Authentication Protocol	Only SHA protocol, no selection available.
Authentication Password	Authentication password for the SNMPv3 user (case sensitive, input of minimum 8 characters up to 16 characters).
Privacy Protocol	Only DES protocol, no selection available.
Privacy Password	Must be identical to the password of the authentication password.

7.4.11 Setting the LDAP Configuration (Active Directory)

NOTICE

To initialize the LDAP configuration changes, the matrix must be restarted. Restarting the matrix may take several minutes, and the matrix is not available during the restart.

The KVM matrix can be synchronized with the directory service Active Directory regarding user authentication. This allows the user to login at the KVM matrix using login information from the Active Directory service and to contact the Active Directory Server for each authentication that does in fact the proper authentication.
The connection between KVM matrix and the Active Directory server is established via OpenLDAP and periodically synchronized every 5 minutes.
The search of users to be synchronized and automatically added to the KVM matrix configuration can either be based on a **group** or **organizational unit (OU)**. In both cases a user requires to be at least assigned to one group:

- In case of the group, all users belonging to a previously defined group on the active directory server are added to the KVM matrix and synchronized. In this alternative, the organizational structure of the organizational units (OUs) is added as matrix user group to the KVM matrix configuration. This means that the organizational unit (OU) that includes the user can be found as a matrix user group in the KVM matrix configuration after the synchronization. A user can be member of up to 8 groups.
- In case of the organizational unit, all users belonging to groups that are located directly under this organizational unit are added and synchronized. The groups can also include subgroups. The structure of the groups is added to the KVM matrix configuration as user group. Each group will be represented in the KVM matrix as a user group after the synchronization. Groups that are located in sub organizational units will be ignored.

The general LDAP settings for the synchronization with the directory service Active Directory are set in this menu.

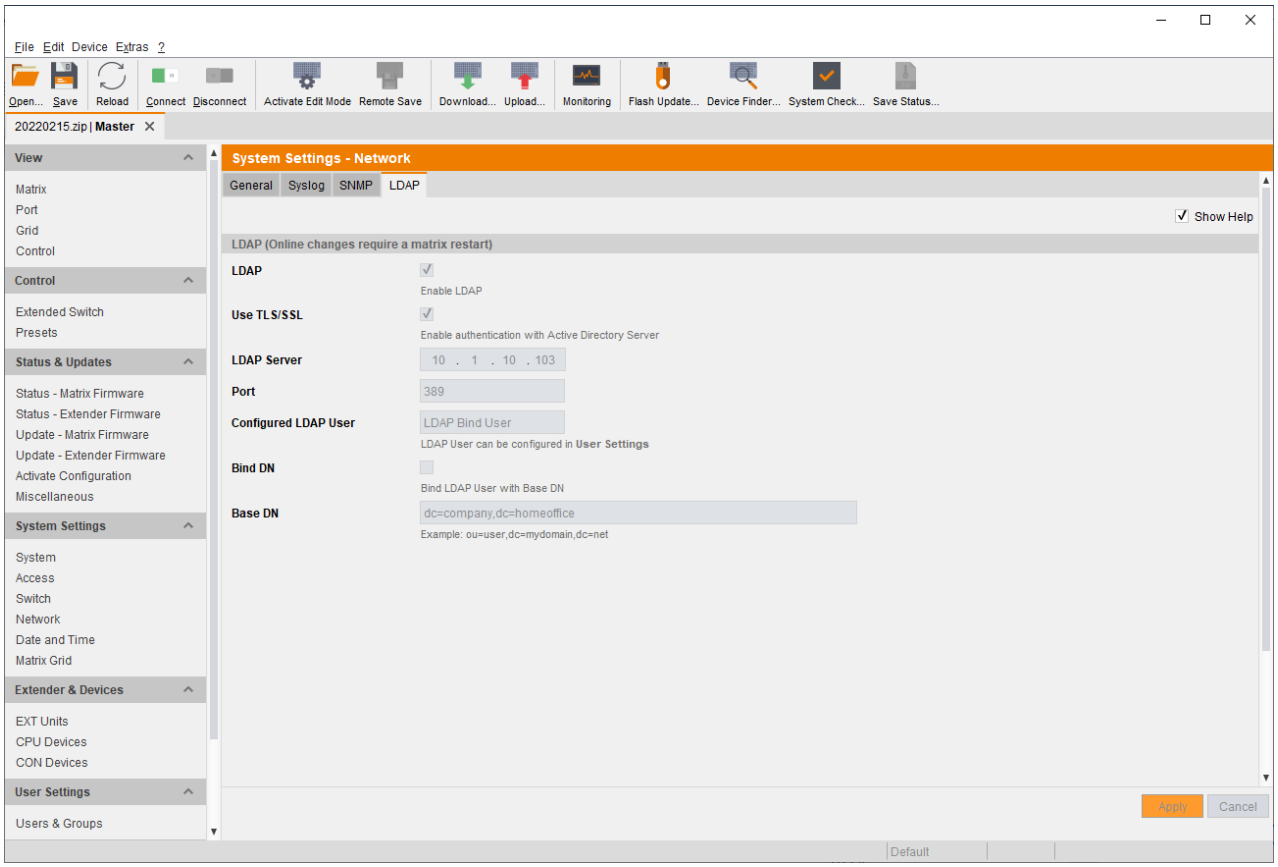


*Fig. 115 Management software menu **System Settings - Network - LDAP***

The following parameters can be configured:

Field	Entry/Status	Description
LDAP	Activated	LDAP for the request of information from a user administration is active.
	Deactivated	Function not active (default).
Use TLS/SSL	Activated	Enable a secured transmission (transport layer security) for the Active Directory access.
	Deactivated	Function not active (default).
LDAP Server	Byte	Enter the IP address for the LDAP-Servers in the form "192.168.1.1".
Port	Byte	Enter the LDAP port (Default: 389/636).
Configured LDAP User	Text	Name of the configured LDAP user.
LDAP Base DN	Text	Enter the LDAP Base DN according to the existing structure of the user directory.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: no restart of the matrix is required.

To configure and enable the synchronization to the Active Directory server, there are three steps required:

- Configuring the LDAP settings.
- Creating an LDAP User (see page 184).
- Creating an LDAP Group (see page 195).

To configure the LDAP settings, proceed as follows:

1. Click **System Settings > Network** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **LDAP** tab in the working area.
4. Tick the **LDAP** checkbox**.**
5. Optionally tick the **Use TLS/SSL** checkbox to activate this function.
6. Enter the respective IP address and port number into the field **LDAP Server** (default port number: 389 (636 for SSL)).
7. Enter the LDAP **Base DN** into the respective field (e.g., dc=example, dc=com).
8. Click **Apply** to confirm the settings.
9. Restart the matrix.

Changes done in step 4 to 8 only come into effect after a restart of the matrix.

10. Create an LDAP User settings (see page 184).
11. Create an LDAP Group (see page 195).

7.4.12 Setting the Date and Time

The parameters for the system configuration are set in this menu, based on Simple Network Time Protocol (SNTP):

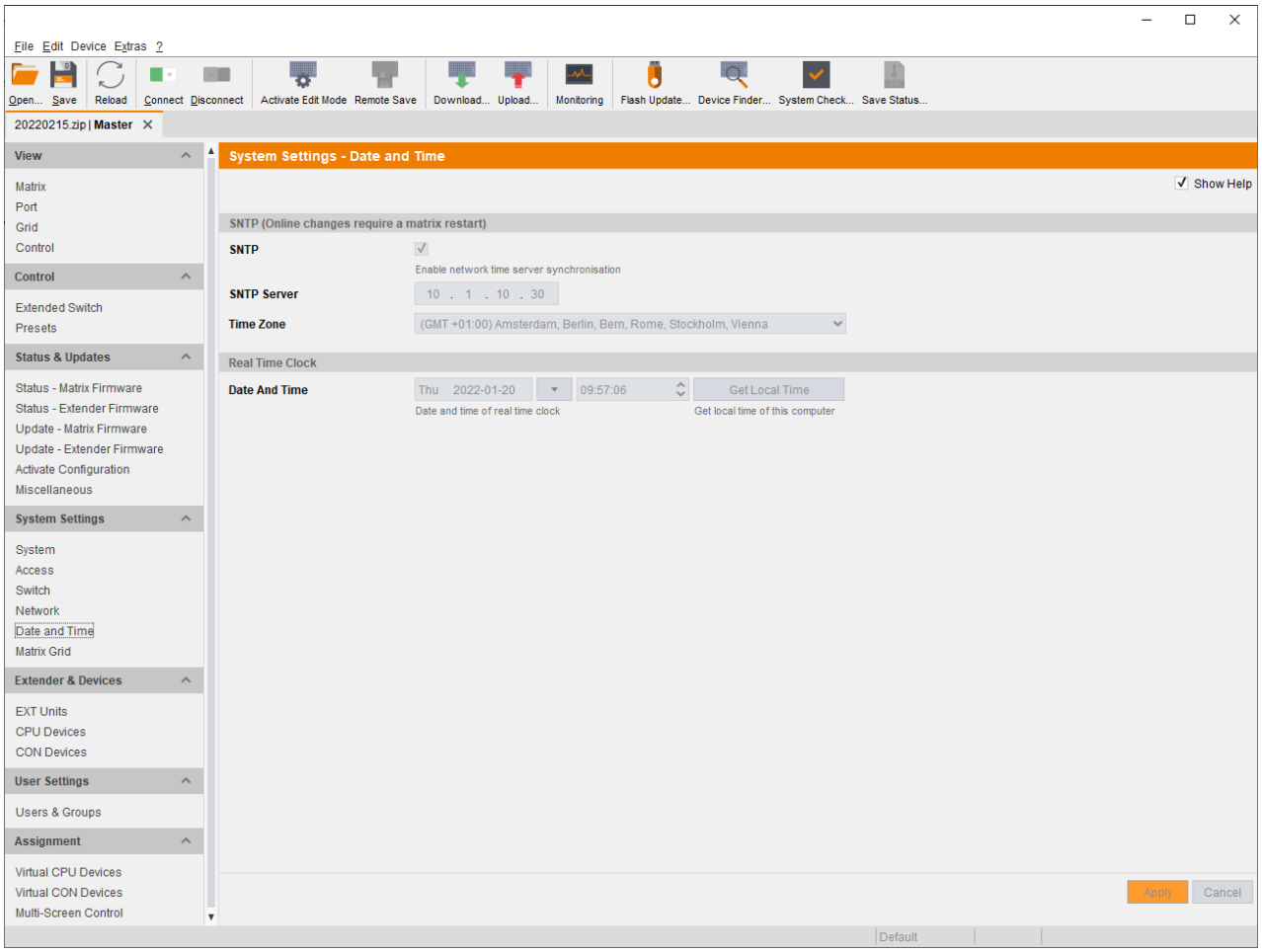


*Fig. 116 Management software menu **System Settings - Date and Time***

The following parameters can be configured:

SNTP

Field	Entry/Status	Description
SNTP	Activated	Enable the network time server synchronization.
	Deactivated	Function not active (default).
SNTP Server	Byte	Enter the SNTP server IP address (default: 000.000.000.000).
Time Zone	Region	Set your specific time zone (default: GMT + 00).

Real Time Clock

Field	Description
Date*	Date and time of the real time clock.
Get Local Time	Get local time of this computer.

* Date format according to the English notation.

Configuring the Time Server

To configure a time server, proceed as follows:

1. Click **System Settings > Date and Time** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Tick the **SNTP** checkbox to enable the SNTP option.
4. Enter the IP address of your SNTP server into the **SNTP Server** field.
5. Select your time zone in the **Time Zone** field.
6. Click **Apply** to confirm your settings.
7. Restart the matrix.
   After the restart, the system time is now provided by the SNTP server.
8. Click **Deactivate Edit Mode** in the toolbar.

Configuring the Real Time Clock without Time Server

To set the real time clock without using SNTP, proceed as follows:

1. Click **System Settings > Date and Time** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Set the current date in the **Date and Time** section.
4. Set the current time in the **Date and Time** section.
   The entered time is set immediately in the settings.
5. Option: if you want to receive the time from your currently used computer, click **Get Local Time**.
6. Click **Deactivate Edit Mode** in the toolbar.

7.5 Configuring User Settings

7.5.1 Setting the User Access

New users and their user settings and permissions are set in this menu.

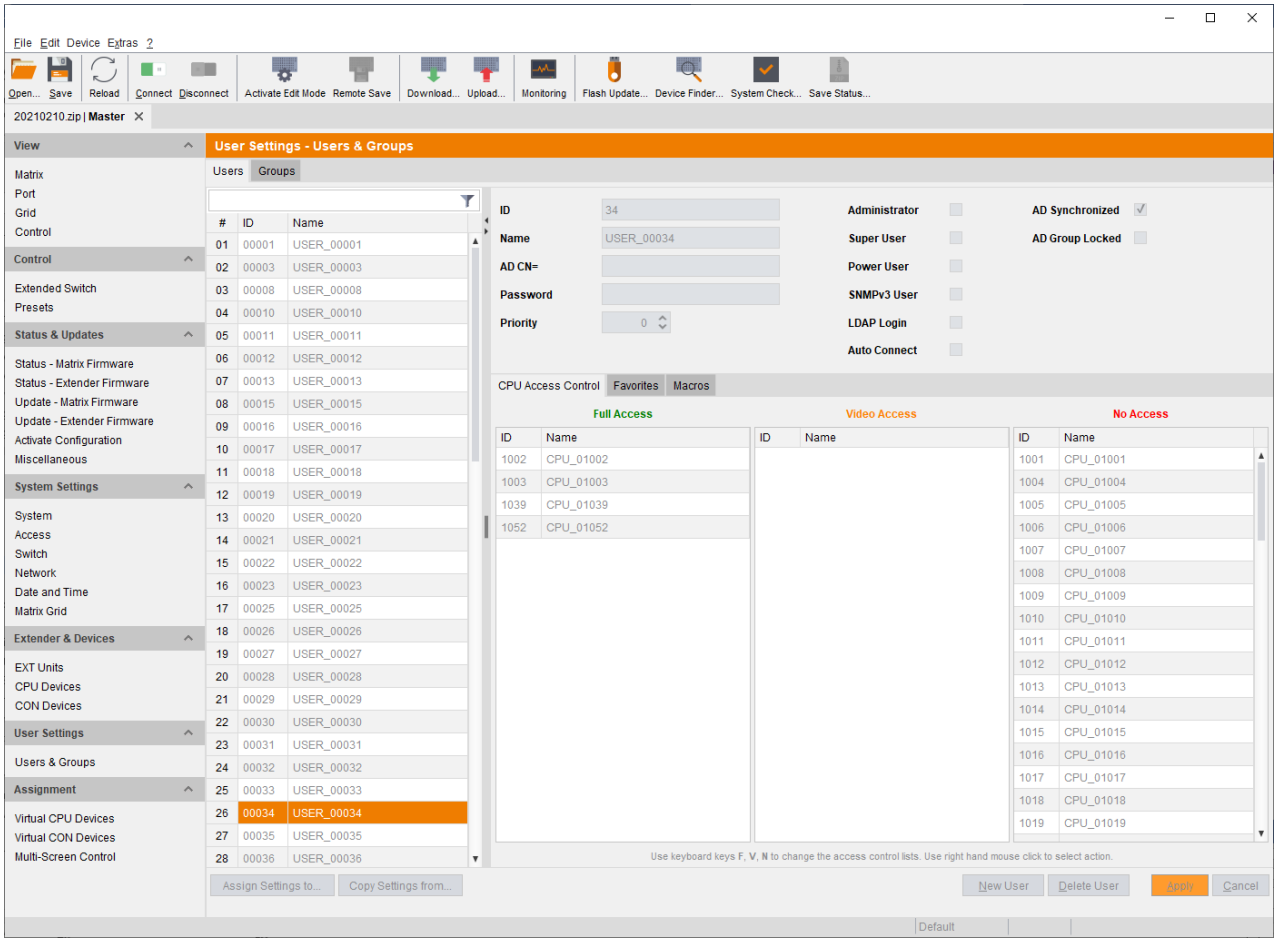


*Fig. 117 Management software menu **User Settings - Users & Groups - Users***

NOTICE

Failed SNMP logging

If the login data of the SNMPv3 user differs between the matrix and the SNMP server, no SNMP loggings are transmitted.

➡ Ensure the login data (username and password) in both settings are identical (see section on page 176).

The following parameters can be configured:

Field	Entry/Status	Description
ID	Numerical	Ident number of the user
Name	Text	For standard users it is the login name (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
		For LDAP Users it is the name (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
		For users synchronized via LDAP, it is the sAMAccountName, automatically retrieved from the LDAP server. Can be used to log in to the OSD.
Full Name/ Login Name/ AD CN=	Text	For standard users it is the full name (optional input of up to 32 characters). Can be used to log in to the OSD.
		For LDAP Users it is the login name (case sensitive, input of minimum 1 character up to 32 characters). Can be used to log in to the OSD.
		For users synchronized via LDAP, it is the userPrincipalName, automatically retrieved. Can be used to log in to the OSD.
Password	Text	For standard users (optional input of up to 16 characters). Can be used to log in to the OSD.
		For LDAP Users (case sensitive, input of minimum 1 character up to 16 characters). Can be used to log in to the OSD.
Priority	Value	Priority of the user
Administrator	Activated	Permission for system configuration and all switching operations
	Deactivated	Function not active (default).
Super User	Activated	Permission to switch any CON Device to any CPU Device in **Extended Switching**
	Deactivated	Function not active (default).
Power User	Activated	Permission to switch CON Devices to CPU Devices in **Extended Switching** according to the **CON Device ACL** or **User ACL**, but not in Private Mode
	Deactivated	Function not active
SNMPv3 User	Activated	Permission to use SNMPv3 (encrypted)
	Deactivated	SNMPv3 is not enabled
LDAP Login	Activated	Bind User for accessing the Active Directory
	Deactivated	Function not active (default).
Auto Connect	Activated	Re-establish the previous user connection after login
	Deactivated	Function not active

Field	Entry/Status	Description
AD Synchronized	Activated	Enable synchronization with the Active Directory **Note:** LDAP Login has to be activated to use the synchronization
	Deactivated	Function not active
AD Group Locked	Activated	Lock synchronization of group attribute for an Active Directory user. This setting is required for a manual change of user groups for a specific Active Directory user.
	Deactivated	Function not active (default).

7.5.1.1 Creating a new Standard User Account

To create a new user, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **New User**.
   A selection dialog appears.
4. Select a template of an existing user if applicable (**Choose template**) in the selection box.
5. Click **Ok**.
6. Enter a name.
7. Optionally enter a full name and a password.
8. Enter general access permissions.
9. Set user permissions for CPU Device access (paste function).
10. Set user favorites for OSD access.
11. Click **Apply** to confirm the new user settings.
12. Click **Deactivate Edit Mode** in the toolbar.

7.5.1.2 Creating a new LDAP User Account

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **New User**.
   A selection dialog appears.
4. Select **Create a LDAP User** in the selection box to create a new LDAP user (bind user).
5. Click **Ok**.
6. Enter the name of the bind user from the Active Directory into the field **Name**.
7. Enter the Common Name (CN) of the bind user from the Active Directory into the field **Login Name**.
8. Enter the password of the bind user from the Active Directory into the field **Password**.
9. Click **Apply** to confirm the creation of the user.
10. Click **Deactivate Edit Mode** in the toolbar.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: No restart of the matrix is required.

7.5.1.3 Changing a User Account

To change user settings, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a user in the Users list.
4. Change the desired settings.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.5.1.4 Configuring User Access Rights

To configure user access rights for CPU Devices, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a user in the **Users** list.
4. By clicking with the right mouse button once on a CPU Device in one of the respective access lists (**Full Access**, **Video Access,** and **No Access**), a context menu for selection appears in which the respective CPU Device can be moved, and the access rights can be changed. Alternatively, press f, v, or n to set the respective access rights.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.5.2 Setting User Favorites

Individual favorite lists of CPU Devices that will be switched frequently can be created for different users in this menu. A favorite list can contain up to 32 different CPU Devices (from firmware V3.05).

The switching of the favorites is done via keyboard command (see chapter 8.1.1, page 290).

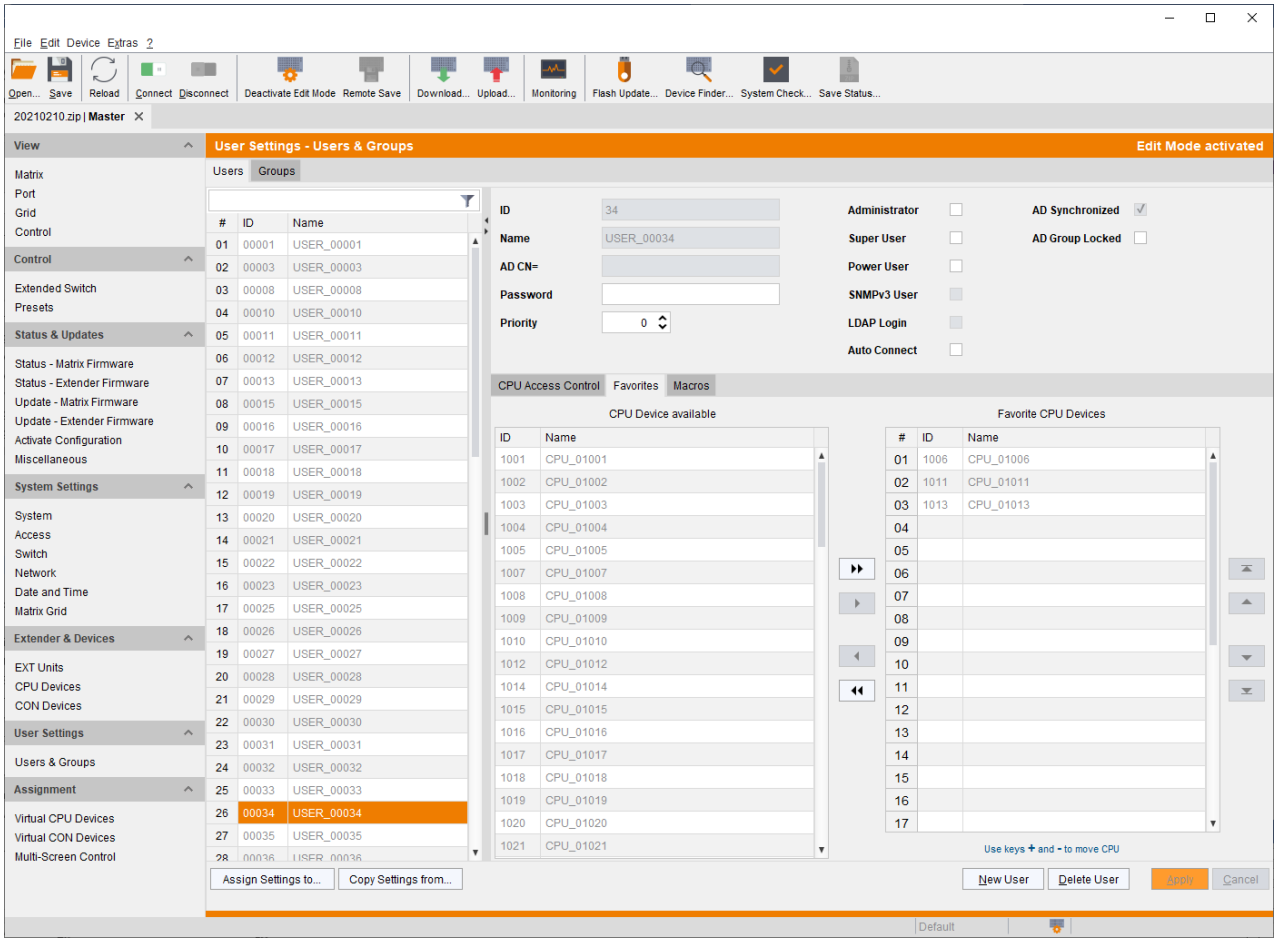


*Fig. 118 Management software menu **User Settings - Users & Groups - Users - Favorites***

Creating a Favorites List for Users

To create a favorites list for any user, proceed as follows:

1. Click **User Settings> Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the respective user for the favorites list in the **Users** list.
4. Click the **Favorites** tab in the working area.
5. Select the CPU Devices in the **CPU Device available** list that should be added to the favorites list (**Favorite CPU Devices**). By pressing and holding down Ctrl at the same time, more than one CPU Device can be highlighted.
6. Click ▶ to move the highlighted CPU Devices to the favorites list. By clicking ▶▶, all CPU Devices from the **CPU Device available** list will be moved to the favorites list (**Favorite CPU Devices**).
7. To remove highlighted CPU Devices from the favorites list, click ◀. By clicking ◀◀, all CPU Devices will be removed from the favorites list.
8. Click ▼ or ▲ to change the order of the CPU Devices within the favorites list.
   Or press + or - to change the order of the CPU Devices within the favorites list.
9. Click **Apply** to confirm the changes.
10. Click **Deactivate Edit Mode** in the toolbar.

7.5.3 Setting User Macros

In this menu macro commands for switching, disconnection or user administration can be created. Macro commands are created for each user separately. A macro can execute up to 16 commands successively. The execution of the macros is done via Hot Key and the F1 to F16 function keys (see chapter 8.1.4, page 293).

To execute user macros the user has to be logged in to the matrix.

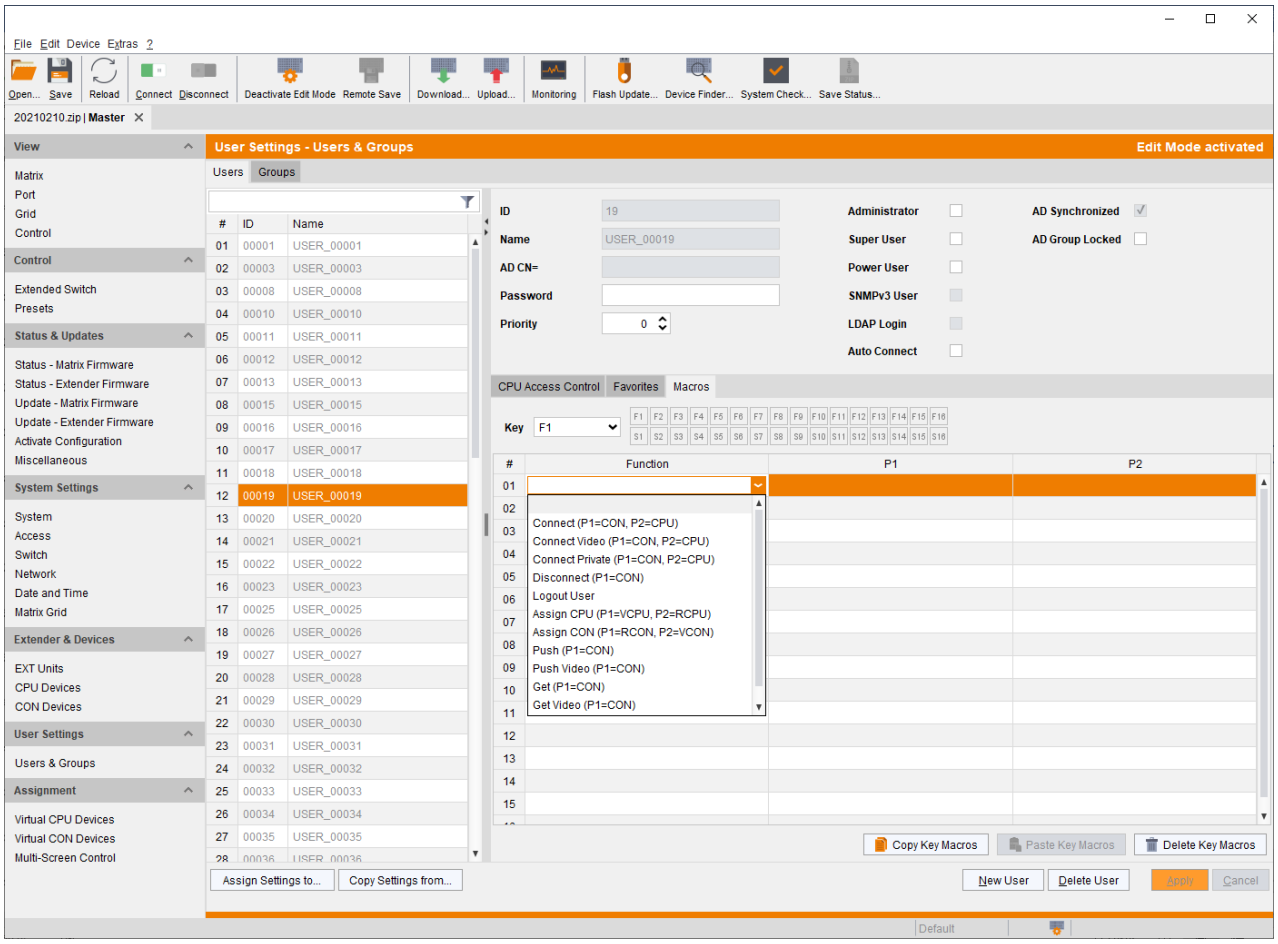


*Fig. 119 Management software menu **User Settings - Users & Groups - Users - Macros***

The following parameters can be configured:

Field	Selection	Description
Function (01 to 16)	**Connect (P1=CON, P2=CPU)**	Set a bidirectional connection from CON Device P1 to CPU Device P2
	Connect Video (P1=CON, P2=CPU)	Set a Video Only connection from CON Device P1 to CPU Device P2
	Disconnect (P1=CON)	Disconnect the CON Device P1
	Logout User	Logout the current user
	Assign CPU (P1=VCPU, P2=RCPU)	Assign a virtual CPU Device to a real CPU Device

Field	Selection	Description
	Assign CON (P1=RCON, P2=VCON)	Assign a real CON Device to a virtual CON Device
	Push (P1=CON)	The user's Full Access connection is forwarded to CON Device P1 and is changed into a Video Only connection.
	Push Video (P1=CON)	The video signal of the current connection (Full Access or Video Only) is forwarded to CON Device P1. The user's connection remains unchanged (Full Access or Video Only).
	Get (P1=CON)	The user's CON Device gets a Full Access connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 is changed into a Video Only connection.
	Get Video (P1=CON)	The user's CON Device gets a Video Only connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 remains unchanged (Full Access or Video Only).
	Login User console P2	Login a certain user P1 at CON Device P2
P1	**CON or CPU Device**	Name of CON Device or CPU Device
P2	**CON or CPU Device**	Name of CON Device or CPU Device

To create a macro for the selected user, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the user for which macros are to be created.
4. Open the **Macros** tab.
5. Select in the **Key** field the function key for which a macro has to be created.
6. Double-click in the **Function** column to display a list of all available commands that should be part of the macro.
7. Select the desired command in the selection list.
8. Select in the **P1** and **P2** columns the respective parameters for the macro functions (e.g., corresponding CON Devices and CPU Devices).
9. Click **Apply** to confirm the changes.
10. Click **Deactivate Edit Mode** in the toolbar.

For an efficient macro configuration, the following context functions are available:

➡ When clicking on the **Macros** tab, macros can be assigned to other users by using the **Assign Settings to...** function (see description on page 190) and can be copied from other users by using the **Copy Settings from...** function (see description on page 192).

➡ When clicking on the macro list, macros of the selected key can be copied into the cache by using the **Copy Key Macros** function. You can paste the macros from the cache into another key by using the **Paste Key Macros** function and you can reset all macros of the selected key by using the **Delete Key Macros** function.

7.5.4 Setting Access Rights for Logging in to the OSD

Users can be blocked from logging in for certain CON Devices.

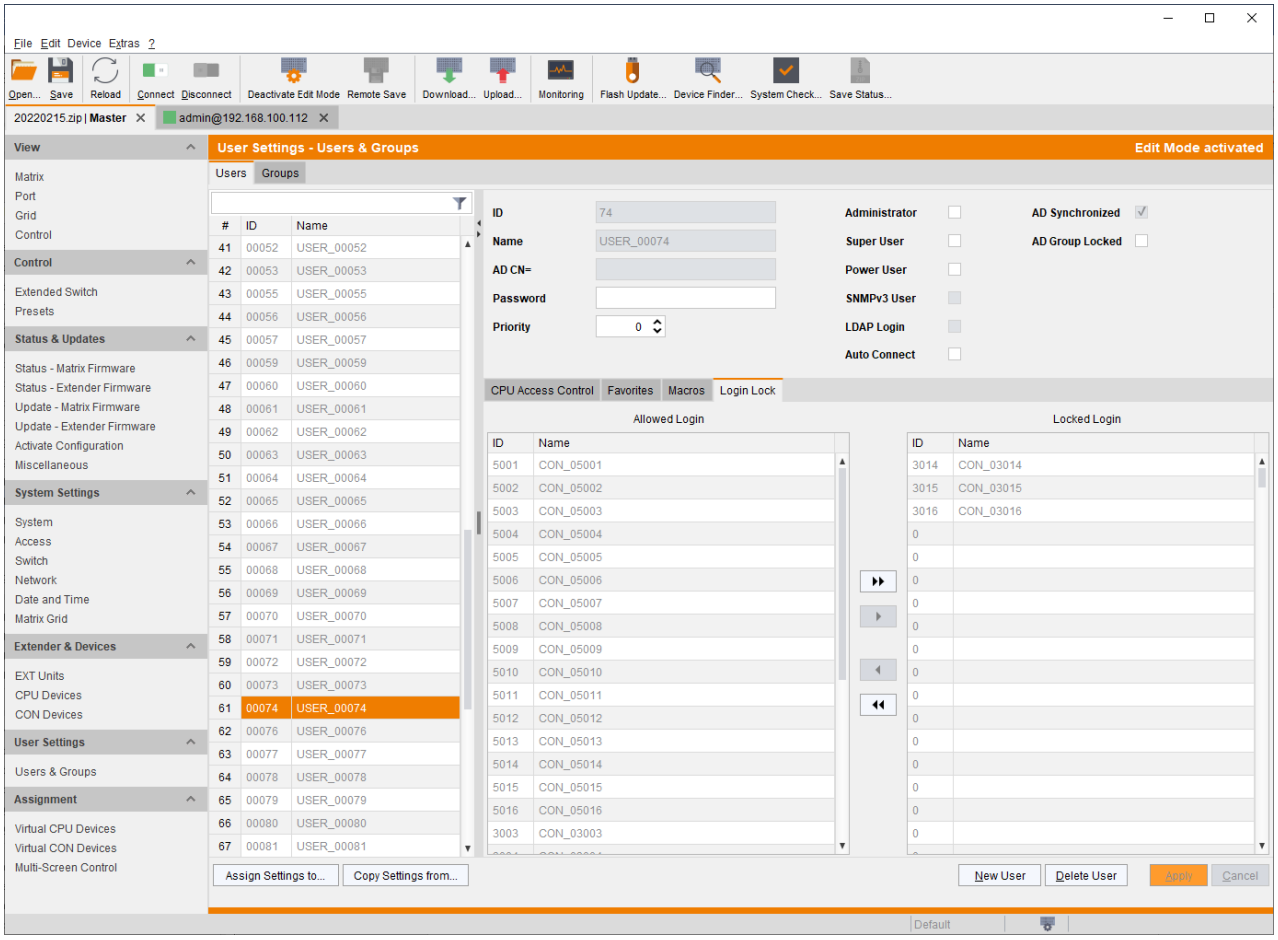


*Fig. 120 Management software menu **User Settings - Users & Groups - Users - Login Lock***

To lock the login to the OSD of specified CON Devices, proceed as follows:

1. Click **User Settings> Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the appropriate user from the **Users** list for whom the login for the OSD should be restricted.
4. Click the **Login Lock** tab in the working area.
5. Select the CON Devices in the **Allowed Login** list that should be added to the list of locked CON Devices, (**Locked Login**). By pressing and holding down Ctrl at the same time, more than one CON Device can be highlighted.
6. Click ▶ to move the highlighted CON Devices to **Locked Login** list. By clicking ▶▶, all CON Devices from the **Allowed Login** list will be moved to the **Locked Login** list.
7. To remove highlighted CON Devices from the **Locked Login** list, click ◀. By clicking ◀◀, all CON Devices will be removed from the **Locked Login** list.
8. Click **Apply** to confirm the changes.
9. Click **Deactivate Edit Mode** in the toolbar.

7.5.5 Assigning/Copying Settings of Users

7.5.5.1 Assigning Settings to other Users

To assign settings of a user to other users, proceed as follows:

1. Click **User Settings> Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Favorites** tab in the working area.
4. Select the user whose settings are to be assign to another user.
5. Click **Assign Settings to** below the user list.

   A query to select the settings appears.
6. Tick the checkboxes for the desired settings.
7. Click **Next >**.

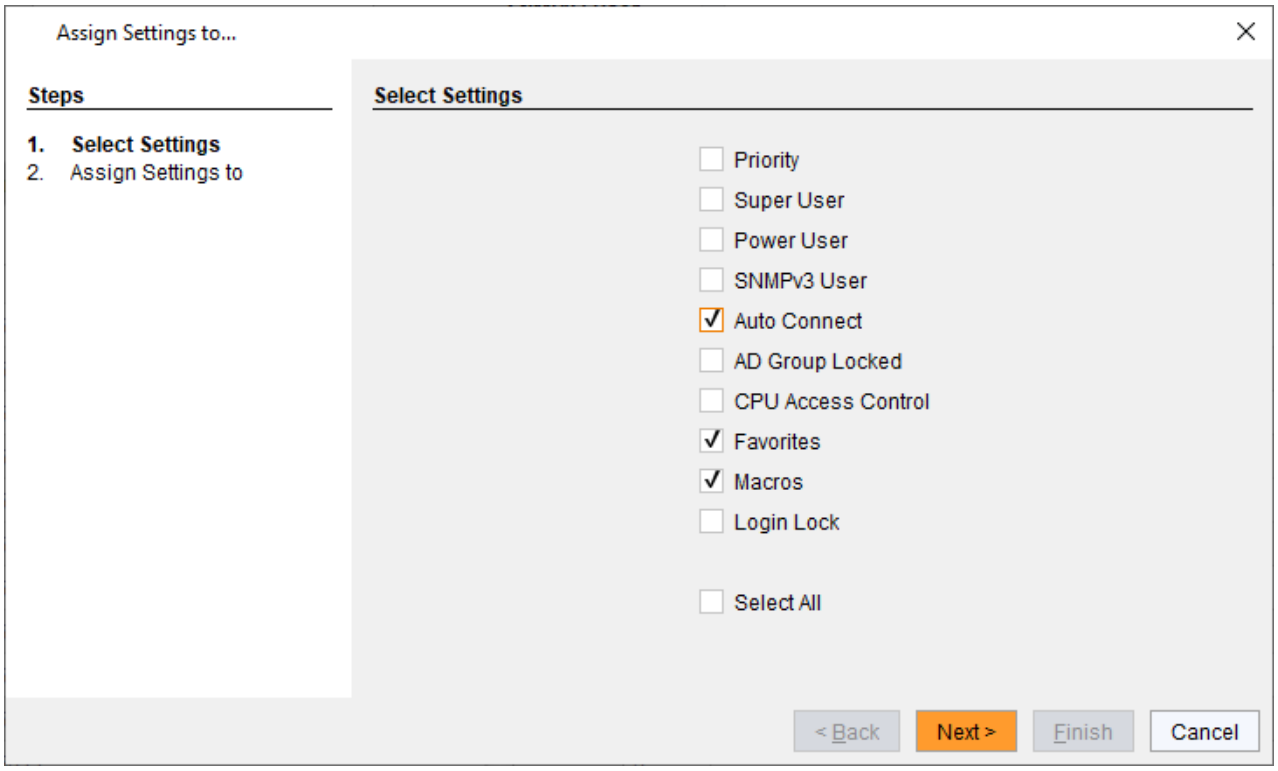


*Fig. 121 Management software menu **Users & Groups - Users - Assign Settings to - Select Settings***

A query to start the assignment appears.

8. Select the user in the **Available to assign settings to** list to which the settings are to be assigned. By pressing and holding down Ctrl at the same time, more than one user can be highlighted.
9. Click ▶ to move the highlighted user to the **Assign settings to** list. By clicking ▶▶, all users will be moved to the **Assign settings to** list.
10. To remove highlighted user from the **Assign settings to** list, click ◀. By clicking ◀◀, all users will be removed from the **Assign settings to** list.
11. Click **Finish**.

    The settings are immediately assigned to the selected users.
12. Click **Deactivate Edit Mode** in the toolbar.

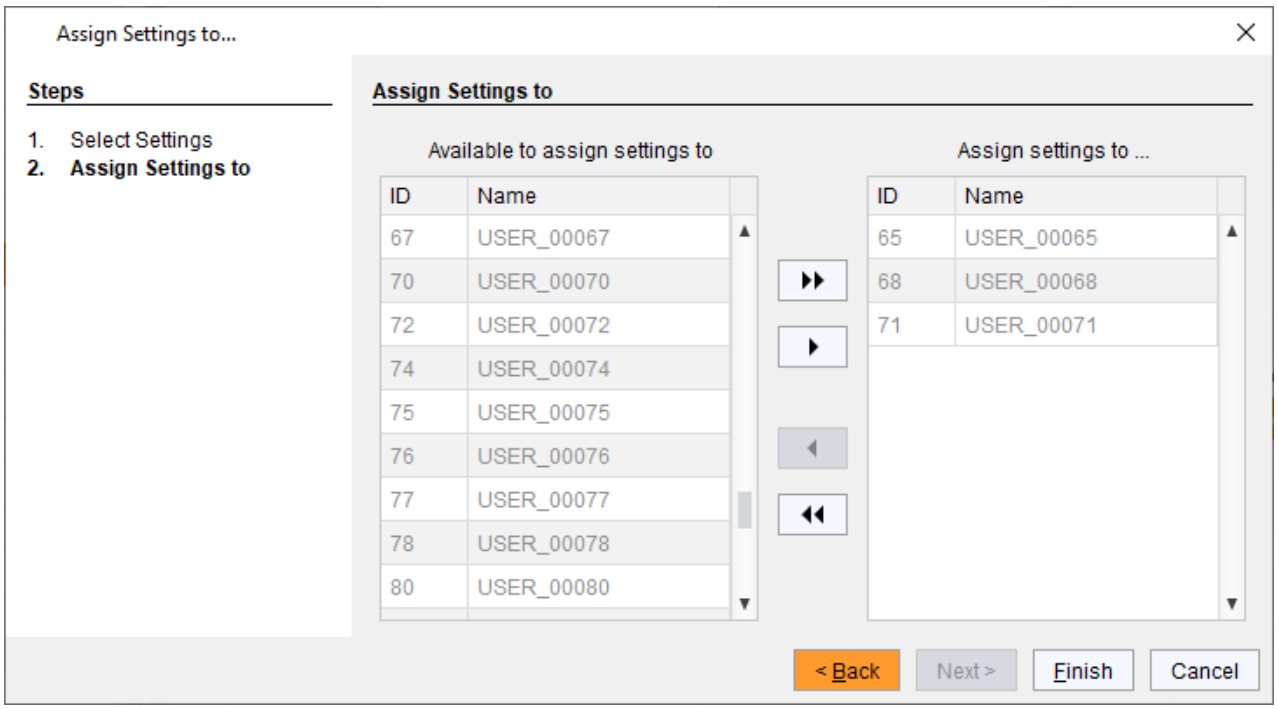


*Fig. 122 Management software menu **Users & Groups - Users - Assign Settings to- Assign Settings***

7.5.5.2 Copying Settings from another User

To copy settings from a user to another user, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the user to copy the settings to. By pressing and holding down Ctrl at the same time, more than one user can be highlighted.
4. Click **Copy Settings from** below the user list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings to be copied.
6. Click **Next >**.

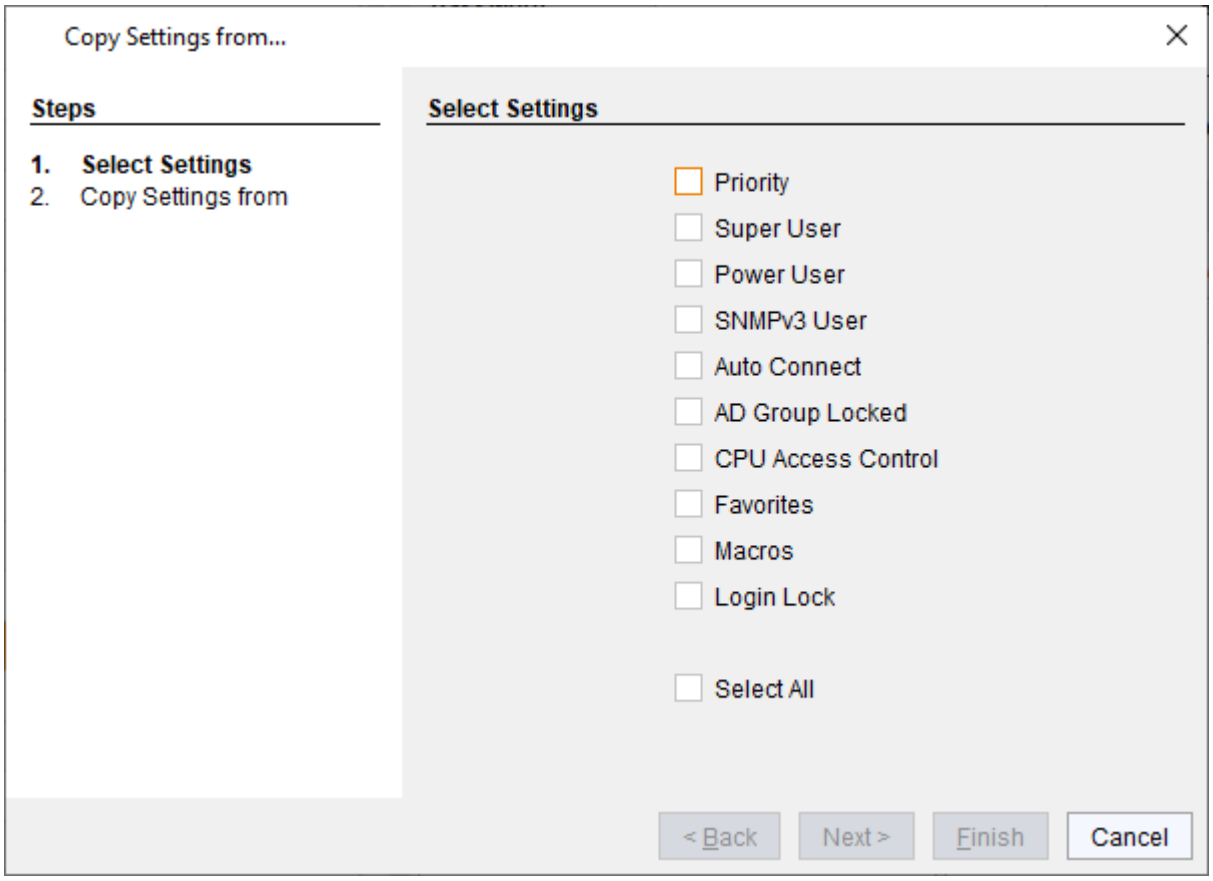


*Fig. 123 Management software menu **Users & Groups - Users - Select Settings***

A query to start the assignment appears.

7. Select the user in the selection list from which the settings are to be copied.
8. Click **Finish**.

   The settings are immediately copied to the selected user.

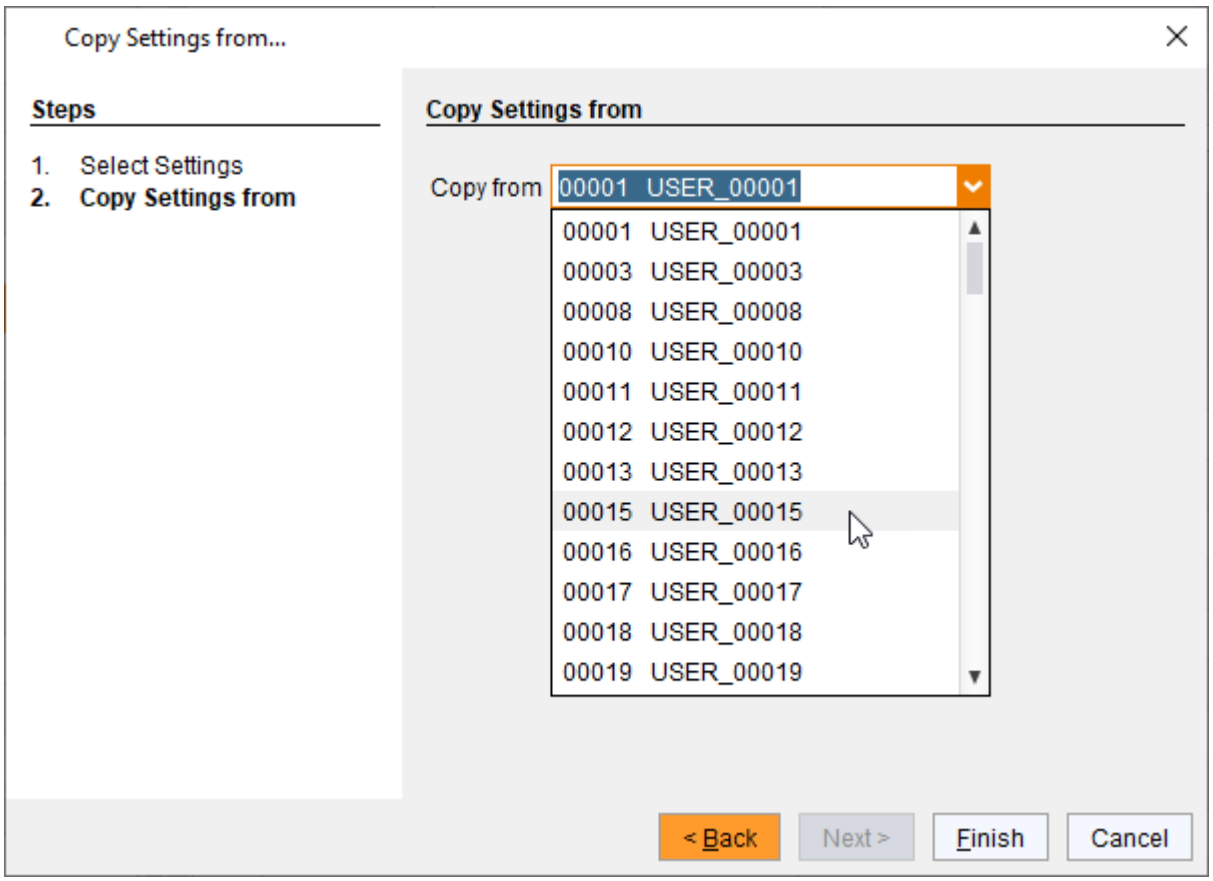


*Fig. 124 Management software menu **Users & Groups - Users - Copy Settings***

7.5.6 Setting the User Groups

The KVM matrix allows to bundle the users of a configuration into User Groups. The groups can be used to subdivide the users logically or thematically. As an application example you can group all power users together. The configuration of User Groups at the same time increases the clarity of the configuration.

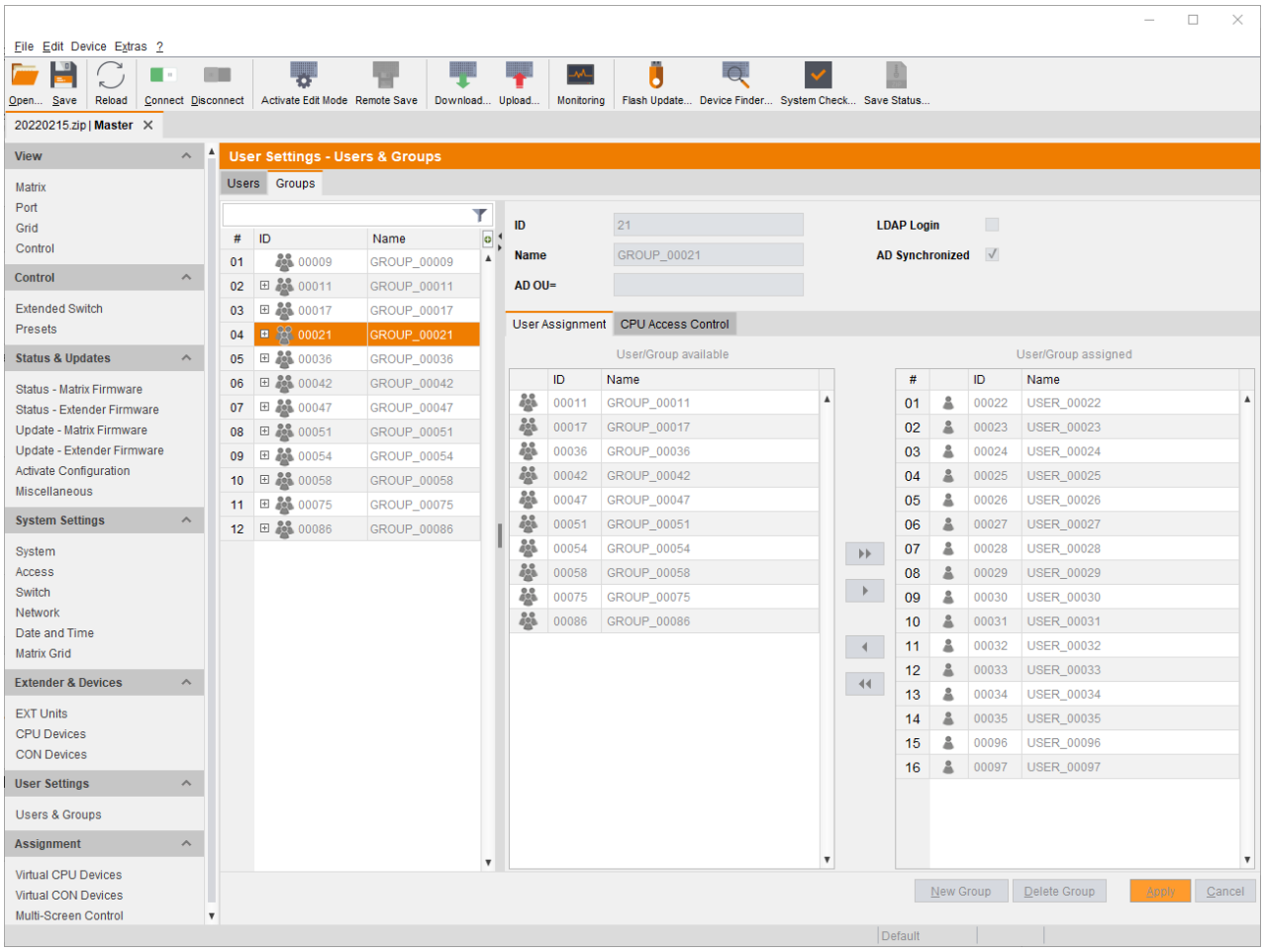


*Fig. 125 Management software menu **User Settings - Users & Groups - Groups - User Assignment***

Creating a Standard User Group

To create and configure a User Group, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Groups** tab in the working area.
4. Click **New Group**.
5. Enter a group name into the field **Name**.
6. Click **Apply** to confirm the group creation.
7. Click **Deactivate Edit Mode** in the toolbar.

Creating an LDAP Group

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Groups** tab in the working area.
4. Click **New Group** to create a new LDAP group.

   A selection window appears.
5. Select **Create a LDAP Group** in the selection box.

   The group determines which users of the Active Directory server should be synchronized.
6. Enter a name into the field **Name**.
7. Enter either the Common Name (CN) of a right group or the Common Name (OU) of an organizational unit into the field **LDAP OU=/CN=** as shown below:
   - OU= name of the organizational unit
   - CN= name of the right group
8. Click **Apply** to confirm the creation of the group.

   The Active Directory synchronization can be used now.
9. Click **Deactivate Edit Mode** in the toolbar.

A matrix configuration should only include one LDAP user and one LDAP group at the same time. The LDAP user and the LDAP group can be created, changed, or deleted during ongoing operation: No restart of the matrix is required.

Assigning a User to a Group

To assign a user to a group, proceed as follows:

1. Click **User Settings > Users & Groups** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **Groups** tab in the working area.
4. Select the User Group to be assigned with a user.
5. Select a user in the list **User/Group available** that should be assigned to the User Group. By pressing and holding down Ctrl at the same time, more than one user can be highlighted.
6. Click ▶ to move the highlighted user to the User Group list (**User/Group assigned**). By clicking ▶▶, all users from the list **User/Group available** will be moved to the list **User/Group assigned**.
7. To remove highlighted users from the User Group list, click ◀. By clicking ◀◀, all Users will be removed from the User Group list.
8. Click **Apply** to confirm the group creation.
9. Click **Deactivate Edit Mode** in the toolbar.

   The user is assigned to the User Group now.

7.6 Configuring Extender Settings

7.6.1 Main Extender Module and EXT Unit Settings

7.6.1.1 Extender Module and EXT Unit Settings

The matrix automatically recognizes every extender module, physically connected to the matrix with a direct cable connection, reads out its serial number and creates EXT Units automatically. This is the Flex Port function of the matrix. Dual-Head extender modules will be recognized as two independent EXT Units.

Add-on modules are not created as independent EXT Units. The data of add-on modules is included in one EXT Unit together with the associated extender module.

All EXT Units are managed in this menu. This includes the creation of new EXT Units and the deletion of existing EXT Units.

NOTICE

The connection of a fixed port EXT Unit (e.g., USB 2.0) to a Flex Port can cause unintended results.
EXT Units for USB 2.0 extender modules have to be created manually (see chapter 7.6.5, page 208).

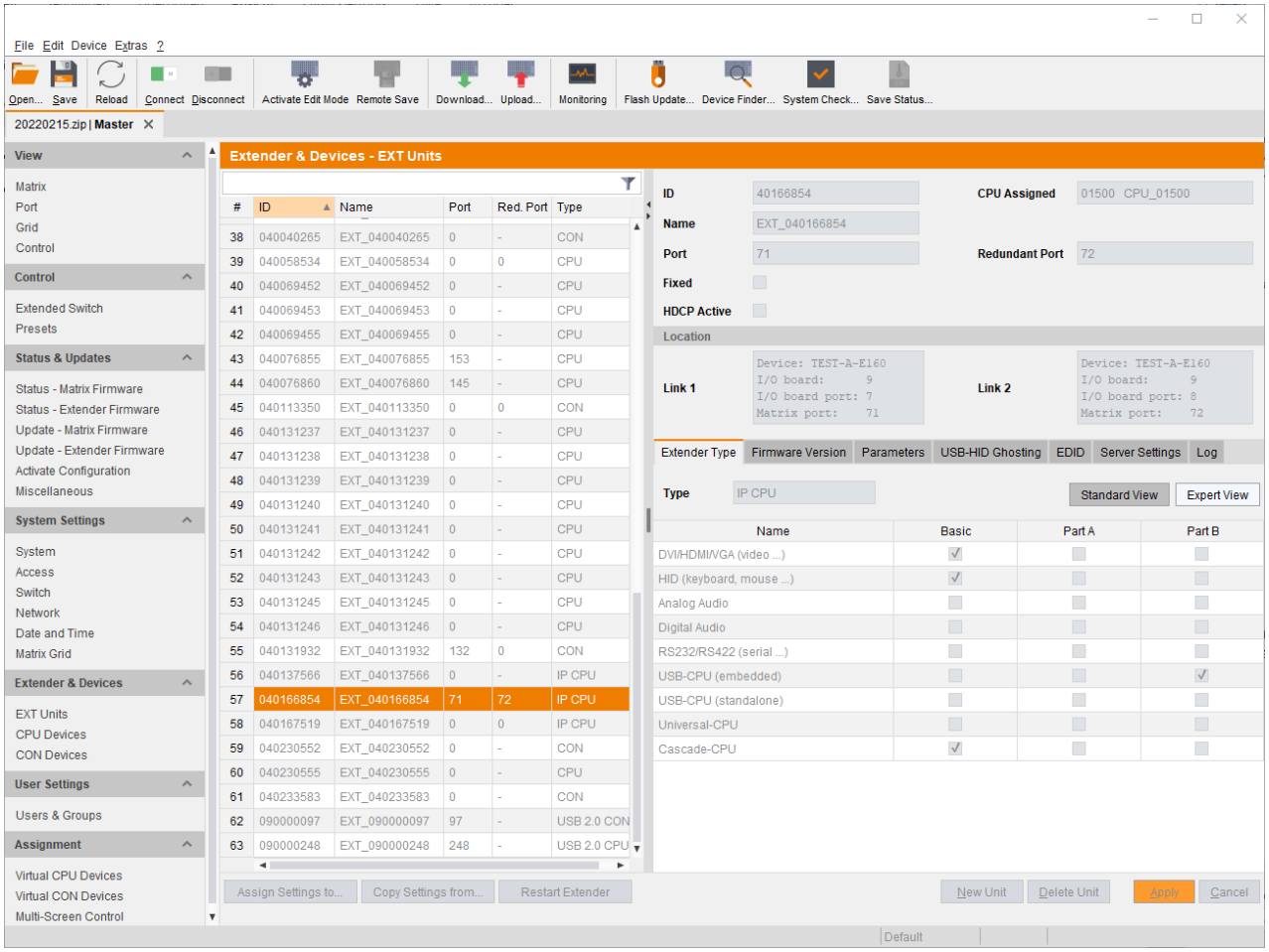


*Fig. 126 Management software menu **Extender & Devices - EXT Units***

The following parameters are recognized automatically (exceptions for USB 2.0 units and cascading units):

Field	Entry/Status	Description
ID	Text	Numerical value of the KVM extender module ID. The ID is provided by the extender module (serial number) and cannot be changed.
Name	Text	Name of the EXT Unit.

Field	Entry/Status	Description
Port	0 or 1 to 2032 Up to 576 ports if using a single matrix or up to 2032 ports within a matrix grid.	• **0** if the primary interconnect port of the extender module is currently not connected to the matrix. • **1 to 2032** if the primary interconnect port of the extender module is currently connected to a matrix within a matrix grid.
Fixed	Activated	EXT Unit was created as a fixed port extender module (e.g., USB 2.0 CON Unit, USB 2.0 CPU Unit).
	Deactivated	Function not active (default).
HDCP Active	Activated	HDCP is active on the respective extender module (retrieved automatically).
	Deactivated	Function not active (default).
CPU/CON Assigned	-	Assigned CPU Device or CON Device.
Redundant Port	-, 0 or 1 to 2032 Up to 576 ports if using a single matrix or up to 2032 ports within a matrix grid.	• **0** if there is no redundant port or if the redundant interconnect port of the extender module is currently not connected to the matrix. • **1 to 2032** if the redundant interconnect port of the extender module is currently connected to the matrix or to a matrix grid. • **-** if the extender module does not have a redundant interconnect port.

7.6.1.2 Extender Module Type

To display the type data of an extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Select the EXT Unit of the extender module whose type is to be displayed.

   The extender module type is displayed on the right side of the working area.

   – The **Basic** column stands for the extender module of the selected EXT Unit.

   – The **Part A** and **Part B** columns stand for the add-on module of the selected EXT Unit.

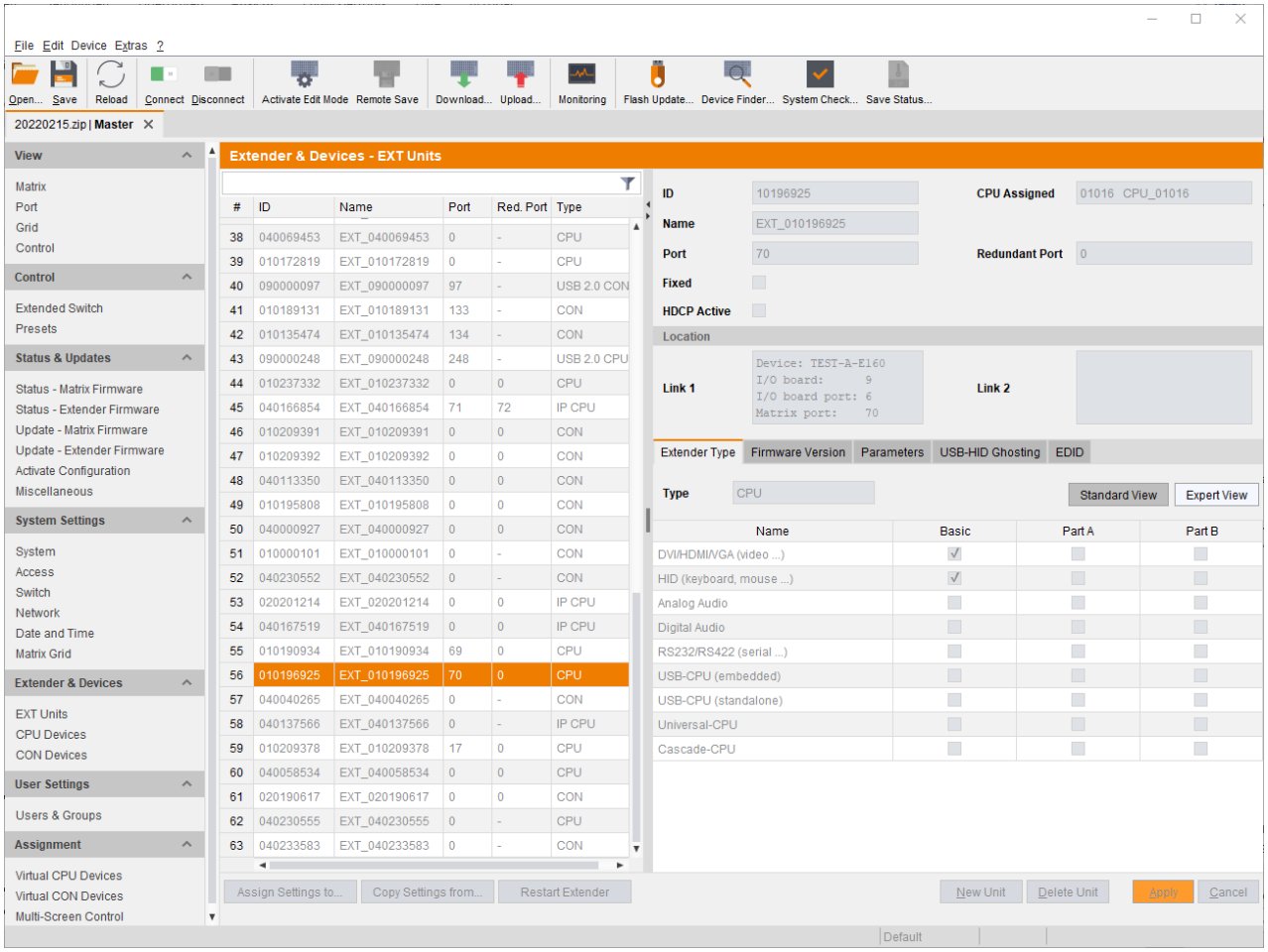


*Fig. 127 Management software menu **Extender & Devices - EXT Units - Expert View - Extender Type***

7.6.1.3 Extender Module Firmware Version

To display the firmware version of an extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Select the EXT Unit of an extender module to be displayed.
3. Click the **Firmware Version** tab on the right side of the working area.

   The **Firmware Version** overview is displayed on the right side of the working area.

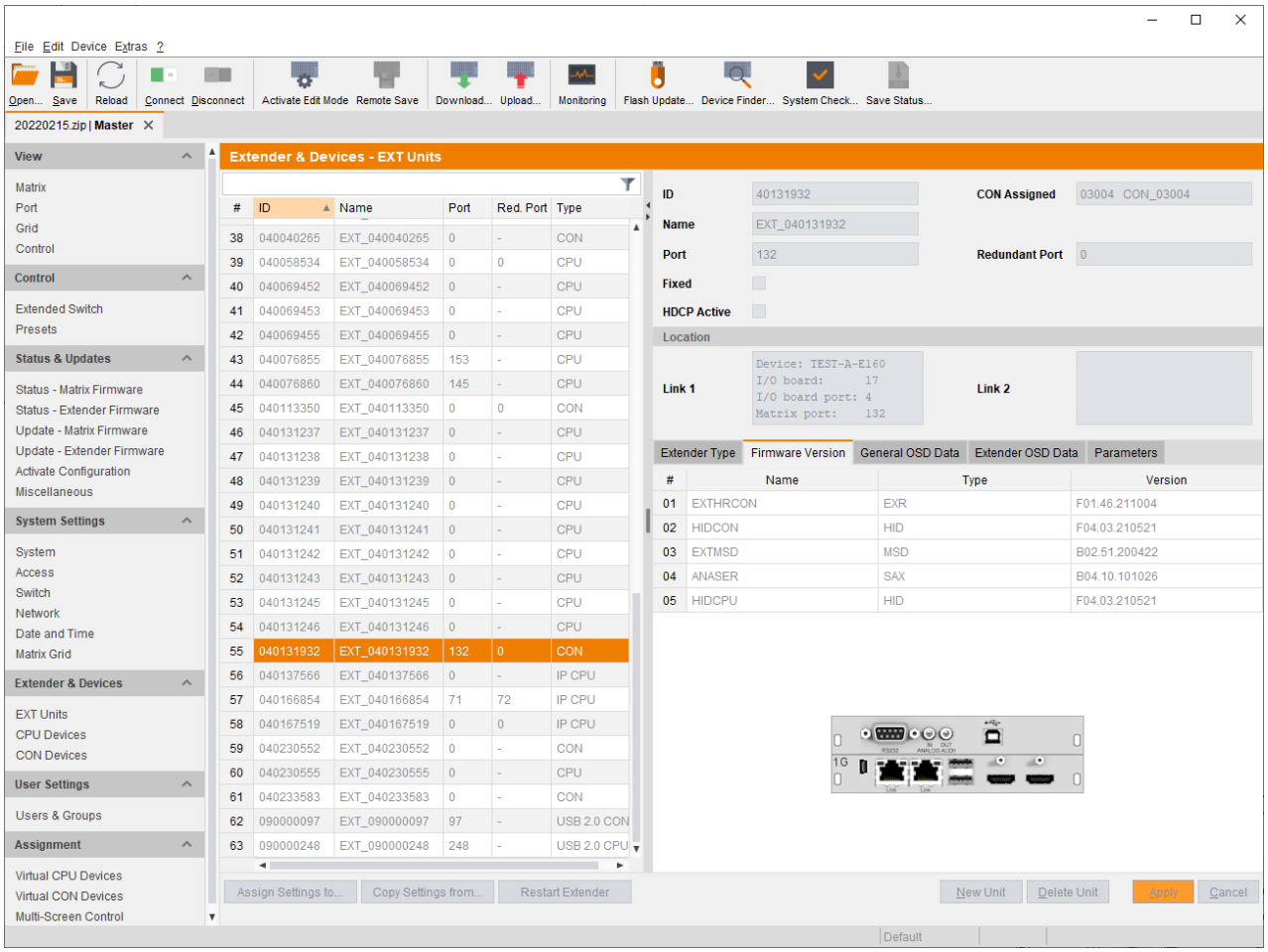


*Fig. 128 Management software menu **Extender & Devices - EXT Units - Firmware Version***

Add-on modules are shown together with the associated extender module in one EXT Unit.

7.6.2 Renaming an EXT Unit

To rename an EXT Unit after initially connecting an extender module to the matrix, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of an extender module to be renamed.
4. Delete the name in the **Name** field and enter the new name.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.6.3 Managing Extender Parameters

Extender module related parameters can be read out, can be displayed, and can be changed in this menu. The behavior of the parameters depends on the individual extender modules. Please refer to the manual of the respective extender module to get information about what the displayed parameters mean.

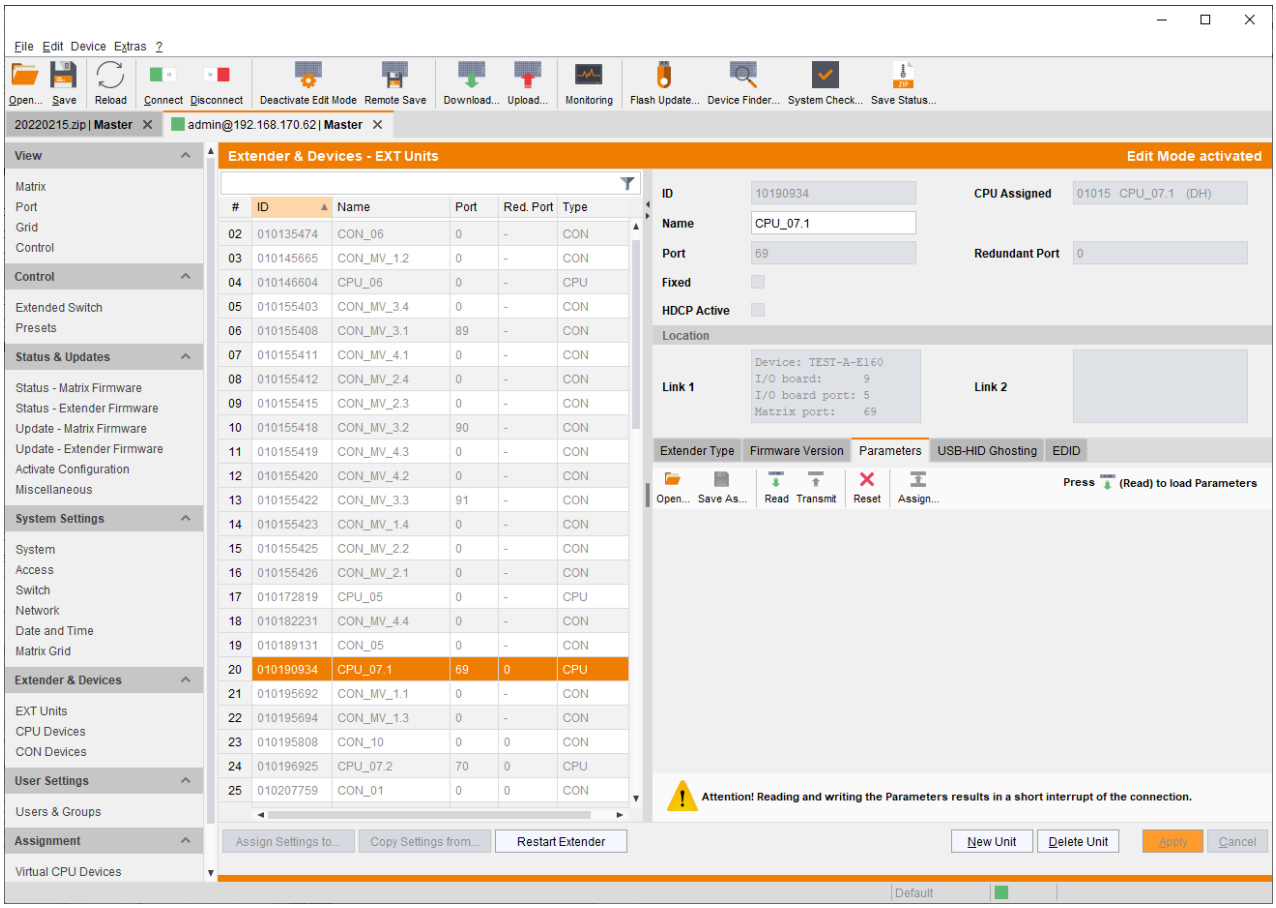


*Fig. 129 Management software menu **Extender & Devices - EXT Units - Read parameters***

The following functions are available in the **Parameters** tab:

Button	Function
Open…	Open locally saved parameters.
Save As…	Save the parameters locally (file Config.txt).
Read	Read the parameters of the extender module.
Transmit	Transmit the parameters to the extender module and activate.
Reset	Reset the parameters of the extender module to factory settings.
Assign	Assign the parameters to several extender modules at the same time.

Reading and writing parameters will result in an interrupt of the connection.

7.6.3.1 Reading Parameters

To read out and display parameters of an extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the extender module whose parameters are to be displayed.
4. Click the **Parameter** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read the parameters appears.
6. Click **Yes** to confirm the reading.

   The parameters of the extender module are read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.

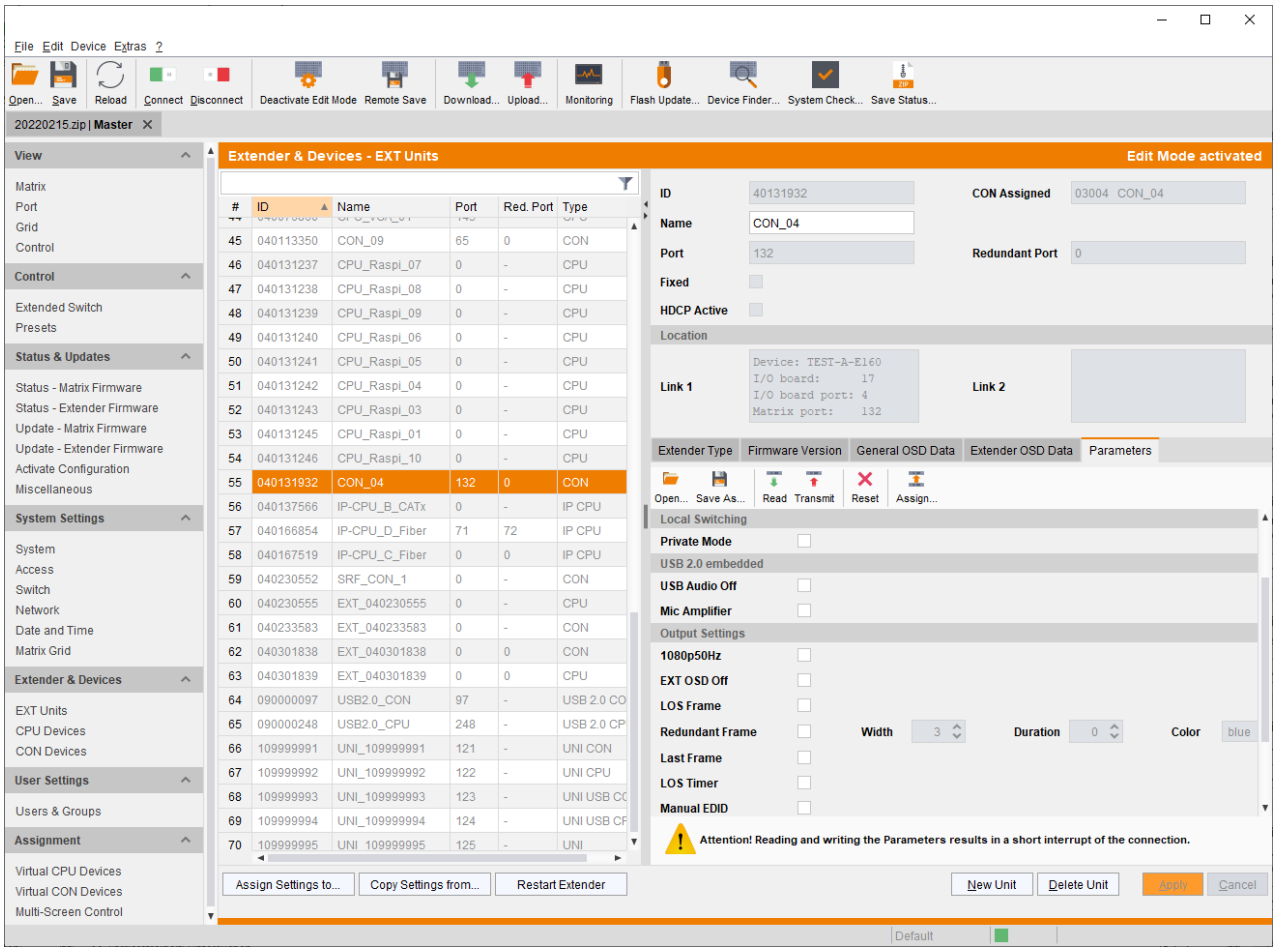


*Fig. 130 Management software menu **Extender & Devices - EXT Units - Displayed parameters***

7.6.3.2 Changing Parameters

To change parameters of an extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Units of the extender module whose parameters are to be displayed.
4. Click the **Parameter** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read the parameters appears.
6. Click **Yes** to confirm the reading.

The parameters of the extender module are read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.

7. Change the parameters.
8. Click **Transmit**.

   A query for transmission appears.
9. Click **Yes** to transmit the modified parameters to the extender module.

   The progress of the parameter transmission is displayed.
10. Click **Close** when the parameter transmission is completed (green).

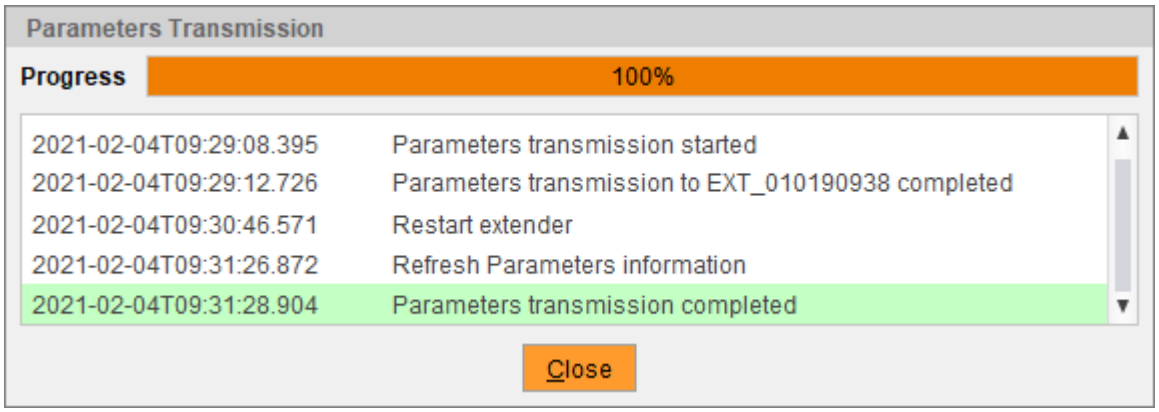


*Fig. 131 Management software menu **Extender & Devices - EXT Units - Transmission finished***

The parameter transmission is finished.

11. Click **Deactivate Edit Mode** in the toolbar.

7.6.3.3 Assigning Parameters

To assign parameters of an extender module to another one, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Units of the extender module whose parameters are to be displayed.
4. Click the **Parameter** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read the parameters appears.
6. Click **Yes** to confirm the reading.

   The parameters of the extender module are read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.
7. Click **Assign**.

   A query to assign the parameters appears.
8. Select the EXT Units of those extender modules the currently displayed parameters should be assign to. By pressing and holding down Ctrl at the same time, more than one EXT Unit can be highlighted.
9. Click ▶ to move the highlighted EXT Units to the **Assign settings to** list. By clicking ▶▶, all EXT Units will be moved to the **Assign settings to** list.
10. To remove highlighted EXT Units from the **Assign settings to** list, click ◀. By clicking ◀◀, all EXT Units will be removed from the **Assign settings to** list.

11. Click **Next >**.

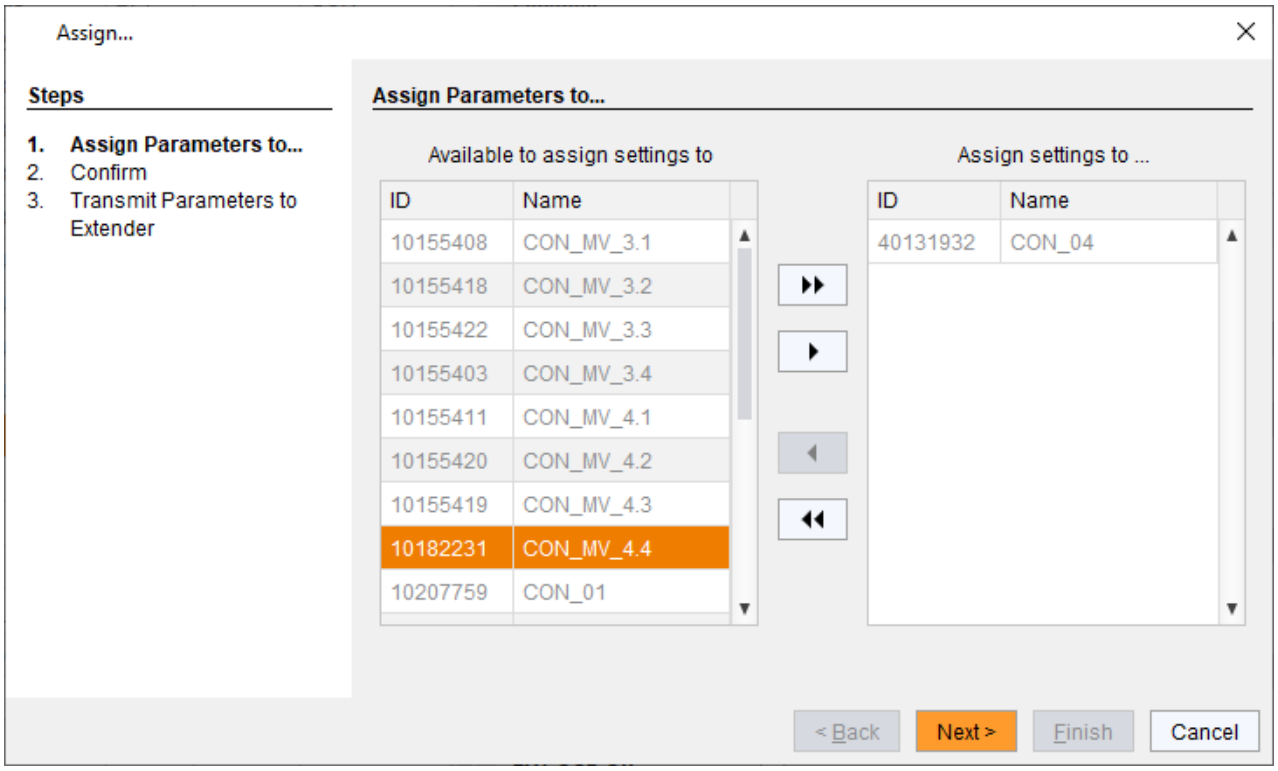


*Fig. 132 Management software menu **Extender & Devices - EXT Units - Select EXT Units***

A query to start the assignment appears.

12. Tick the **Confirm to continue** checkbox to confirm the start of the assignment.
13. Click **Next >** to start of the assignment.

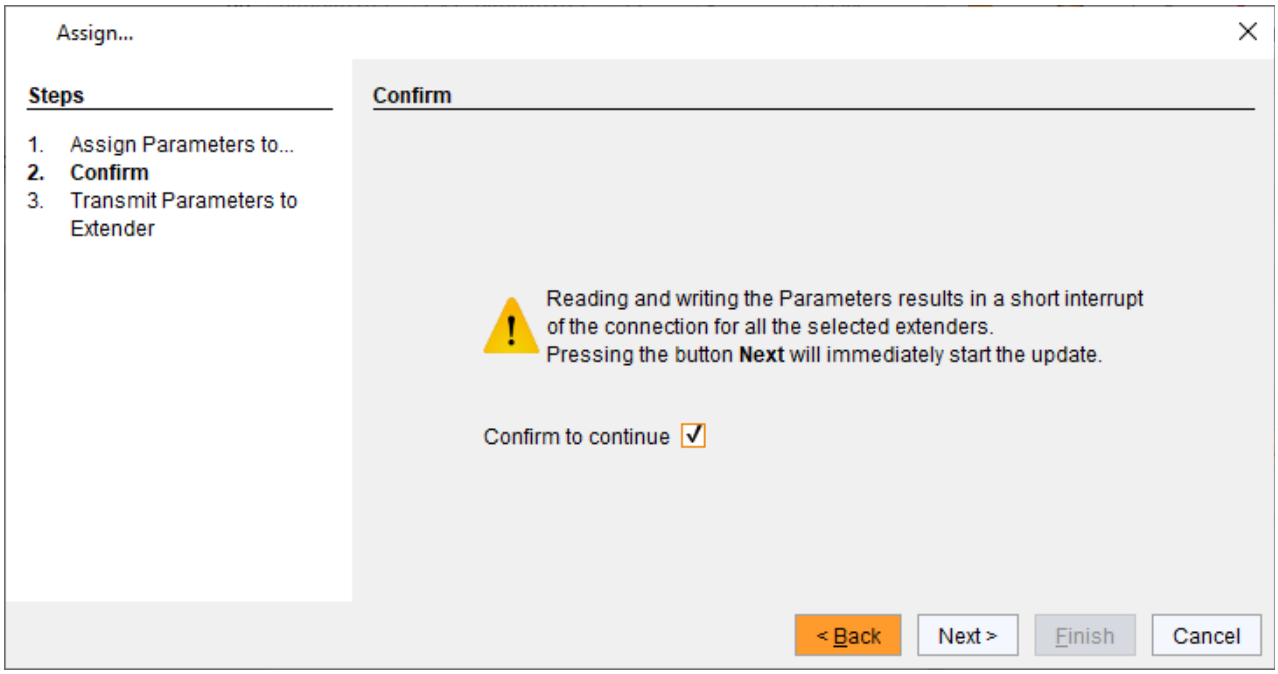


*Fig. 133 Management software menu **Extender & Devices - EXT Units - Start parameter assignment***

The progress of the parameter assignment is displayed.

14. Click **Finish** when the parameter assignment is completed (green).

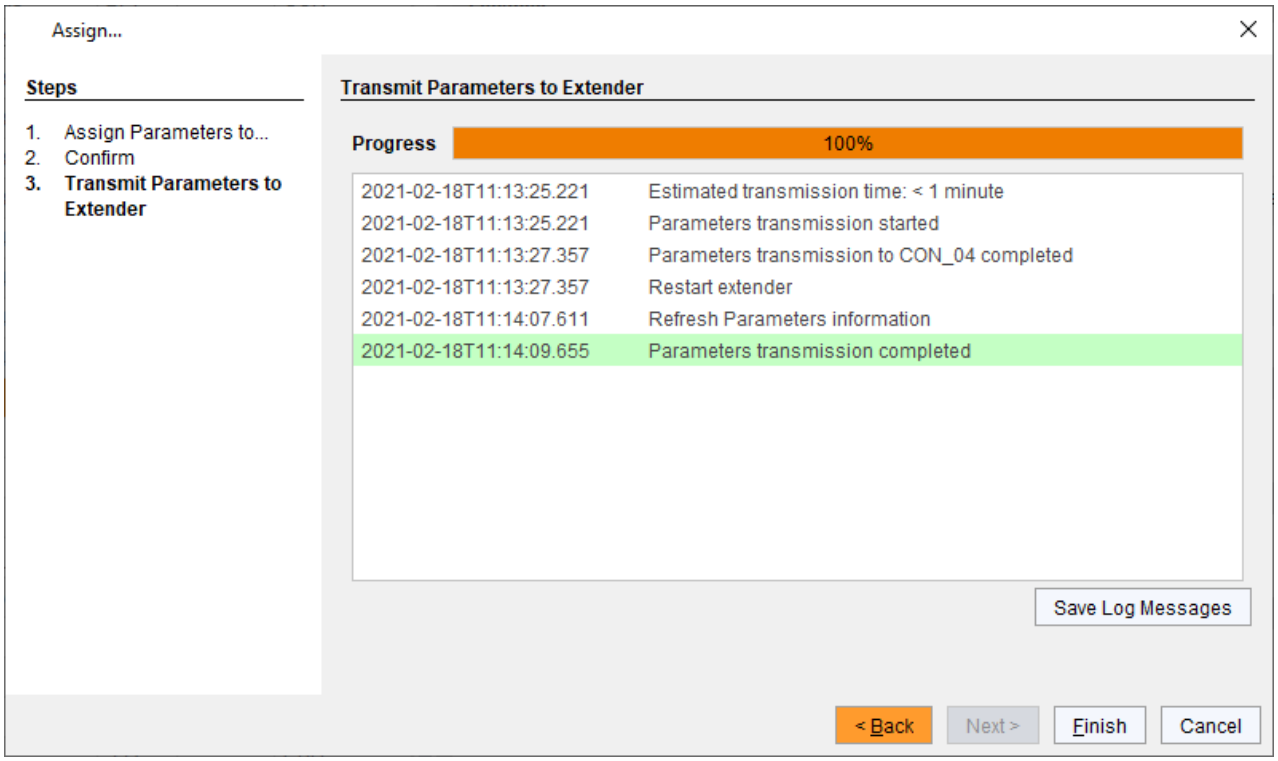


*Fig. 134 Management software menu **Extender & Devices - EXT Units - Assignment finished***

The parameter assignment is finished.

15. Click **Deactivate Edit Mode** in the toolbar.

7.6.4 Assigning/Copying Settings to other CON EXT Units

Assigning Settings to other EXT Units

To assign settings of an extender module to another one, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON EXT Unit whose settings are to be assign to another CON EXT Unit.
4. Click **Assign Settings to** below the EXT Units list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

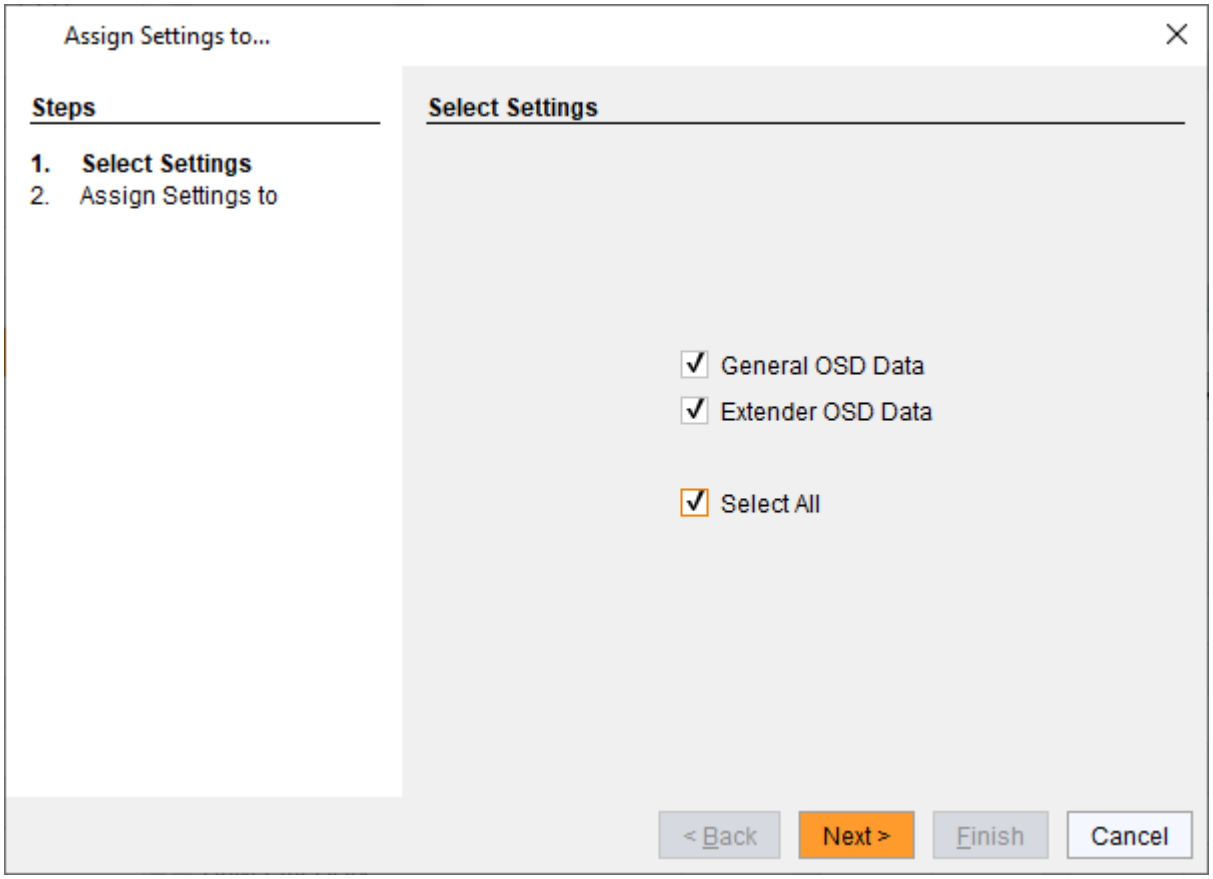


*Fig. 135 Management software menu **Extender & Devices - EXT Units - Assign Settings - Select Settings***

A query to start the assignment appears.

7. Select the CON EXT Unit in the **Available to assign settings to** list to assign the settings to. By pressing and holding down Ctrl at the same time, more than one CON EXT Unit can be highlighted.
8. Click ▶ to move the highlighted CON EXT Unit(s) to the **Assign settings to** list. By clicking ▶▶, all CON EXT Units will be moved to the **Assign settings to** list.
9. To remove highlighted EXT Units from the **Assign settings to** list, click ◀. By clicking ◀◀, all CON EXT Units will be removed from the **Assign settings to** list.
10. Click **Finish**.

    The settings are immediately assigned to the selected CON EXT Units.
11. Click **Deactivate Edit Mode** in the toolbar.

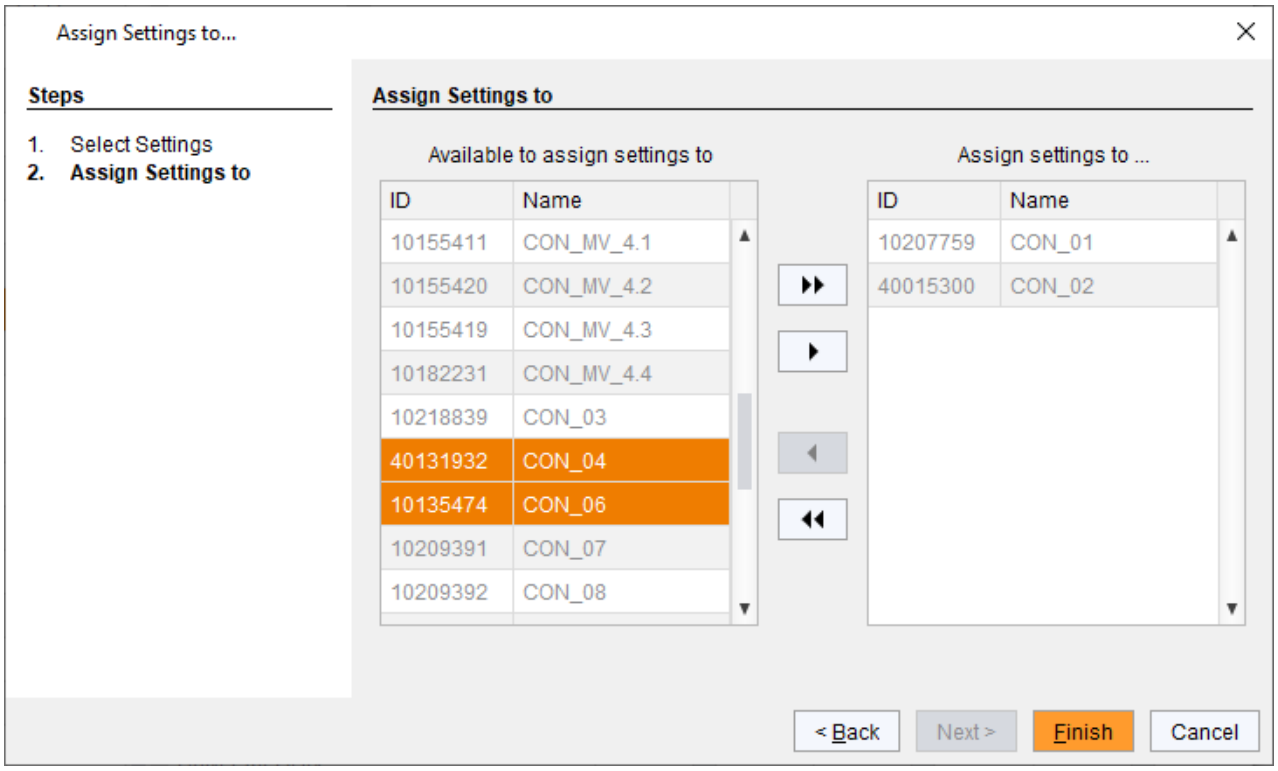


*Fig. 136 Management software menu **Extender & Devices - EXT Units - Assign Settings - Assign Settings to***

Copying Settings from an EXT Unit

To copy settings from a CON EXT Unit to another one, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON EXT Units to copy the settings to. By pressing and holding down Ctrl at the same time, more than one CON EXT Unit can be highlighted.
4. Click **Copy Settings from** below the CON EXT Units list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

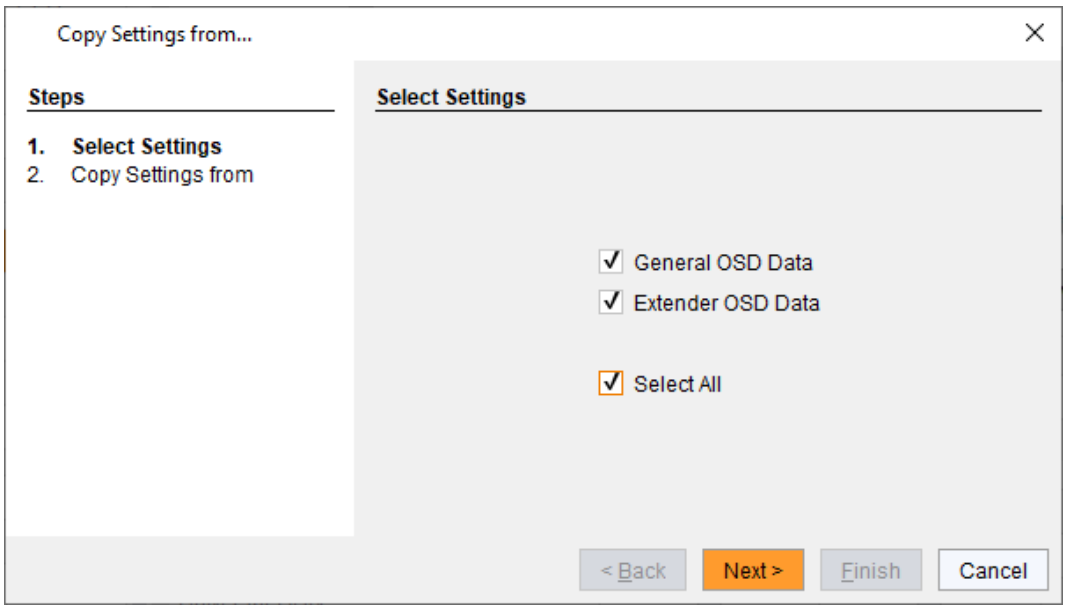


*Fig. 137 Management software menu **Extender & Devices - EXT Units - Select Settings***

A query to start the assignment appears.

7. Select the CON EXT Unit in the selection list from which the settings are to be copied.
8. Click **Finish**.

   The settings are immediately copied to the selected CON EXT Units.

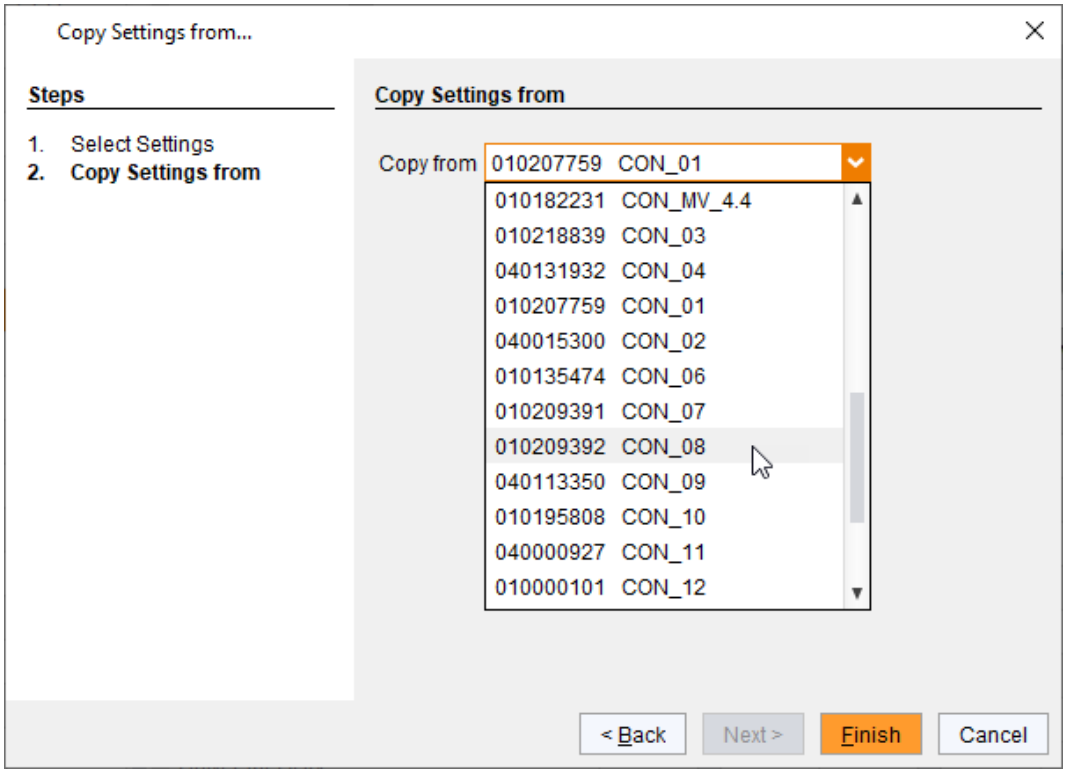


*Fig. 138 Management software menu **Extender & Devices - EXT Units - Copy Settings***

7.6.5 Configuring EXT Units for USB 2.0 Extender Modules

To use USB 2.0 extender modules, the respective EXT Unit has to be configured as fixed port in this menu. USB 2.0 EXT Units can be configured for independent switching or can be assigned to already existing CON Devices or CPU Devices.

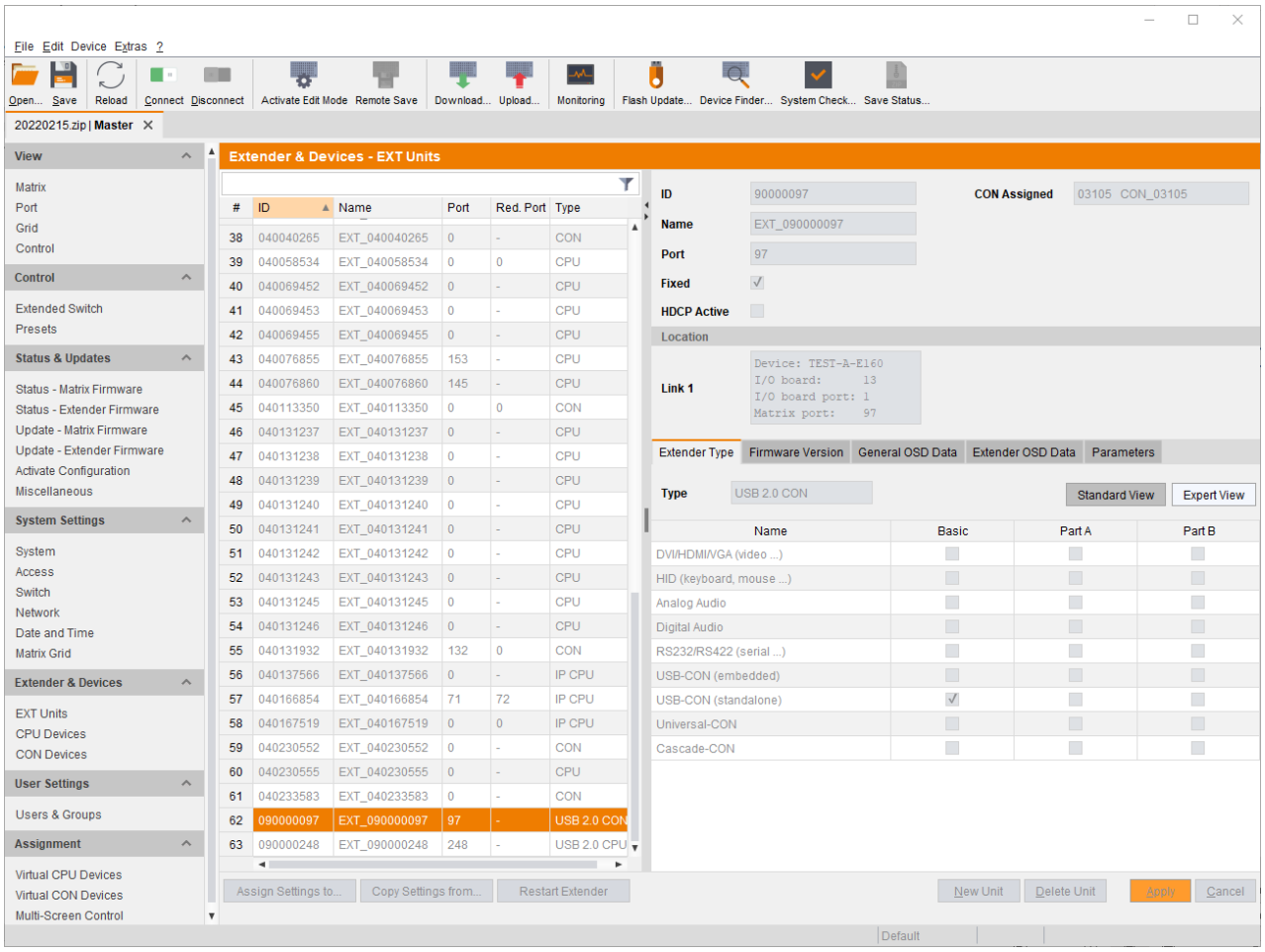


*Fig. 139 Management software menu **Extender & Devices - EXT Units - Extender Type - USB 2.0***

To configure a USB 2.0 EXT Unit, proceed as follows:

1. Select **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **New Unit**.

   A selection dialog appears.
4. Select **Choose template** in the selection box if you want to use a template for a **USB 2.0 CON Unit** or a **USB 2.0 CPU Unit**.

   An EXT Unit with an eight-digit ID will be created, starting with digit **9**.
5. Enter an appropriate name for the EXT Unit in the **Name** field.
6. Enter the port number of the matrix physically connected to the USB 2.0 extender module into the **Port** field.
7. Click **Apply** to confirm the settings.

   A dialog appears to restart the I/O board.
8. Click **Yes** to restart the I/O board to activate the USB fixed port for the new EXT Unit.

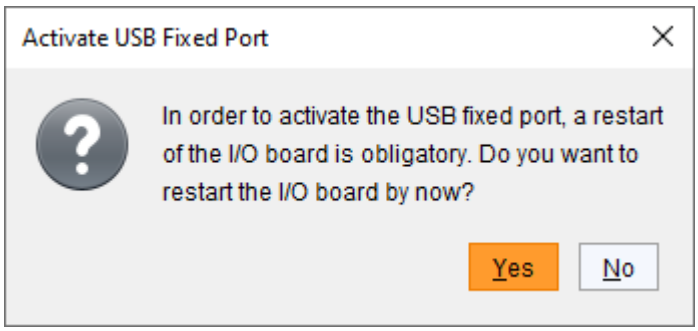


*Fig. 140 Management software dialog **Activate USB Fixed Port***

After restart of the I/O board, the parameters and settings of the USB 2.0 extender module are shown in the working area of the respective EXT Unit.

9. The USB 2.0 CPU/CON EXT Unit has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 7.7.3, page 223,
   - for a **CON Device** see chapter 7.8.3, page 240
10. If you use parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to **10 s** or more (see chapter 7.4.7, page 163).
11. Restart all I/O boards on which USB 2.0 EXT Units have been configured or alternatively restart the matrix.

    The USB 2.0 EXT Units are now configured and can be used.

Manually created EXT Units are always set as fixed port EXT Units. This configuration is necessary if you want to switch, e.g., USB 2.0 connections via the matrix.
To make a fixed port available again for Flex Port EXT Units after deleting a fixed port EXT Unit, a restart of the I/O board is necessary.

7.6.6 Configuring EXT Units for USB 3.0/USB 2.0 Extender Modules

To use USB 3.0/USB 2.0 extender modules connected to a UNI I/O board, SFP modules based on 6.25 Gbit/s are required. The configuration of EXT Units for USB 2.0/USB 3.0 extender modules is set in this menu.

USB 2.0 extender modules can also be used with UNI I/O boards and SFP modules based on 6.25 Gbit/s or can be connected to fixed ports of I/O boards (see chapter 7.6.5, page 208).

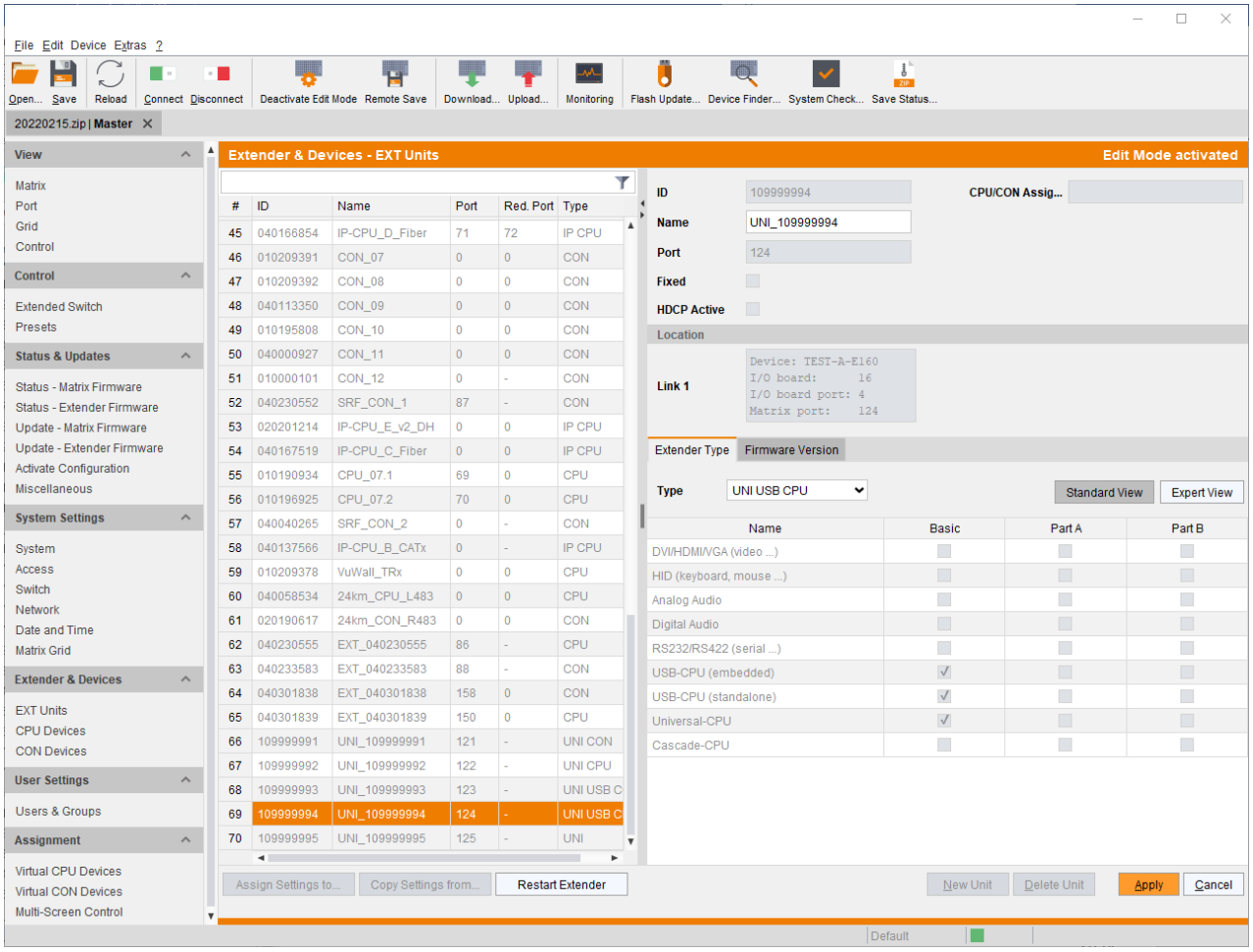


*Fig. 141 Management software menu **Extender & Devices - EXT Units - Expert View - Extender Type***

To configure an SFP for using with USB 2.0/USB 3.0 extender modules, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Insert the SFP modules into the matrix and connect the extender module according to the required application.

   One EXT UNIT will be created for each SFP module in the **EXT Units** list. The appropriate names always start with “UNI”.
3. To configure an EXT Unit as a CON Unit:
   - 3.1. Select one of the EXT Units in the **EXT Units** list that are physically connected to a USB CON Unit.
   - 3.2. Select the item **UNI CON USB** in the **Type** selection box of the **Extender Type** tab.
   - 3.3. Click **Apply** to confirm the setting.
   - 3.4. Click **Yes** to restart the I/O board upon request in the dialog.

4. To configure an EXT Unit as a CPU Unit:
   4.1. Select one of the EXT Units in the **Ext Units** list that are physically connected to a USB CPU Unit.
   4.2. Select the item **UNI CPU USB** in the **Type** selection box of the **Extender Type** tab.
   4.3. Click **Apply** to confirm the setting.
   4.4. Click **Yes** to restart the I/O board upon request in the dialog.
5. The USB 2.0/USB 3.0 CPU/CON EXT Unit has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 7.7.3, page 223,
   - for a **CON Device** see chapter 7.8.3, page 240

   After assigning EXT Units to CON/CPU Devices, the USB 2.0/USB 3.0 CON/CPU Ext Units are configured and can be used.
6. If you use parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to **10 s** or more (see chapter 7.4.7, page 163).

If changing an EXT Unit from a USB CON to a USB CPU, a restart of the I/O board is necessary.

7.6.7 Configuring EXT Units for SDI Usage

For the use of SDI, the matrix is to be configured in this menu. Using SDI requires at least one UNI I/O board and appropriate SFP modules according to the SDI video signal to be used.

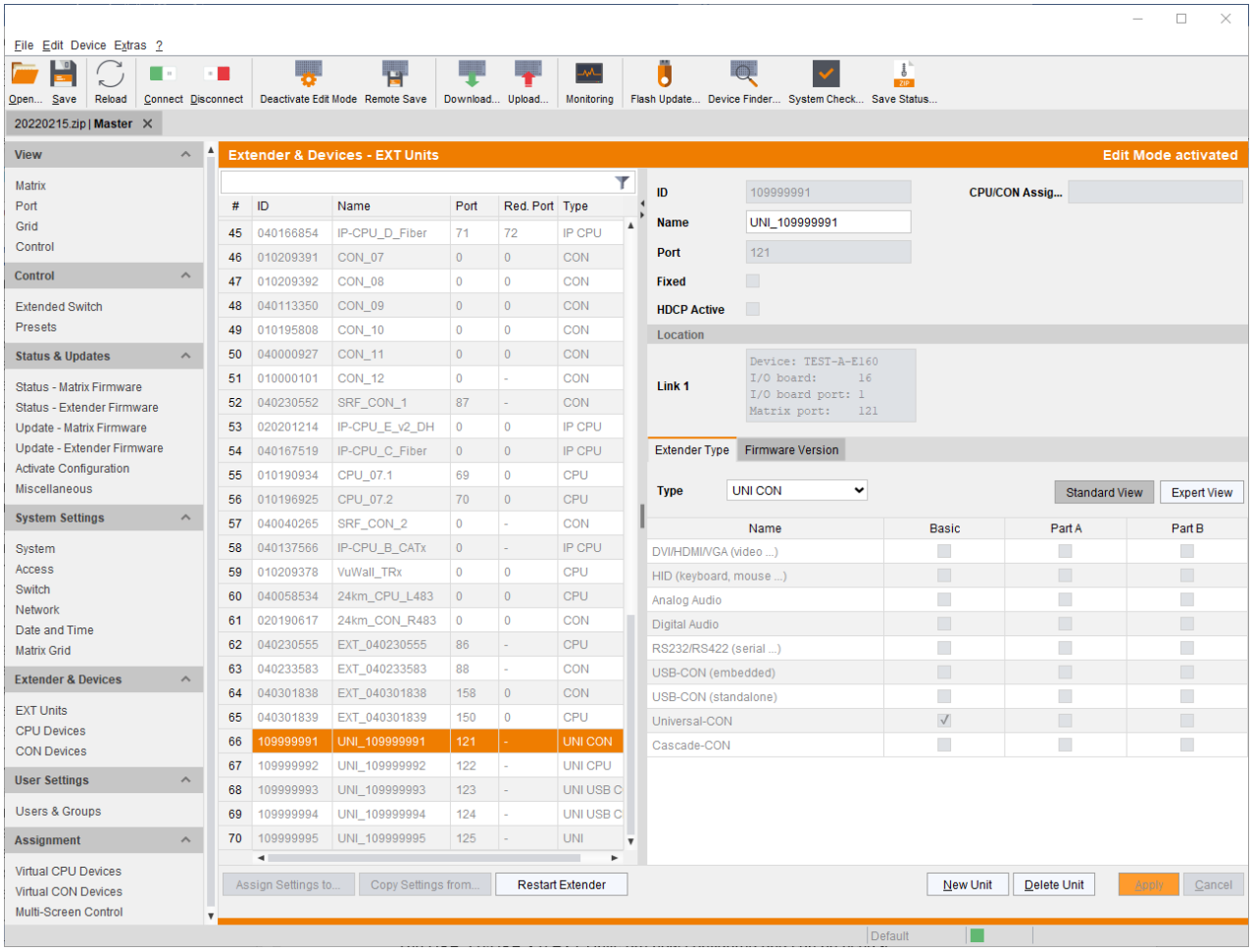


*Fig. 142 Management software menu **Extender & Devices - EXT Units - Expert View - Extender Type***

To configure an SFP for using as an SDI input/output, proceed as follows:

1. Select **Configuration > EXT Units** in the main menu.
2. Insert the SFP modules into the matrix and connect the extender module according to the required application.

   One EXT UNIT will be created for each SFP module in the **EXT Units** list. The appropriate names always start with “UNI”.
3. To configure an EXT Unit as an SDI input:
   - 3.1. Select one of the extender modules in the **EXT Units** list that are physically connected to a USB CON Unit.
   - 3.2. Select the **UNI CPU** item in the **Type** selection box of the **Extender Type** tab.
   - 3.3. Click **Apply** to confirm the setting.
   - 3.4. Click **Yes** to restart the I/O board upon request in the dialog.

4. To configure an EXT Unit as an SDI output:
   4.1. Select one of the extender modules in the **Ext Units** list that are physically connected to a USB CPU Unit.
   4.2. Select the **UNI CON** item in the **Type** selection box of the **Extender Type** tab.
   4.3. Click **Apply** to confirm the setting.
   4.4. Click **Yes** to restart the I/O board upon request in the dialog.
5. The edited EXT Units for the SDI inputs and outputs has to now be either assigned to an existing CPU/CON Device or a new CPU/CON Device has to be created for the assignment:
   - for a **CPU Device** see chapter 7.7.3, page 223,
   - for a **CON Device** see chapter 7.8.3, page 240

   After assigning EXT Units to CON/CPU Devices, the SDI inputs and outputs are configured and can be used.

If changing a UNI Unit from a UNI CON to a USB CPU, a restart of the I/O board is necessary.

7.7 Configuring the CPU-Side Settings

7.7.1 Managing the Extender Module USB-HID Ghosting

This function allows specific keyboard and mice descriptors (device descriptions) to be permanently stored in the CPU Unit. This eliminates the need to register and deregister the keyboard and mouse on an operating system each time there is a shared use of a source by two or more consoles within a matrix.

Next to the use of keyboard commands (see chapter 8.3.2.2, page 296), the activation and management of the USB-HID Ghosting information can also be handled centrally via matrix to reach all connected extender modules at the same time.

General Preparation

To use the USB-HID Ghosting management via management software, it is required that USB-HID Ghosting has been already activated at a CPU Unit via keyboard command or the USB-HID Ghosting information is already available as a file with the file extension .dhg.

Several general options are available. For these options, select the menu **Extender & Devices > EXT Units** in the task area, select a CPU EXT Unit and select the **USB-HID Ghosting** tab in the working area.

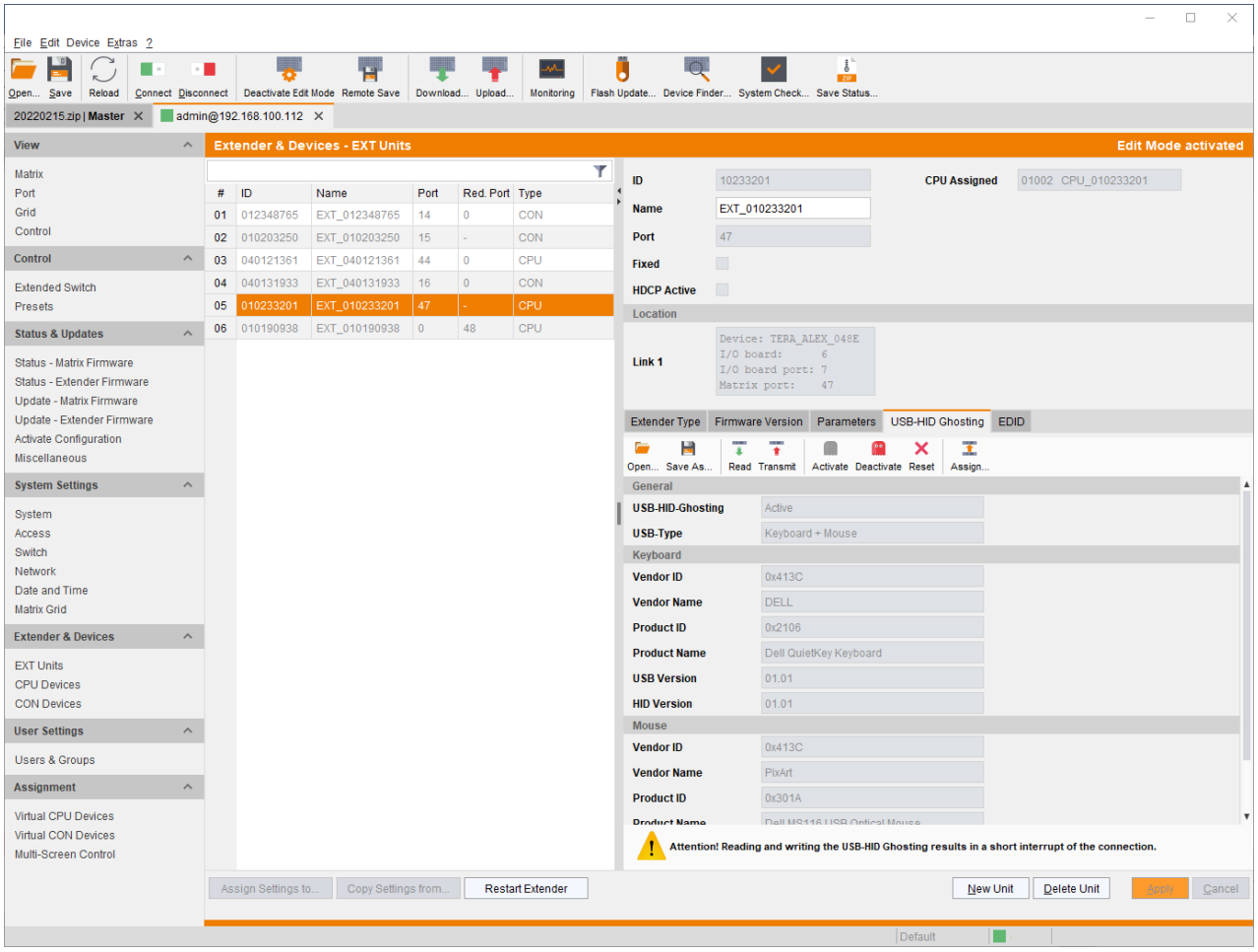


*Fig. 143 Management software menu **Extender & Devices - EXT Units - USB-HID Ghosting***

The following functions are available in the **USB-HID Ghosting** tab:

Button	Function
Open…	Open the locally saved USB-HID Ghosting
Save As…	Save the USB-HID Ghosting locally (file EXT_ID-Nr.dhg)
Read	Read the USB-HID Ghosting of the extender module
Transmit	Transmit the USB-HID Ghosting to the extender module and activate

Button	Function
Activate	Activate the USB-HID Ghosting
Deactivate	Deactivate the USB-HID Ghosting
Reset	Reset the USB-HID Ghosting of the extender module to factory settings
Assign	Assign the USB-HID Ghosting to several extender modules at the same time

During reading and writing USB-HID Ghosting information, there will be a short interrupt of the USB-HID and video signal.

7.7.1.1 Reading USB-HID Ghosting

To read out and display the USB-HID Ghosting of CPU extender modules, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the CPU extender module with active USB-HID Ghosting to be displayed.
4. Click the **USB-HID Ghosting** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read the USB-HID Ghosting appears.
6. Click **Yes** to confirm the reading.

   The current USB-HID Ghosting information of the CPU extender module is read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.

7.7.1.2 Loading a USB-HID Ghosting Template

To load a USB-HID Ghosting template (file extension .dhg) for a further distribution proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the CPU extender module to transmit the USB-HID Ghosting to.
4. Click the **USB-HID Ghosting** tab on the right side of the working area.
5. Click **Open** in the symbol bar of the tab.
6. Go to the respective template with the file extension .dhg and click **Select**.
7. Click **Transmit** in the symbol bar of the tab.

   A query for transmission appears.
8. Click **Yes** to transmit the loaded USB-HID Ghosting to the CPU extender module.

   The progress of the parameter transmission is displayed.
9. Click **Close** when the USB-HID Ghosting transmission is completed (green).

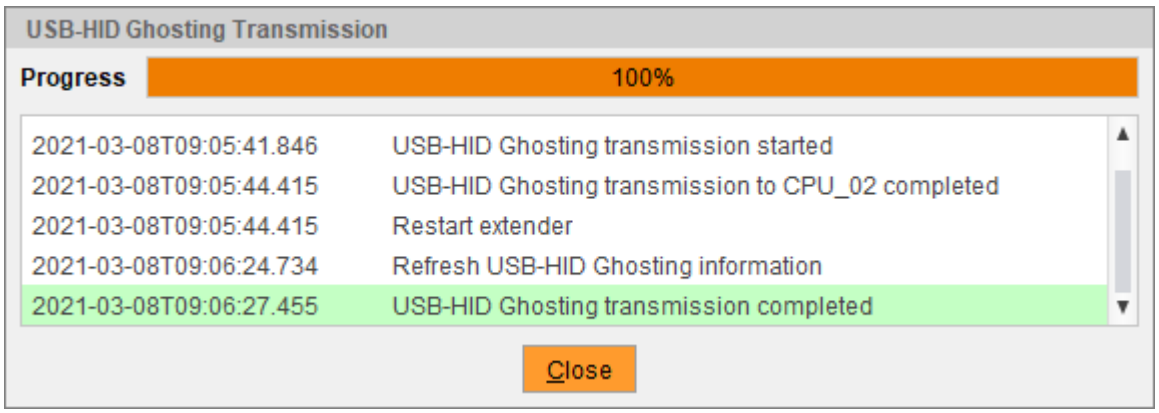


*Fig. 144 Management software menu **Extender & Devices - EXT Units - Transmission finished***

10. Click **Deactivate Edit Mode** in the toolbar.

7.7.1.3 Assigning USB-HID Ghosting

To assign any manually activated USB-HID Ghosting of an extender module to any connected extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the CPU extender module with active USB-HID Ghosting to be displayed.
4. Click the **USB-HID Ghosting** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read the USB-HID Ghosting appears.
6. Click **Yes** to confirm the reading.

   The current USB-HID Ghosting information of the CPU extender module is read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.
7. Click **Assign** in the symbol bar of the tab.

   A query to assign the USB-HID Ghosting appears.
8. Select those EXT Units in the **Available to assign settings to** field that are intended to receive the USB-HID Ghosting information. By pressing and holding down Ctrl at the same time, more than one EXT Unit can be highlighted.
9. Click ▶ to move the highlighted EXT Units to the **Assign settings to** list. By clicking ▶▶, all EXT Units will be moved to the **Assign settings to** list.
10. To remove highlighted EXT Units from the **Assign settings to** list, click ◀. By clicking ◀◀, all EXT Units will be removed from the **Assign settings to** list.
11. Click **Next >**.

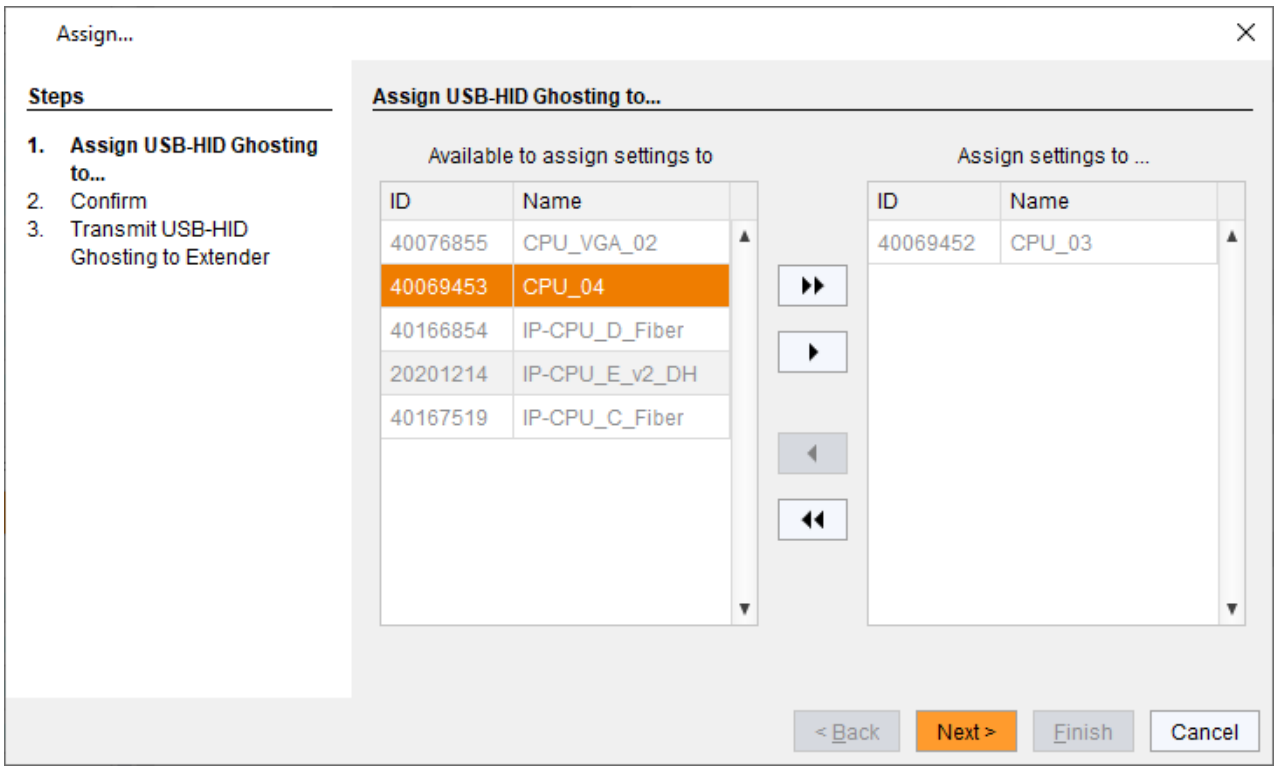


*Fig. 145 Management software menu **Extender & Devices - EXT Units - Assign to***

A query to start the assignment appears.

12. Tick the **Confirm to continue** checkbox to confirm the start of the assignment.

13. Click **Next >** to start of the assignment.

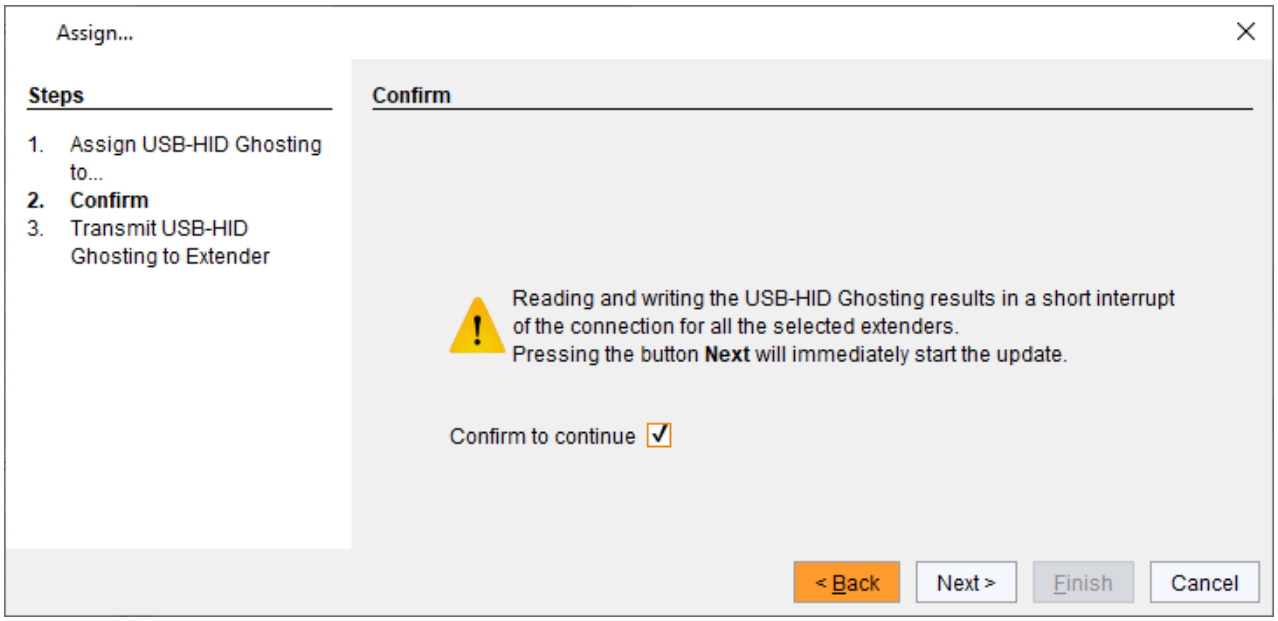


*Fig. 146 Management software menu **Extender & Devices - EXT Units - Confirm assignment***

The progress of the USB-HID Ghosting assignment is displayed.

14. Click **Finish** when the USB-HID Ghosting assignment is completed (green).

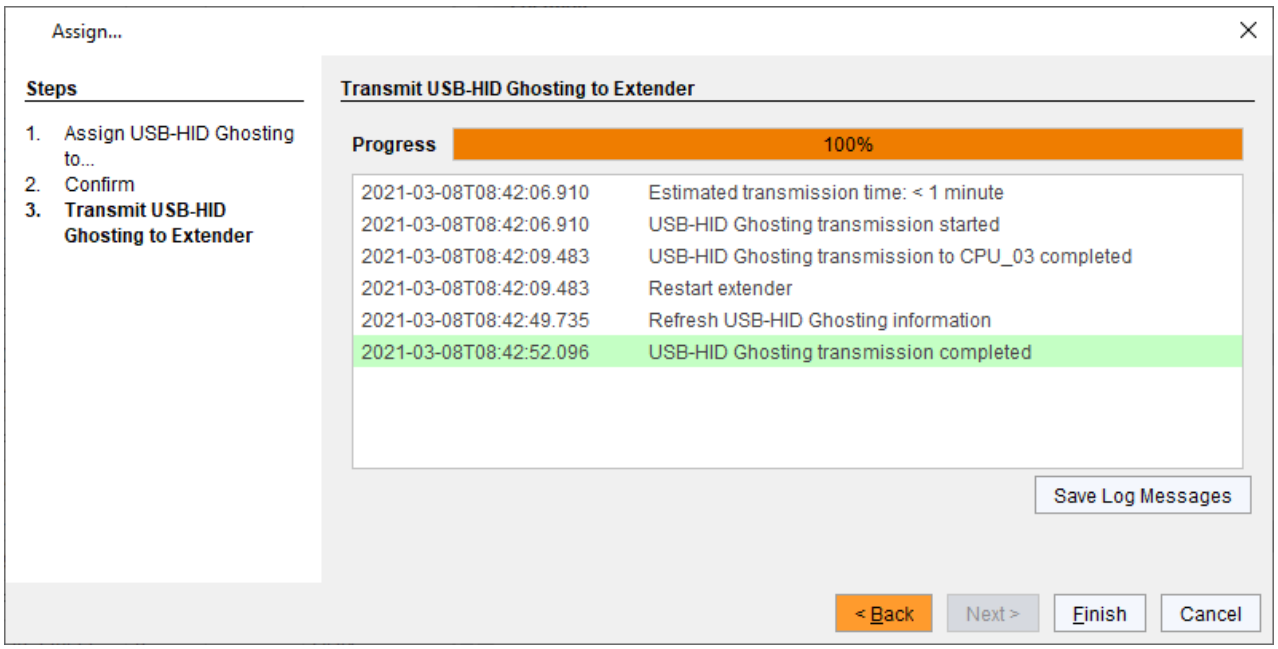


*Fig. 147 Management software menu **Extender & Devices - EXT Units - Assignment finished***

The USB-HID Ghosting assignment is finished.

15. Click **Deactivate Edit Mode** in the toolbar.

Further options:

- To locally store existing USB-HID Ghosting information of a selected CPU EXT Unit, click **Save As…** in the symbol bar of the tab.
- To delete existing USB-HID Ghosting information of a selected CPU EXT Unit, click **Reset** in the symbol bar of the tab.

7.7.2 Managing the Extender Module EDID

By default, the extender modules transmit the factory preset EDID to the sources. This information is suitable in most cases. The EDID can be retrieved and uploaded as a binary file to the CPU Unit.

Next to the use of keyboard commands (see chapter 8.3.2.1, page 296), the activation and management of the EDID can also be handled centrally via matrix to reach all connected extender modules at the same time.

General Preparation

To use the EDID management via management software it is required that the EDID has been already transmitted at a CPU Unit via keyboard command or the EDID is already available as a file with the extension .bin.

Several general options are available. For these options, select the menu **Extender & Devices > EXT Units** in the task area, select the EXT Unit of an extender module and select the **EDID** tab (**EDID 2** for Dual-Head) in the working area.

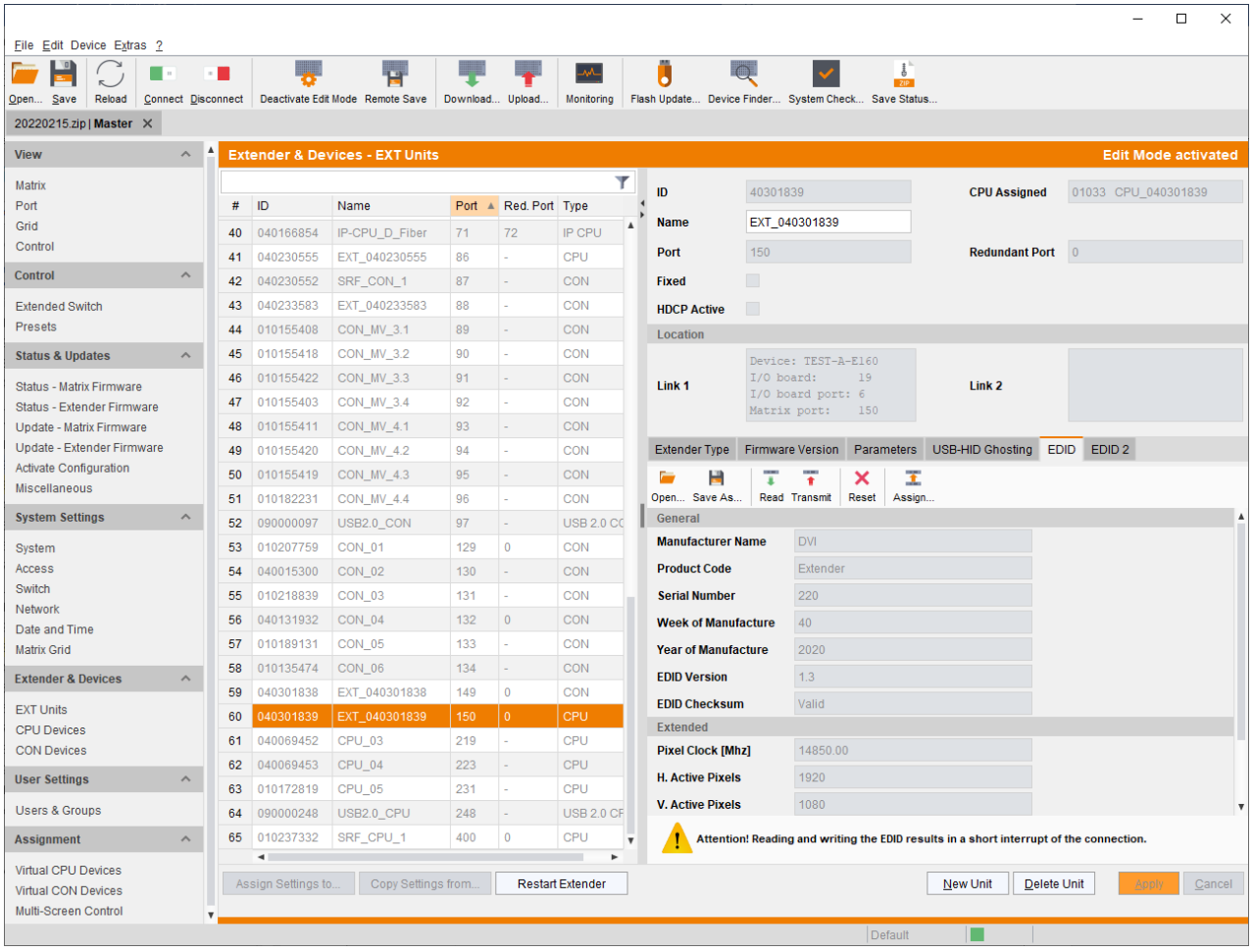


*Fig. 148 Management software menu **Extender & Devices - EXT Units - EDID***

Button	Function
Open…	Open the locally saved EDID.
Save As…	Save the EDID locally (file extension .bin).
Read	Read the EDID of the extender module.
Transmit	Transmit the EDID to the extender module and activate the EDID.
Reset	Reset the EDID of the extender module to factory settings.
Assign	Assign the EDID to several extender modules at the same time.

7.7.2.1 Reading an EDID

To read out and display the EDID of an extender module, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the extender module whose EDID is to be displayed.
4. Click the **EDID** tab on the right side of the working area.
5. Click **Read** in the symbol bar of the tab.

   A query to read out the EDID appears.
6. Click **Yes** to confirm the reading.

   The transmitted EDID of the extender module is read out and displayed on the right side of the working area. At the same time, the connection will be disconnected for a few seconds.

7.7.2.2 Loading an EDID Template

To load a EDID template (file extension .bin) for a further distribution, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **EDID** tab on the right side of the working area.
4. Select the EXT Unit of a CPU extender module to transmit the EDID to.
5. Click **Open** in the symbol bar of the tab.
6. Go to the respective template with the file extension .bin and click **Select**.
7. Click **Transmit** in the symbol bar of the tab.

   A query for transmission appears.
8. Click **Yes** to transmit the loaded EDID to the CPU extender module.

   The progress of the parameter transmission is displayed.
9. Click **Close** when the EDID transmission is completed (green).

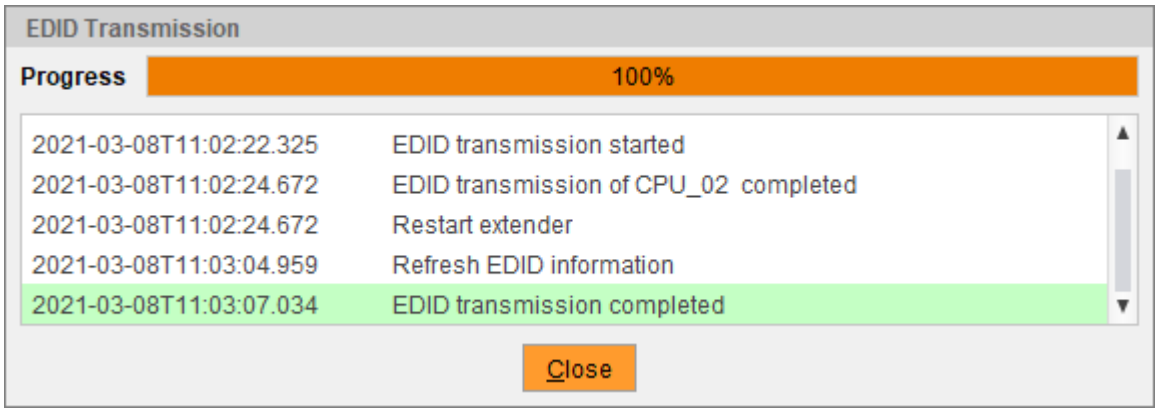


*Fig. 149 Management software menu **Extender & Devices - EXT Units - Transmission finished***

10. Click **Deactivate Edit Mode** in the toolbar.

Further options:

- To locally store existing EDID of a CPU extender module whose EXT Unit is selected, click **Save As…** in the symbol bar of the tab.
- To set existing the EDID of a CPU extender module whose EXT Unit is selected back to factory settings, click **Reset** in the symbol bar of the tab.

7.7.2.3 Assigning an EDID

To assign any manually transmitted EDID of an extender module to another one, proceed as follows:

1. Click **Extender & Devices > EXT Units in the task area**.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the extender module with the already transmitted EDID.
4. Click the **EDID** tab on the right side of the working area.
5. Read out and display the EDID (see description in section before).
6. Click **Assign** in the symbol bar of the tab.

   A query to assign the EDID appears.
7. Select the EXT Units of those extender modules in the **Available to assign settings to** field that are intended to receive the EDID. By pressing and holding down Ctrl at the same time, more than one EXT Unit can be highlighted.
8. Click ▶ to move the highlighted EXT Units to the **Assign settings to** list. By clicking ▶▶, all EXT Units will be moved to the **Assign settings to** list.
9. To remove highlighted EXT Units from the **Assign settings to** list, click ◀. By clicking ◀◀, all EXT Units will be removed from the **Assign settings to** list.
10. Click **Next >**.

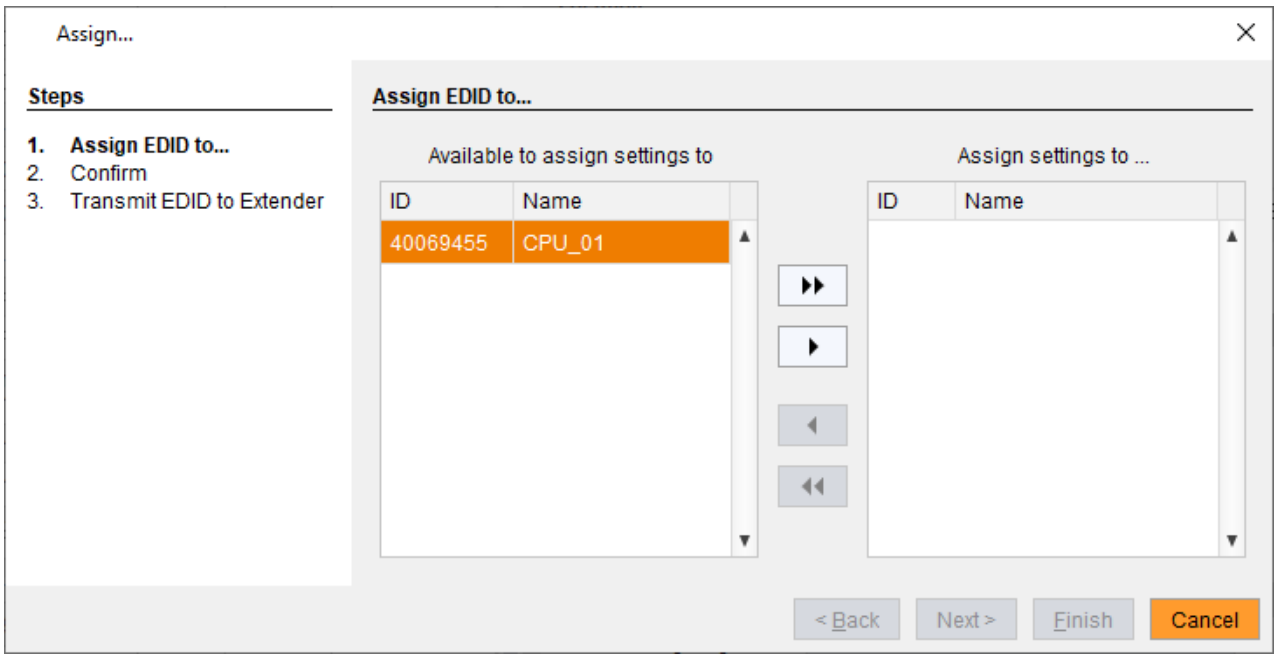


*Fig. 150 Management software menu **Extender & Devices - EXT Units - Assign EDID to***

   A query to start the assignment appears.
11. Tick the **Confirm to continue** checkbox to confirm the start of the assignment.

12. Click **Next >**to start of the assignment.

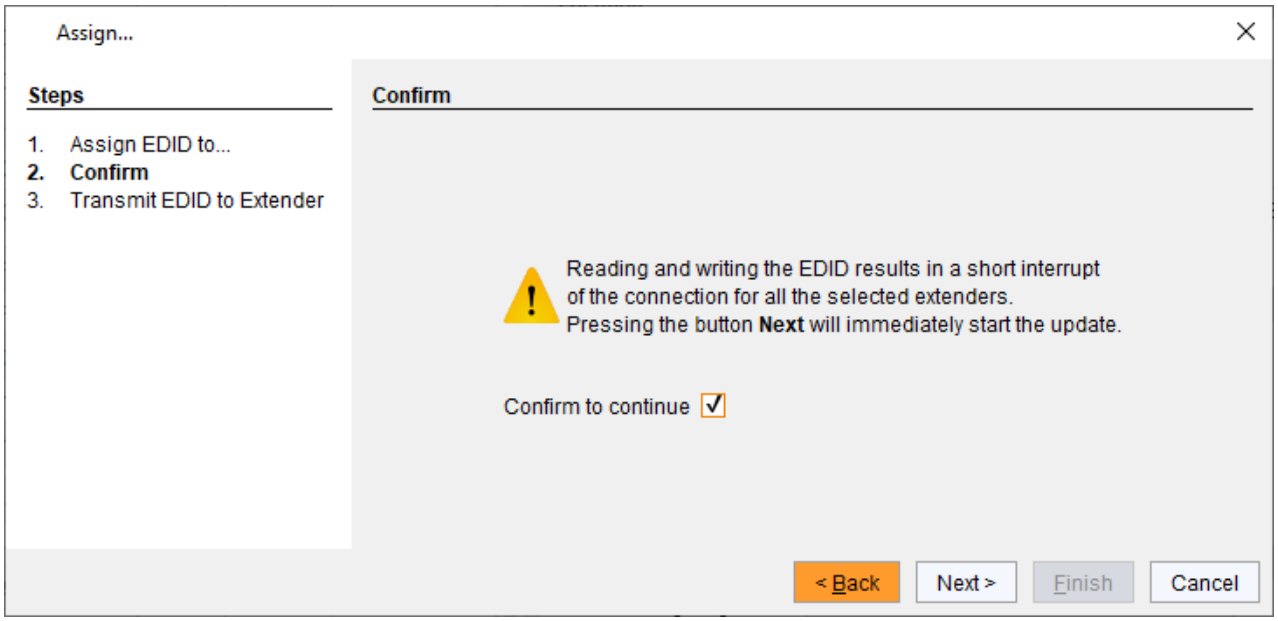


*Fig. 151 Management software menu **Extender & Devices - EXT Units - Confirm assignment***

The progress of the USB-HID Ghosting assignment is displayed.

13. Click **Finish** when the USB-HID Ghosting assignment is completed (green).

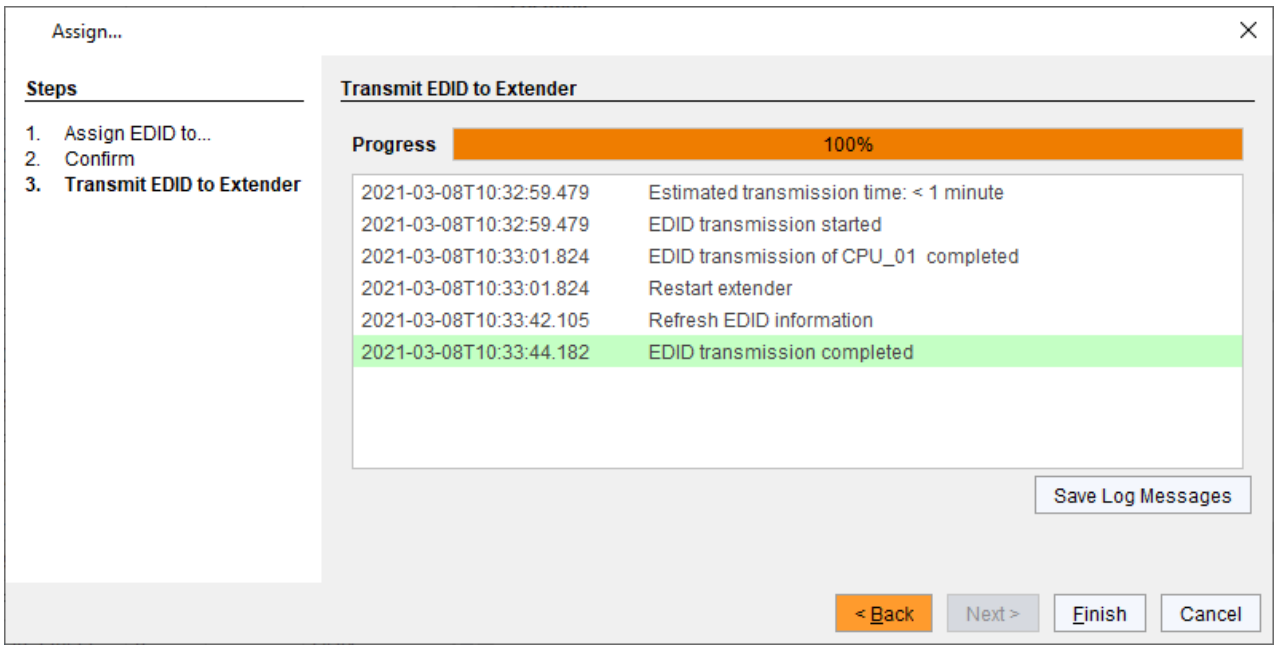


*Fig. 152 Management software menu **Extender & Devices - EXT Units - Assignment finished***

The EDID assignment is finished.

14. Click **Deactivate Edit Mode** in the toolbar.

7.7.3 Setting CPU Devices

New CPU Devices are configured in this menu including their assignment to EXT Units.

The assignment helps to describe and switch more complex computer configurations (e.g., Quad-Head with USB 2.0) in the matrix. To run a CPU Device via a matrix, one or more CPU EXT Units must be assigned.

Physically connected extender modules can be replaced without losing the assignment of EXT Units and their CPU/CON Devices (see chapter 13.1.7, page 331)

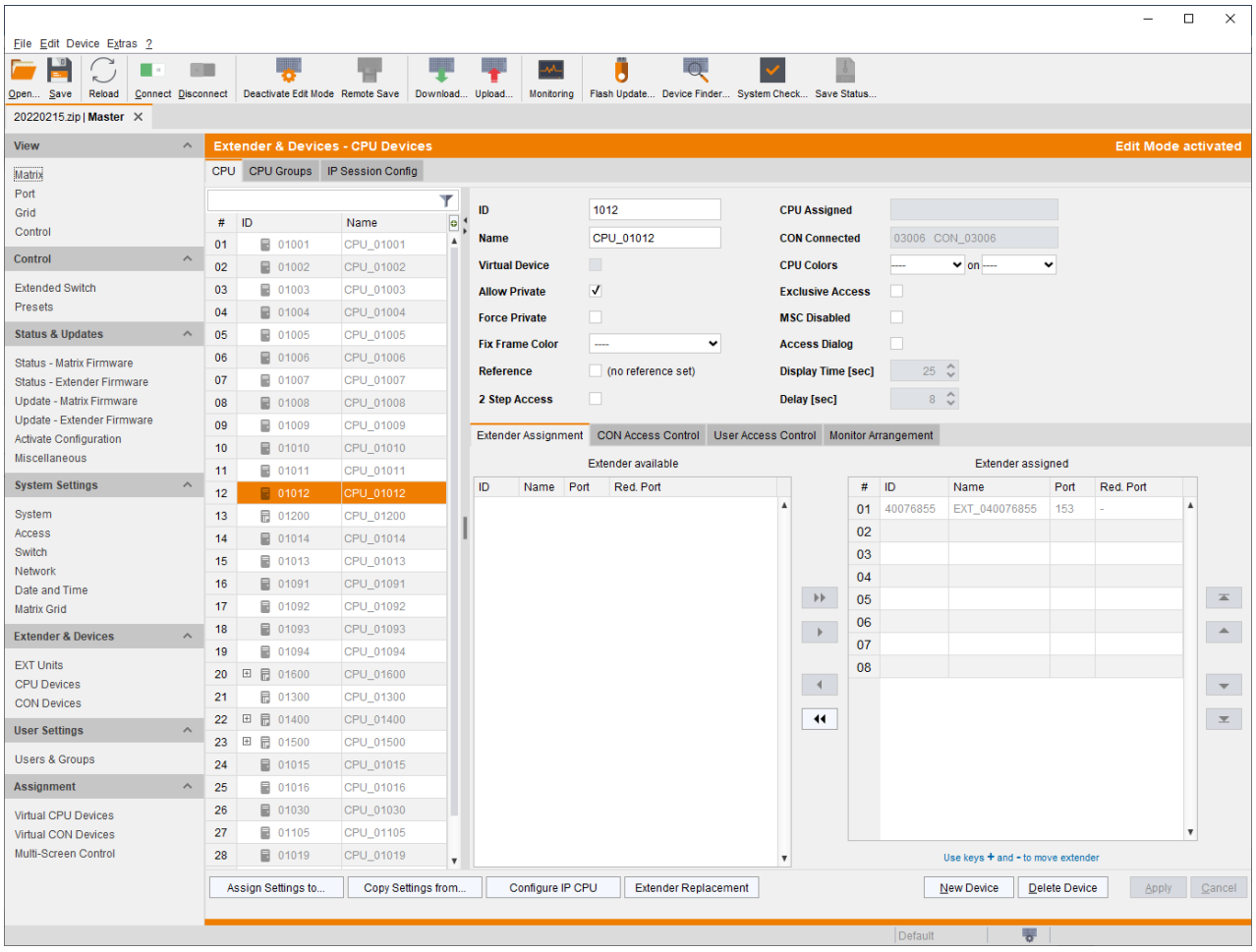


*Fig. 153 Management software Menu **Extender & Devices - CPU Devices - Extender Assignment***

The following parameters can be configured:

Field	Entry/Status	Description
ID	Text	Ident number of the CPU Device.
Name	Text	Name of the CPU Device.
Virtual Device	Activated	The CPU Device was created as a virtual CPU Device.
	Deactivated	Function not active (default).
Allow Private	Activated	Allow switching to the respective CPU Device in Private Mode.
	Deactivated	Function not active (default).
Force Private	Activated	Force switching to the respective CPU Device only in Private Mode.
	Deactivated	Function not active (default).
Fix Frame Color	Selection list	Activate a colored frame when switching to the respective CPU Device. You can select between 7 colors.

Field	Entry/Status	Description
Reference	Activated	Activate a reference CPU Device that inherits both CPU Device and EXT Unit settings to any CPU Unit that is connected to the matrix for the first time. **Note**: It is recommended to activate the reference setting for one single CPU Device only.
	Deactivated	Function not active (default).
2 Step Access	Activated	Open a pop-up window after switching to the particular CPU Device. In the background a Video Only connection will be established. A confirmation in the pop-up window is required to establish a Full Access connection to the CPU Device.
	Deactivated	Function not active (default).
CPU Assigned	-	ID and name of the assigned virtual CPU Device, cannot be changed, is retrieved automatically.
CON Connected	-	ID and name of the connected CON Device, cannot be changed, is retrieved automatically.
CPU Colors	Selection list	The CPU Device name will be highlighted according to the color setting for text and background. You can select between 16 colors.
Exclusive Access	Activated	Activate an access limitation for the case that a CPU Device is already connected via Full Access connection. When having the same priorities, any additional access to the CPU Device can only be established with a Video Only connection. Having a lower priority any additional connection is not possible. Only when having a higher priority, an additional Full Access connection can be established, and K/M control can be taken over.
	Deactivated	Function not active (default).
MSC Disabled	Activated	MSC function deactivated.
	Deactivated	MSC function activated.
Access Dialog	Activated	When a user tries to connect to another CPU Device, the current user of the CON Device gets a message.
	Deactivated	Function not active (default).
Display Time [sec]	-99 to +99 seconds	Time of displaying the dialog: With positive value +1 to +99, the CPU Device is accessed after the set time has expired. With negative value -99 to 0 there is no access to the CPU Device after the set time has expired.
Delay [sec]	0 to 99 seconds	Time until next positive request.

7.7.3.1 Creating a new CPU Device

To create a new CPU Device, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **New Device**.

   A selection dialog appears.

4. Select a real CPU Device (**Create a standard CPU**) or a virtual CPU Device (**Create a virtual CPU**) or a template of an existing CPU Device (**Choose template**) in the **Choose template** selection box.
   Note: A template is only available if there is at least one existing CPU Device.
5. Click **OK**.
   A new CPU Device will be created.
6. Determine all parameters that are relevant for the CPU Device.
7. Click **Apply** to confirm the creation of the CPU Device.
8. Click **Deactivate Edit Mode** in the toolbar.

7.7.3.2 Changing a CPU Device

To change settings of a CPU Device, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a CPU Device in the CPU Device list.
4. Change the desired settings.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.7.3.3 Assigning a CPU Device to an EXT Unit

To assign an EXT Unit to a CPU Device, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the new CPU Device in the **CPU Devices** list.
4. Click the **CPU Access Control** tab on the right side of the working area.
5. Select an EXT Unit in the **Extender available** list that you want to assign to the CPU Device. By pressing and holding down Ctrl at the same time, more than one EXT Unit can be highlighted.
6. Click ▶ to move the highlighted EXT Units to the **Extender assigned** list. By clicking ▶▶, all available EXT Units from the **Extender available** list will be moved to the **Extender assigned** list.
   The assignments are displayed in the **Extender assigned** list.
7. Click ▼ or ▲ to change the order of the EXT Units within the **Extender assigned** list.
   Or press + or - to change the order of the EXT Units within the **Extender assigned** list.
8. Click **Apply** to confirm the assignment.
9. Click **Deactivate Edit Mode** in the toolbar.

7.7.3.4 Unassign an EXT Unit from a CPU Device

To remove an EXT Unit assignment, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a CPU Device in the **CPU Devices** list.
4. Select one or more EXT Units in the **Extender assigned** list.
5. To remove highlighted EXT Units from the **Extender assigned** list, click ◀. By clicking ◀◀, all CPU Devices will be removed from the **Extender assigned** list.
6. Click **Apply** to confirm the removal.
7. Click **Deactivate Edit Mode** in the toolbar.

7.7.3.5 Assigning Settings to other CPU Devices

To assign settings of a CPU Device to other CPU Devices, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CPU Device whose settings are to be assign to another CPU Devices.
4. Click **Assign Settings to** below the CPU Device list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

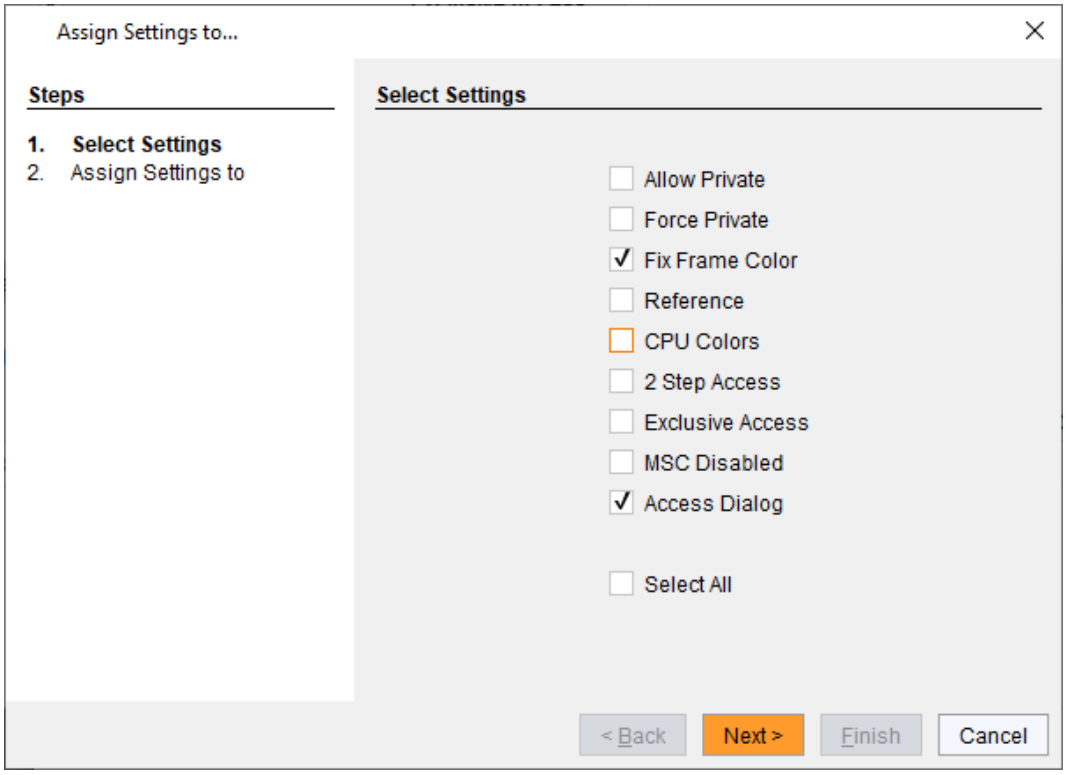


*Fig. 154 Management software menu **Extender & Devices - CPU Devices - Select Settings***

A query to start the assignment appears.

7. Select the CPU Device in the **Available to assign settings to** list to which the settings are to be assigned. By pressing and holding down Ctrl at the same time, more than one CPU Device can be highlighted.
8. Click ▶ to move the highlighted CPU Device to the **Assign settings to** list. By clicking ▶▶, all CPU Devices will be moved to the **Assign settings to** list.
9. To remove highlighted CPU Devices from the **Assign settings to** list, click ◀. By clicking ◀◀, CPU Devices will be removed from the **Assign settings to** list.
10. Click **Finish**.

    The settings are immediately assigned to the selected CPU Devices.
11. Click **Deactivate Edit Mode** in the toolbar.

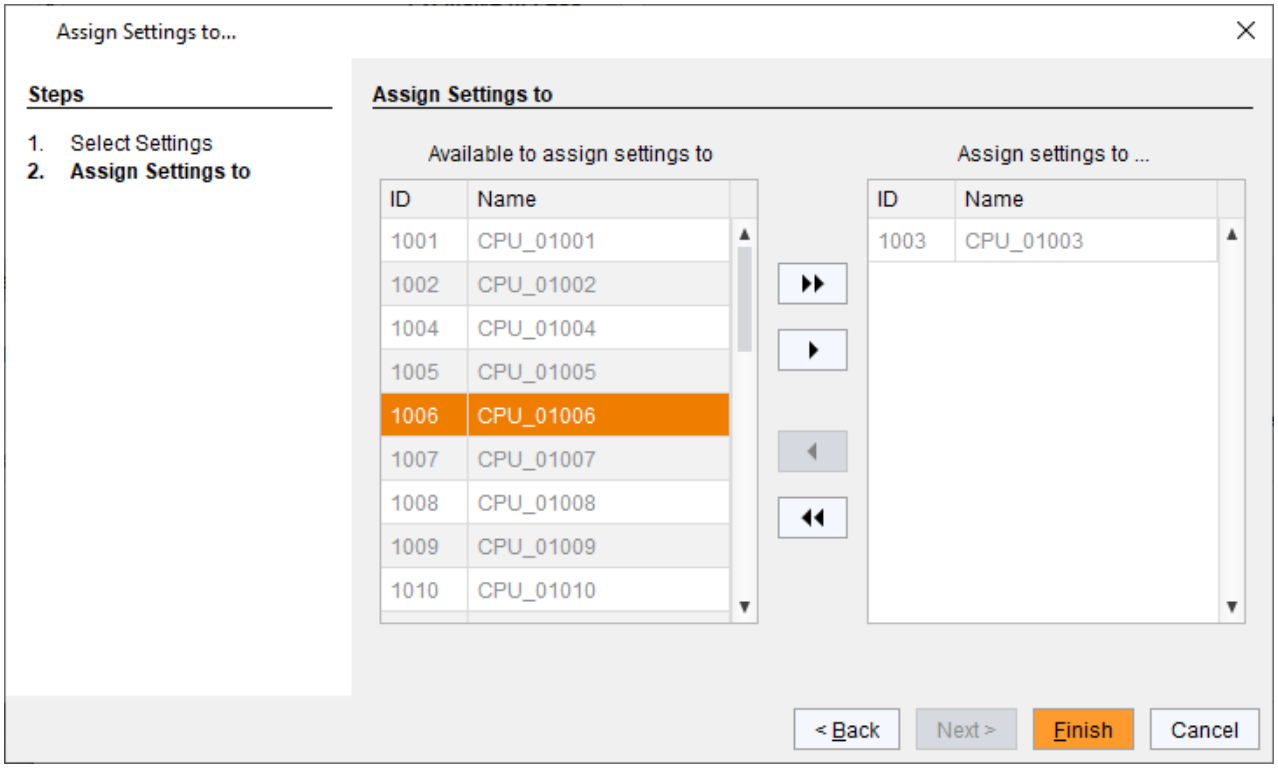


*Fig. 155 Management software menu **Extender & Devices - CPU Devices - Assign Settings***

7.7.3.6 Copying Settings from another CPU Device

To copy settings from a CPU Device to another CPU Device, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CPU Device to copy the settings to. By pressing and holding down Ctrl at the same time, more than one CPU Device can be highlighted.
4. Click **Copy Settings from** below the CPU Device list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

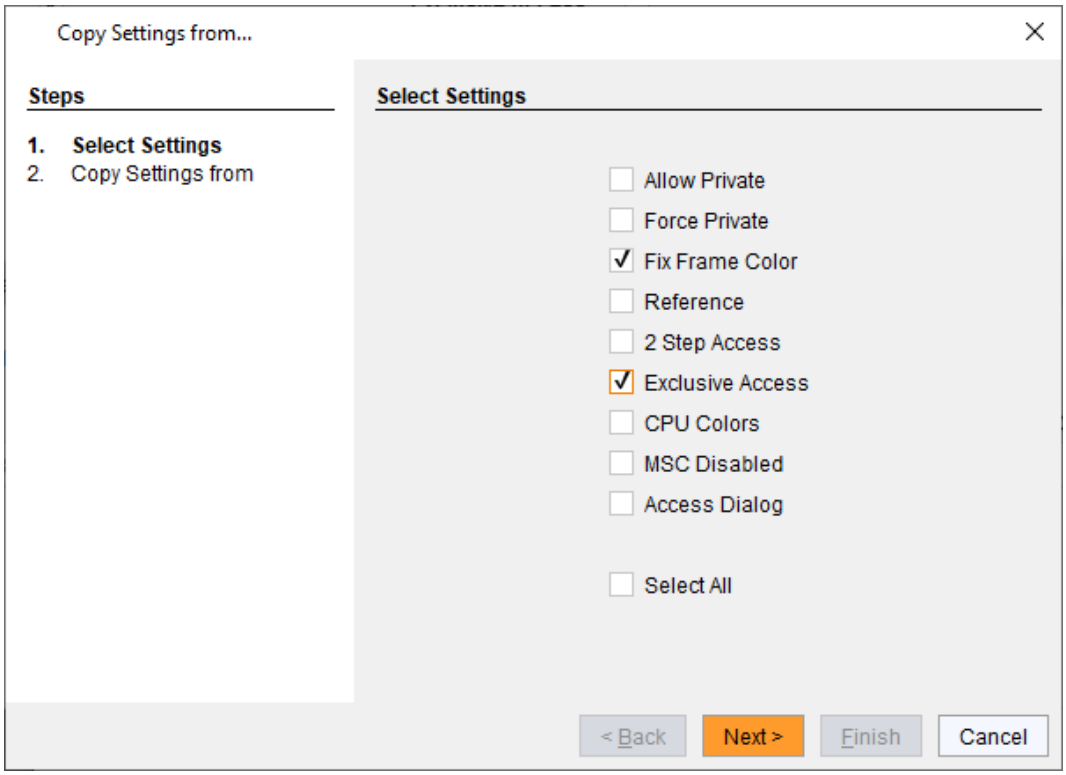


*Fig. 156 Management software menu **Extender & Devices - CON Devices - Select Settings***

A query to start the assignment appears.

7. Select the CPU Device in the selection list from which the settings are to be copied.
8. Click **Finish**.

   The settings are immediately copied to the selected CPU Devices.

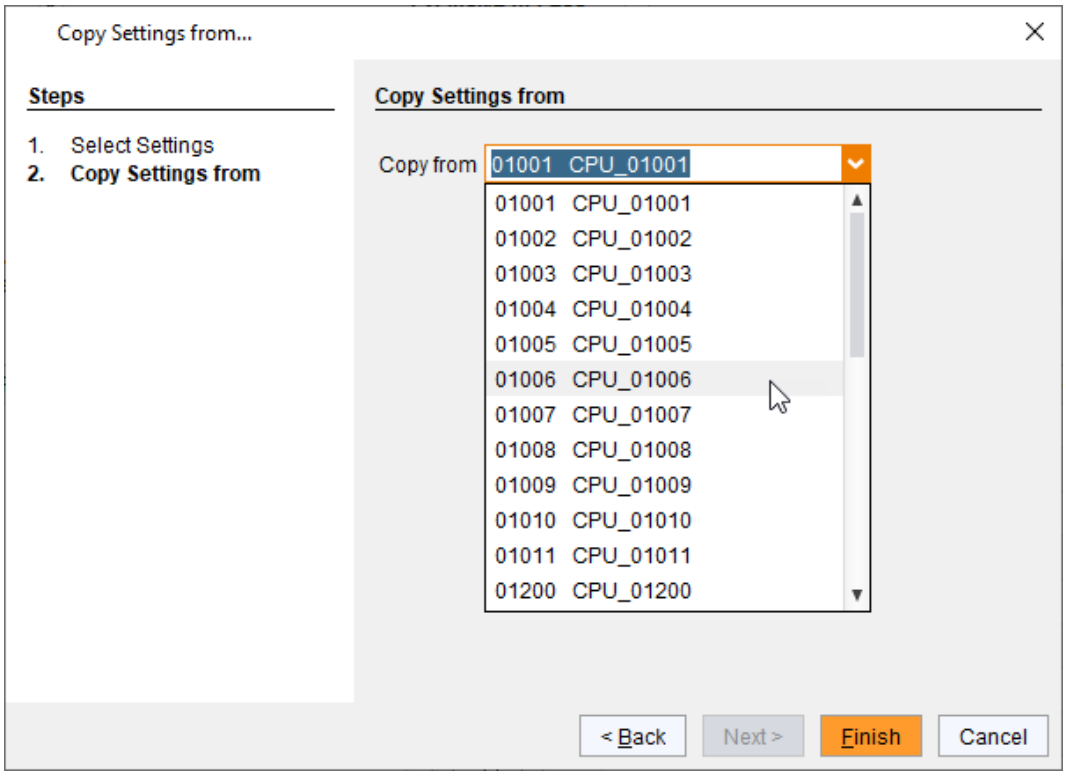


*Fig. 157 Management software menu **Extender & Devices - CPU Devices - Copy Settings***

7.7.4 Setting CON Device Access Rights for CPU Devices

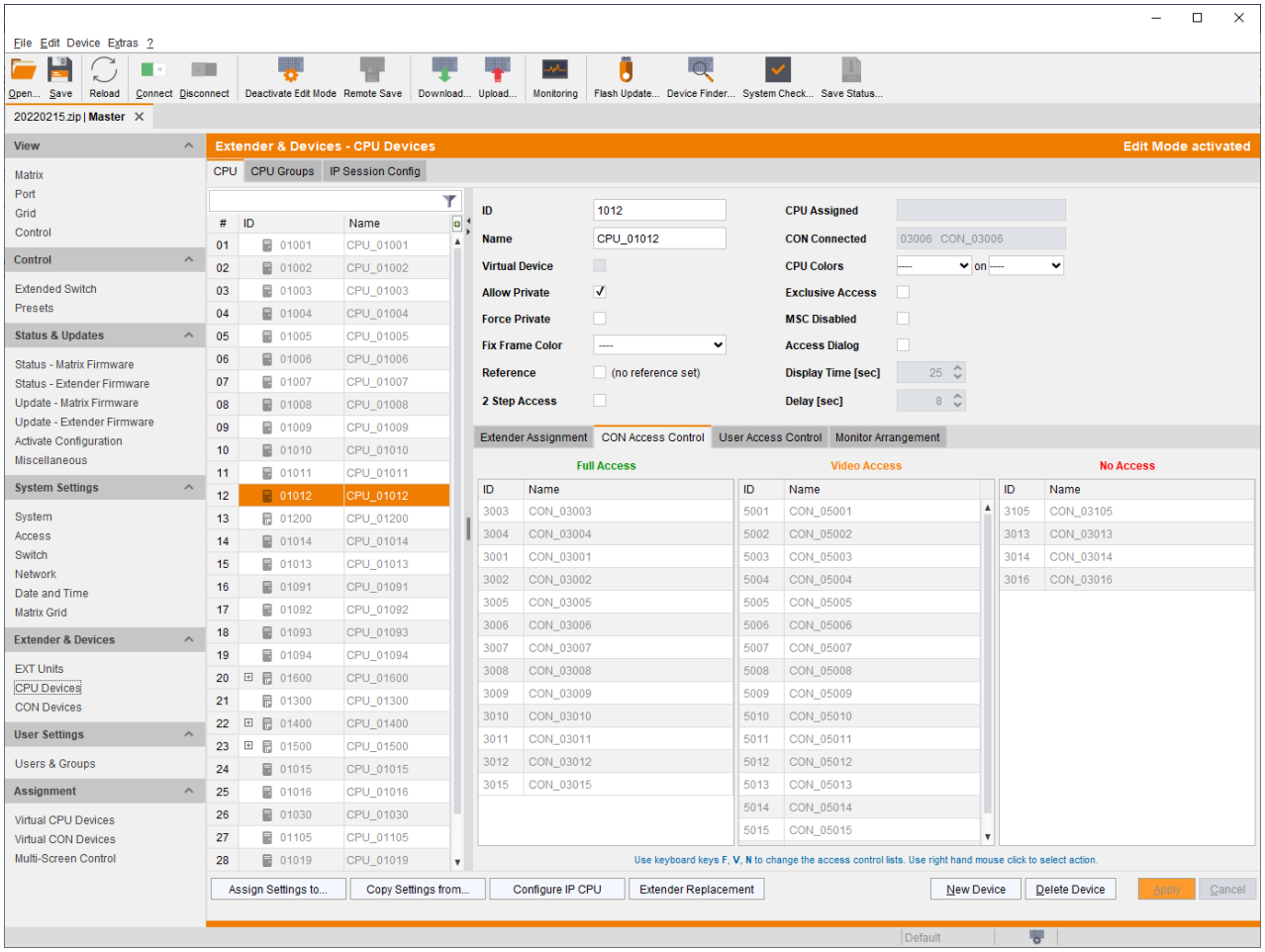


*Fig. 158 Management software Menu **Extender & Devices - CPU Devices - CON Access Control***

To configure CON Devices access rights for CPU Devices, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select CPU Device in the **CPU Devices** list, which should get access rights by a CON Device.
4. Click the **CON Access Control** tab.
5. By clicking with the right mouse button once on a CON Device in one of the respective access lists (**Full Access**, **Video Access,** and **No Access**), a context menu for selection appears for changing the respective CON Device access rights. Alternatively, press f, v, or n to set the respective access rights.
6. Click **Apply** to confirm the changes.
7. Click **Deactivate Edit Mode** in the toolbar.

7.7.5 Assigning Virtual CPU Devices

In this menu, either one or more Virtual CPU Devices can be assigned to a real CPU Device.

With a virtual CPU Device, the effort of switching several CON Devices to the same CPU Device can be reduced. If several CON Devices are connected to a virtual CPU Device that is assigned to a real CPU Device, you only have to change the real CPU Device once and all CON Devices will receive the video signal of the new real CPU Device.

One real CPU Device can be assigned to several virtual CPU Device.

NOTICE

If the **Auto Send** checkbox is ticked in the lower left corner of the workspace, the switching operations will be performed immediately without user confirmation by clicking **Send**.

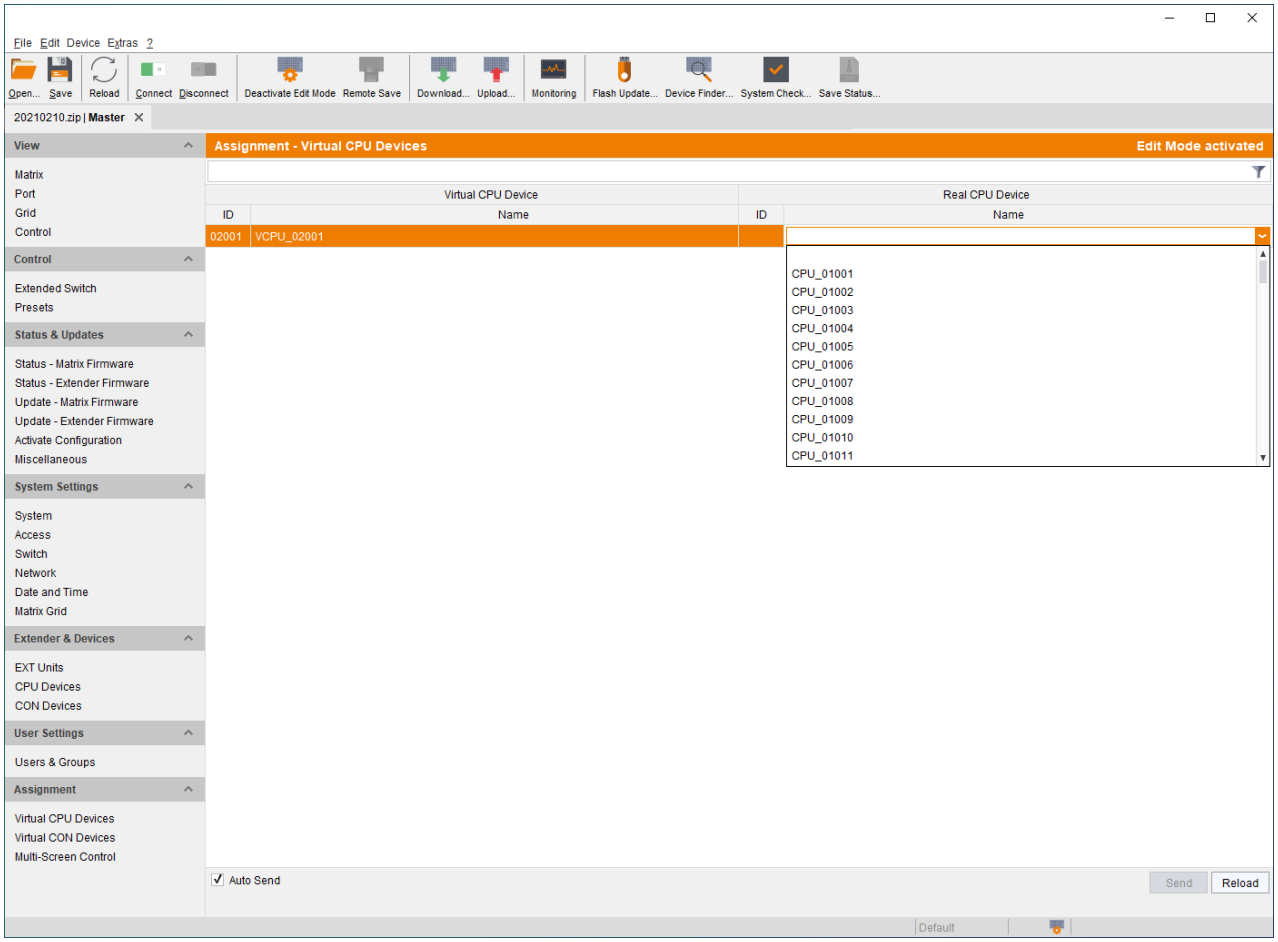


*Fig. 159 Management software menu **Assignment - Virtual CON Devices***

The following functions are available:

Button	Function
Send	Send assignments to the matrix
Reload	Reload changes

The selection boxes in the **Real CPU Device** column contain a filter function for an easy selection of a single CPU Device from a larger pool of CPU Devices.

For an assignment, proceed as follows:

1. Click **Assignment > Virtual CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a virtual CPU Device in the **Virtual CPU Device** list.
4. Double-click in the **Real CPU Device** column to display a list of all available real CPU Devices.
5. Select a real CPU Device in the selection list.
6. Click **Send** to send the assignment to the matrix.
7. Click **Deactivate Edit Mode** in the toolbar.

The management software offers the option to switch directly from the **Assignment** menu to the definition menu to check specific settings for the respective real CPU Device or virtual CPU Device.

➡ Click with the right mouse button on the respective real CPU Device or virtual CPU Device and select **Open CPU Device** in the context menu.

The definition menu for the CPU Device settings is opened (see chapter 7.7.3, page 223).

7.7.6 Setting CPU Groups

The KVM matrix allows to bundle the CPU Devices of a configuration into CPU groups. The groups can be used to subdivide the CPU Devices logically or thematically. As an application example you can group all CPU Devices together that are connected to a specific matrix within a matrix grid. The configuration of CPU groups at the same time increases the clarity of the configuration.

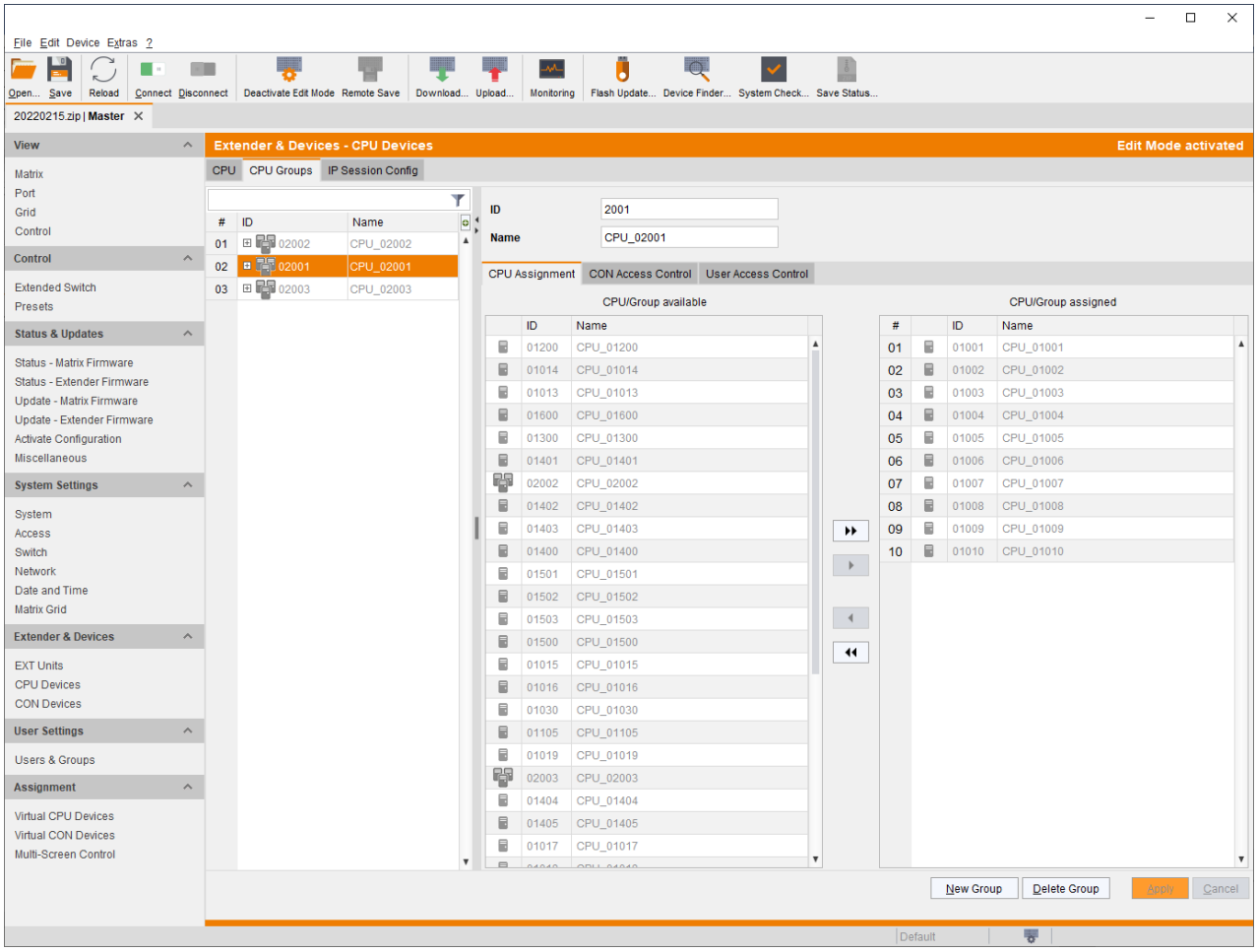


*Fig. 160 Management software Menu **Extender & Devices - CPU Devices - CPU Groups***

7.7.6.1 Creating a new CPU Group

To create a CPU Group, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **CPU Groups** tab in the working area.
4. Click **New Group**.

   A selection dialog appears.
5. Select a standard Group (**Create a standard Group**) or a LDAP Group (**Create a LDAP Group**) or a template of an existing Group (**Choose template**) in the **Choose template** selection box.
   Note: A template is only available if there is at least one existing Group.
6. Click **OK**.
7. Enter a group name into the field **Name**.
8. Click **Apply** to confirm the creation of the group.
9. Click **Deactivate Edit Mode** in the toolbar.

7.7.6.2 Assigning a CPU Device to a CPU Group

To assign a CPU Device to a CPU Group, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the **CPU Groups** tab in the working area.
4. Select the CPU Group to be assigned with a CPU Device.
5. Select a CPU Device in the list **CPU/Group available** that you want to assign to the CPU Group. By pressing and holding down Ctrl at the same time, more than one CPU Device can be highlighted.
6. Click ▶ to move the highlighted CPU Devices to the **CPU/Group assigned** list. By clicking ▶▶, all CPU Devices from the **CPU Device available** list will be moved to the **CPU/Group assigned** list.
7. To remove highlighted CPU Devices from the **CPU/Group assigned** list, click ◀. If clicking ◀◀, all CPU Devices will be removed from the **CPU/Group assigned** list.
8. Click **Apply** to assign the CPU Device to the CPU Group.
9. Click **Deactivate Edit Mode** in the toolbar.

7.7.6.3 Configuring CON Access Rights for CPU Groups

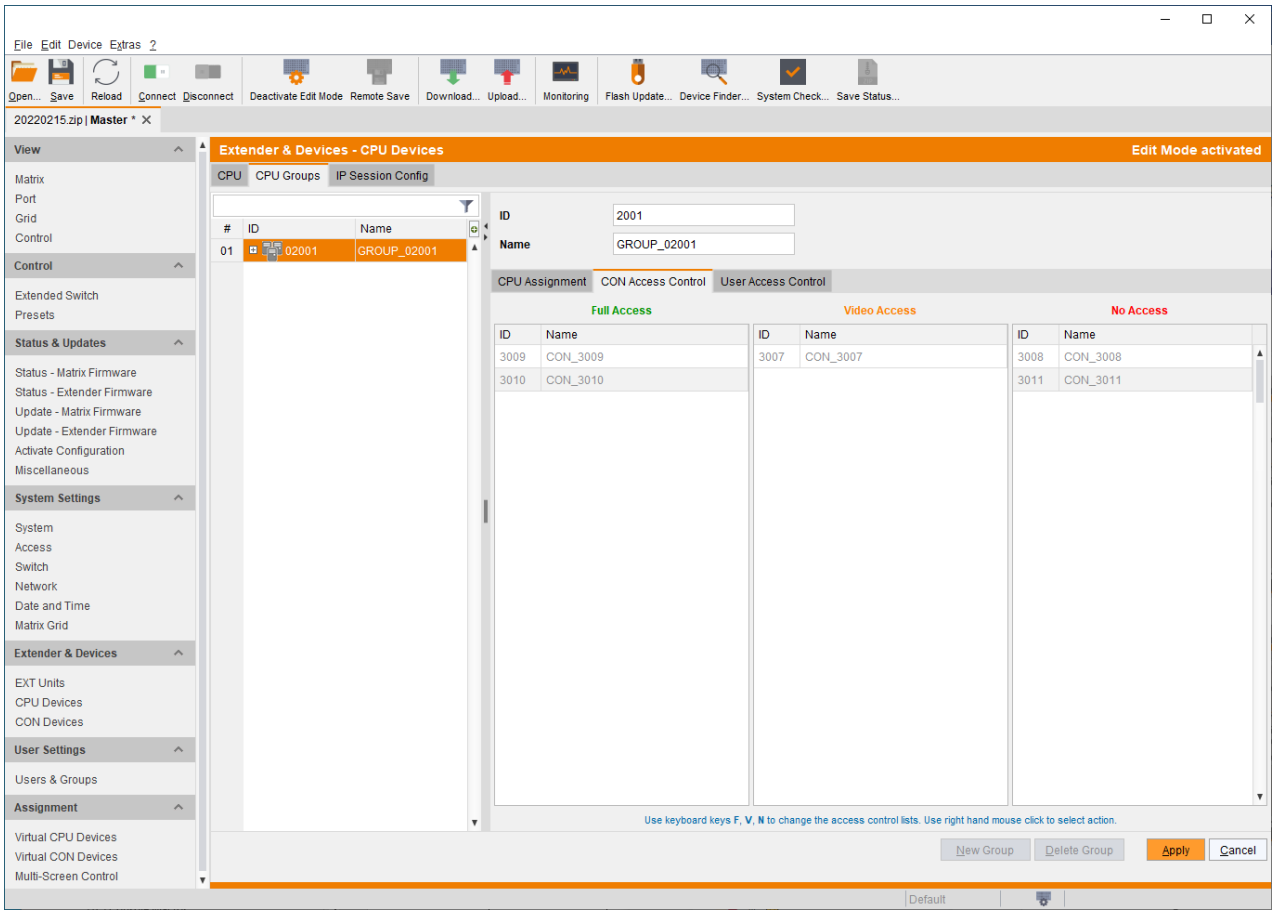


*Fig. 161 Management software Menu **Extender & Devices - CPU Devices - CON Access Control***

To configure CON access rights for CPU groups, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click the CPU Group tab in the working area.
4. Select a CPU Group in the **CPU Group** list.
5. By clicking with the right mouse button once on a CON Device in one of the respective access lists (**Full Access**, **Video Access,** and **No Access**), a context menu for selection appears for changing the respective CON Device access rights. Alternatively, press f, v, or n to set the respective access rights.
6. Click **Apply** to confirm the changes.
7. Click **Deactivate Edit Mode** in the toolbar.

7.8 Configuring CON-Side Settings

Connecting a CON Unit to the matrix creates an EXT Unit in the matrix, reading the serial number of the CON Unit. An EXT Unit has to be assigned to a CON Device. Switching operation is only possible between CON Device and CPU Device. All steps to create switchable CON Devices are described in this chapter. Several real CON Devices can be assigned to a virtual CON Device to reduce operation efforts (see chapter 7.8.7, page 248).

7.8.1 Configuring Mouse and Keyboard used in the Extender OSD

The OSD configuration for mouse and keyboard is made in this menu.

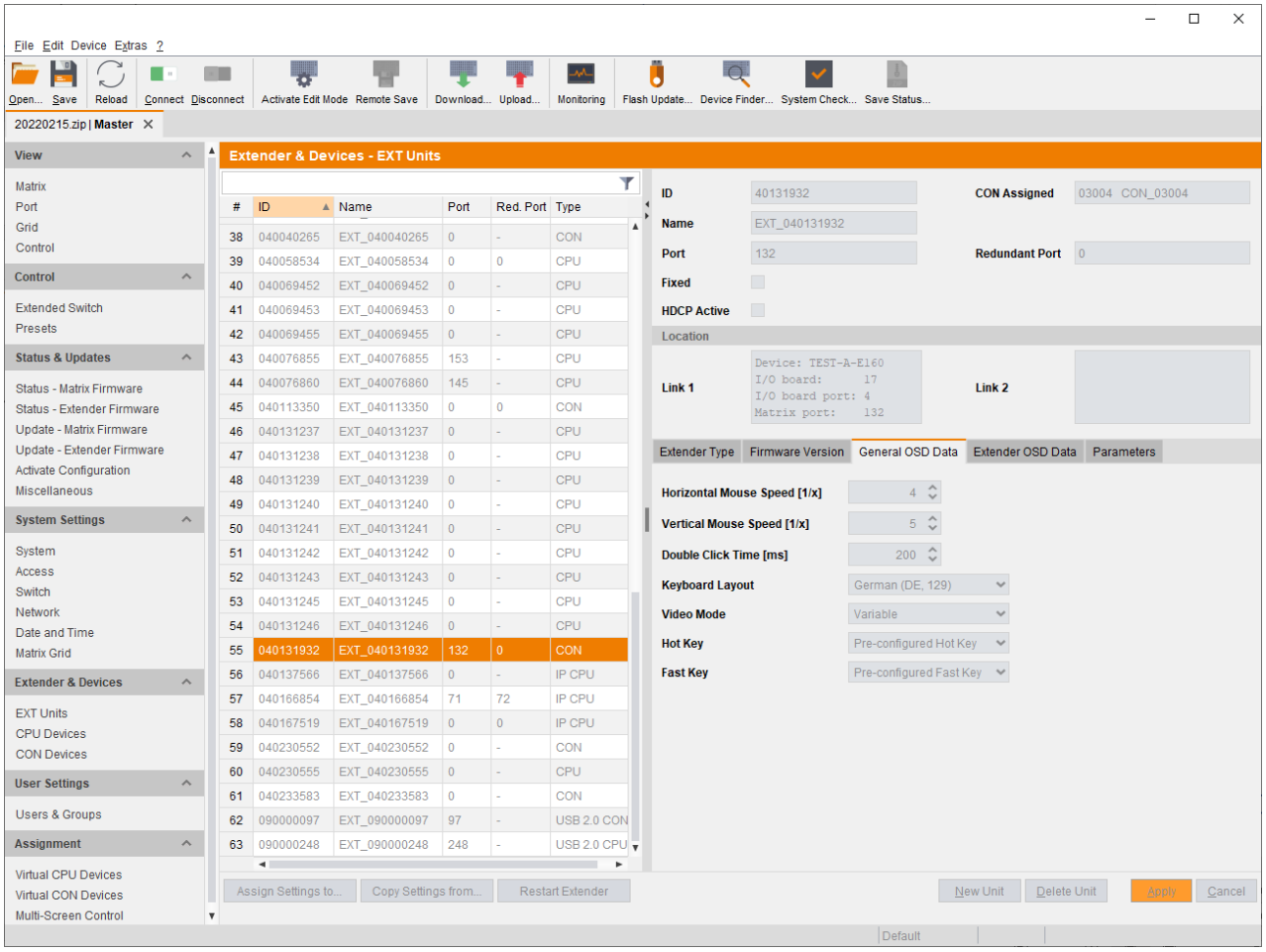


*Fig. 162 Management software menu **Extender & Devices - EXT Units - General OSD Data***

The following parameters can be configured:

Field	Entry/Status	Description
Horizontal Mouse Speed [1/x]	1 to 9	Adjust the horizontal mouse speed, 1 = slow, 9 = fast (default: 4).
Vertical Mouse Speed [1/x]	1 to 9	Adjust the vertical mouse speed, 1 = slow, 9 = fast (default: 5).
Double Click Time [ms]	100 to 800	Adjust the time slot for a double-click (default: 200 ms).
Keyboard Layout	Region	Set the OSD keyboard layout according to the used keyboard (default: German (DE)).

Field	Entry/Status	Description
Video Mode	Variable or specific resolution	Set the resolution that is used when opening the OSD.
Hot Key	Keyboard command	Call the command mode via keyboard sequence.
Fast Key	Keyboard command	Open the OSD via direct access. How often the shortcut key has to be pressed depends on the specified key: 1x for function keys or print key, 2x for all other keys.

The settings for mouse and keyboard are CON Device-specific and can be set separately for each CON Device.

Changing Settings for Mouse and Keyboard

To change the settings for mouse and keyboard, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON EXT Unit in the **EXT Units** list whose extender module OSD settings has to be adjusted.
4. Click the **General OSD Data** tab.
5. Change the desired settings.
6. Click **Apply** to confirm your entries.
7. Click **Deactivate Edit Mode** in the toolbar.

7.8.2 Setting Extender OSD

In this menu the parameters for the Extender OSD can be set. These are local settings that can be made individually for each CON Device.

When setting the horizontal OSD position, a prefixed minus describes the orientation to the right edge of the monitor, e.g., -2 means 2 x 10 = 20 pixels to this edge. When setting a vertical position, a prefixed minus describes the orientation to the lower edge of the monitor.

If the **Update Connection Info** function is deactivated, the Extender OSD only appears when switching via OSD.

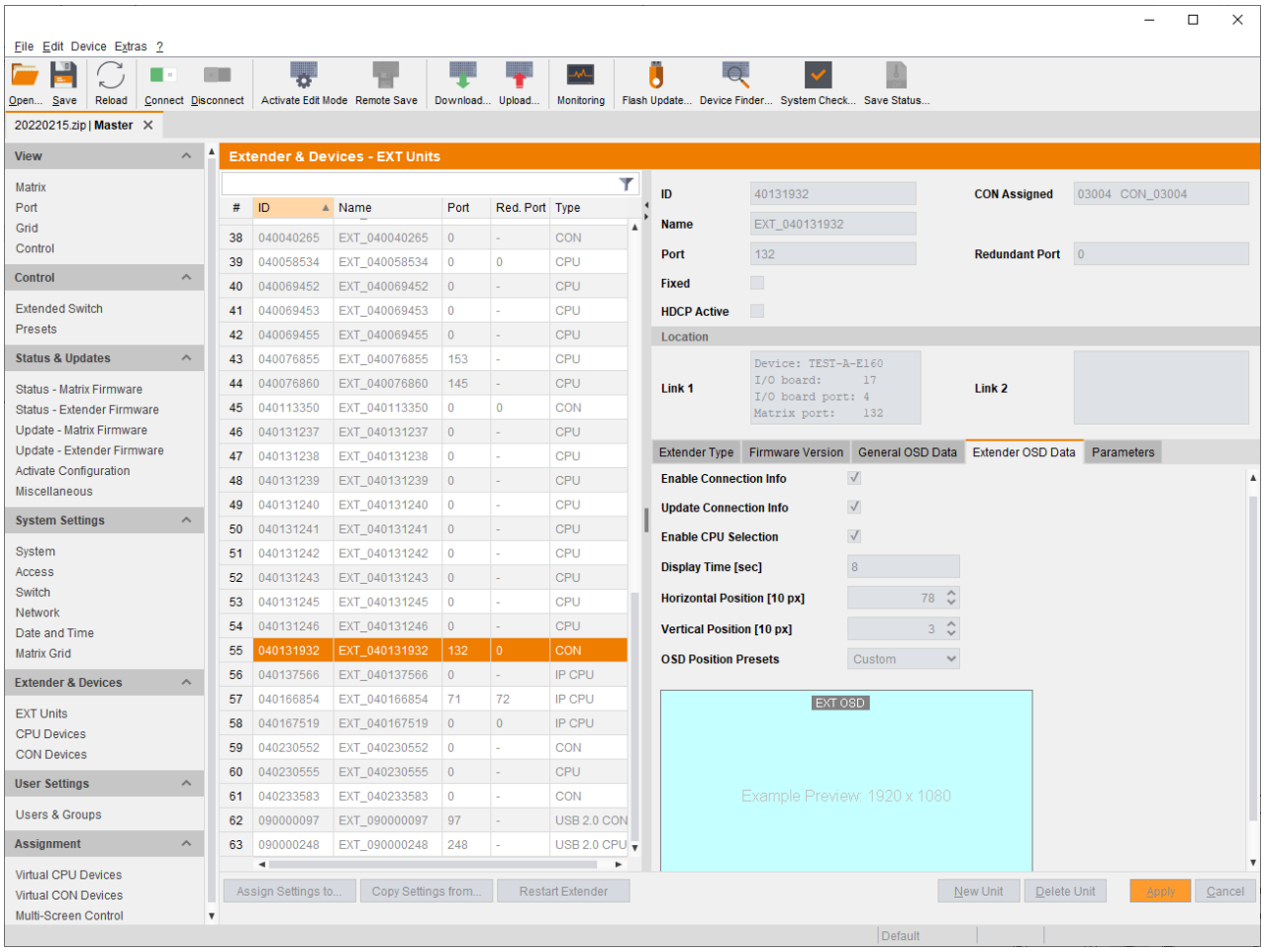


*Fig. 163 Management software menu **Extender & Devices - EXT Units - Extender OSD Data***

The following parameters can be configured:

Field	Entry/Status	Description
Enable Connection Info	Activated	Enable Extender OSD (default)
	Deactivated	Function not active
Update Connection Info	Activated	Every change of the connection status is shown by fade-in of the extender OSD (e.g., sharing situation)
	Deactivated	Function not active (default).
Enable CPU Selection	Activated	When executing the key sequence for opening the OSD, a selection list for switching CPU Devices will be displayed in the center of the monitor. Pressing F7 within the selection list opens the OSD menu.
	Deactivated	Function not active (default).

Field	Entry/Status	Description
Display Time [sec]	0 to 999 seconds	Duration of OSD fade-in (default: 10)
Horizontal Position [10 px]	-127 to +127 pixels	Horizontal OSD position (default: -2). E.g., value 5 means 5 x 10 px distance to the left border.
Vertical Position [10 px]	-127 to +127 pixels	Vertical OSD position (default: 3) E.g., value 5 means 5 x 10 px distance to the top border.
OSD Position Preset	Selection list	Presets for OSD positioning Centered, Top Left, Top Right, Bottom Left, Bottom Right, Custom

Changing the Extender OSD Settings

To change the extender OSD settings, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit of the CON extender module whose OSD settings have to be changed.
4. Click the **Extender OSD Data** tab.
5. Change the desired settings.
6. Click **Apply** to confirm your entries.
7. Click **Deactivate Edit Mode** in the toolbar.

For an efficient extender OSD configuration, OSD settings can be assigned to extender modules (see description on page 205) or can be copied from an extender module (see description on page 206).

7.8.3 Setting CON Devices

New CON Devices are created in this menu including access rights and assignment to EXT Units. To run a CON Device via a matrix, one or more CON EXT Units must be assigned.

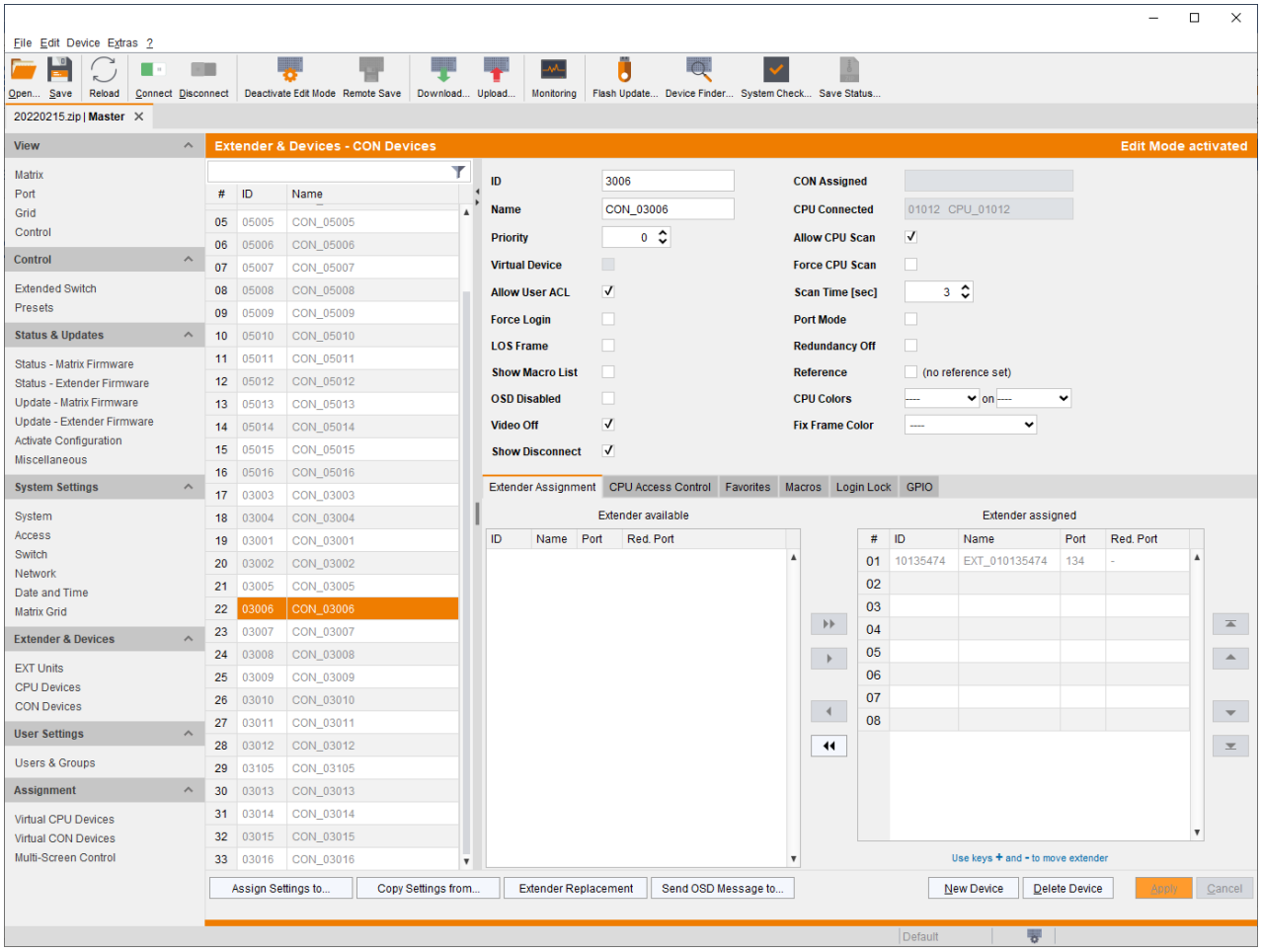


*Fig. 164 Management software menu **Extender & Devices - CON Devices - Extender Assignments***

The following parameters can be configured:

Field	Entry/Status	Description
ID	Text	Ident number of the CON Device.
Name	Text	Name of the CON Device.
Priority	0 to 999	Priority of the CON Device. **Note:** There is no K/M sharing between CON Devices with a different priority and the release time does not come into account. CON Devices only have Video Only access to a CPU Device if a CON Device with a higher priority is already switched to it.
Virtual Device	Activated	The CON Device was created as a virtual CON Device.
	Deactivated	Function not active (default).
Allow User ACL	Activated	Allow activation of the User ACL at the local CON Device.
	Deactivated	Function not active (default).

Field	Entry/Status	Description
Force Login	Activated	The user has to login with a username and a password once to enter OSD. Thereafter the user remains logged in until he explicitly logs out or an auto logout is affected. **Note:** When using the **Force Login** function, Console ACL are still active. When the **Force Login** function is activated and a user is logged in, only the user favorites are available. The CON favorites are not accessible.
	Deactivated	Function not active (default).
LOS Frame	Activated	• When the video signal between source and the CPU Unit or the connection between matrix and the CON Unit is lost, an orange frame will be displayed. • When switching to a CPU Unit without video signal, a blank screen will appear surrounded by an orange frame.
	Deactivated	Function not active (default).
Show Macro List	Activated	Show the macro list instead of the CPU Device selection list.
	Deactivated	Function not active (default).
OSD Disabled	Activated	Disable OSD access for the respective CON Device (executing macros and favorite switching is still possible)
	Deactivated	Function not active (default).
Video Off	Activated	Switch off the video signal after 60 sec without connection to the CPU Device so that the monitor can go into stand-by mode.
	Deactivated	Function not active (default).
Show Disconnect	Activated	Show a message if the connection to the CPU Device is lost.
	Deactivated	Function not active (default).
CON Assigned	-	ID and name of the assigned virtual CPU Device, cannot be changed, is retrieved automatically.
CPU Connected	-	ID and name of the connected CON Device, cannot be changed, is retrieved automatically.
Allow CPU Scan	Activated	Allow a scan mode with an automatic change of the video signal for the favorite list (CPU Devices) of the respective CON Device or a logged in user.
	Deactivated	Function not active (default).
Force CPU Scan	Activated	Force a scan mode with an automatic change of the video signal for the favorite list (CPU Devices) of the respective CON Device or a logged in user. **Note:** An active scanner can be stopped by a mouse or keyboard event. You gain Full Access for the currently switched CPU Device if Force Connect is activated.
	Deactivated	Function not active (default).
Scan Time [sec]	0 to 99 seconds	Retention period until switching to the next CPU Device.

Field	Entry/Status	Description
Port Mode	Activated	The favorite list will be replaced by a port list where the ports from 1 to 999 can be directly selected at each matrix or Matrix Grid. **Note:** The selection only works for CPU Devices and has to be made according to the switching of favorites. When using the Port Mode, CON and User favorites will be deactivated.
	Deactivated	Function not active (default).
Redundancy Off	Activated	Function is not active.
	Deactivated	Automatically switch to the second link of a connected redundant CON Unit when losing the primary link of a CPU Unit (default).
Reference	Activated	Activate a reference CON Device that inherits both Device and EXT Unit settings to any CON Unit that is connected to the matrix for the first time. **Note**: It is recommended to activate the reference setting for one single CON Device only.
	Deactivated	Function not active (default).
CPU Colors	Selection list	The CPU Device name will be highlighted according to the color setting for text and background. You can select between 16 colors.
Fix Frame Color	Selection list	Show a colored frame at the CPU Device. You can select between 7 colors. The colored frame of the CPU device is displayed with priority to the one of the CON Device.

7.8.3.1 Creating a CON Device

To create a CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **New Device**.

   A selection dialog appears.
4. Select a real CON Device (**Create a real Console**) or a virtual CON Device (**Create a virtual Console**) or a template of an existing CPU Device (**Choose template**) in the **Choose template** selection box.
   Note: A template can only be used if there is at least on existing CON Device.
5. Click **OK**.

   A new CON Device will be created.
6. Determine all parameters that are relevant for the CON Device.
7. Click **Apply** to confirm the creation.
8. Click **Deactivate Edit Mode** in the toolbar.

7.8.3.2 Changing a CON Device

To change settings of a CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a CON Device in the CON Device list.
4. Change the desired settings.
5. Click **Apply** to confirm the changes.
6. Click **Deactivate Edit Mode** in the toolbar.

7.8.3.3 Assigning a CON Device to an EXT Unit

To assign an EXT Unit to a CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device in the **CON Devices** list that has to be assigned to an EXT Unit.
4. Select the EXT Unit in the **Extender available** list that should be assigned to the CON Device.
5. Click ▶ to move the highlighted EXT Unit to the **Extender assigned** list. By clicking ▶▶, all CON Devices from the **Extender available** list will be moved to the **Extender assigned** list.
6. Optional: Click ▼ or ▲ to change the order of the CON Devices within the **Extender assigned** list. Or press + or - to change the order of the CON Devices within the **Extender assigned** list.
7. Click **Apply** to confirm the assignment.
8. Click **Deactivate Edit Mode** in the toolbar.

7.8.3.4 Unassign an EXT Unit from a CON Device

To remove an EXT Unit assignment, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a CON Device in the **CON Devices** list.
4. Select one or more EXT Units in the **Extender assigned** list.
5. To remove highlighted EXT Units from the **Extender assigned** list, click ◀. By clicking ◀◀, all CON Devices will be removed from the **Extender assigned** list.
6. Click **Apply** to confirm the removal.
7. Click **Deactivate Edit Mode** in the toolbar.

7.8.4 Setting CPU Device Access Rights for CON Devices

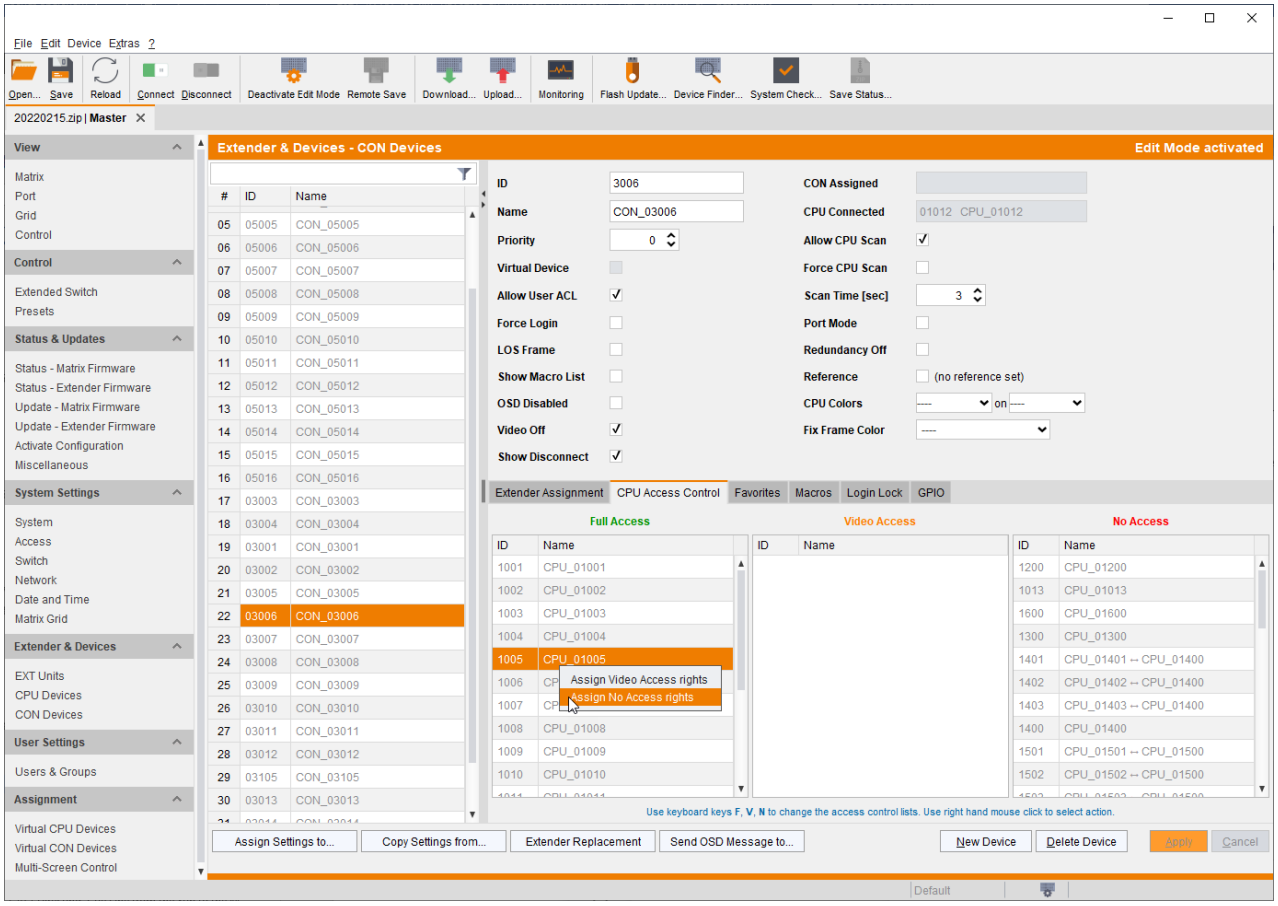


*Fig. 165 Management software Menu **Extender & Devices - CON Devices - CPU Access Control***

To configure CPU Device access rights of CON Devices, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device in the **CON Devices** list to be modified.
4. Click the **CPU Access Control** tab.
5. By clicking with the right mouse button once on a CPU Device in one of the respective access lists (**Full Access**, **Video Access,** and **No Access**), a context menu for selection appears for changing the respective CPU Device access rights. Alternatively, press f, v, or n to set the respective access rights.
6. Click **Apply** to confirm the changes.
7. Click **Deactivate Edit Mode** in the toolbar.

7.8.5 Setting CON Device Favorites

Individual favorite lists of CPU Devices to be switched frequently can be created for all CON Devices in this menu. A favorite list can contain up to 32 different CPU Devices (from firmware V3.05).

The switching of the favorites is done via keyboard commands (see chapter 8.1.1, page 290).

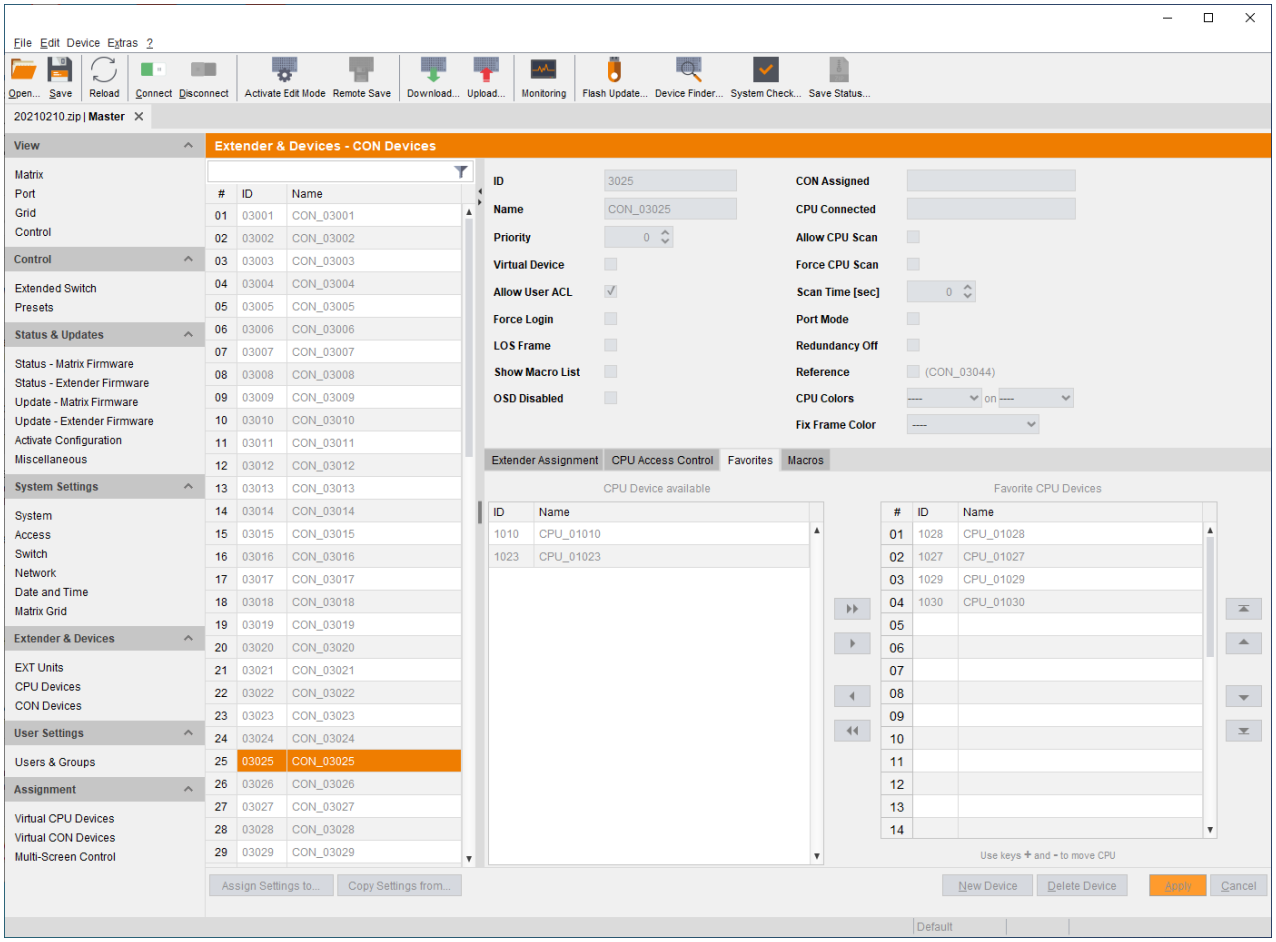


*Fig. 166 Management software menu **Extender & Devices - CON Devices - Favorites***

To create a favorite list for any CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device for which a favorites list is to be created.
4. Click the **Favorites** tab.
5. Select the CPU Devices in the **CPU Device available** list that should be added to the favorites list (**Favorite CPU Devices**). By pressing and holding down Ctrl at the same time, more than one CPU Device can be highlighted.
6. Click ▶ to move the highlighted CPU Devices to the favorites list. By clicking ▶▶, all CPU Devices from the **CPU Device available** list will be moved to the favorites list (**Favorite CPU Devices**).
7. To remove highlighted CPU Devices from the favorites list, click ◀. By clicking ◀◀, all CPU Devices will be removed from the favorites list.
8. Optional: Click ▼ or ▲ to change the order of the CPU Devices within the favorites list.
   Or press + or - to change the order of the CPU Devices within the favorites list.
9. Click **Apply** to confirm the changes.
10. Click **Deactivate Edit Mode** in the toolbar.

For an efficient favorite configuration, favorite settings can be assigned to CON Devices (see description on page 251) or can be copied from a CON Device (see description on page 253).

7.8.6 Setting CON Device Macros

In this menu macro commands for switching, disconnection or user administration can be created. The macro commands are created for each CON Device separately.

A macro can execute up to 16 switching commands successively.

The execution of the macros is done by entering a keyboard command by pressing the Hot Key and the function keys F1 to F16 (see chapter 8.1.4, page 293).

The macros can also be used to switch to CPU groups.

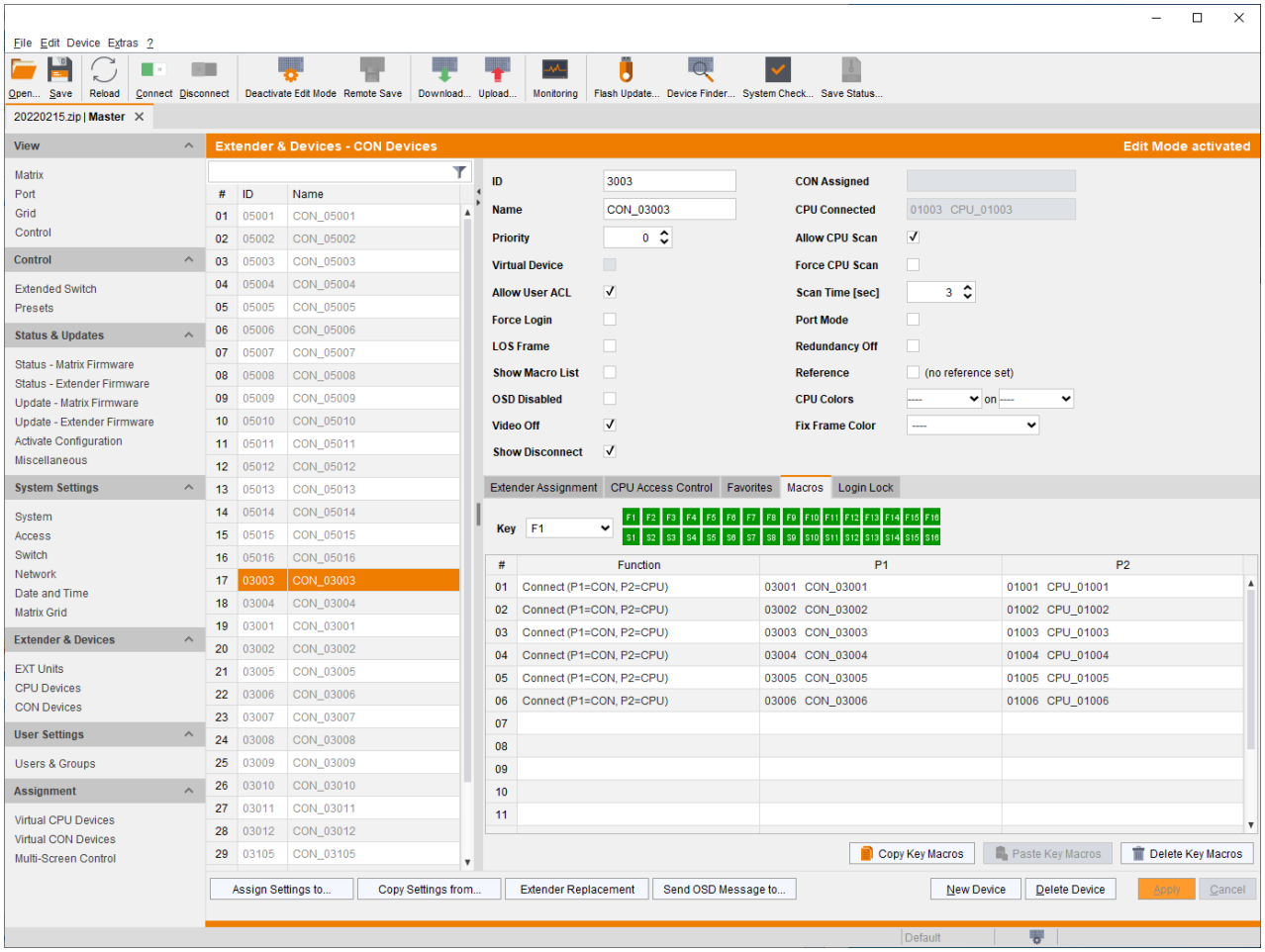


*Fig. 167 Management software menu **Extender & Devices - CON Devices - Macros***

The following parameters can be configured:

Field	Selection	Description
Function (01 to 16)	**Connect (P1=CON, P2=CPU)**	Set a bidirectional connection from CON Device P1 to CPU Device P2
	Connect Video (P1=CON, P2=CPU)	Set a Video Only connection from CON Device P1 to CPU Device P2
	Disconnect (P1=CON)	Disconnect the CON Device P1

Field	Selection	Description
Function (01 to 16)	**Logout User**	Logout the current user
	Assign CPU (P1=VCPU, P2=RCPU)	Assign a virtual CPU Device to a real CPU Device
	Assign CON (P1=RCON, P2=VCON)	Assign a real CON Device to a virtual CON Device
	Push (P1=CON)	The user's Full Access connection is forwarded to CON Device P1 and is changed into a Video Only connection.
	Push Video (P1=CON)	The video signal of the current connection (Full Access or Video Only) is forwarded to CON Device P1. The user's connection remains unchanged (Full Access or Video Only).
	Get (P1=CON)	The user's CON Device gets a Full Access connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 is changed into a Video Only connection.
	Get Video (P1=CON)	The user's CON Device gets a Video Only connection to the CPU Device that is currently connected to CON Device P1. The connection of CON Device P1 remains unchanged (Full Access or Video Only).
	Login User console P2	Login a certain user P1 at CON Device P2
P1	**CON or CPU Device**	Name of CON Device or CPU Device
P2	**CON or CPU Device**	Name of CON Device or CPU Device

To create a macro for the selected CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device for which a CON Device macro is to be created.
4. Click the **Macros** tab.
5. Select in the **Key** field the function key (**F1** to **F32**) for which a macro is to be created.
6. Select in the **Function** column the commands that should be part of the macro. The selection list will be opened by a double-click on the empty fields.
7. Select the respective parameters for the macro functions (e.g., corresponding CON Devices or CPU Devices) in the **P1** and **P2** columns.
8. Click **Apply** to confirm your entries.
9. Click **Deactivate Edit Mode** in the toolbar.

For an efficient macro configuration, the following context functions are available:

- ➡ When clicking on the **Macros** tab, macros can be assigned to other CON Devices by using the **Assign Settings to...** function (see description on page 251) and can be copied from other CON Devices by using the **Copy Settings from...** function (see description on page 253).
- ➡ When clicking on the macro list, macros of the selected key can be copied into the cache by using the **Copy Key Macros** function. You can paste the macros from the cache into another key by using the **Paste Key Macros** function and you can reset all macros of the selected key by using the **Delete Key Macros** function.

7.8.7 Setting Access Rights for Logging in to a CON Device

Users can be blocked from logging in for certain CON Devices.

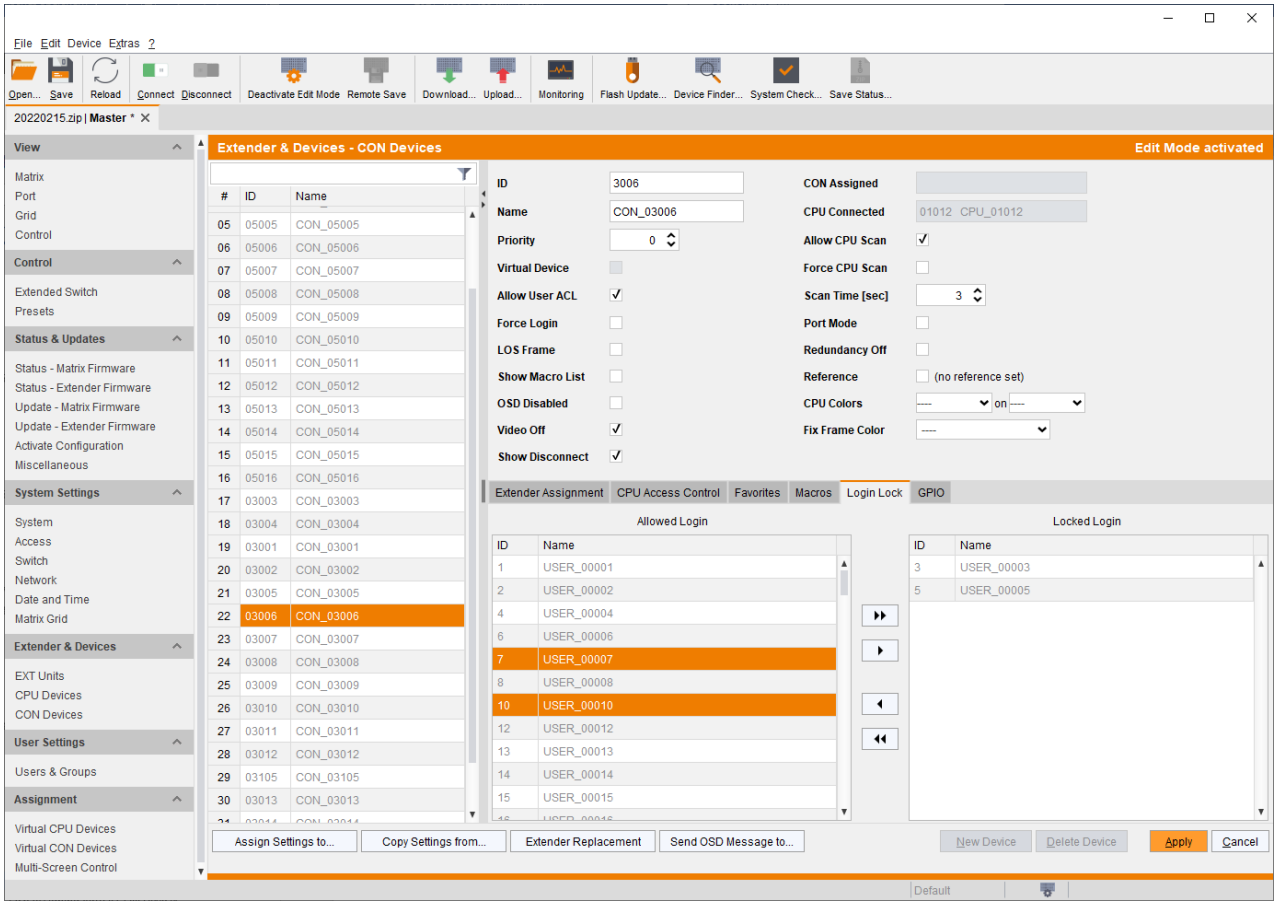


*Fig. 168 Management software menu **Extender & Devices - CON Devices - Login Lock***

To lock the login to the OSD of specified CON Devices, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device for which the login should be locked in the **CON Device** list.
4. Click the **Login Lock** tab in the working area.
5. Select the Users in the **Allowed Login** list that should be added to the list of locked Users (**Locked Login**). By pressing and holding down Ctrl at the same time, more than one User can be highlighted.
6. Click ▶ to move the highlighted User to the **Locked Login** list. By clicking ▶▶, all Users from the **Allowed Login** list will be moved to the **Locked Login** list.
7. To remove highlighted Users from the **Locked Login** list, click ◀. By clicking ◀◀, all Users will be removed from the **Locked Login** list.
8. Click **Apply** to confirm the changes.
9. Click **Deactivate Edit Mode** in the toolbar.

7.8.8 Setting Functions for an External Switching Solution

Functions for an external switching solution connected to a GPIO add-on module are set in this menu.

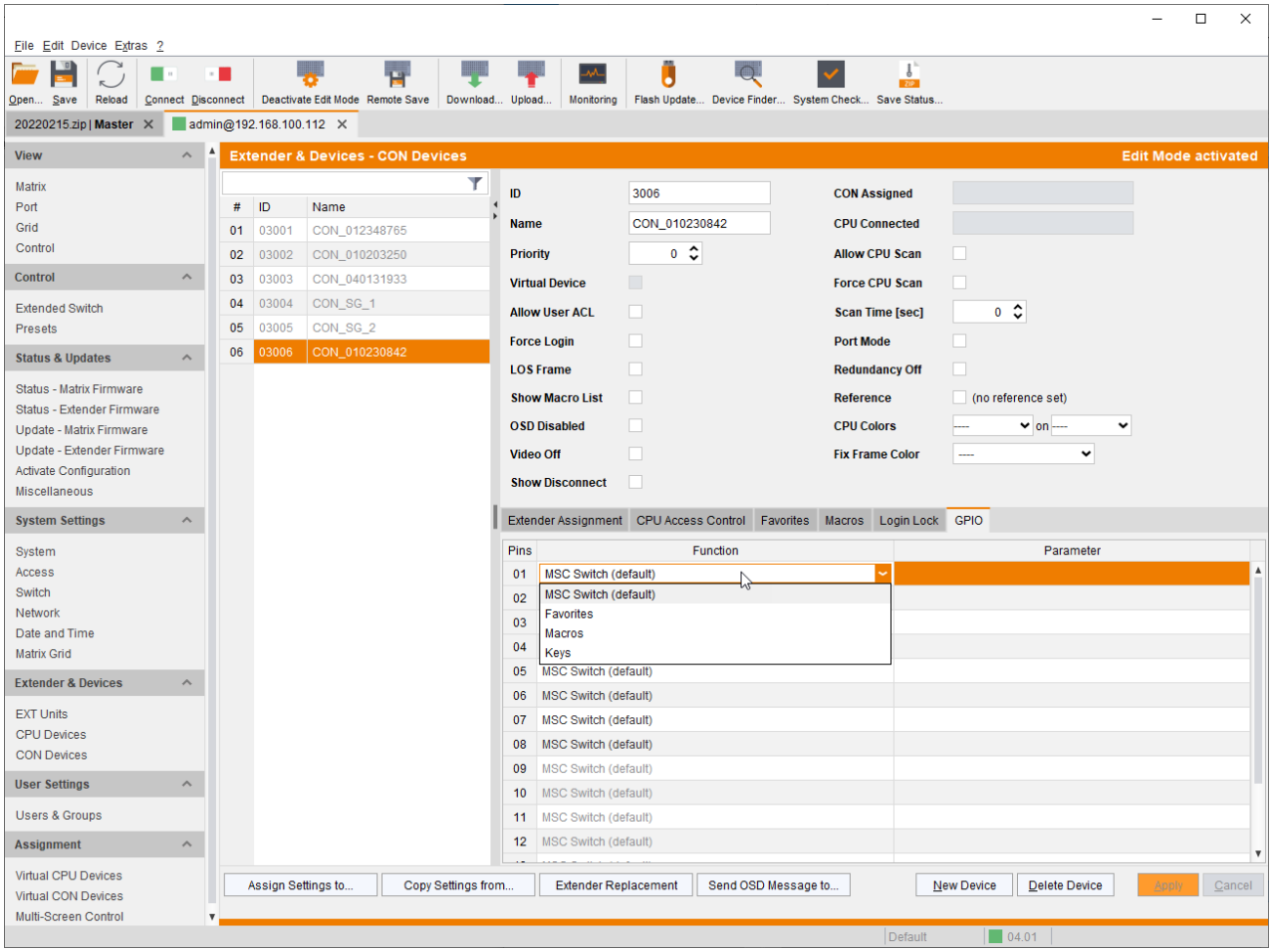


*Fig. 169 Management software menu **Extender & Devices - CON Devices - GPIO***

To set favorites for an external switching solution, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device of the extender module with GPIO add-on module to define the functions of the pins.
4. Click the **GPIO** tab in the working area.
5. Double-click in the **Function** column of the pin to be defined.

   A selection menu is opened.
6. Select **Favorites** as function for the pin.
7. Double-click in the **Parameter** column of the selected pin.

   A selection menu is opened.
8. Select the favorite CPU Device from the **Favorite CPU Devices** list.
9. Click **Apply** to confirm the changes.
10. Click **Deactivate Edit Mode** in the toolbar.

Defining a macro for a pin is done analogously.

To set keys for an external switching solution, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device of the extender module with GPIO add-on module to define the functions of the pins.
4. Click the **GPIO** tab in the working area.
5. Double-click in the **Function** column of the pin to be defined.

   A selection menu is opened.
6. Select **Key** as function for the pin.
7. Double-click in the **Parameter** column of the selected pin.

   A menu is opened.
8. If required, click the arrow under **Keyboard Layout** and select the desired keyboard layout in the opened selection list.
9. Tick the checkbox for the desired key under **Modification Keys** or click the arrow under **Key Code** and select the desired key in the opened selection list.
10. Click **Ok** to confirm the settings.

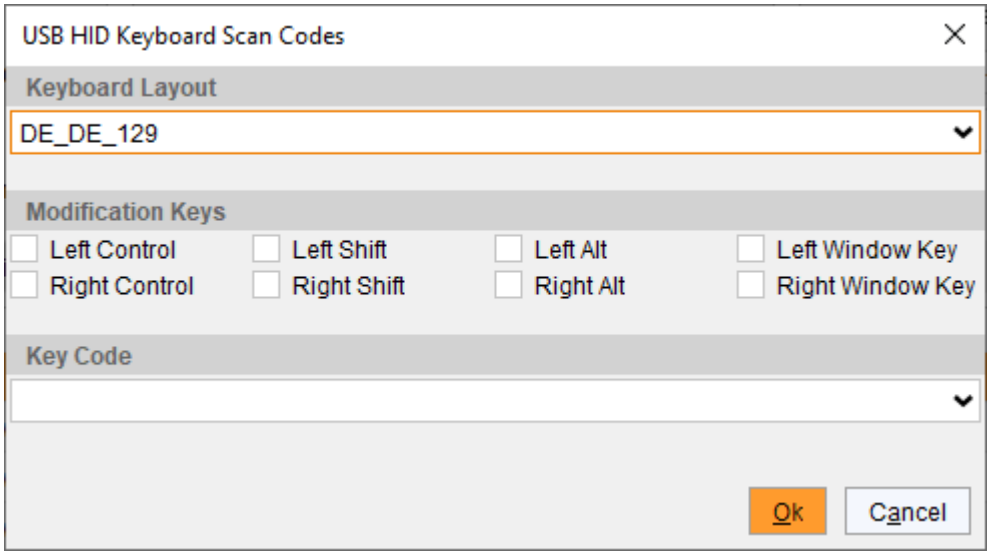


*Fig. 170 Management software menu **Extender & Devices - CON Devices - GPIO***

11. Click **Apply** to confirm the settings.
12. Click **Deactivate Edit Mode** in the toolbar.

7.8.9 Assigning/Copying Settings of CON Devices

7.8.9.1 Assigning Settings to other CON Devices

To assign settings of a CON Device to other CON Devices, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device whose settings are to be assign to another CON Devices.
4. Click **Assign Settings to** below the CON Device list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

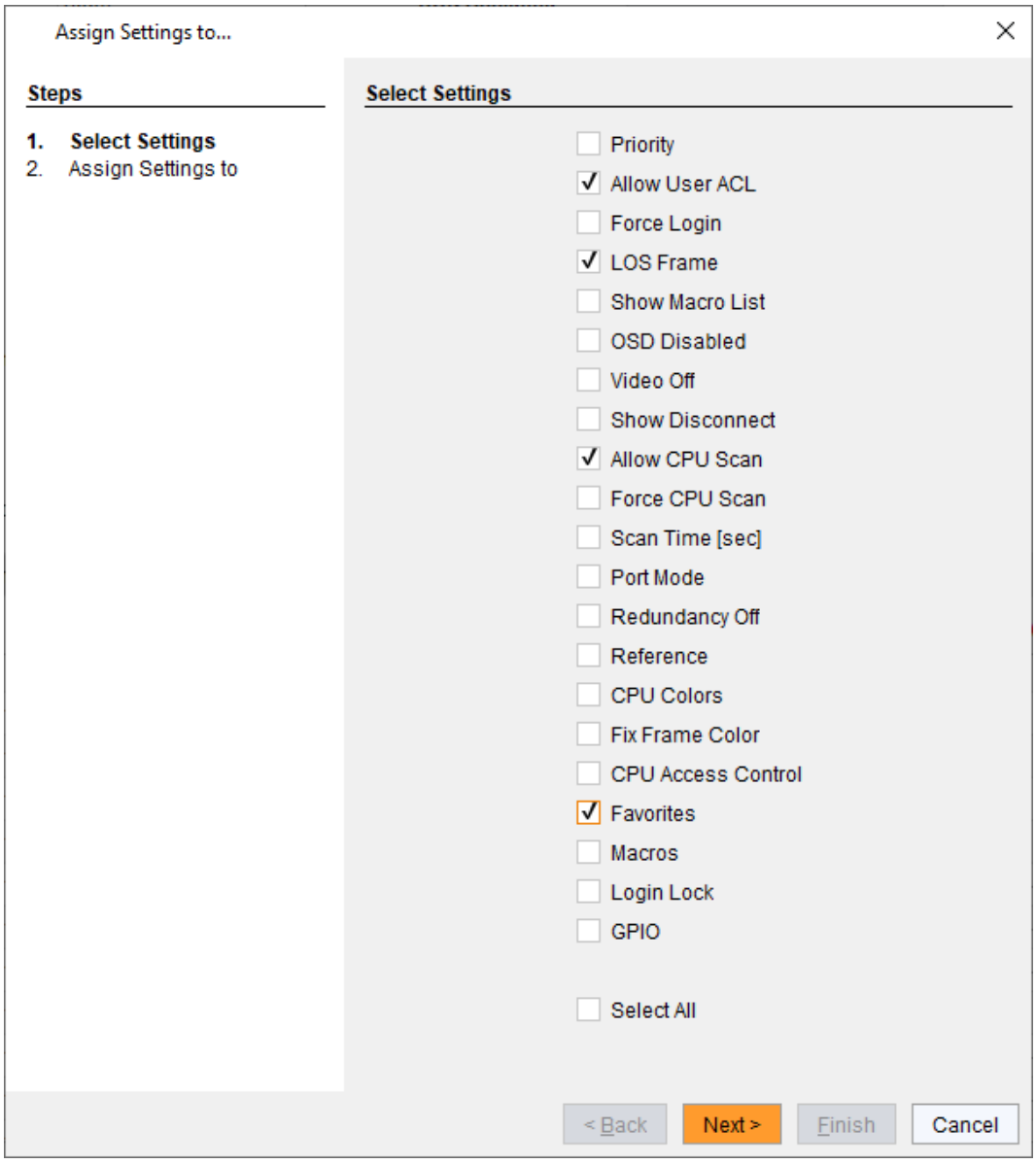


*Fig. 171 Management software menu **Extender & Devices - CON Devices - Select Settings***

A query to start the assignment appears.

7. Select the CON Device in the **Available to assign settings to** list to which the settings are to be assigned. By pressing and holding down Ctrl at the same time, more than one CON Device can be highlighted.
8. Click ▶ to move the highlighted CON Device to the **Assign settings to** list. By clicking ▶▶, all CON Devices will be moved to the **Assign settings to** list.
9. To remove highlighted CON Devices from the **Assign settings to** list, click ◀. By clicking ◀◀, CON Devices will be removed from the **Assign settings to** list.
10. Click **Finish**.

    The settings are immediately assigned to the selected CON Devices.
11. Click **Deactivate Edit Mode** in the toolbar.

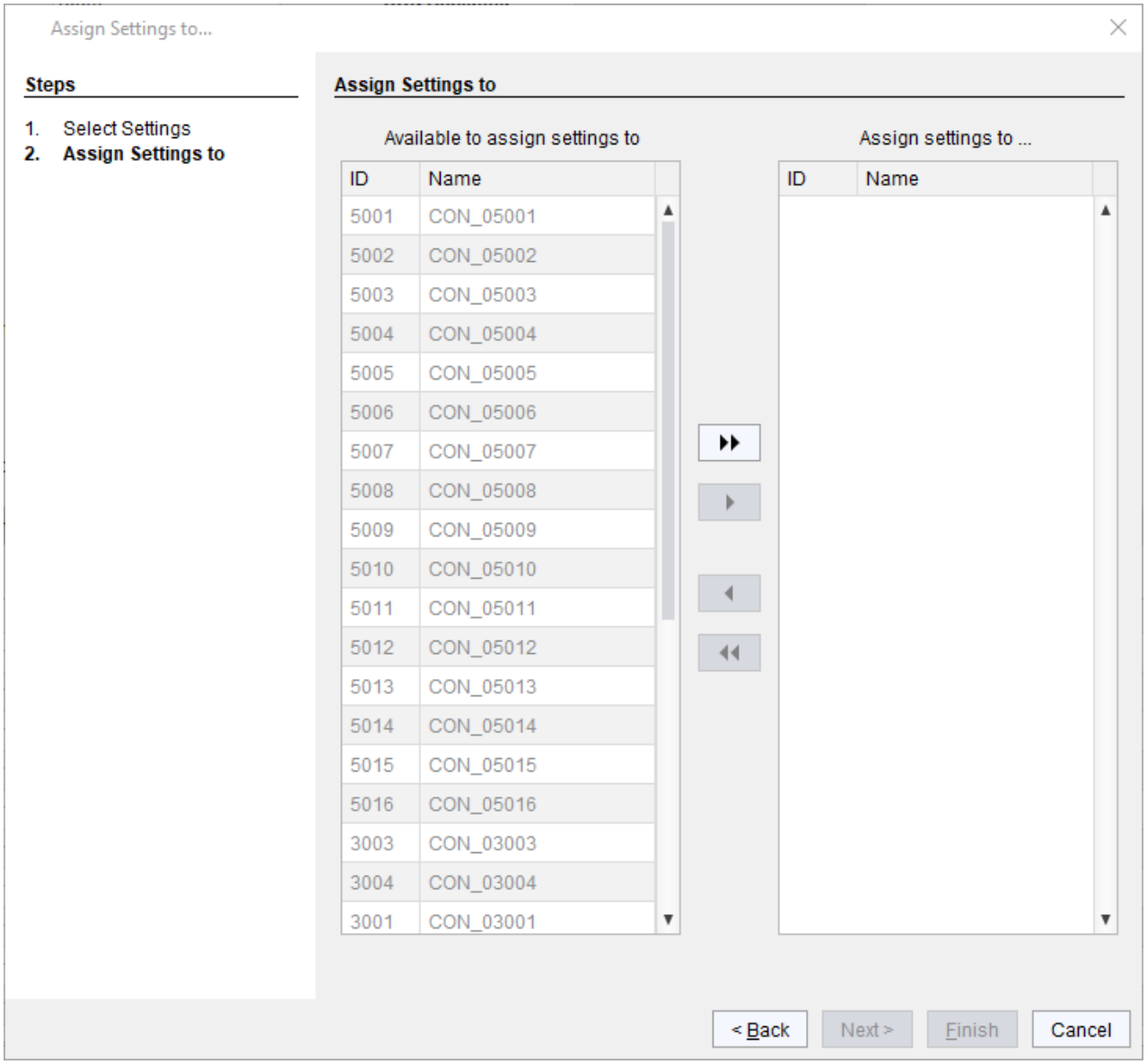


*Fig. 172 Management software menu **Extender & Devices - CON Devices - Assign Settings***

7.8.9.2 Copying Settings from another CON Device

To copy settings from a CON Device to another CON Device, proceed as follows:

1. Click **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CON Device to copy the settings to. By pressing and holding down Ctrl at the same time, more than one CON Device can be highlighted.
4. Click **Copy Settings from** below the CON Device list.

   A query to select the settings appears.
5. Tick the checkboxes to select the desired settings.
6. Click **Next >**.

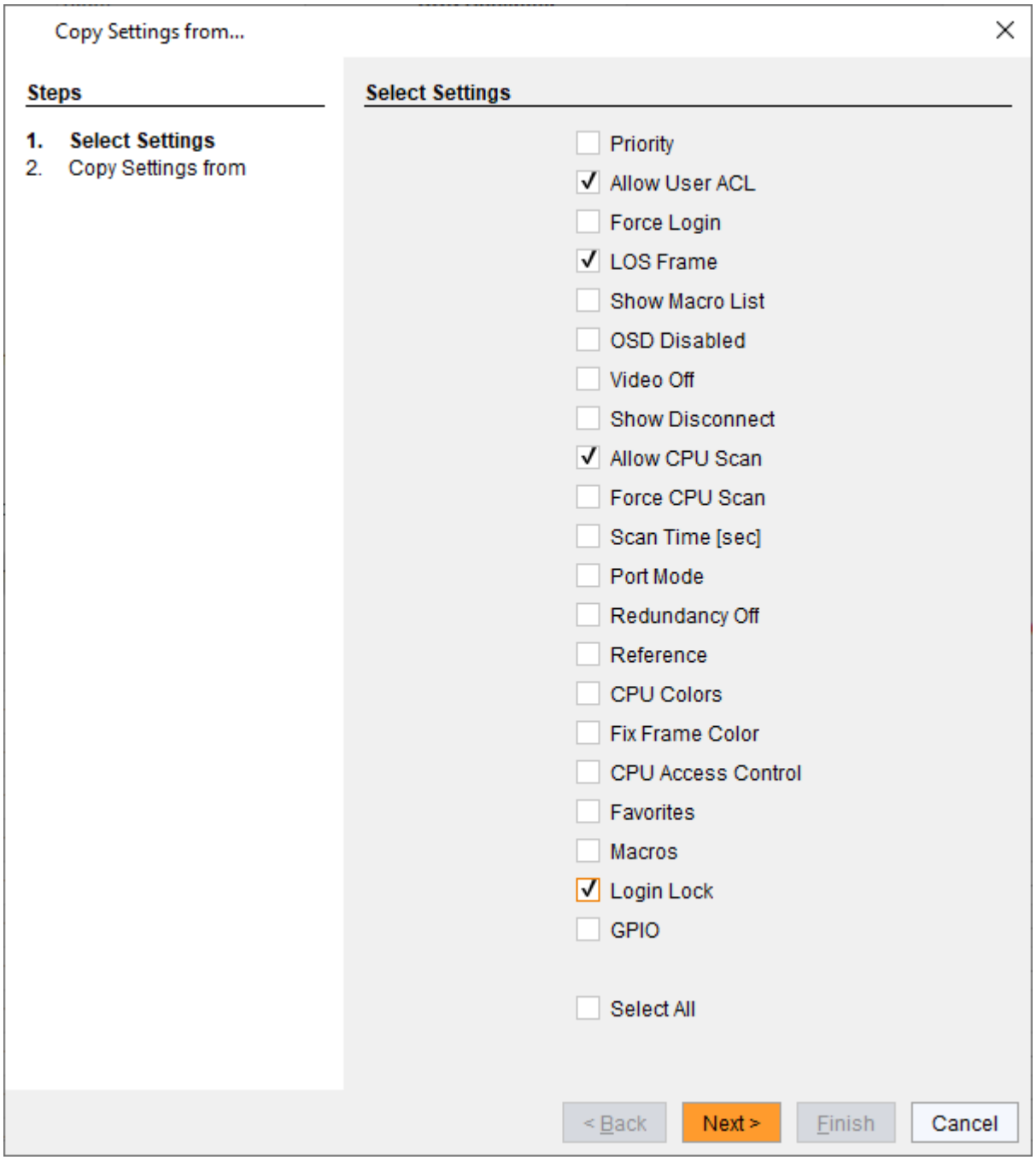


*Fig. 173 Management software menu **Extender & Devices - CON Devices - Select Settings***

A query to start the assignment appears.

7. Select the CON Device in the selection list from which the settings are to be copied.
8. Click **Finish**.

   The settings are immediately copied to the selected CON Devices.

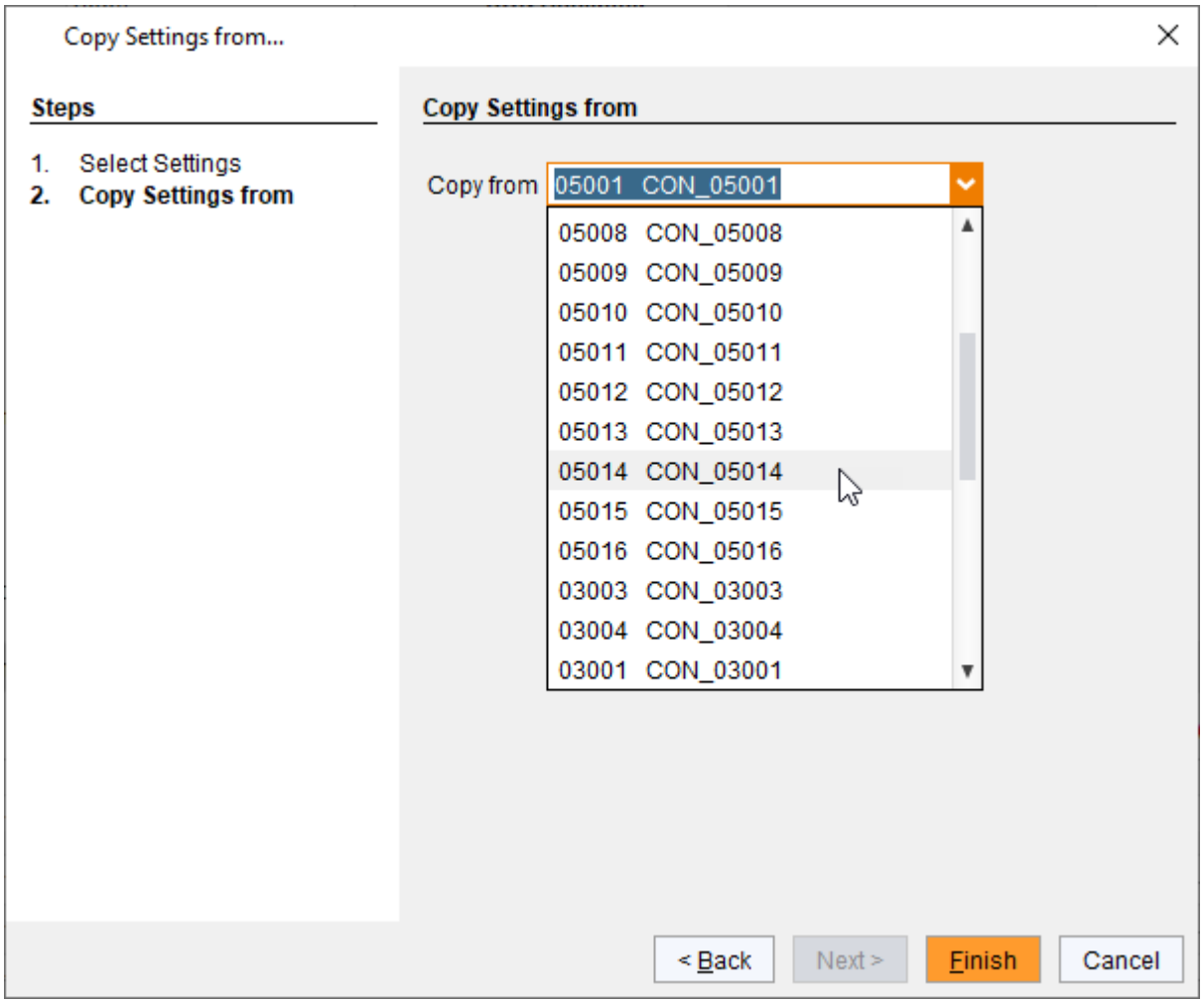


*Fig. 174 Management software menu **Extender & Devices - CON Devices - Copy Settings***

7.8.10 Assigning Virtual CON Devices

In this menu, several real CON Devices can be assigned to a virtual CON Device.

This function reflects changes in permission made to virtual CON Devices onto real CON Devices. Virtual CON Devices can be switched in the same way as real CON Devices. Real CON Devices that are assigned to a virtual CON Device that is connected to a CPU Device will receive the video signal. The last assigned CON Device will also have control of the keyboard and mouse.

A virtual CON Device can be assigned to more than one real CON Devices.

NOTICE

If the **Auto Send** checkbox is ticked in the lower left corner of the workspace, the switching operations will be performed immediately without user confirmation by clicking **Send**.

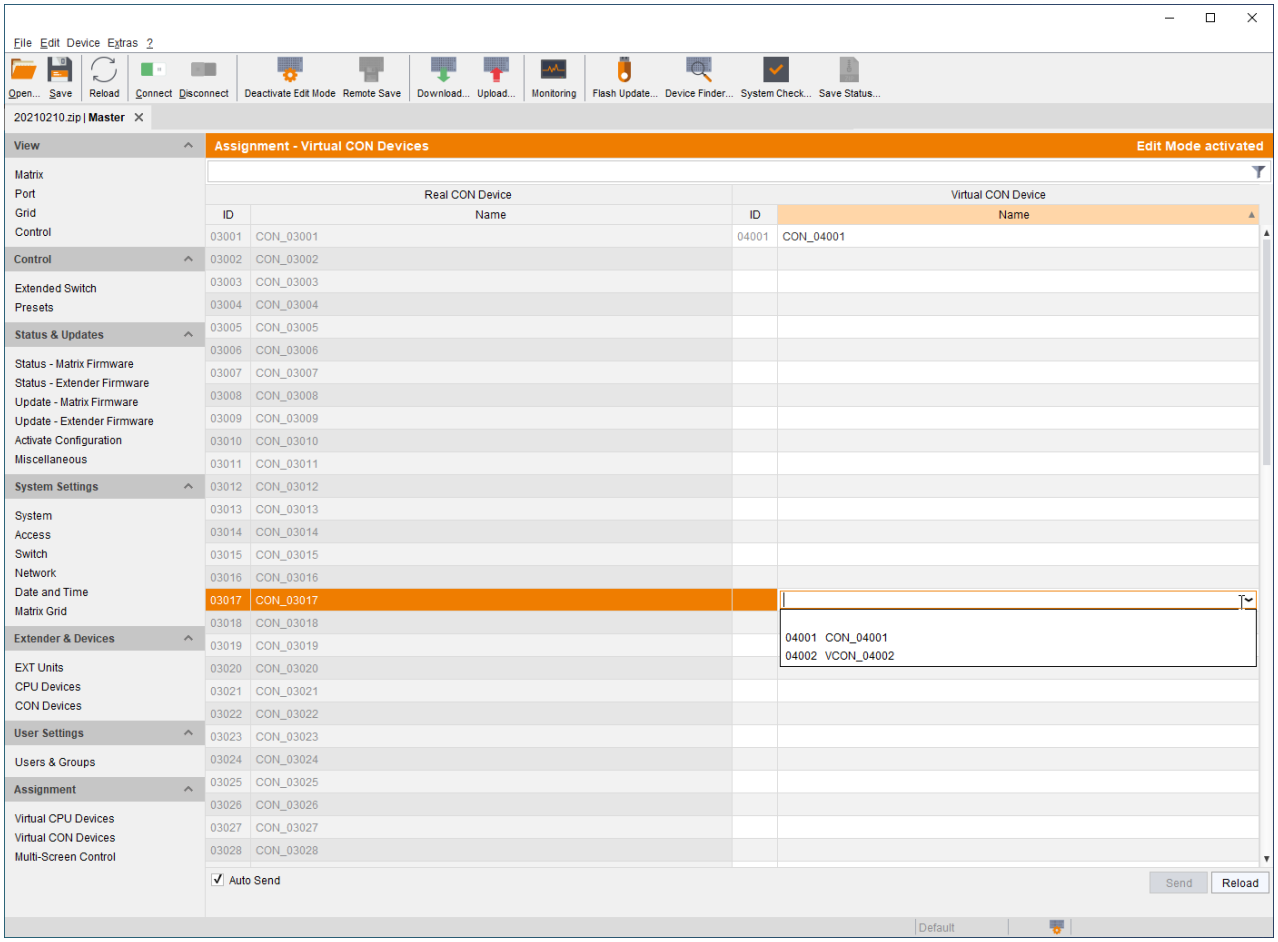


*Fig. 175 Management software menu **Assignment - Virtual CON Devices***

The following functions are available:

Button	Function
Send	Send assignments to the matrix
Reload	Reload changes

The selection boxes in the **Virtual CON Device** column contain a filter function for an easy selection of a single CON Device from a larger pool of CON Devices.

Configuring EXT Unit Assignments

To assign a real CON Device to a virtual CON Device, proceed as follows:

1. Click **Assignment > Virtual CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the required real CON Device in the **Real CON Device** list.
4. Double-click in the **Virtual CON Device** column to display a list of all available virtual CON Devices.
5. Select the required virtual CON Device in the selection list.
6. Click **Send** to send the assignment to the matrix.
7. Click **Deactivate Edit Mode** in the toolbar.

The management software offers the option to switch directly from the **Assignment** menu to the definition menu to check specific settings for the respective real CON Device or virtual CON Device.

➡ Click with the right mouse button on the respective real CON Device or virtual CON Device and select **Open CON Device** in the context menu.

The definition menu for the CON Device settings is opened (see chapter 7.8.1, page 236).

7.8.11 Configuring Multi-Screen Control

When using MSC, switching up to eight connected sources can be performed at one sink with only one connected mouse or keyboard. The sink can consist of up to eight CON Units and accordingly up to eight monitors, or up to sixteen monitors when using Dual-Head extender modules. In a matrix system, MSC can be set up at multiple sinks. The CON Units of a sink with MSC must all be physically connected to the same block of 8 ports on the I/O board. When using one of these I/O boards (480-C8, 480-S8 or 480-V8), the block size is limited to 4 ports (port 1 to 4, or port 5-8).

One of the CON Devices is designated for USB-HID control of the connected sources, below referred to as “Control CON Device”. Control CON Devices are referred to the extender modules within the MSC that are connected to keyboard and mouse for operation. If the USB-HID control has to be performed via several USB-HID devices, several CON Devices have to be defined as Control CON Device.

Smooth switching of sources with the mouse is performed by dragging the mouse pointer beyond the respective display to an adjacent display in an arrangement of displays. The displays can be arranged side by side, in a grid layout, or completely free. Alternatively, switching can be performed via keyboard commands according to the ID number in the MSC setup.

NOTICE
When using CON Units with the possibility to connect a local source in a MSC environment, the local switching will be disabled.

The connected sources need to support absolute mouse mode. Else a specific mouse driver needs to be installed.

CON Units that have been already configured for MSC can be connected all together to other blocks of 8 ports at another I/O board. In this case any further configuration is not necessary, their functionality will remain as set previously.

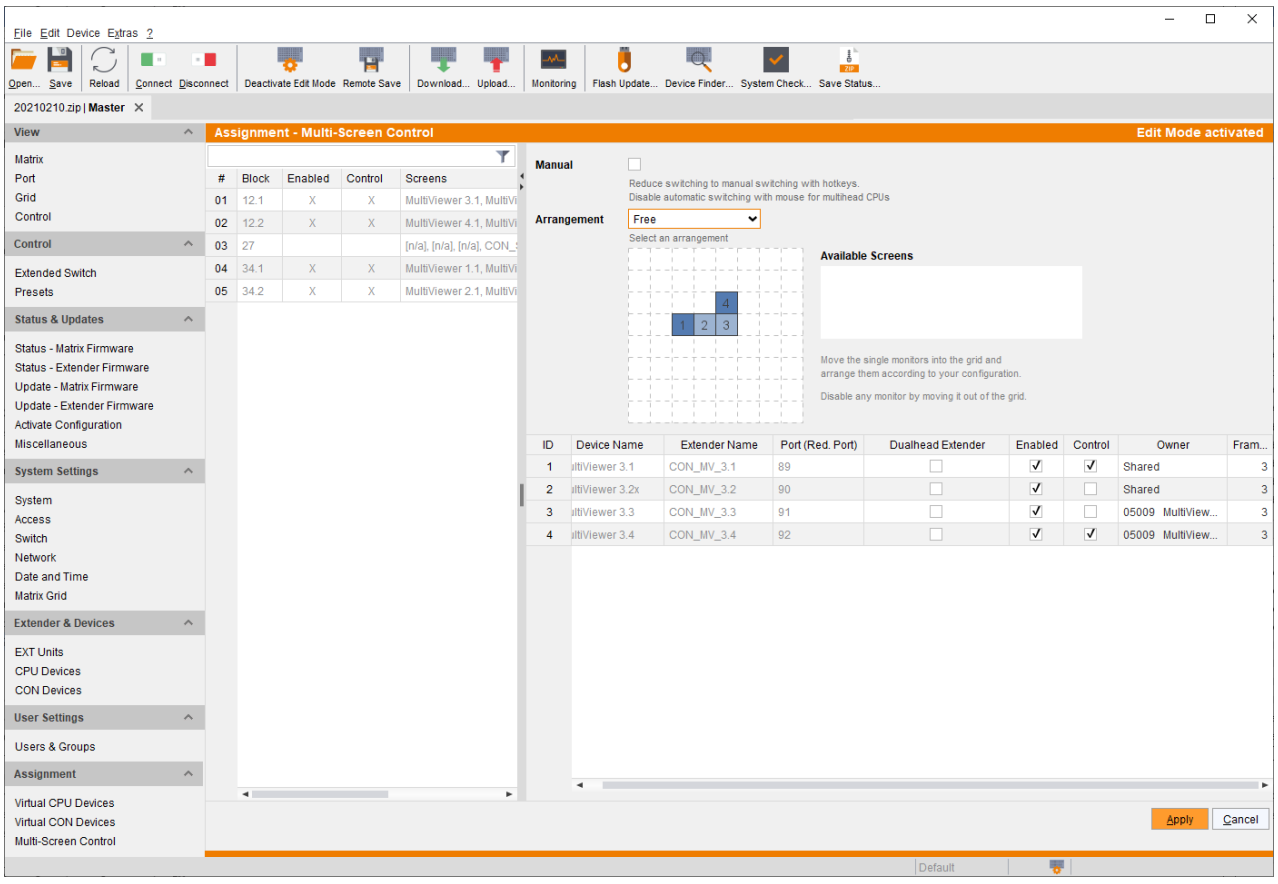


*Fig. 176 Management software menu **Assignment - Multi-Screen Control***

The following parameters can be configured:

Field	Entry/Status	Description
Dual-Head Extender	Activated	Enable configuring two displays for the Dual-Head extender module
	Deactivated	Function not active (default).
Enable	Activated	Activate the respective display for MSC.
	Deactivated	Function not active (default).
Control	Activated	Enable the CON Device for USB-HID control of other CON Devices if access is permitted.
	Deactivated	Function not active (default).
Owner	Selection	• Shared (default) permits the access from a Control CON Device to all other CON Devices except to another Control CON Device. • Name of the own Control CON Device to restrict access to other CON Devices.
Frame	0 to 999 seconds	Set the keyboard/mouse inactivity timer after which a red frame is faded in at the display with current mouse/keyboard control. This frame remains active for a fixed period of time and disappears thereafter.

Configuring Multi-Screen Control

To configure more than four CON Devices for MSC, the free layout has to be used.

If the horizontal or block layout is used for up to four CON Devices, the CON Units have to be connected to the ports 1 - 4 or 5 - 8 of the respective I/O board. E.g., if connecting four CON Units to ports 1, 2, 5, and 6 of an I/O board, configuring MSC for these CON Devices will not be possible.

To configure the MSC, proceed as follows:

1. Click **Assignment > Multi-Screen Control** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the block of four or eight ports in the list of the working area that should be configured for MSC.
   Only blocks of four or eight ports that contain at least one CON Unit are shown.
4. Tick the **Manual** checkbox if the USB-HID switching is to be restricted to keyboard commands (see chapter 8.1.6, page 294). Manual switching allows the use of multi-head consoles.
5. In the **Arrangement** field, select the layout for the CON Devices you want to configure. Select as follows:
   - **Horizontal**: horizontal arrangement for a maximum of four CON Units
   - **Block**: block arrangement for a maximum of four CON Units
   - **Free**: free arrangement for a maximum of eight CON Units (The free arrangement allows a flexible positioning of the screens for diverse applications.) Move the displays from the **Available Screens** field to the arrangement field.
     The fields for the configuration of the individual displays will be arranged accordingly.
6. If the CON Unit to be configured is a Dual-Head extender module, tick the **Dual-Head Extender** checkbox to activate the option.
   An additional display appears in the **Available Screens** field.
7. Tick the **Enable** checkboxes for all CON Devices to be enabled for MSC.
   Enabled Control CON Devices are shown as light blue screens in the arrangement field.

8. Tick the **Control** checkbox for one or more CON Devices to be enabled as Control CON Device.

   Enabled Control CON Devices are shown as dark blue screens in the arrangement field.

9. Use the **Frame** function to configure a red frame that shows the display with current mouse control, for the duration of a specified time by flashing briefly. The frame can be activated individually for each screen by using a timer > 0 seconds.

   9.1. Double-click in the respective CON Device in the **Frame** column.

   9.2. Select the keyboard/mouse inactivity time, after which the red frame should be faded in at the display with current mouse/keyboard control.

10. Click **Apply** to confirm the settings.

    A dialog appears querying a restart of the I/O board.

11. Click **Yes** to restart the I/O board.
12. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
13. Click **Remote Save** in the toolbar.
14. Click **Deactivate Edit Mode** in the toolbar.

All Control CON Devices are enabled to control USB-HID of all other CON Devices in the setup except of another Control CON Device. To restrict the access to other CON Devices, see following section.

Access Restriction when using Multiple Control CON Devices

Dragging the mouse pointer over the display border is only permitted for those displays whose CON Device is enabled for access by the owner of the respective Control CON Device.

To enable access to a display for only one Control CON Device, proceed as follows:

1. To enable a Control CON Device for access for a CON Device, double-click on the corresponding selection box within the **Owner** column and select the name of the respective Control CON Device.
2. Double-click on the corresponding selection box within the **Owner** column of all Control CON Device whose display should be accessible and select the name of the respective Control CON Device.

   The mouse can now be used to access those displays whose CON Device is enabled for access by the assigned Control CON Device.

3. Click **Apply** to confirm the settings.

   A dialog appears querying a restart of the I/O board.

4. Click **Yes** to restart the I/O board.
5. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
6. Click **Remote Save** in the toolbar.
7. Click **Deactivate Edit Mode** in the toolbar.

No simultaneous USB HID sharing of multiple Control CON devices

Example: In a setup of 8 CON Devices, if CON Device 1 and 2 are each Control CON Devices and six other "non-Control CON Devices" are configured, both Control CON Devices can access the displays of CON Device 3 to 8 if they are configured with **Owner = Sharing**.

However, Control CON Device 1 and 2 cannot access the display of a "non-Control CON Device" at the same time. The Control CON Device that first had USB-HID control is reset to its "own" display when the second Control CON Device takes over.

Changing Multi-Screen Control

Changes of the MSC are permitted only if the USB-HID control is switched to the Control CON Device.

To change the MSC for a setup, proceed as follows:

1. Switch the USB-HID control to the Control CON Device.
2. Click **Assignment > Multi-Screen Control** in the task area.
3. Click **Activate Edit Mode** in the toolbar.
4. Select the setup in the list of the working area the MSC should be changed.
5. Make any edits at the configuration and system settings.
6. Click **Apply** to confirm the changes.
   A dialog appears querying a restart of the I/O board.
7. Click **Yes** to restart the I/O board.
8. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
9. Click **Remote Save** in the toolbar.
10. Click **Deactivate Edit Mode** in the toolbar.

Deleting Multi-Screen Control

Changes of the MSC are permitted only if the USB-HID control is switched to the Control CON Device.

To delete the MSC for a setup, proceed as follows:

1. Switch the USB-HID control to the Control CON Device.
2. Click **Assignment > Multi-Screen Control** in the task area.
3. Click **Activate Edit Mode** in the toolbar.
4. Select the setup in the list of the working area for which the MSC should be deleted.
5. Click the **Enable** checkboxes for all CON Devices to remove the checkmarks.
   The disabled Control CON Devices are shown as gray screens in the arrangement field and the MSC is disabled.
6. Click the **Control** checkbox for all CON Devices to remove the checkmarks.
7. Click **Apply** to confirm the changes.
   A dialog appears querying a restart of the I/O board.
8. Click **Yes** to restart the I/O board.
9. Wait until the boot process of the matrix is finished and the status LED 1 flashes green.
10. Click **Remote Save** in the toolbar.
11. Click **Deactivate Edit Mode** in the toolbar.

Configuring Multi-Head sources for Multi-Screen Control

NOTICE
A Multi-Head configuration for Apple Mac sources is not supported due to limitations of the macOS.

For the use of Multi-Head sources, an additional configuration of the CPU Devices is mandatory. The configuration of CPU Devices, which are connected to Single-Head sources is not mandatory.

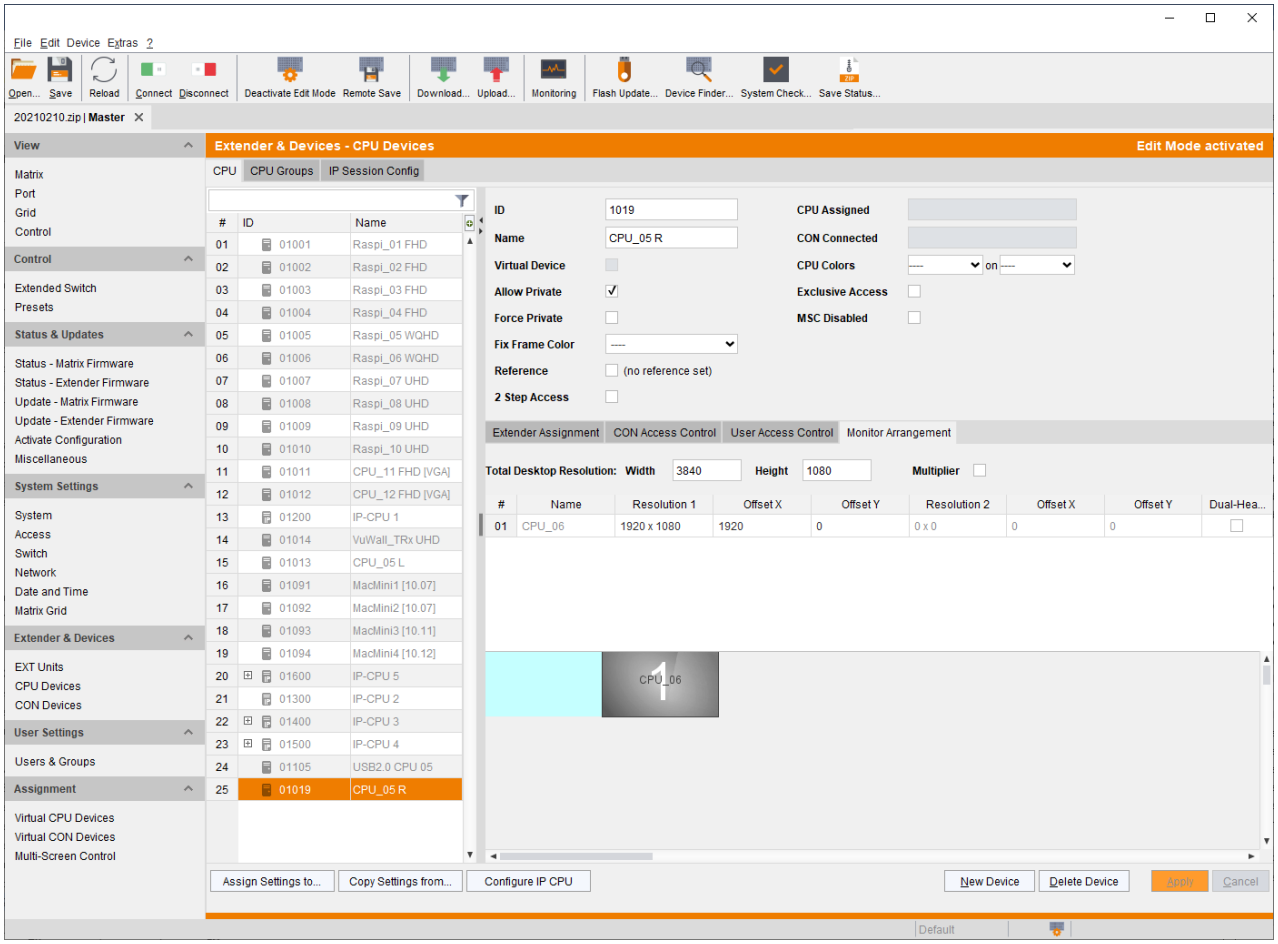


*Fig. 177 Management software menu **Extender & Devices - CPU Devices - Monitor Arrangement***

For an additional configuration of the CPU Devices for the use of Multi-Head sources, proceed as follows.

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CPU Device to be configured.
4. Click the **Monitor Arrangement** tab.
5. Enter the resolution of the total desktop area into the fields **Total Desktop Resolution**. For instance, if there are 4 graphic card outputs with a resolution of 1920x1080 each, you have to enter 7680 under **Width** and 1080 under **Height**.
6. Select the individual resolution of the graphic card output from the selection list in the field **Resolution 1** (e.g., 1920x1080). This is the graphic card output the CPU Device is connected to.
7. Enter the respective pixel coordinates that particular screen in the MSC arrangement into the fields **Offset X** and **Offset Y**.
   Note: Offset: X=0/Y=0 defines the upper left corner.
   For instance, you have to enter 1920 for a shift of 1920 pixels to the right into the field Offset X.
   The corresponding screen will be positioned accordingly within the light blue grid.

8. If the CPU Device to be configured is a Dual-Head extender module, tick the **Dual-Head Extender** checkbox to activate the option. Enter the resolution of the 2nd graphic card output and the offset information in the field **Resolution 2**.
9. For some operating systems it is necessary to activate the option **Multiplier**. This is mandatory if you cannot reach all areas of the desktop with your mouse cursor.
10. Click **Apply** to confirm the settings.

    A dialog appears to restart the extender module.
11. Click **Yes** to restart the extender module to with the new configuration.

    The CPU Device is now configured for the Multi-Head operation.

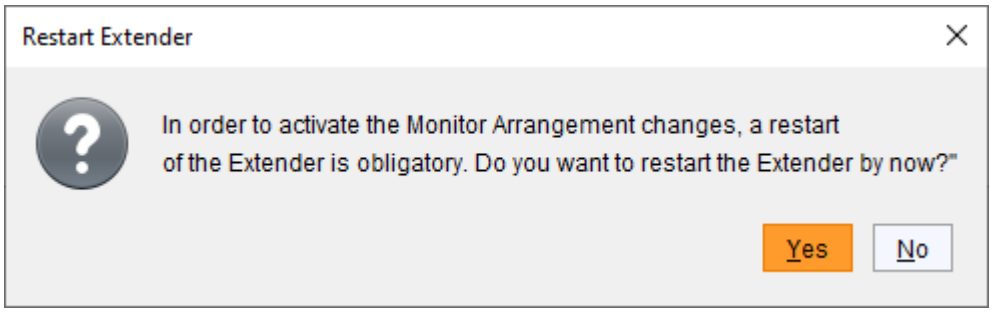


*Fig. 178 Management software dialog **Monitor Arrangement - Restart Extender***

12. Click **Deactivate Edit Mode** in the toolbar.

7.9 Configuring Matrix Cascading

This simple method of cascading allows a switchable connection between two matrices via so called **Tie Lines**. The Matrix Cascading does not require **Bundle 4**.

This kind of configuration may become necessary if the number of ports in the entire system has to be increased or if certain important connections should be distributed to several matrices due to reasons of redundancy.

The Tie Lines are unidirectional and can only be used in one direction according to their configuration. For a bidirectional use of the cascading, you have to configure opposite Tie Lines.

To connect Tie Lines to the matrices, you first have to create intended **Cascade CON Devices** and **Cascade CPU Devices** that have to be switched within the cascaded environment.

Ensure that the Tie Lines will only be connected after finishing the configuration.

Activating the Sub Matrix Option

1. Connect to the defined Sub Matrix and click **Activate Edit Mode** in the toolbar.
2. Click **System Settings > System** in the task area of the Sub Matrix.
3. Tick the **Sub Matrix** checkbox in the working area.
4. Click **Apply** to confirm the Sub Matrix option.

The OSD of the Sub Matrix will immediately freeze and will be only accessible by using the keyboard command Hot Key, s, o.

5. Click **Deactivate Edit Mode** in the toolbar.

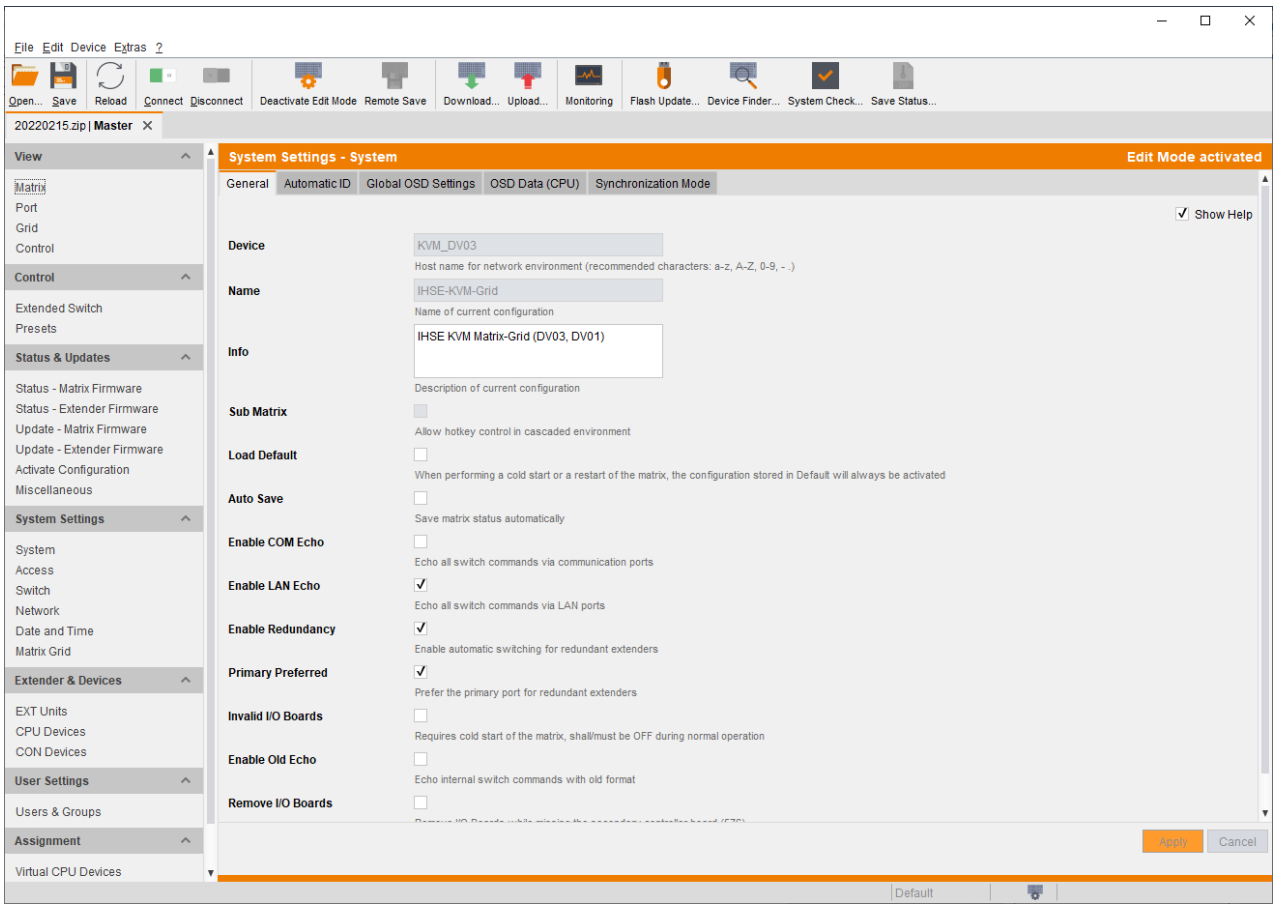


*Fig. 179 Management software menu **System Settings > System***

7.9.1 Directing a Tie Line from the Sub to the Master

To configure settings for using Matrix Cascading and to direct the Tie Line from the Sub to the Master, proceed as follows:

1. Connect to the Master Matrix.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **Extender & Devices > EXT Units** in the task area.
   3.1. Click **New Unit**.
   A selection dialog appears.
   3.2. Select **Cascading CPU Unit** in the **Choose template** selection box.
   3.3. Click **OK**.
   A new Cascading CPU Unit will be created.

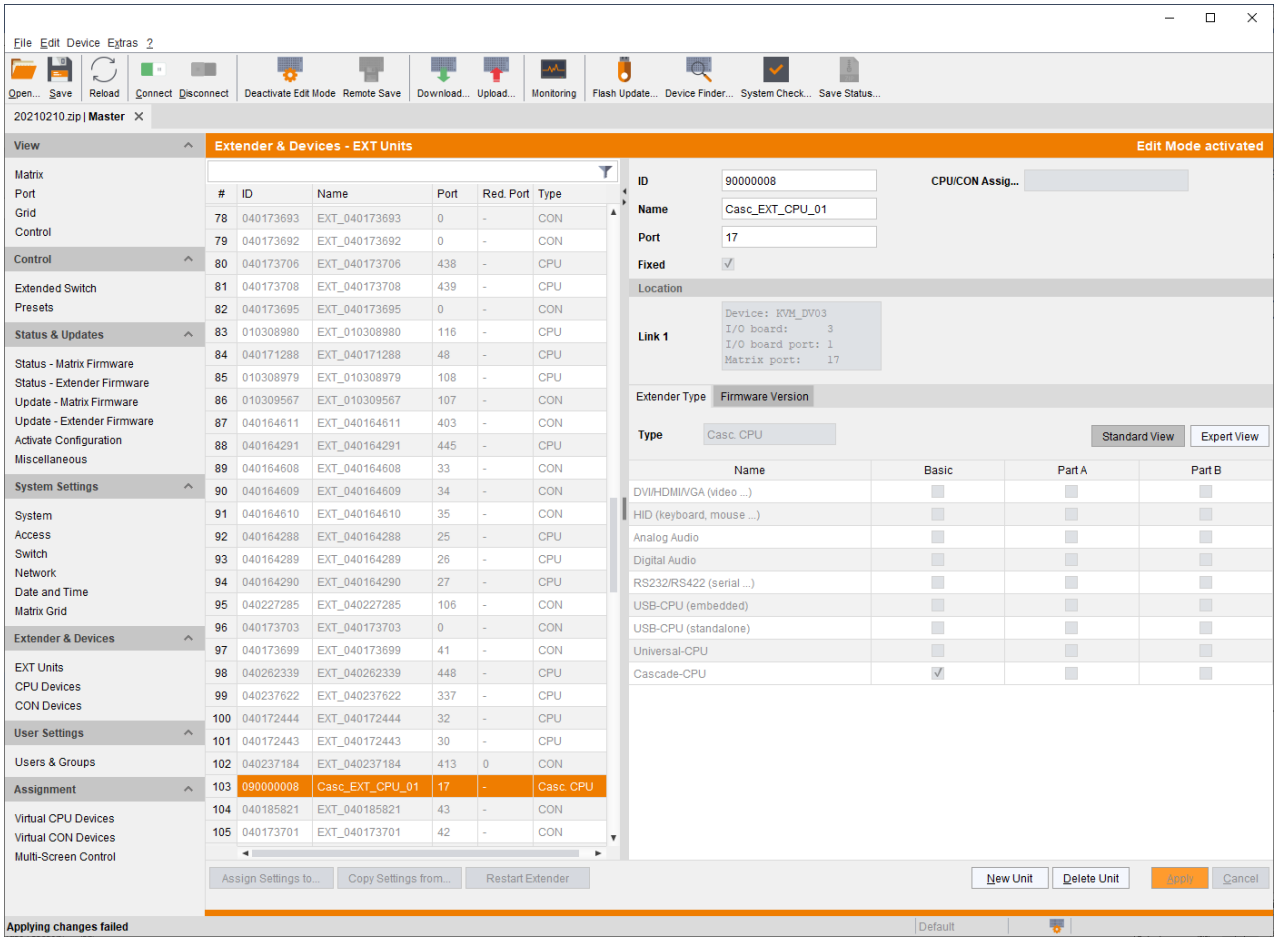


*Fig. 180 Management software menu **Extender & Devices - EXT Units - Cascading CPU Unit***

   3.4. Enter an appropriate name for the Cascading CPU Unit into the **Name** field.
   3.5. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   3.6. Click **Apply** to confirm the creation of a Cascading CPU Unit.

4. Click **Extender & Devices > CPU Devices** in the task area of the Master Matrix.
   4.1. Click **New Device**.
   A switchable CPU Device will be created.
   4.2. Enter an appropriate name for the Cascading CPU Device into the **Name** field.

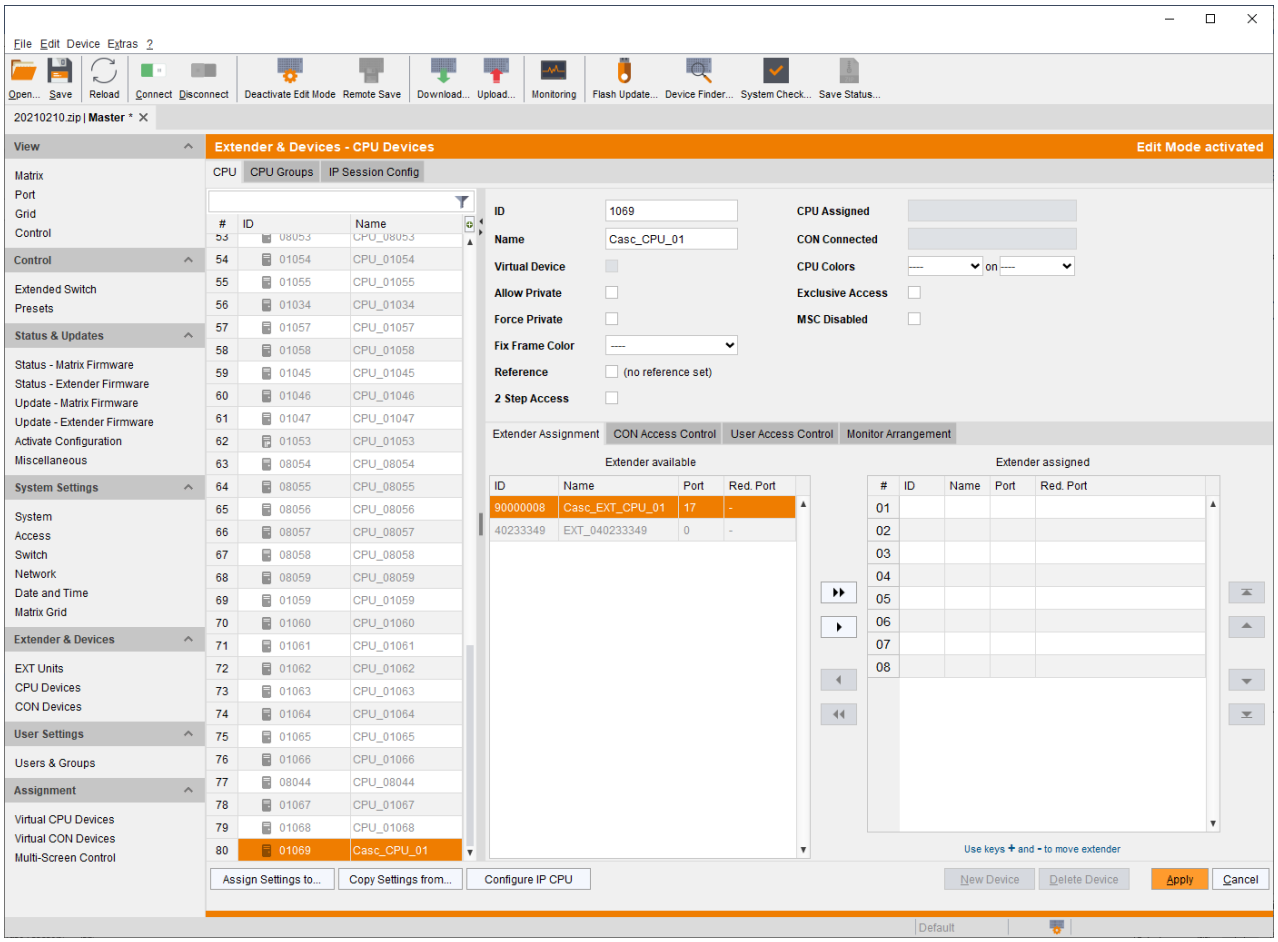


*Fig. 181 Management software menu **Extender & Devices > CPU Devices - Cascading CPU Device***

   4.3. Select the previously configured Cascading CPU Unit in the **Extender available** list.
   4.4. Click ▶ to move the highlighted Cascading CPU Unit to the **Extender assigned** list.
   The assignment is displayed in the **Extender assigned** list.
   4.5. Click **Apply** to confirm the assignment.

5. Connect to the Sub Matrix.
6. Click **Activate Edit Mode** in the toolbar.
7. Click **Extender & Devices > EXT Units** in the task area.
   7.1. Click **New Unit**.
   A selection dialog appears.
   7.2. Select **Cascading CON Unit** in the **Choose template** selection box.
   7.3. Click **OK**.
   A new Cascading CON Unit will be created.

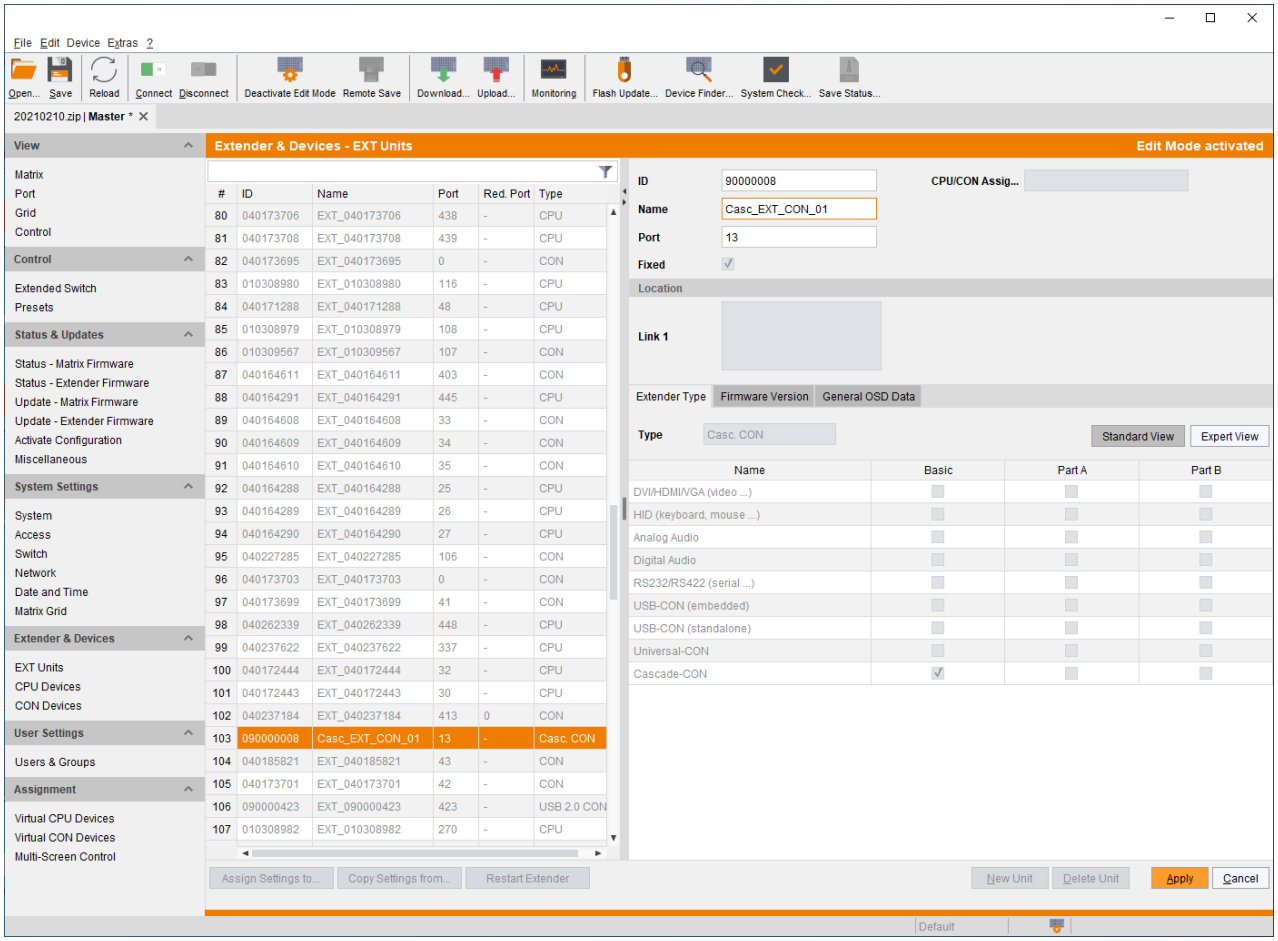


*Fig. 182 Management software menu **Extender & Devices > EXT Units - Cascading CON Unit***

   7.4. Enter an appropriate name for the Cascading CON Unit into the **Name** field.
   7.5. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   7.6. Click **Apply** to confirm the creation of a Cascading CON Unit.

8. Click **Extender & Devices > CON Devices** in the task area of the Sub Matrix.
   8.1. Click **New Device**.
   A switchable CON Device will be created.
   8.2. Enter an appropriate name for the Cascading CON Device into the **Name** field.

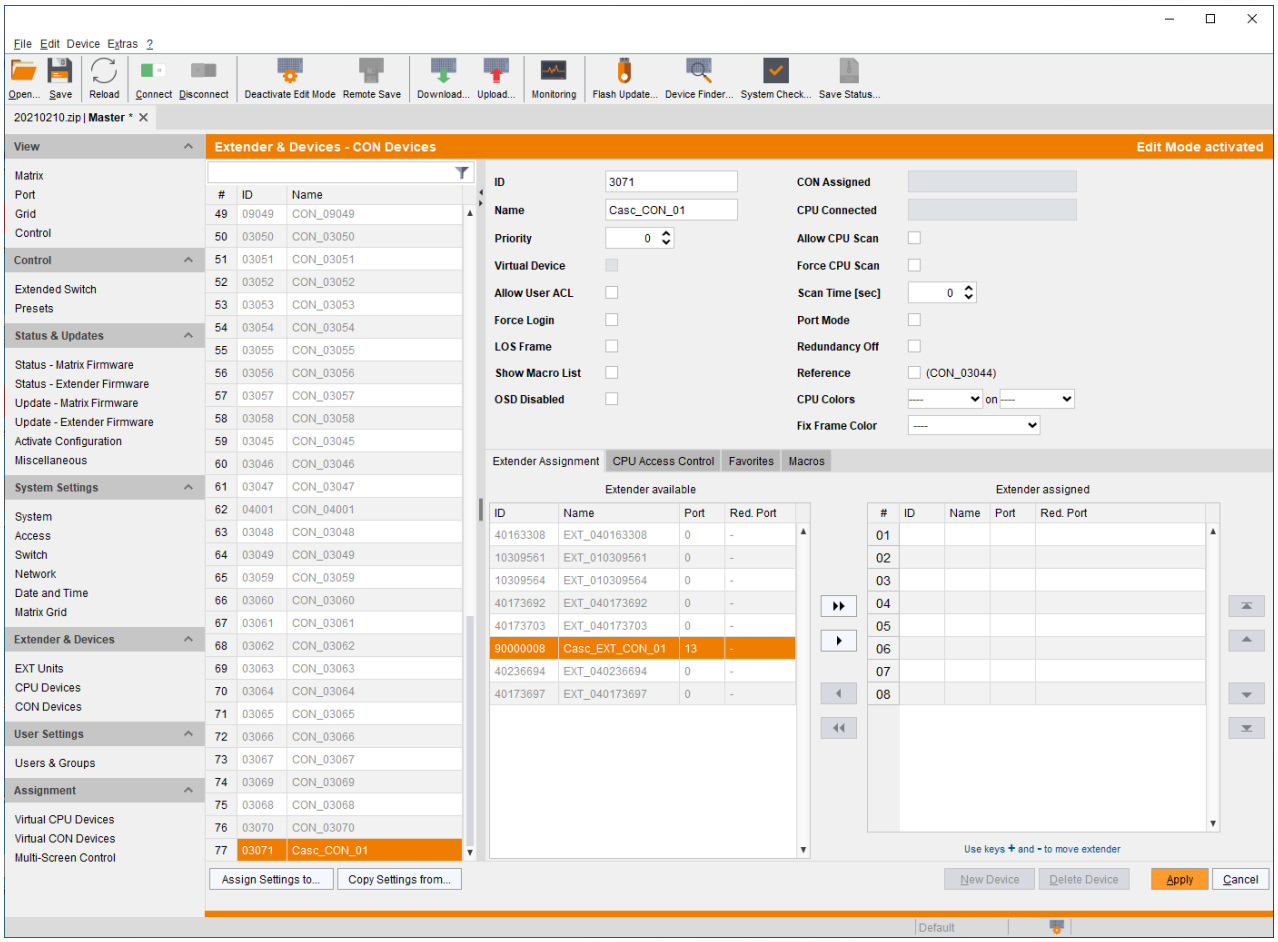


*Fig. 183 Management software menu **Extender & Devices > CON Devices - Cascading CON Device***

   8.3. Select the previously configured Cascading CON Unit in the **Extender available** list.
   8.4. Click ▶ to move the highlighted Cascading CON Unit to the **Extender assigned** list.
   The assignment is displayed in the **Extender assigned** list.
   8.5. Click **Apply** to confirm the assignment.
9. Click **Deactivate Edit Mode** in the toolbar.

The OSD of the Sub Matrix will immediately freeze and will be only accessible by using the keyboard command Hot Key, s, o.

10. Restart all I/O boards on which any Master/Sub CON Units or CPU Units have been configured (see chapter 12.2.3, page 320) or alternatively restart the matrix (see chapter 12.2.1, page 318).
11. Connect the Tie Lines to the matrices. Ensure that each **Cascade CON Device** on one matrix is connected to **Cascade CPU Device** on the other matrix to achieve switching ability between two matrices.
    The Matrix Cascading is now configured and can be used.

Additional Tie Lines are configured accordingly. The use of cascading is described in in chapter 8.1.1, page 290.

7.9.2 Directing a Tie Line from the Master to the Sub

To configure settings for using Matrix Cascading and to direct the Tie Line from the Master to the Sub, proceed as follows:

1. Connect to the Master Matrix.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **Extender & Devices > EXT Units** in the task area.
   3.1. Click **New Unit**.
   A selection dialog appears.
   3.2. Select **Cascading CON Unit** in the **Choose template** selection box.
   3.3. Click **OK**.
   A new Cascading CON Unit will be created.

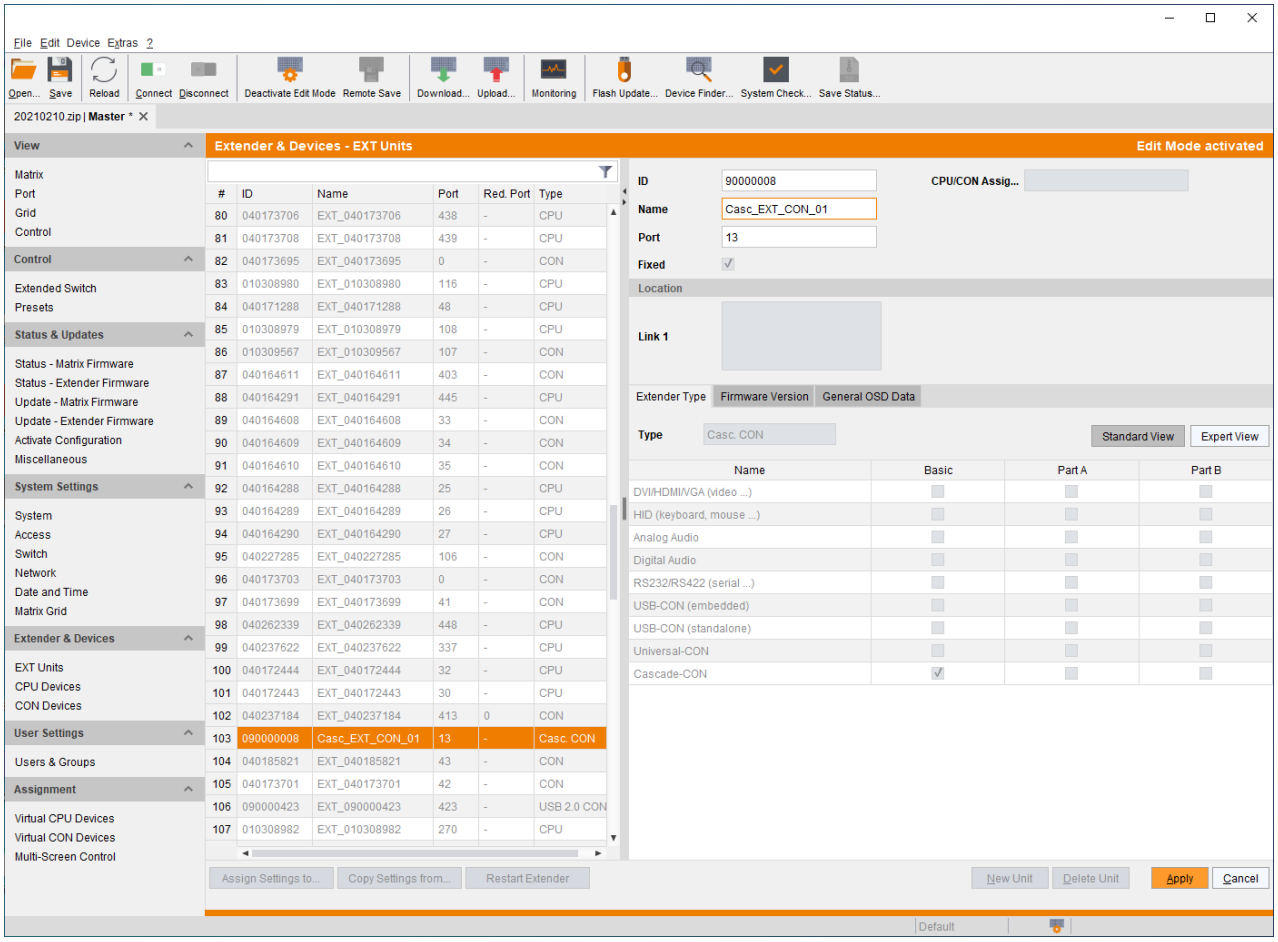


*Fig. 184 Management software menu **Extender & Devices - EXT Units - Cascading CON Unit***

   3.4. Enter an appropriate name for the Cascading CON Unit into the **Name** field.
   3.5. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   3.6. Click **Apply** to confirm the creation of a Cascading CON Unit.

4. Click **Extender & Devices > CON Devices** in the task area of the Master Matrix.
   4.1. Click **New Device**.
   A switchable CON Device will be created.
   4.2. Enter an appropriate name for the Cascading CON Device into the **Name** field.

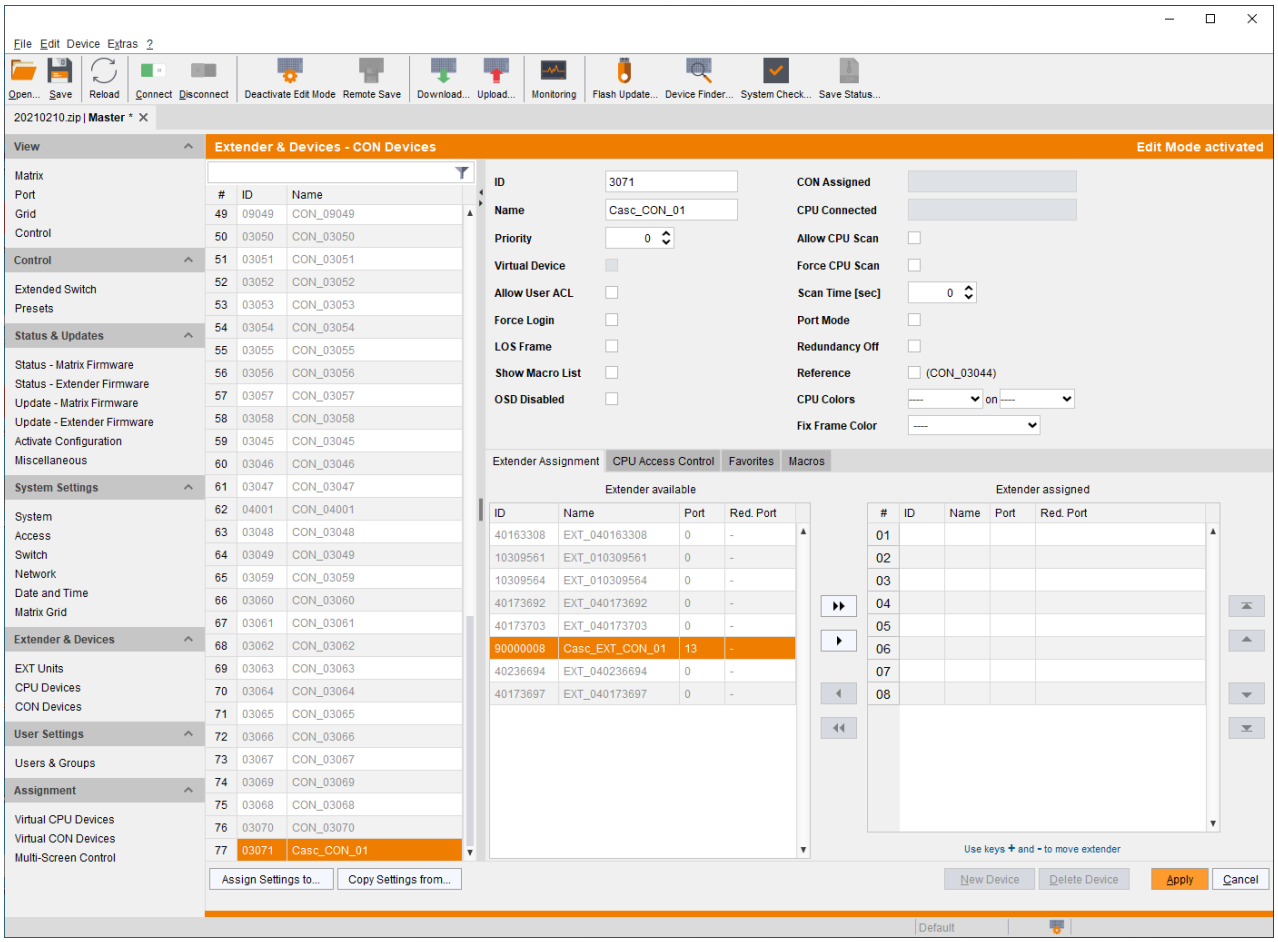


*Fig. 185 Management software menu **Extender & Devices > CON Devices - Cascading CON Device***

   4.3. Select the previously configured Cascading CON Unit in the **Extender available** list.
   4.4. Click ▶ to move the highlighted Cascading CON Unit to the **Extender assigned** list.
   The assignment is displayed in the **Extender assigned** list.
   4.5. Click **Apply** to confirm the assignment.

5. Connect to the Sub Matrix.
6. Click **Activate Edit Mode** in the toolbar.
7. Click **Extender & Devices > EXT Units** in the task area.
   7.1. Click **New Unit**.
   A selection dialog appears.
   7.2. Select **Cascading CPU Unit** in the **Choose template** selection box.
   7.3. Click **OK**.
   A new Cascading CPU Unit will be created.

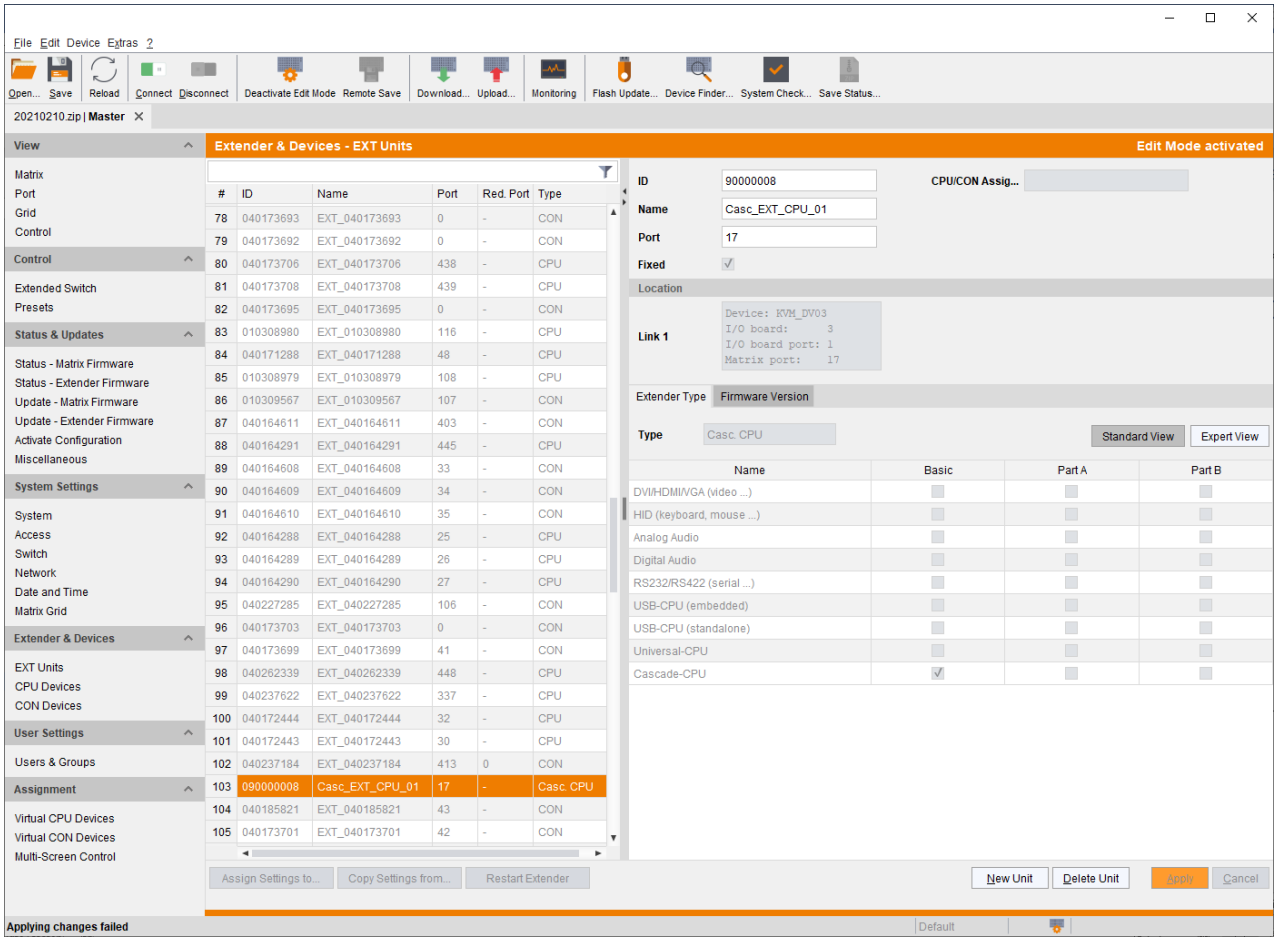


*Fig. 186 Management software menu **Extender & Devices - EXT Units - Cascading CPU Unit***

   7.4. Enter an appropriate name for the Cascading CPU Unit into the **Name** field.
   7.5. Enter a port number into the **Port** field according to the required connection of the Tie Line.
   7.6. Click **Apply** to confirm the creation of a Cascading CPU Unit.

8. Click **Extender & Devices > CPU Devices** in the task area of the Sub Matrix.
   8.1. Click **New Device**.
   A switchable CPU Device will be created.
   8.2. Enter an appropriate name for the Cascading CPU Device into the **Name** field.

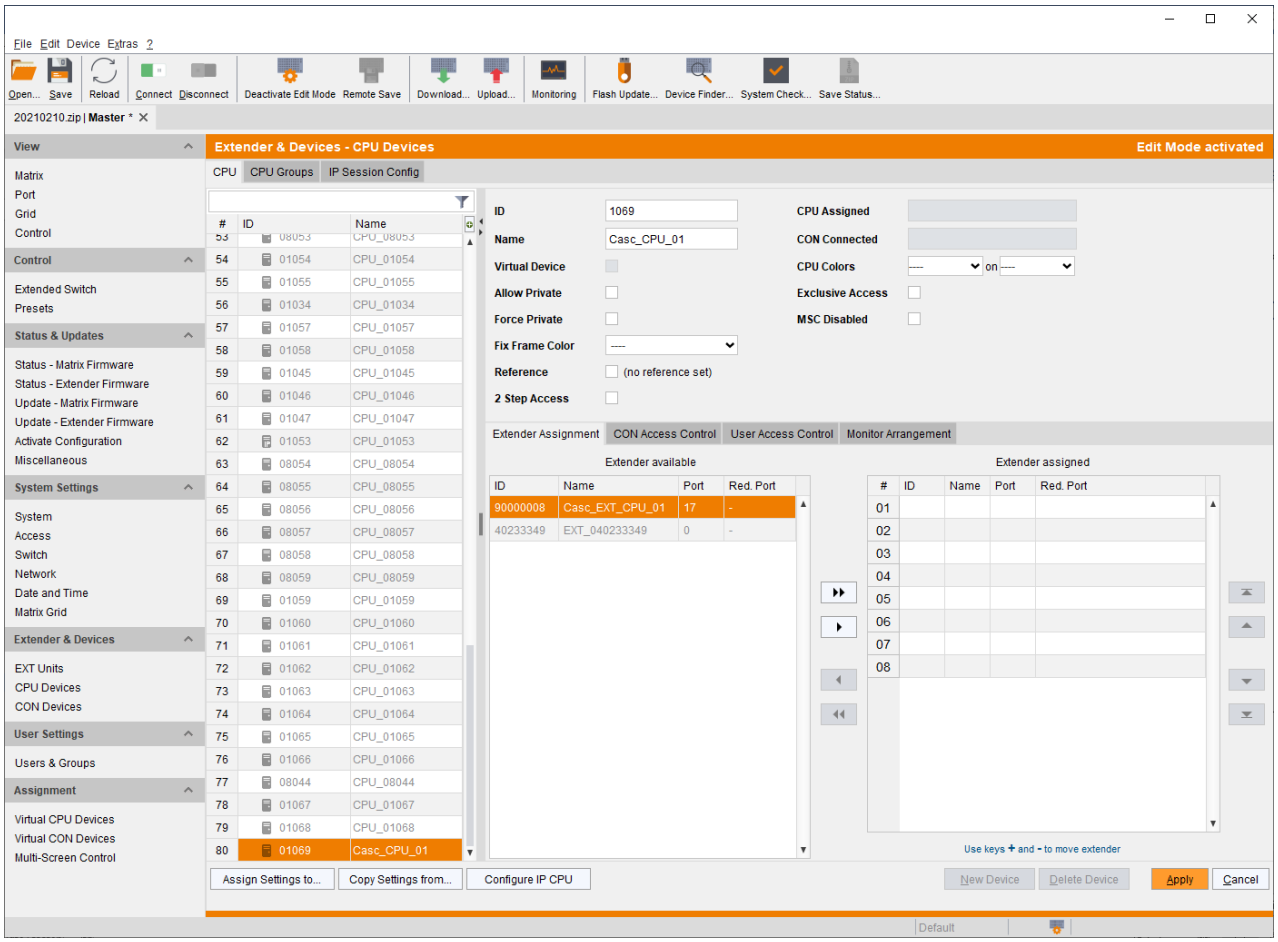


*Fig. 187 Management software menu **Extender & Devices > CPU Devices - Cascading CPU Device***

   8.3. Select the previously configured Cascading CPU Unit in the **Extender available** list.
   8.4. Click ▶ to move the highlighted Cascading CPU Unit to the **Extender assigned** list.
   The assignment is displayed in the **Extender assigned** list.
   8.5. Click **Apply** to confirm the assignment.
9. Click **Deactivate Edit Mode** in the toolbar.
10. Restart all I/O boards (see chapter 12.2.3, page 320) on which any Master/Sub CON Units or CPU Units have been configured or alternatively restart the matrix (see chapter 12.2.1, page 318).
11. Connect the Tie Lines to the matrices. Ensure that each **Cascade CON Device** on one matrix is connected to **Cascade CPU Device** on the other matrix to achieve switching ability between two matrices.
    The Matrix Cascading is now configured and can be used.

Additional Tie Lines are configured accordingly. The use of cascading is described in in chapter 8.1.1, page 290.

7.10 Configuring Matrix Grid

A Matrix Grid to connect two or more matrices can be configured in this menu. This kind of configuration may become necessary if the number of ports in the entire system has to be increased or if certain important connections should be distributed to several matrices due to reasons of redundancy.

The connections between two matrices have to be established by so called Grid Lines that are connected between particular I/O ports as connecting links. The Grid Lines can be used bidirectionally and can respectively handle a full access connection of a CON Device to a CPU Device.

The number of Grid Lines in the system specifies, if a CON Device can be switched to a CPU Device in Non-Blocking Access or in Blocking Access and has to be separately determined for each Grid environment.

In this case Non-Blocking Access means that a Grid Line for a cross-matrix switching operation of a CON Device to a CPU Device is available at any time.

Whereas Blocking Access means that for a certain switching operation no Grid Line may be available according to the switching status within the Grid. The result will be that no cross-matrix switching will be possible.

Administration of Settings

Within a Matrix Grid you have to differ between settings that have to be made locally for each matrix and settings that can be made globally so that they are valid for the whole Matrix Grid.

The settings in the following menus have to be made separately for each matrix or within the master matrix to affect all matrices in the Grid:

System, Access, Switch, Network, Date + Time, SNMP, Matrix Grid, Multi-Screen Control

If global settings are made in the respective menus, they will be immediately available on each matrix within the Matrix Grid.

General Preparation

The following requirements have to be fulfilled before starting the Matrix Grid configuration:

- First configure all matrices that have to be added to the grid the first time.
- Then install Grid Lines for all matrices that have to be added to the grid the first time
- Ensure that for both the existing matrices in the Matrix Grid and the new matrix a suitable configuration file is available.
- The Matrix Grid function (Bundle 4) must be activated on all matrices to be connected to the Grid by a license key (see chapter 7.13, page 274). Please contact the technical support of the manufacturer if the Bundle 4 is missing.
- Firmware V03.10 must be installed on all matrices to be connected to the Grid, but with the same firmware on each matrix.
- All matrices to be connected to the Grid must be within the same TCP/IP network (see chapter 7.4.8, page 166).
- Port 5556/5566 needed for network communication must not be blocked by a firewall.

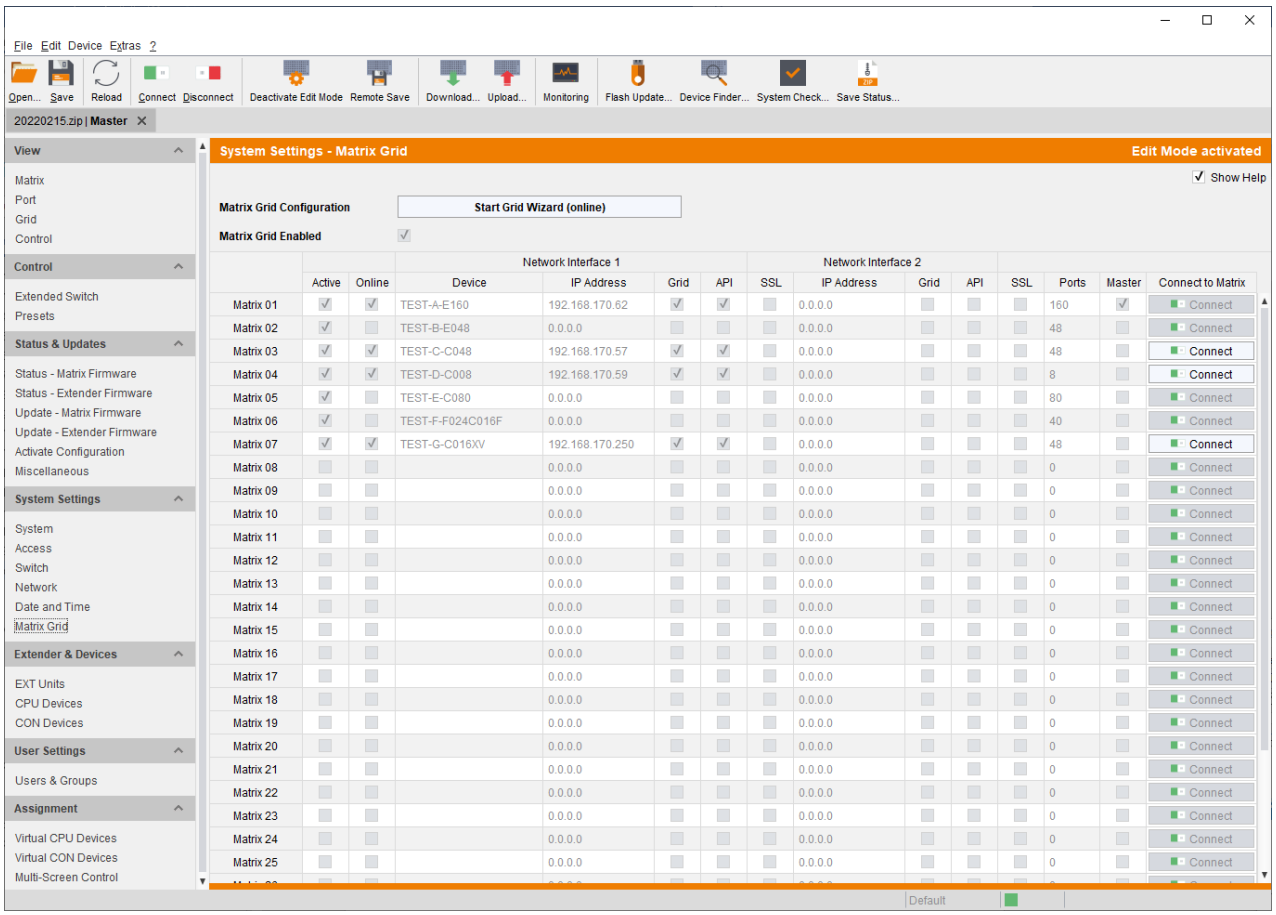


*Fig. 188 Management software menu **System Settings - Matrix Grid***

To use the Matrix Grid, proceed as follows:

1. Click **System Settings > Matrix Grid** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **Start Grid Wizard (online)** in the working area.

   The wizard will guide through the configuration of Matrix Grids.

7.11 Saving and Activating Configurations

NOTICE
By default, the last configuration that has been saved in the permanent matrix memory will be restored after a restart of the matrix.

First starting the matrix, the factory configuration will be copied into the current configuration. There are three possibilities to save configuration changes:

- Save the current configuration permanently in the matrix memory (**Remote Save**)
- Save configuration on a local memory (**Save** or **Save as**)
- Upload the configuration in up to 8 predefined storage locations, as well as the default configuration in the memory of the matrix (**Upload**)

7.11.1 Saving the Current Configuration to the Matrix

By default, the last configuration that has been saved in this way will be restored after a restart of the matrix.

To save the current configuration permanently in the matrix memory, proceed as follows:

1. Click **Remote Save** in the toolbar.

   A query to save the configuration appears.
2. Click **Yes** to confirm the saving.

   The previously active configuration is overwritten and saved in the permanent memory of the matrix.

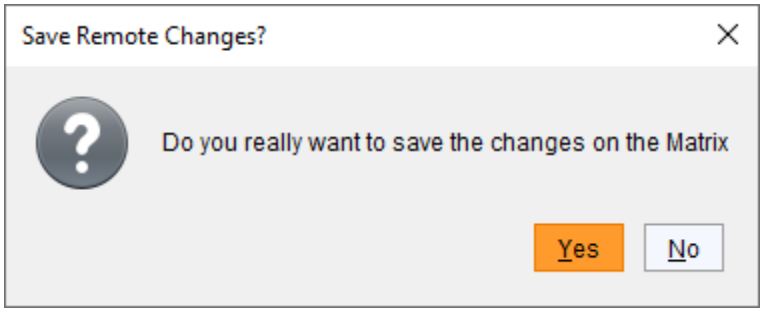


*Fig. 189 Management software dialog **Save Remote Changes***

7.11.2 Saving of Configurations Locally

Configurations can be saved as a file that can be stored independent of the matrix with the following content:

- Control (Extended Switch, Presets)
- System Settings (System, Access, Switch, Network. Date and Time, Matrix Grid)
- Extender & Devices (EXT Units, CPU Devices, CON Devices)
- User Settings (Users & Groups)
- Assignment (Virtual CPU Devices, Virtual CON Devices)

To save a configuration file locally, proceed as follows:

1. Click **File > Save** or **File > Save As** in the menu bar.
2. Enter a name for the configuration.
3. Select the directory of the configuration on your storage medium where the configuration is to be saved.

Configurations are always saved with the file extension .dtc.

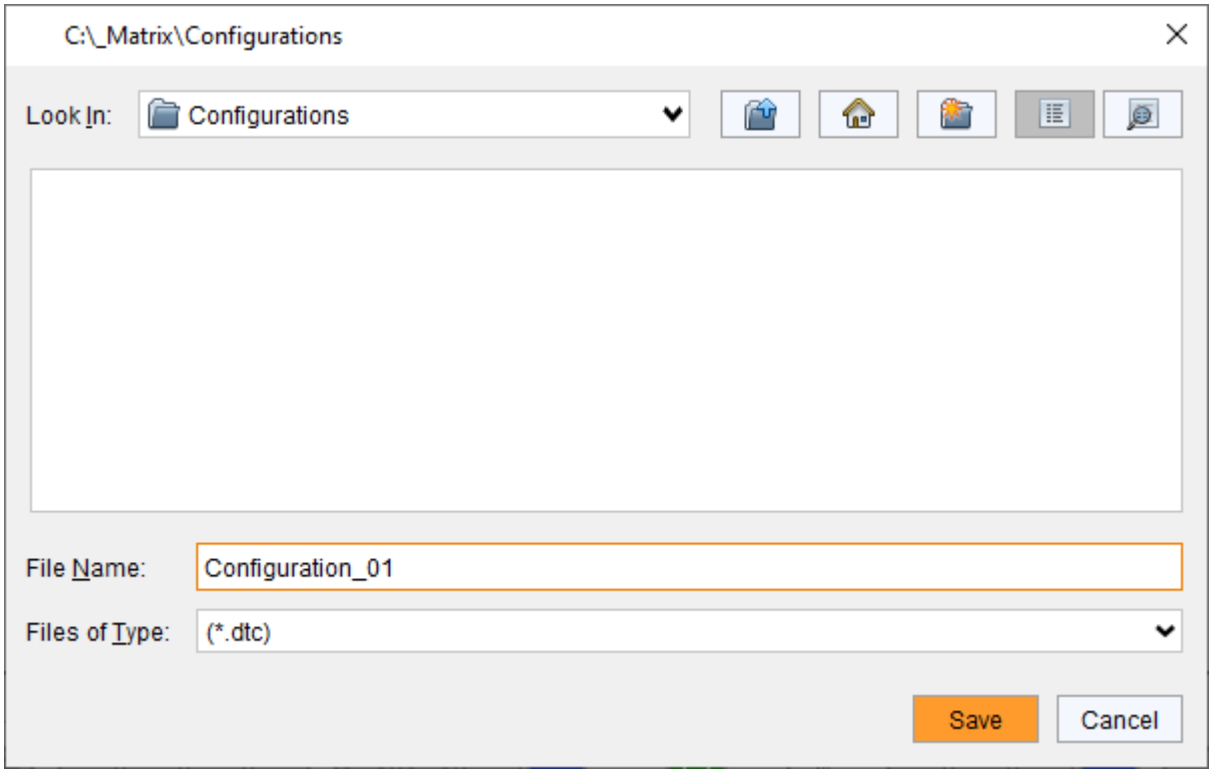


*Fig. 190 Management software menu **File - Save As…***

Local saved configurations files can be opened in the management software (see chapter 7.11.3, page 276), be uploaded to the matrix (see chapter 7.11.4, page 277) and be used as active configuration (see chapter 7.11.5, page 279) in the system.

7.11.3 Opening a Locally Saved Configuration

To open a locally saved configuration, proceed as follows:

1. Click **Open…** in the toolbar.
2. Go to the location of the configuration file to be opened.
3. Click the configuration file to be opened.
4. Click **Open** to open the configuration file.

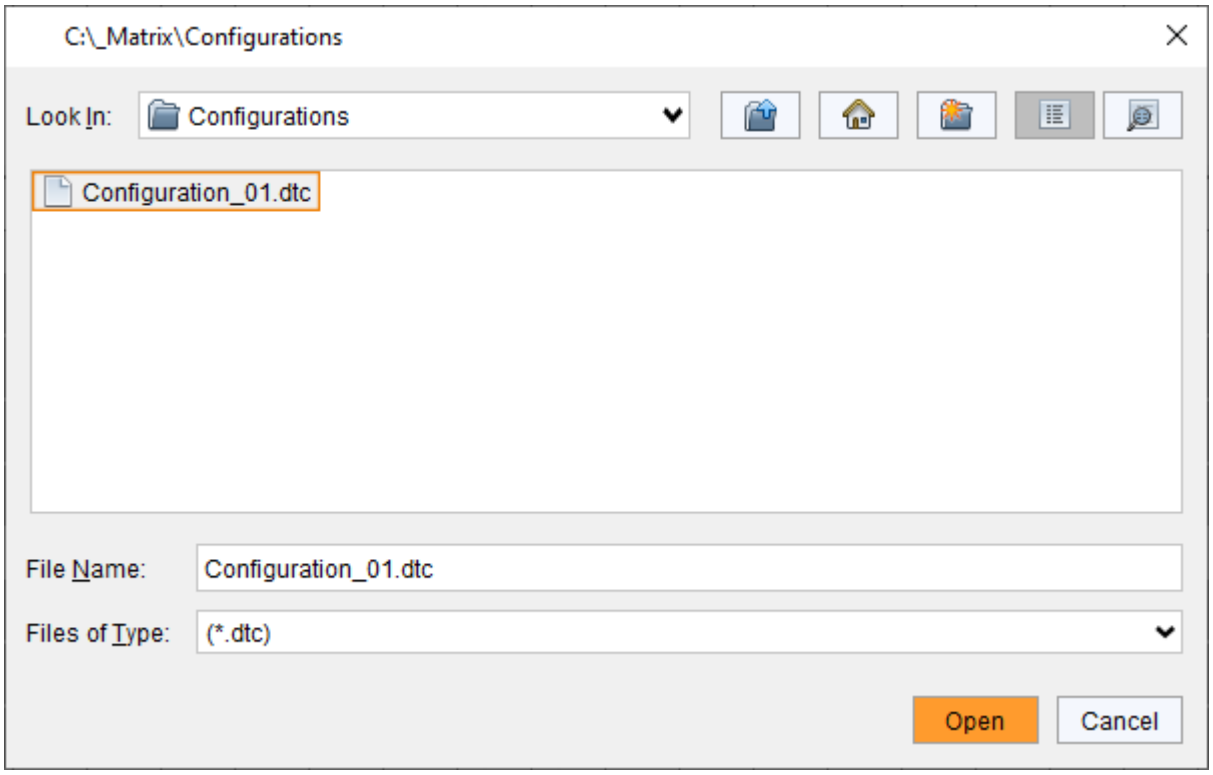


*Fig. 191 Management software menu **Open***

The configuration can also be opened via drag & drop. To do this, click on the configuration file, hold down the left mouse button and drag the configuration file into the management software.

7.11.4 Uploading a Predefined Configuration to the Matrix

Using the function **Upload**, the configuration can be saved within eight storage locations in the matrix (**File#1** to **File#8**). However, it does not replace the buffering of configuration (see chapter 7.11.1, page 274).

Additionally, a configuration can also be saved as default configuration that can be automatically loaded with each start (for activation of this function see chapter 7.4.1, page 151.

To upload an opened configuration to the matrix, proceed as follows:

1. Click **Upload** in the toolbar.

   An access window appears.
2. Enter the IP address of the matrix.
3. Enter the username and password of the administrator.
4. Click **Next >**.

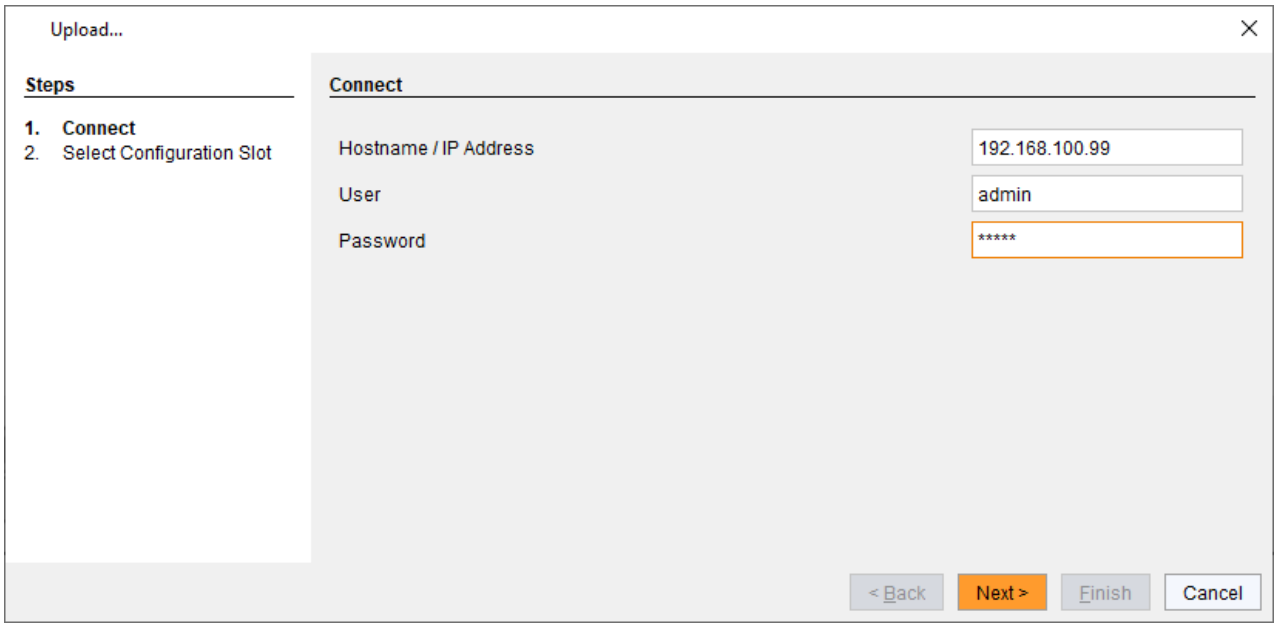


*Fig. 192 Management software menu **Upload - Connect***

5. Under **Select Configuration Slot**, select the storage slot for the configuration (**default** or **config01** to **config08**).
6. Option: to activate the uploaded configuration immediately, tick the **Activate configuration after upload** checkbox.

NOTICE
If you tick the **Activate configuration after upload** checkbox, the matrix will be restarted immediately after the save process has been completed. The restart of the matrix may take several minutes, and the matrix is not available during the restart.

7. Click **Finish** to save the configuration to the selected storage location.

   A message appears to inform about successful upload.

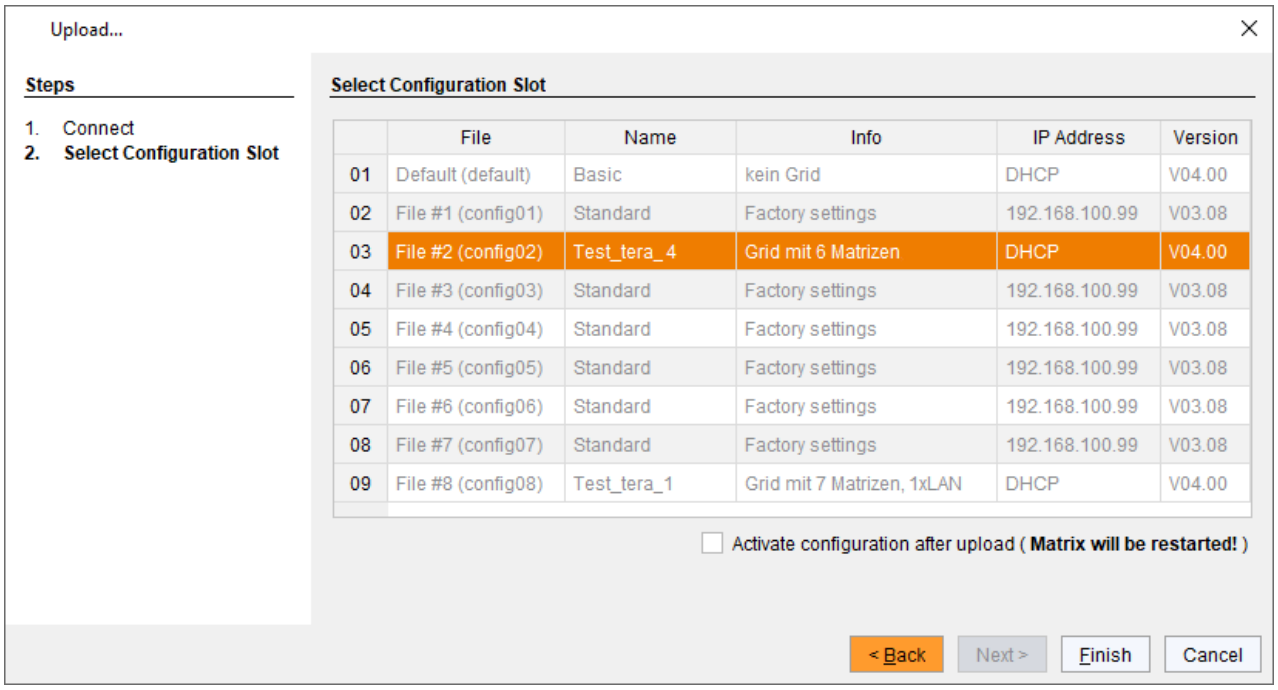


*Fig. 193 Management software menu **Upload - Select Configuration Slot***

7.11.5 Activating a Predefined Configuration

Previously saved configurations are loaded in this menu. In **Active Configuration**, the name and detailed information of the currently loaded configuration is displayed. The selection of the configuration to be loaded can be made between eight customizable configurations and the default settings.

NOTICE
Activating a configuration will disconnect and restart the matrix. The selected configuration is loaded on restart and is shown in the menu as active configuration under **Active Configuration** in the working area. The previously active configuration is overwritten. The restart of the matrix may take several minutes, and the matrix is not available during the restart.

To activate an uploaded configuration, proceed as follows:

1. Click **Status & Updates > Activate Configuration** during online-mode in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the configuration to be activated.

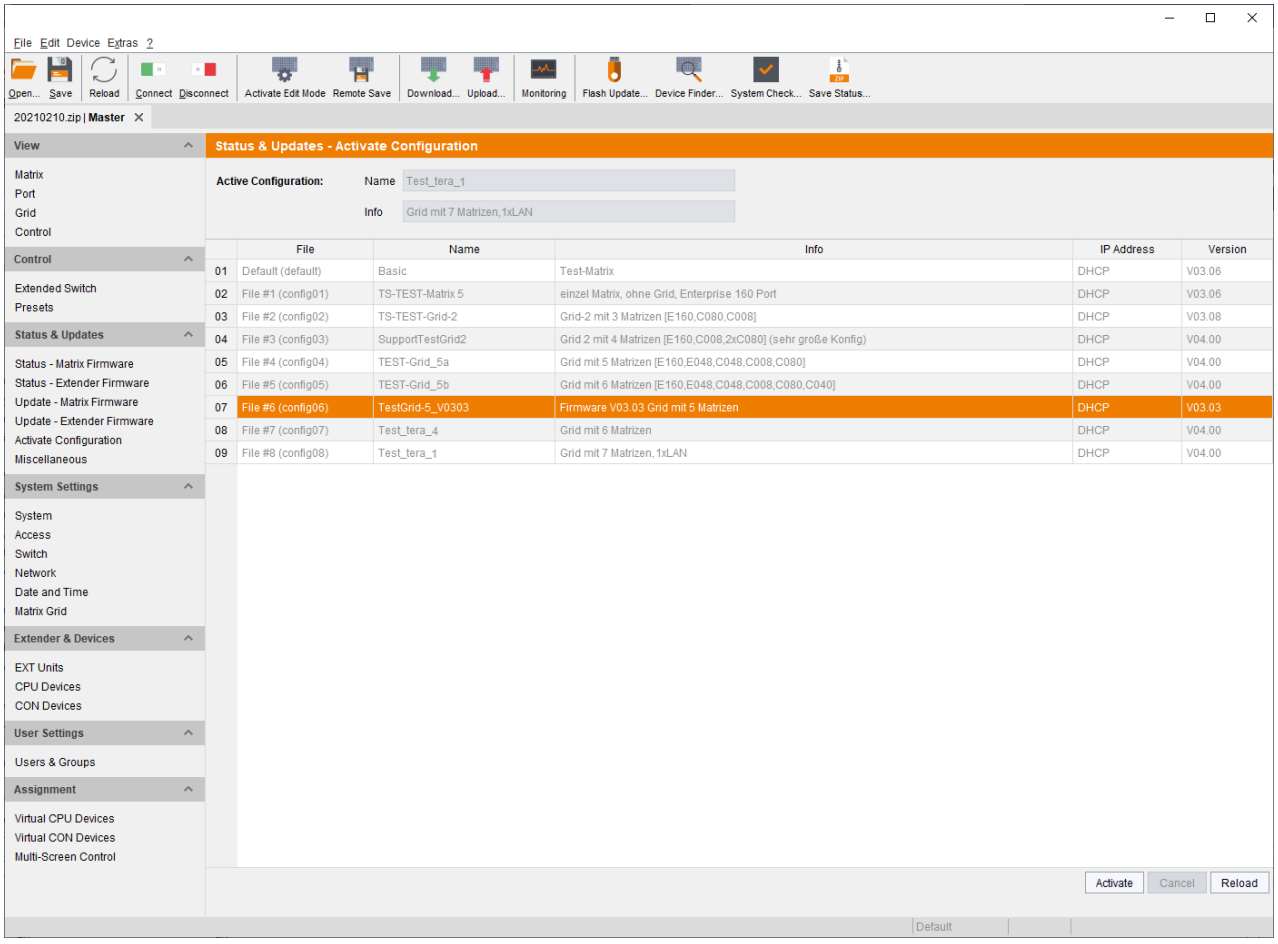


*Fig. 194 Management software menu **Status & Updates - Activate Configuration***

4. Click **Activate** to activate the selected configuration.

   A query to restart the matrix appears.
5. Click **Yes** to confirm the activation of the selected configuration.

   The connection is disconnected, and the matrix is restarted. The selected configuration is loaded on restart and is shown in the menu as active configuration under **Active Configuration** in the working area. The previously active configuration is overwritten.
6. Click **Deactivate Edit Mode** in the toolbar.

7.11.6 Downloading a Predefined Configuration from the Matrix

Configurations saved in the matrix can be downloaded for offline editing in this menu.

To download a configuration from the matrix, proceed as follows:

1. Click **Download** in the toolbar.

   An access window appears.
2. Enter the IP address of the matrix.
3. Enter the username and password of the administrator.
4. Click **Next >** to display the selection of storage location.

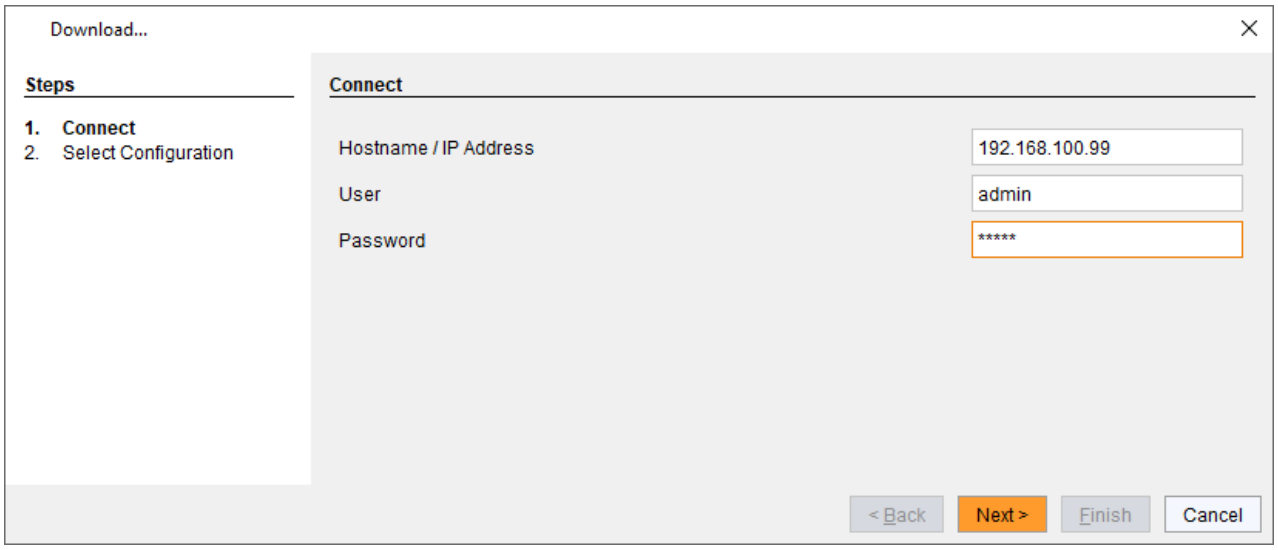


*Fig. 195 Management software menu **Download - Connect***

5. Under **Select Configuration**, select the storage location of the desired configuration (**default** or **config01** to **config08**).
6. Click **Finish** to download the desired configuration to the management software.

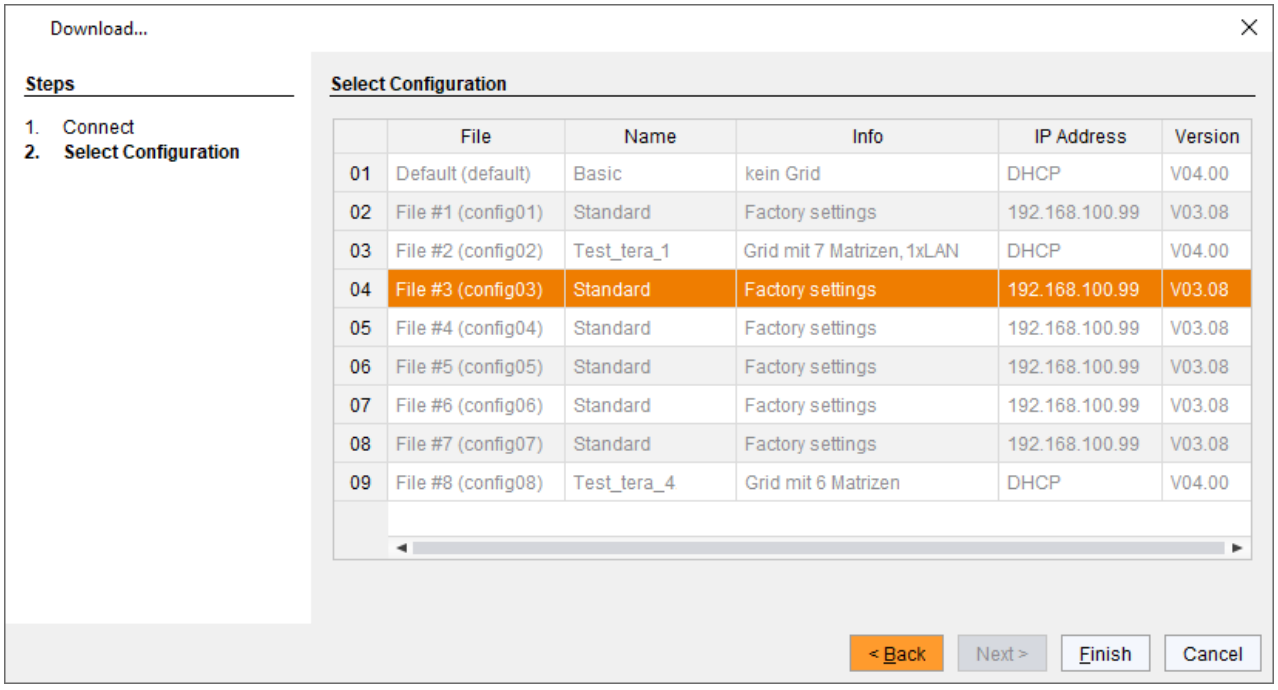


*Fig. 196 Management software menu **Download - Select Configuration***

7.12 Export and Import Options

The matrix offers the ability to read out available configuration lists (e.g., extender modules, CPU Devices, CON Devices, users, etc.) for export and import via management software.

Exported configuration lists are always saved in .csv format that allows offline editing with common spreadsheet applications.

7.12.1 Export Options

Configuration lists are exported in this menu.

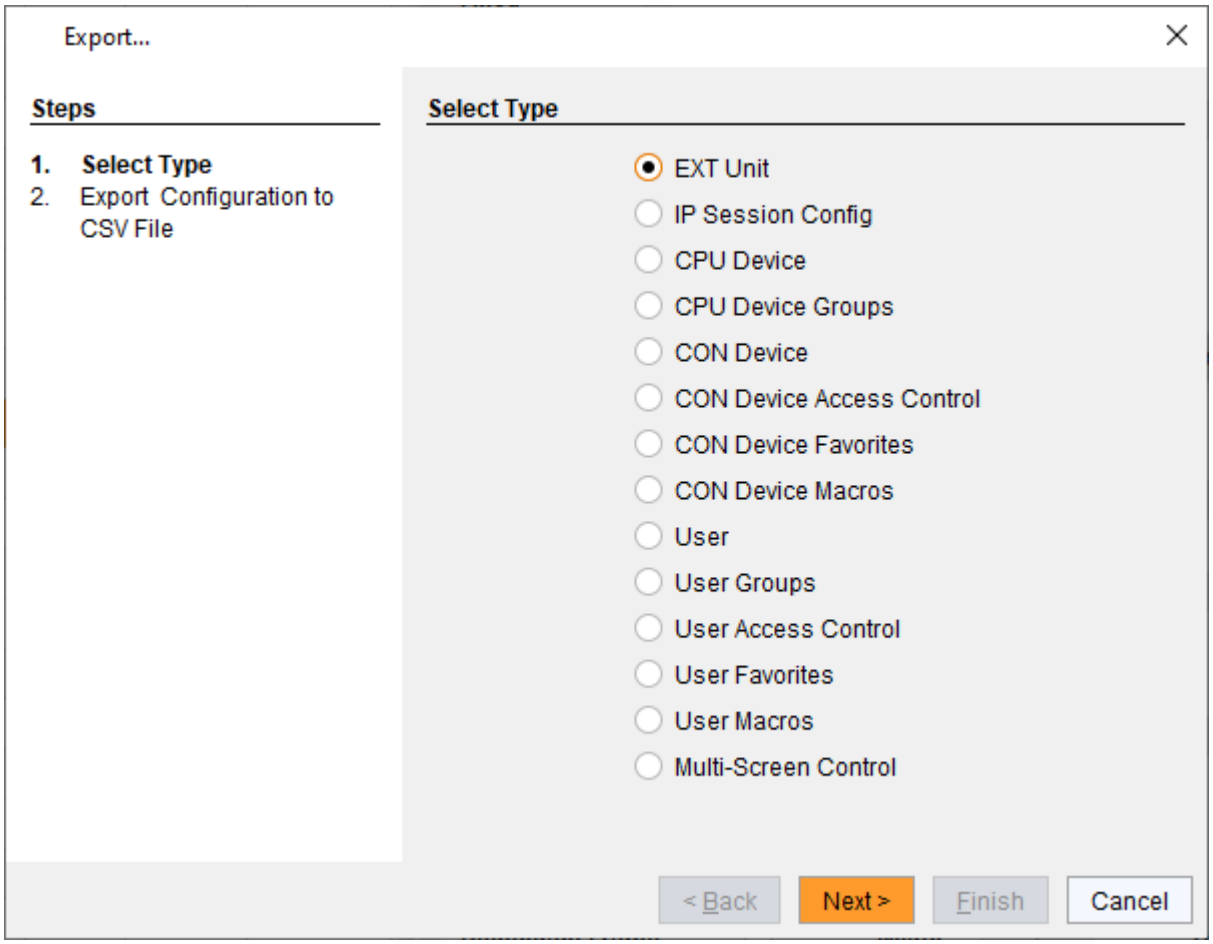


*Fig. 197 Management software menu **File - Export - Select Type***

To export, proceed as follows:

1. Click **File > Export** in the menu bar.
2. After opening the menu, select the configuration type to be exported.
3. Click **Next >**.
4. Go to the location of the configuration file to be exported.
5. Enter the name for the configuration file to be exported.
6. Click **Finish** to confirm the export.

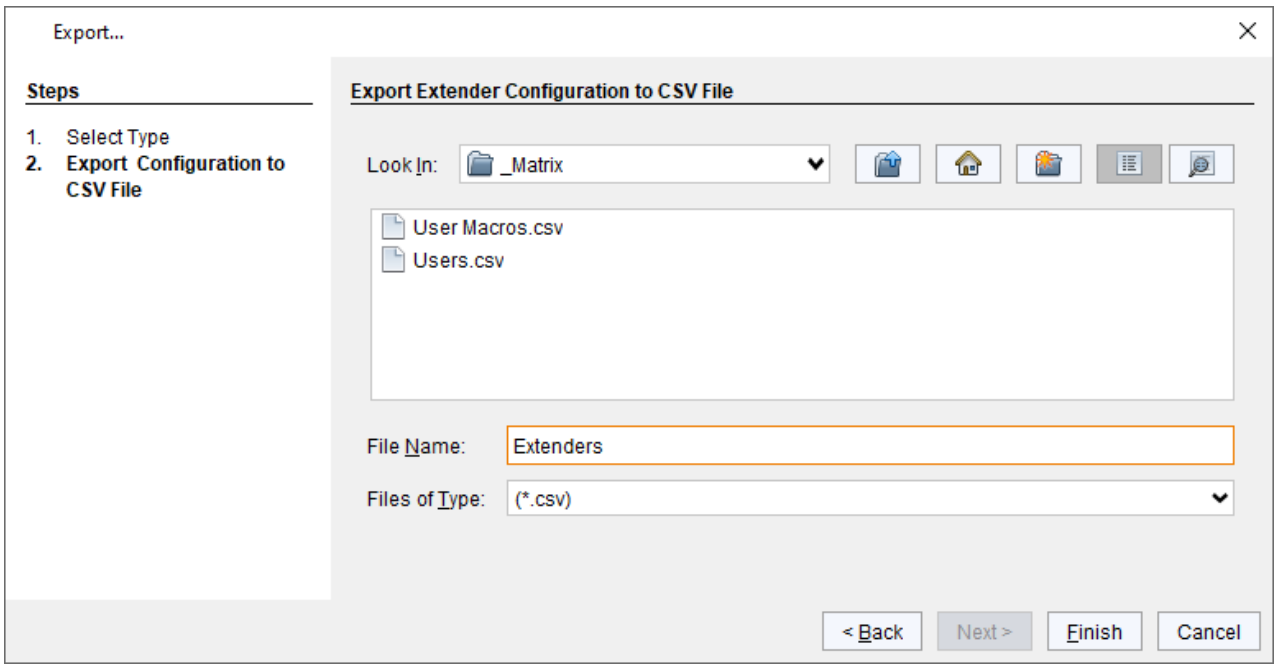


*Fig. 198 Management software menu **File - Export - Export Configuration to CSV File***

7.12.2 Import Options

Importing configuration lists is only possible in offline configurations.

Configuration lists are imported in this menu.

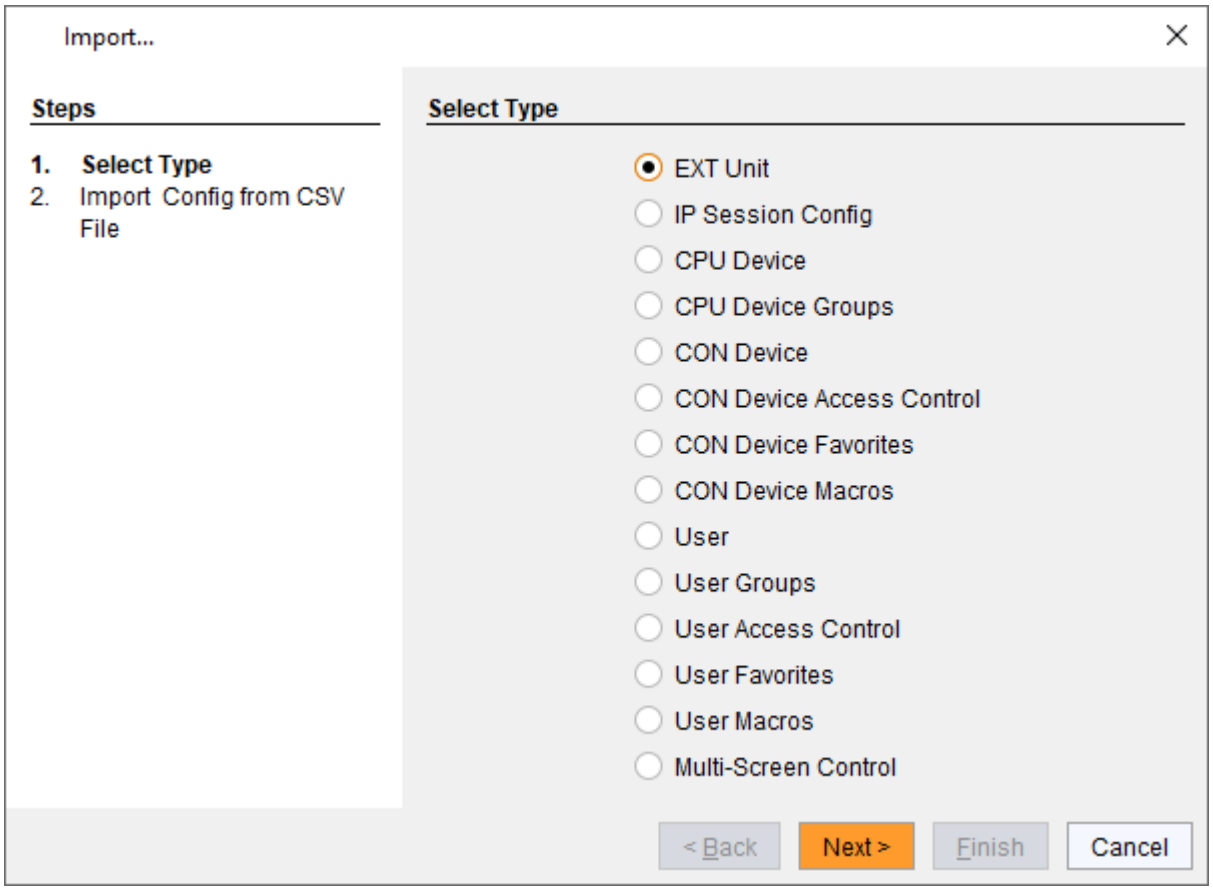


*Fig. 199 Management software menu **File - Import - Select Type***

To import configurations, proceed as follows:

1. Open a locally saved configuration or create a new configuration.
2. Click **File > Import** in the menu bar of the offline or new configuration.
3. After opening the menu, select the configuration type to be imported.
4. Click **Next >**.
5. Go to the location of the configuration file to be imported.
6. Select the configuration file to be imported.
7. Click **Finish** to confirm the import.

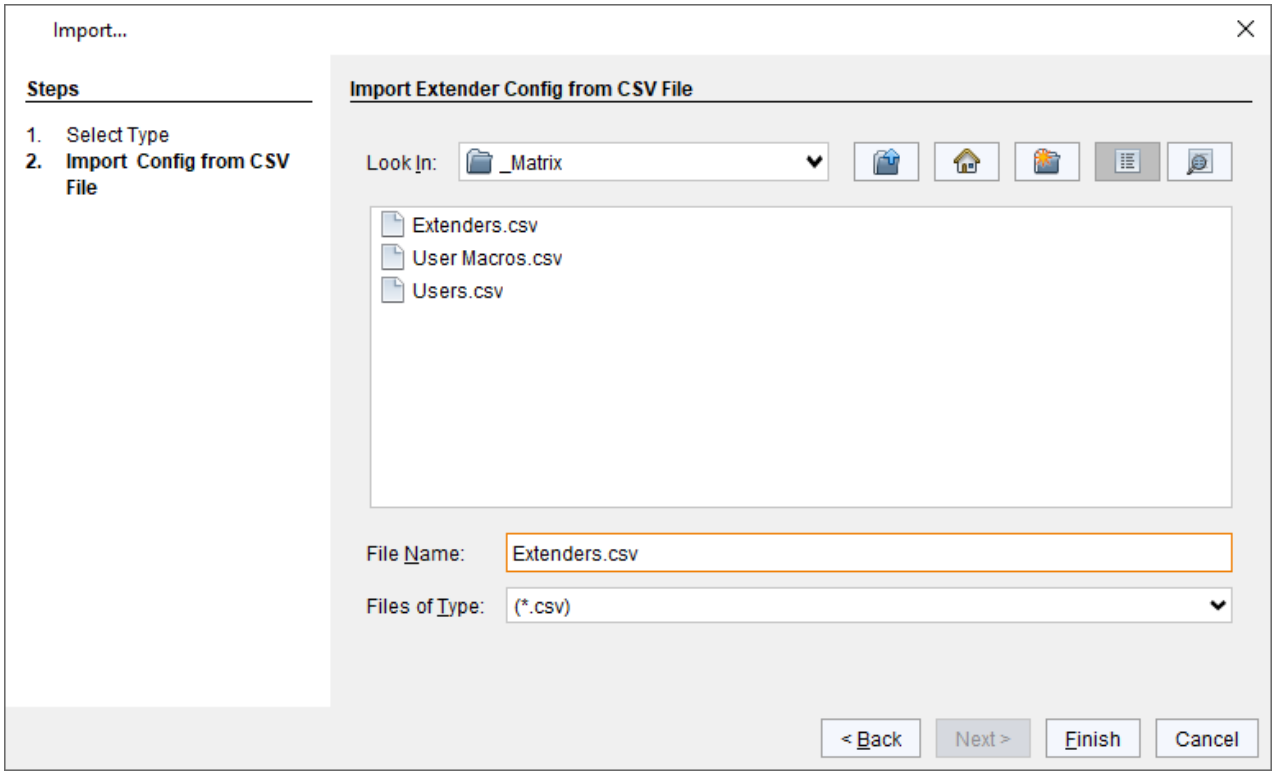


*Fig. 200 Management software menu **File - Import - Import Config to CSV File***

7.13 License Management

In this menu the matrix can be upgraded with new function bundles by installation of license keys.

To obtain license keys to upgrade matrix functions, contact your distributor

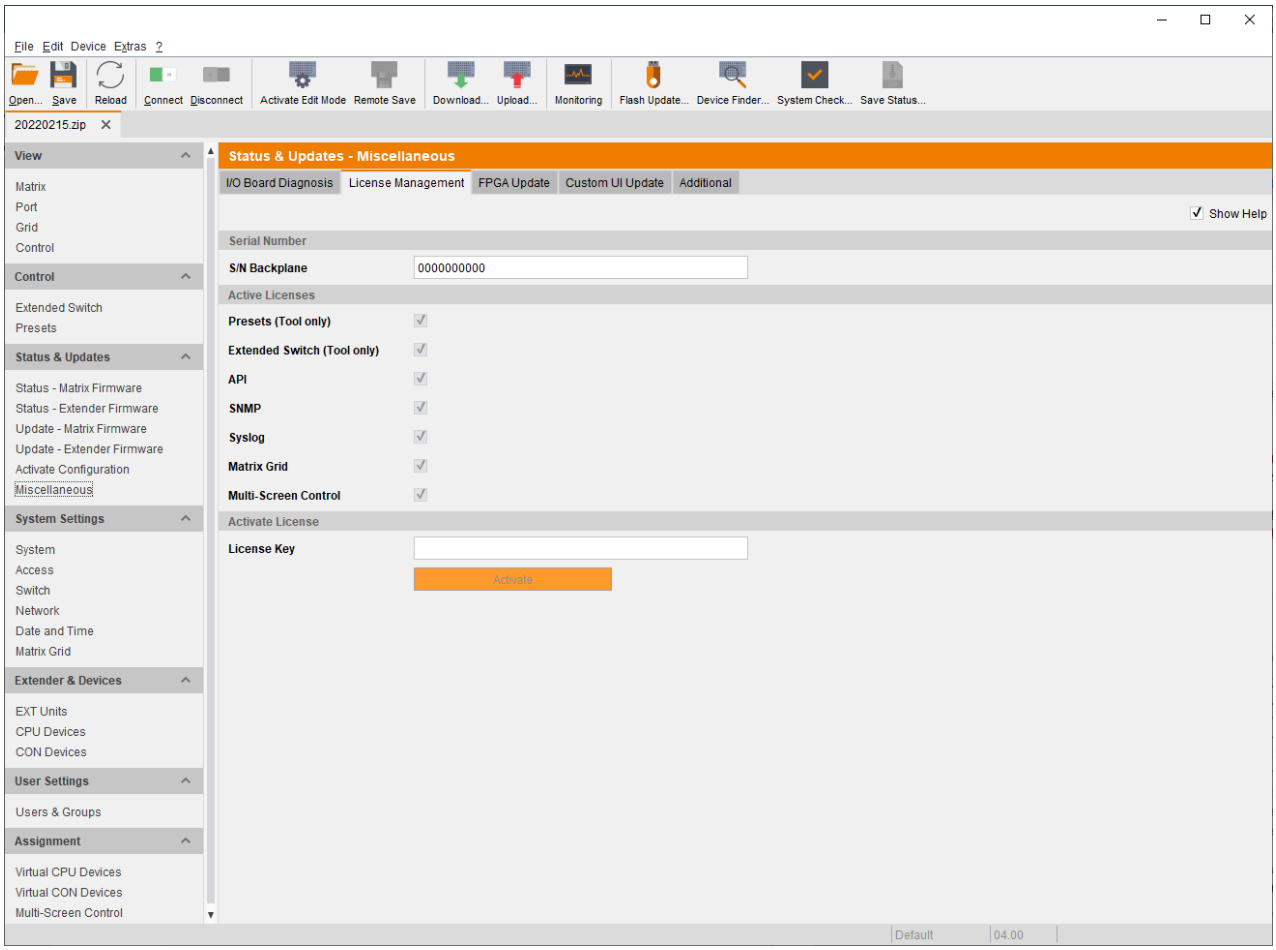


*Fig. 201 Management software menu **Status & Updates - Miscellaneous - License Management***

To activate a function bundle, proceed as follows:

1. Click **Status & Updates > Miscellaneous** in the task area.
2. Click the **Miscellaneous** tab.
3. Enter your license key in the working area under **Activate License** in the **License Key** field.
4. To activate the license key, click **Activate**.

   The new functions will be immediately enabled, a restart of the matrix will not be necessary.

7.14 Saving, Opening, and Uploading a locally saved Configuration Status

7.14.1 Saving a Status

When a status is saved, the following information contained in the matrix configuration at the time of saving is saved to a `.zip` file:

- View (Matrix, Port, Grid, Control)
- Control (Extended Switch, Presets)
- Status & Updates (current Matrix and Extender Module Firmware, stored configurations, etc.)
- System settings (System, Access, Switch, Network. Date and Time, Matrix Grid)
- Extender & Devices (EXT Units, CPU Devices, CON Devices)
- User Settings (Users & Groups)
- Assignment (Virtual CPU Devices, Virtual CON Devices)
- Type of matrix
- Current matrix and extender module firmware
- Connected ports
- Switching status
- Configurations with all users, macros, access rights, etc.

The current configuration will be saved as `config.dtc`, configurations stored in the slots **Default**, or **File#1** to **File#8** are saved as `default.dtc`, or `config01.dtc` to `config08.dtc`.)

To save a matrix status, proceed as follows:

1. Click **Save Status** in the toolbar to read out the overall status of the device and store it locally.
   A dialog appears.
2. Choose the status option to be saved.
3. Click **Next >**.

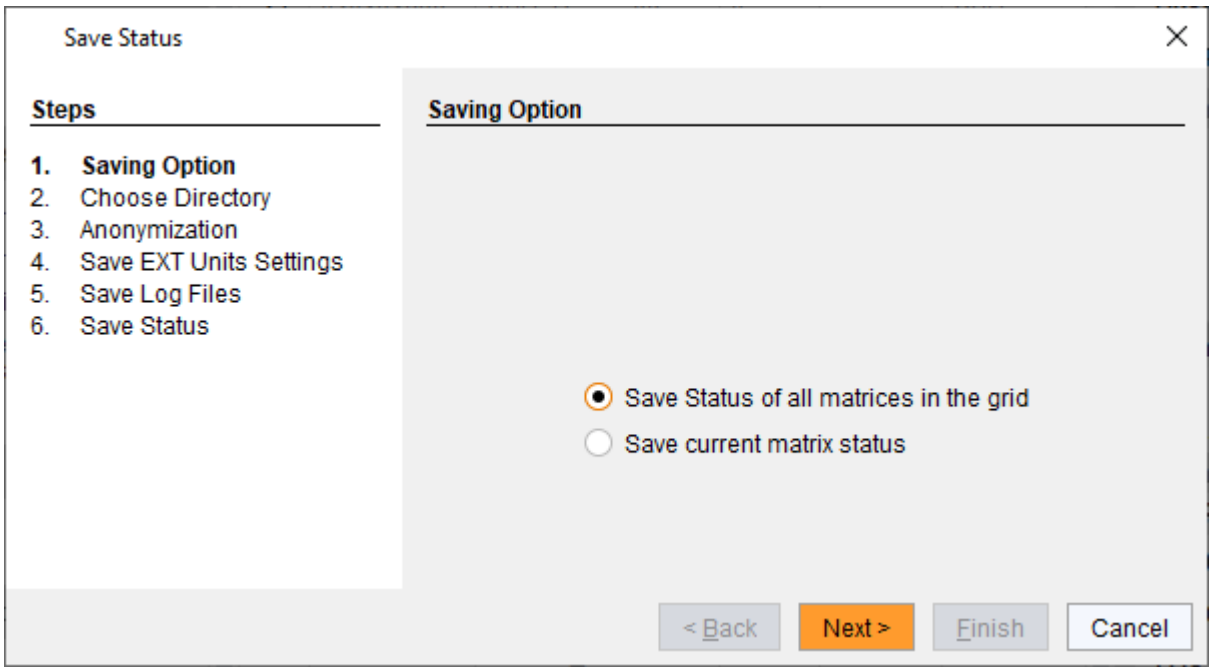


*Fig. 202 Management software menu **Save Status - Saving Option***

4. Go to the directory you want to save the status file.
5. Click **Next >**.

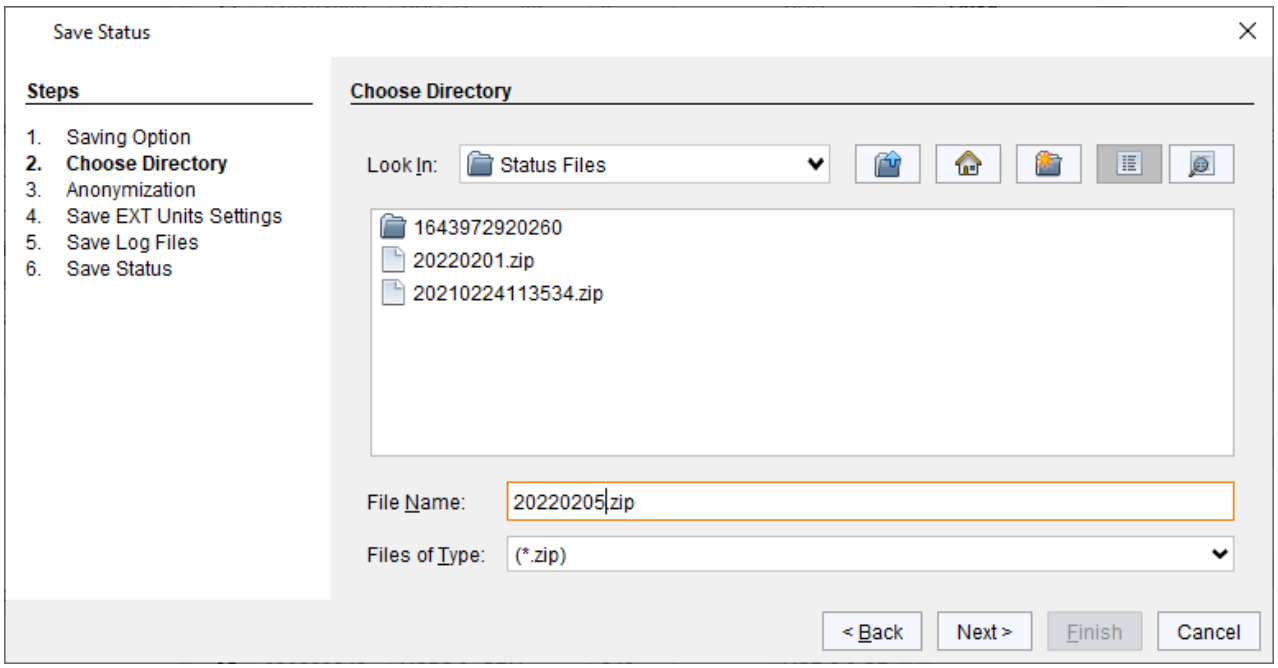


*Fig. 203 Management software menu **Save Status - Choose Directory***

6. Tick the **Anonymize** checkbox to anonymize your personal data when saving the status file if necessary (not recommended for trouble shooting).

   If you want to use the status file as a backup, do not tick the **Anonymize** checkbox.

7. Click **Next >**.

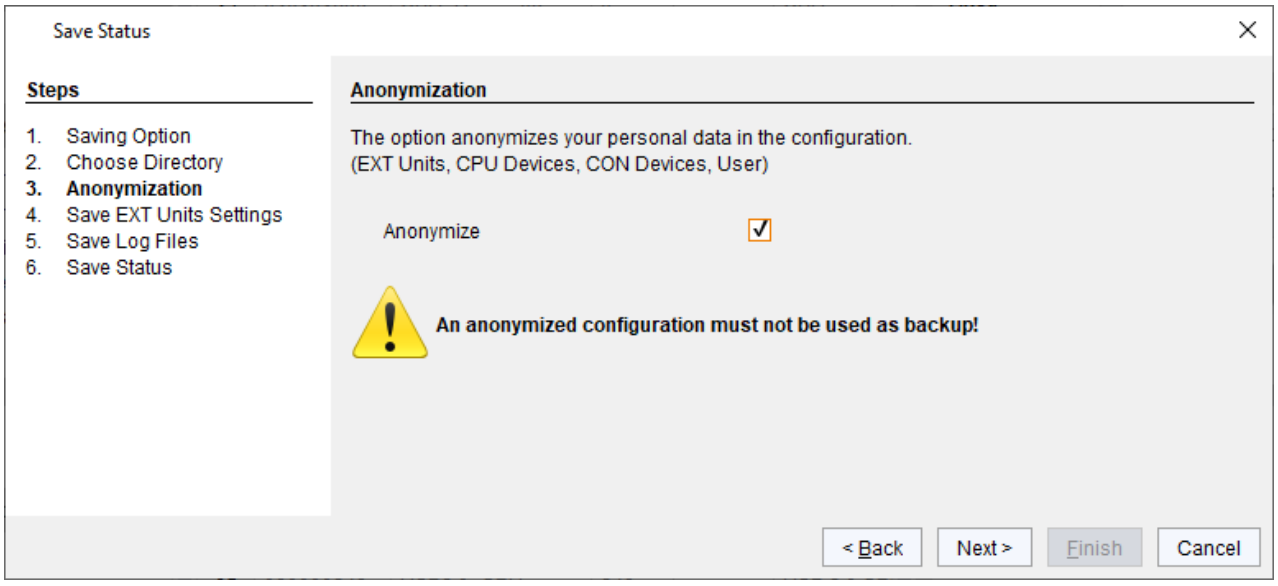


*Fig. 204 Management software menu **Save Status - Anonymization***

8. Tick the **Save EXT Units Settings** checkbox to save the EXT Unit settings.

9. Click **Next >**.

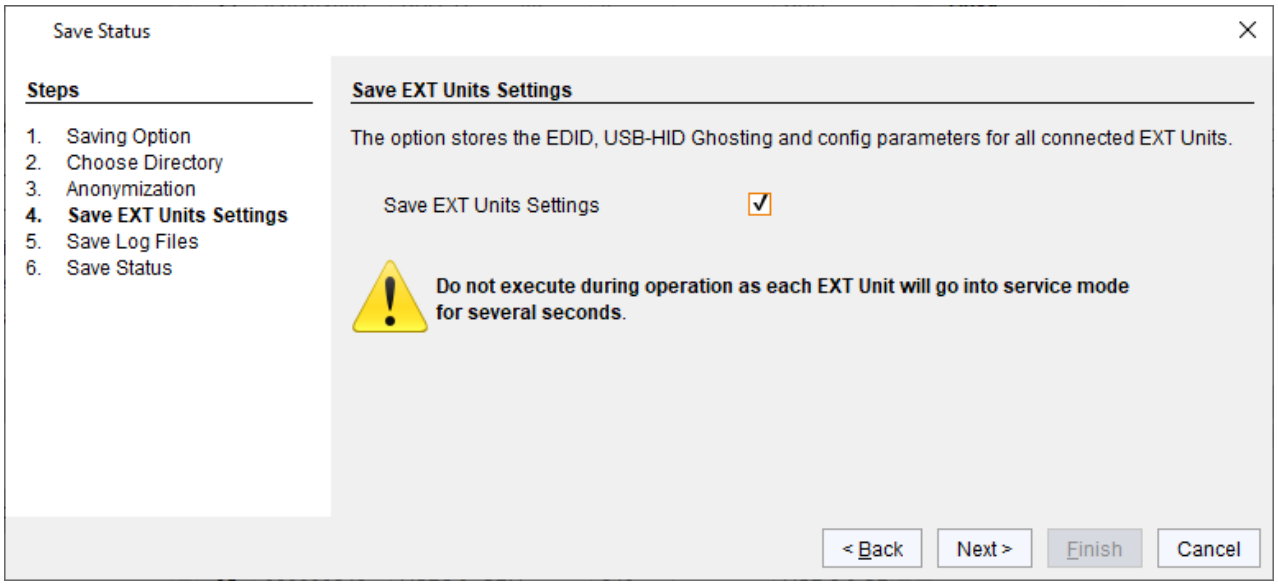


*Fig. 205 Management software menu **Save Status - Save EXT Unit Settings***

10. Tick the **Save Log Files** checkbox to save the controller board and I/O board log files.
11. Click **Next >**.

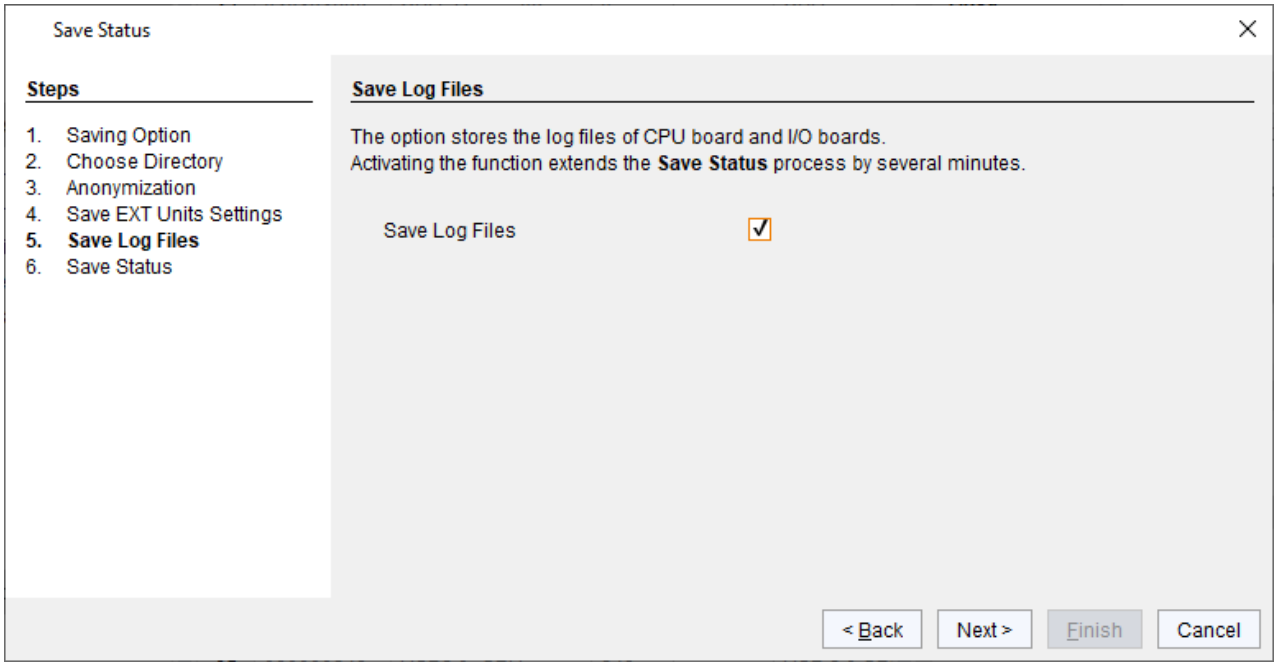


*Fig. 206 Management software menu **Save Status - Save EXT Unit Settings***

12. Wait until all steps show green checkmarks and the **"Saving status successful"** message is displayed.

13. Click **Finish** to complete the status saving process.

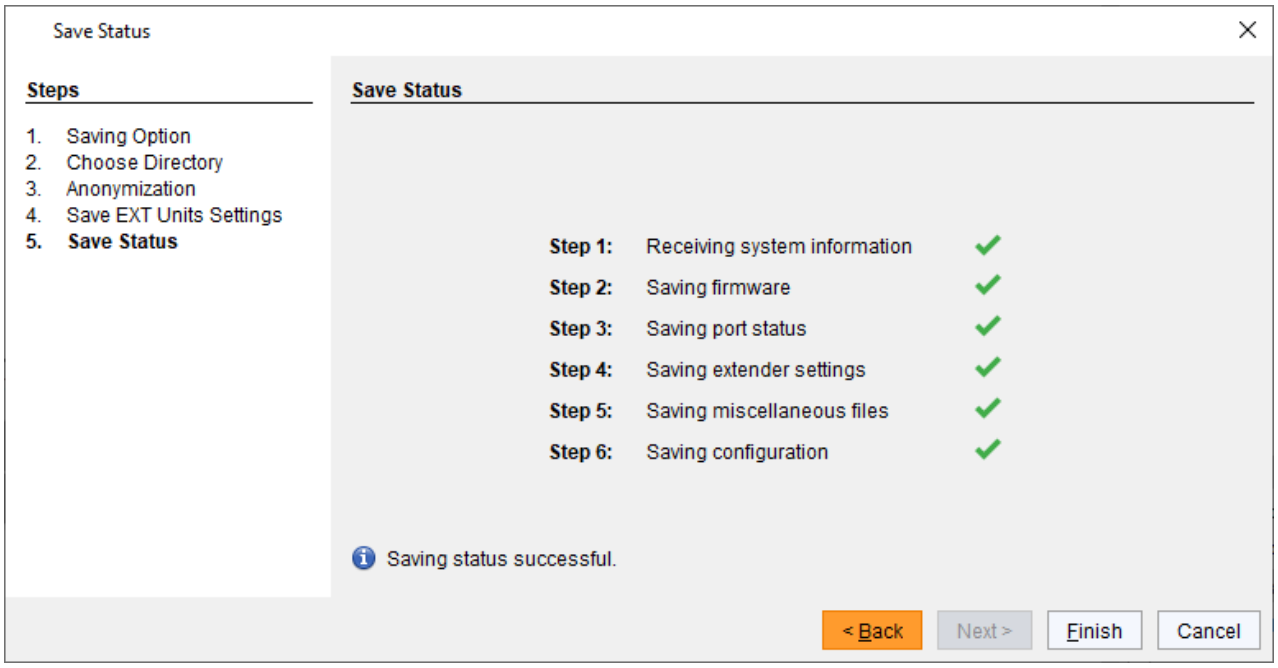


*Fig. 207 Management software menu **Save Status - Save Status***

7.14.2 Opening a Locally Saved Configuration Status

To load a locally saved status, proceed as follows:

1. Click **Device > Load Status…** in the menu bar.
2. Go to the storage location of the status file to be opened.
3. Click the status file to be opened.
4. Click **Open** to open the status file.

   The saved configuration status is opened showing the latest current configuration that was saved as `config.dtc`.

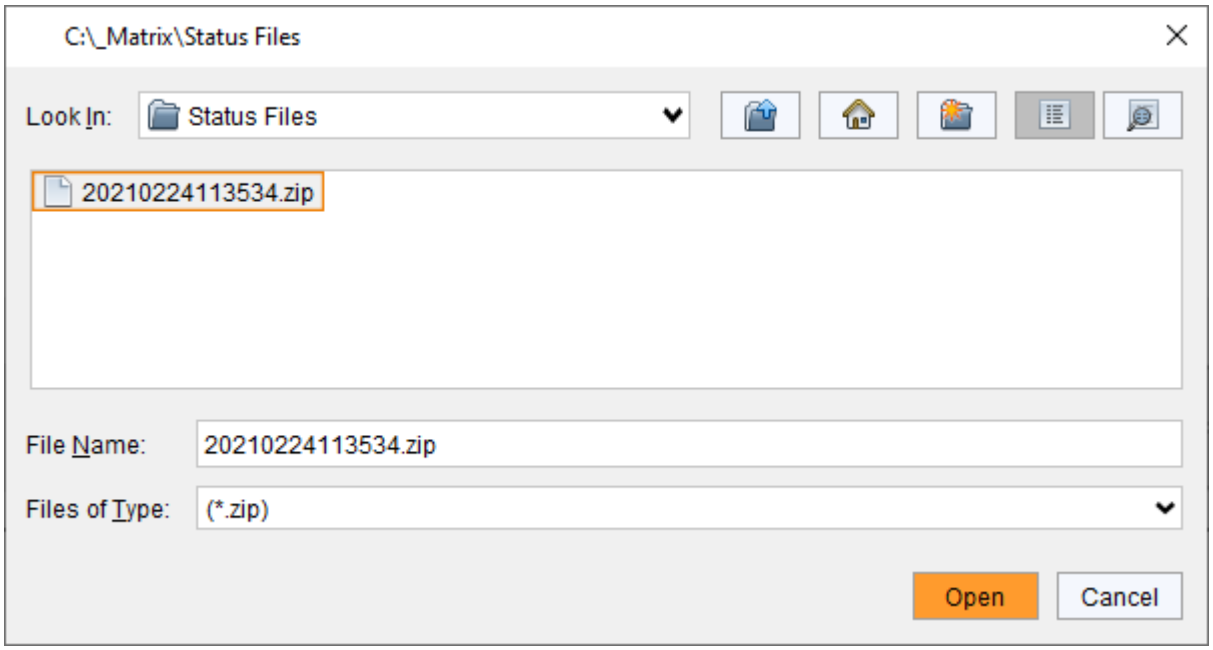


*Fig. 208 Management software menu **Device - Load Status***

The status can also be opened via drag & drop. To do so, open the file browser, go to the storage location of the status file, click on the status file, hold down the left mouse button and drag and drop the status file into the management software.

7.14.3 Uploading a Locally Saved Configuration Status

To load a locally saved status, proceed as follows:

1. Open a locally saved status or drag & drop the required configuration file of the `.zip` file into the management software.
2. Perform the uploading process (see chapter 7.11.4, page 277).

Uploading the opened status will save the config.dtc as current configuration to the matrix.
If you want to upload further configurations saved in the zipped status file, proceed as follows:

- ➡ Extract the zipped status file.
- ➡ Click the **Open** button, navigate to the storage location of the extracted configuration files, select the file to be uploaded and click the **Open** button in the dialog.
- ➡ Click the **Upload** button and proceed as described above.

8 Operation via Keyboard

8.1 Switching Operation via Keyboard

Fastest switching time can be achieved by using identical mice, keyboards, and monitors. This contributes to a smooth and seamless direct switching of the matrix.

8.1.1 Addressing of Master and Sub Matrices

The matrix can be cascaded over two levels.

- Send the commands (including opening the OSD) to the master or the sub matrix.
- When in command mode, select whether commands should be handled in the master or the sub matrix.

The matrix can be cascaded over two levels.

- Send the commands (including opening the OSD) to the master or the sub matrix.
- When in command mode, select whether commands should be handled in the master or the sub matrix.

OSD Access

- To get access to the OSD of the master matrix, enter Hot Key, m (optional), o.
- To get access to the OSD of the sub matrix, enter Hot Key, s, o.

Cross-Matrix Switching

To do a cross-matrix switching, proceed as follows:

1. Enter Hot Key, m, o to open the OSD of the master matrix.
2. Select the CPU Device configured as Tie Line in the CPU selection list and press Enter to switch onto.
3. Enter Hot Key, s, o to open the OSD of the master matrix.
4. Select the target CPU Device in the CPU selection list of the sub matrix.

The selected master matrix/sub matrix mode is permanently activated until the other mode will be manually activated. This means that if you press s, all prospective commands will be sent to the sub matrix, but not if the command mode is left in the meantime. E.g., if you press Hot Key, s, F1, the defined macro is sent to the sub matrix.

8.1.2 Direct Switching via Favorites

The direct switching by favorites on a keyboard is the fastest possibility for a user to switch at his sink between different sources. This offers the option to switch video, keyboard, and mouse, or Video Only.

Direct Switching of Video, Keyboard and Mouse in Full Access Mode

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Enter the index number of the new CPU Device from the user's favorites list.
3. Press Enter to confirm.

   At the same time the command mode is closed, and the sink is connected to the new CPU Device with complete KVM control.

   Example: switching to CPU Device with favorite index number 7 in **Full Access**:

   Hot Key, 7, Enter

Direct Switching in Private Mode

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Enter the index number of the new CPU Device from the user's favorites list.
3. Press Left Shift + Enter at the same time to confirm.

   At the same time the command mode is closed, and the sink is connected to the new CPU Device with complete control in **Private Mode**.

   Example: switching to CPU Device with favorite index number 3 in **Private Mode**:

   Hot Key, 3, Left Shift + Enter

Direct Switching in Video Only Mode

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Enter the index number of the new CPU Device from the user's favorites list.
3. Press Space to confirm.

   At the same time command mode is closed, and the sink (console) is connected to the new CPU Device with Video Only.

   Example: switching to CPU Device with favorite index number 1 in **Video Only**

   Hot Key, 1, Space

Switching to previous CPU Devices

If you switch to a source that was previously connected with Video Access only, you will be connected to this source with full KVM access.

You can only switch to valid, unused sources using Hot Keys. The options **Force Connect** and **Force Disconnect** as well as the restrictions of the User ACL and CON ACL are taken into account.
Hot Keys are only supported if neither **Enable User Login** nor the **Enable User ACL** is selected, and the user is logged in the OSD.

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Press p.

   At the same time command mode is closed, and the sink (console) is connected to the previous source with full KVM access.

Disconnecting the current Connection

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Press Backspace.

   The command mode is closed, and the sink (console) is disconnected from the previous connected source.

8.1.3 Instant Switching via Favorites

Optimal results can be achieved by using identical resolutions as far as possible. This contributes to a smooth and seamless function of the scan mode.

Switching via favorites enables fast displaying of different video signals by switching between associated CPU Devices registered as favorites without continuously using the Hot Key.

1. Press the Hot Key to start the command mode.
   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Press Left Shift and hold it down.
3. Enter the index number of a CPU Devices from the favorites list with the keyboard.
   The video signal of the respective source is immediately displayed after entering the index number.
4. Press Esc to leave the instant switching mode.

If you do not enter Esc in between 10 seconds after the last input of an index number, your CON Device will be switched to the associated CPU Device in Video Only Mode.

8.1.4 Switching via Macros using Function Keys F1 to F16

In the command mode you can retrieve the macros 1 to 32 with the F1 to F16 function keys on the connected standard keyboard instead of the special macro keyboard.

Executing macros 17 to 32 is realized by the simultaneous use of Left Shift.

The stored command sequence for the appropriate function key is executed and the command mode is left immediately.

It is not necessary to press Enter to confirm the selection of macros.

8.1.5 Switching a CON Unit to a Local Source

KVM CON Unit extender modules connected to a local source can be locally switched via the matrix. Switching is performed between the local source and the KVM connection and can be executed via keyboard commands or OSD (see chapter 9.1.6, page 307).

If you switch to the local source, the KVM connection will be automatically disconnected.

When using CON Units with the possibility to connect a local source in a MSC environment, the local switching will be disabled.

The following keyboard commands are available to switch to the local source:

Keyboard command	Function
Hot Key, k, 1, Enter	Switch to interconnection port 1.
Hot Key, k, 2, Enter	Switch to interconnection port 2 (only with redundant CON Units).
Hot Key, l, Enter	Switch to the local source.

8.1.6 Switching via Multi-Screen Control

The MSC function contains a switching of the USB-HID control between different statically connected sources within a CON Device and can be performed via keyboard (configuration see chapter 7.8.11, page 257) or mouse (see chapter 10, page 312).

To perform a switching operation via keyboard command, proceed as follows:

1. Press the Hot Key to start the command mode.

   The Caps Lock and Scroll Lock LEDs on the keyboard are flashing.
2. Press the number of the specific source or display.
3. Press Enter to confirm.

   At the same time the command mode is closed, the switching operation will be performed, and keyboard and mouse are connected to the specified source or display.

When using the numeric keypad for switching, a confirmation of the switching operation by pressing Enter is not necessary.

The following keyboard commands are available for switching operations (e.g., using the numeric keypad):

Keyboard command	Function
Hot Key, NUM0	Switch the USB-HID control to the CPU Device connected to the user's CON Device.
Hot Key, Num1	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 1.
Hot Key, Num2	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 2.
Hot Key, Num3	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 3.
Hot Key, Num4	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 4.

8.2 Operation via External Switching Solution

Via 4-button external switching solution (dry contact) with a GPIO interface, connected to an add-on module of an extender module, several operation functions are available, depending on the settings for the buttons of the external switching solution (macros, favorites, or keys). Settings see chapter 7.8.8, page 249.

8.3 Summary of Keyboard Commands

In the following you find a summary of keyboard commands that can activate extender module and matrix functions after executing the Hot Key.

Keyboard commands are fixed to the position of the keys on the keyboard. Keyboard mapping tables may vary for country-specific layouts.

➥ Note the key position of a freely defined Hot Key when changing the keyboard layout, e.g., from QWERTZ to AZERTY. E.g., if defining 2x a as Hot Key on a German or US keyboard layout, the French keyboard layout (AZERTY) requires then 2x q as Hot Key to be pressed instead.

8.3.1 Command Mode and OSD

8.3.1.1 Changing, Resetting, and Deleting the Hot Key and the Fast Key

Hot Key

Keyboard command	Function
Hot Key, c, new Hot Key code, Enter	Change the Hot Key according to the predefined Hot Key Code table.
Hot Key, c, 0, new Hot Key, Enter	Define a freely selectable Hot Key.
Right Shift + Del within 5 s after switching on the CON Unit or plugging in a keyboard	Reset the Hot Key back to default settings.

Fast Key

Keyboard command	Function
Hot Key, f, Hot Key Code, Enter	Define a Fast Key according to the predefined Hot Key Code table to open the OSD directly.
Hot Key, f, o, new Hot Key, Enter	Define a freely selectable Fast Key to open the OSD directly.
Hot Key, f, 0, Del, Enter	Delete the Fast Key.

Hot Key Code

Hot Key Code	Hot Key
0	Freely selectable, ESC, Del, and Enter
2	2x Scroll
3	2x Left Shift
4	2x Left Ctrl
5	2x Left Alt
6	2x Right Shift
7	2x Right Ctrl
8	2x Right Alt

8.3.1.2 Starting and Exiting the Command Mode

Keyboard command	Function
2x Left Shift	Start the command mode (Hot Key, factory setting).
Esc	Exit the command mode.

8.3.1.3 Opening and Exiting the OSD

Keyboard command	Function
Hot Key, o Fast Key	Open the OSD.
Hot Key, s, o	Open OSD of the sub matrix in a cascaded environment.
Esc	Exit the OSD in the main menu or go back one step in the menu structure.
Left Shift + Esc Left Ctrl + Esc	Exit the OSD within the menus.

8.3.1.4 Switching the USB-HID Control

Keyboard command	Function
Hot Key, Num0	Switch the USB-HID control to the CPU Device connected to the user's CON Device.
Hot Key, Num1	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 1.
Hot Key, Num2	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 2.
Hot Key, Num3	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 3.
Hot Key, Num4	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 4.

8.3.2 Managing of the EDID and USB-HID Ghosting

8.3.2.1 EDID

Keyboard command	Function
Hot Key, a	Download the EDID of a monitor connected to the CON Unit into the associated CPU Unit.

8.3.2.2 USB-HID Ghosting

Keyboard command	Function
Hot Key, h, w, Enter	Write the device descriptions of the input devices connected to the CON Unit into the CPU Unit. Activate the emulation of these device descriptions in the CPU Unit.
Hot Key, h, e, Enter	Activate the emulation of already stored device descriptions in the CPU Unit.
Hot Key, h, d, Enter	Deactivate the emulation of active device descriptions in the CPU Unit. The input devices connected to the CON Unit will be now passed transparently to the source.
Hot Key, h, r, Enter	Deactivate the emulation of active device descriptions in the CPU Unit. Deletes the descriptions out of the CPU Unit. The input devices connected to the CON Unit will be now passed transparently to the source.

8.3.3 Switching

8.3.3.1 Switching of Sources for CON Units with local Input

Keyboard command	Function
Hot Key, k, 1, Enter	Switch to the extender module interconnection port 1.
Hot Key, l, Enter	Switch to the local source.

8.3.3.2 Switching of Video Channels in Dual-Head Mode

Keyboard command	Function
Hot Key, d, 1, Enter	Switch to video channel 1 of a Dual-Head CPU Unit.
Hot Key, d, 2, Enter	Switch to video channel 2 of a Dual-Head CPU Unit.

8.3.3.3 Switching of two different CPU Units via redundant CON Unit

Keyboard command	Function
Hot Key, k, 1, Enter	Switch to the extender module interconnection port 1.
Hot Key, k, 2, Enter	Switch to the extender module interconnection port 2.

8.3.3.4 Switching Devices

Keyboard Command	Description
Hot Key, Backspace	Close the current connection of the own CON Device.
Hot Key, p	Switch back to the previous connected source with a KVM connection.
Hot Key, 1...16, Enter (Space or Left Shift + Enter)	Switch to a source stored in the favorite list with a KVM connection (Video Only or Private Mode connection).

8.3.3.5 Executing Macros

Keyboard Command	Description
Hot Key, F1...F16	Execute a predefined macro (macro 1 to 16).
Hot Key, Left Shift + F17 ... F32	Execute a predefined macro (macro 17 to 32).

8.4 Overview of Keyboard Commands

In the following you find a summary of keyboard commands that can be used to configure and activate extender module and matrix functions.

8.4.1 Extender Module

8.4.1.1 Keyboard Commands for Configuration

Keyboard command	Function
Hot Key, c, new Hot Key code, Enter	Change the Hot Key according to the predefined Hot Key Code table.
Hot Key, c, 0, new Hot Key, Enter	Define a freely selectable Hot Key.
Right Shift + Del within 5 s after switching on the CON Unit or plugging in a keyboard	Reset the Hot Key back to default settings.
Hot Key, f, Hot Key Code, Enter	Define a Fast Key according to the predefined Hot Key Code table to open the OSD directly.
Hot Key, f, o, new Hot Key, Enter	Define a freely selectable Fast Key to open the OSD directly.
Hot Key, f, 0, Del, Enter	Delete the Fast Key.

8.4.1.2 Keyboard Commands for Operation

Keyboard command	Function
Hot Key, a	Download the EDID of a monitor connected to the CON Unit into the CPU Unit.
Hot Key, h, w, Enter	Write the device descriptions of the input devices connected to the CON Unit into the CPU Unit. Activate the emulation of these device descriptions in the CPU Unit.
Hot Key, h, e, Enter	Activate the emulation of already stored device descriptions in the CPU Unit.
Hot Key, h, d, Enter	Deactivate the emulation of active device descriptions in the CPU Unit. The input devices connected to the CON Unit will be now passed transparently to the source.
Hot Key, h, r, Enter	Deactivate the emulation of active device descriptions in the CPU Unit. Deletes the descriptions out of the CPU Unit. The input devices connected to the CON Unit will be now passed transparently to the source.
Hot Key, k, 1, Enter	Switch to the extender module interconnection port 1.
Hot Key, k, 2, Enter	Switch to the extender module interconnection port 2.
Hot Key, l, Enter	Switch to local source (only CON Units with port for a local input).
Hot Key, d, 1, Enter	Switch to video channel 1 of a Dual-Head CPU Unit.
Hot Key, d, 2, Enter	Switch to video channel 2 of a Dual-Head CPU Unit.

8.4.2 Matrix

8.4.2.1 Keyboard Commands for Operation

Keyboard command	Function
2x Left Shift	Start the command mode (Hot Key, factory setting).
Esc	Exit the command mode.
Hot Key, o Fast Key	Open the OSD.
Hot Key, m, o	Open the OSD of the master matrix in a cascaded environment.
Hot Key, s, o	Open the OSD of the sub matrix in a cascaded environment.
Esc	Exit the OSD in the main menu or go back one step in the menu structure.
Esc	Exit the OSD in the main menu or go back one step in the menu structure.
Left Shift + Esc Left Ctrl + Esc	Exit the OSD within the menus.
Hot Key, Backspace	Close the current connection of the own CON Device.
Hot Key, p	Switch back to the previous connected CPU Device with a KVM connection.
Hot Key, 1 ... 16, Enter (Space or Left Shift + Enter)	Switch to a CPU Device stored in the Favorite List with a KVM connection (video only or Private-Mode connection).
Hot Key, F1 ... F16	Execute a predefined macro (macro 1-16).
Hot Key, Left Shift + F17 ... F32	Execute a predefined macro (macro 17-32).
Hot Key, Num0	Switch the USB-HID control to the CPU Device connected to the user's CON Device.
Hot Key, Num1	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 1.
Hot Key, Num2	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 2.
Hot Key, Num3	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 3.
Hot Key, Num4	Switch the USB-HID control to the CPU Device connected to the CON Device with monitor display 4.

9 Operation via OSD

9.1 Switching via OSD

9.1.1 Switching

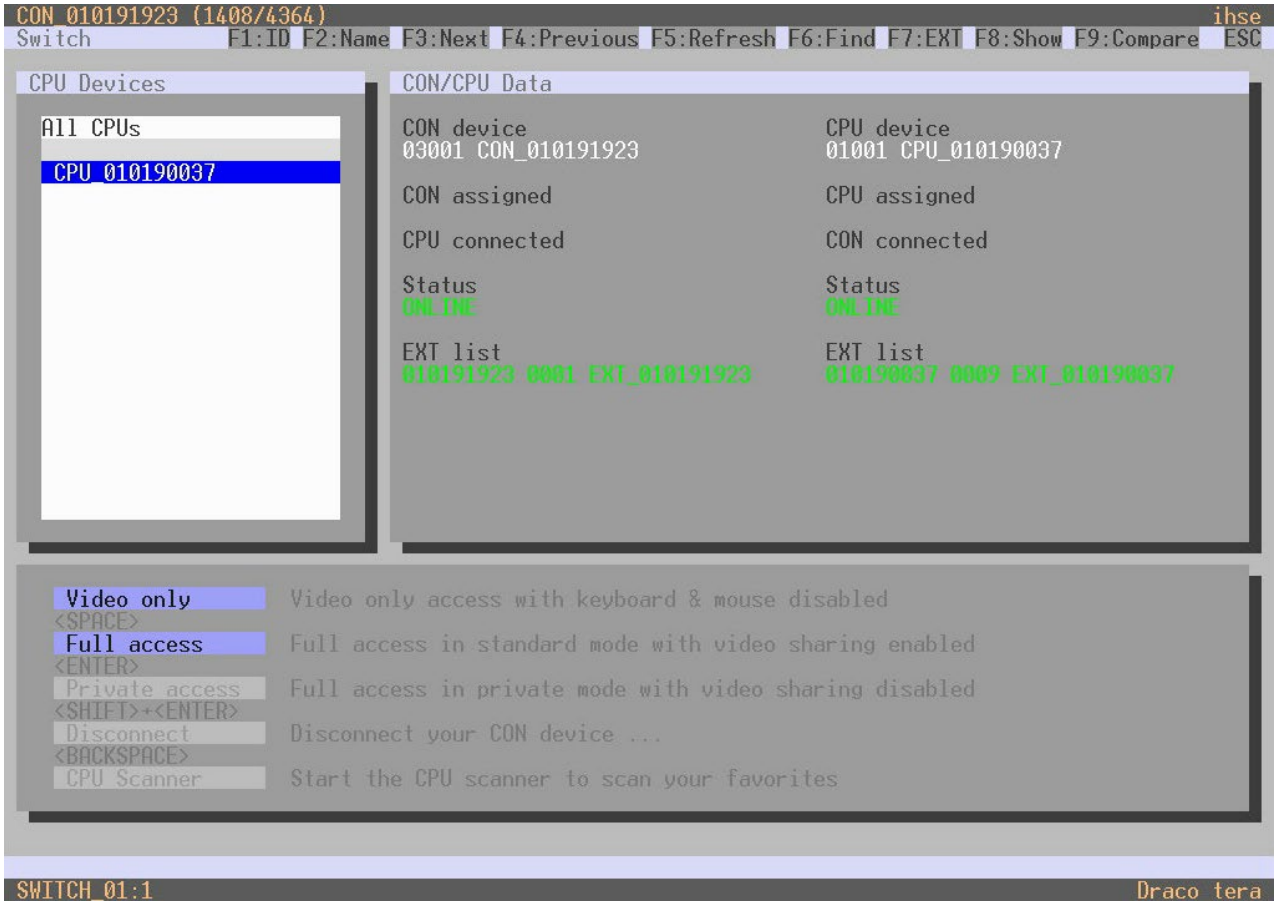


*Fig. 209 OSD Menu **Switch***

The following keyboard commands are available to select the connection type:

Keyboard command	Function
Space	Set a video only connection.
Enter	Set a KVM connection with full access.
Shift + Enter	Set a KVM connection in Private Mode (video sharing disabled).
Backspace	Disconnect the own CON Device from the CPU Device.

To switch the CON Device to any available CPU Device, proceed as follows:

1. Click **Switch** in the main menu.
2. Select in the **CPU Devices** list on the left-hand side that CPU Device that should be connected to the CON Device.
3. Press the appropriate keyboard command to confirm the desired connection type.

Switching operations from the own CON Device can only be performed to CPU Devices that are available in the **CPU Devices** list.

Listed CPU Devices highlighted in red color are currently connected in Private Mode and are blocked by the connected CON Device.

Press F8 to expand the current view to show inactive CPU Devices.

Switching via CPU Device Selection List

The matrix offers the ability to execute KVM switching operations by means of a CPU Device selection list next to the OSD in full screen.

To use the CPU Devices selection list, proceed as follows:

1. Tick the **Enable CPU Selection** checkbox in the **Configuration > EXT Units** menu for those CON Devices where the CPU Device selection list should be available.
2. Press Hot Key + o or the Fast Key to open the OSD.
   The extender OSD opens showing the CPU Device selection list.

Press F8 to hide inactive CPU Devices to provide a clearer overview.

3. Select the desired CPU Device the CON Device should be switched.
4. Press the respective key to execute the desired switching operation.
   To prevent a switching operation and access the OSD menu, press F7.
   To close the selection list, press Esc.

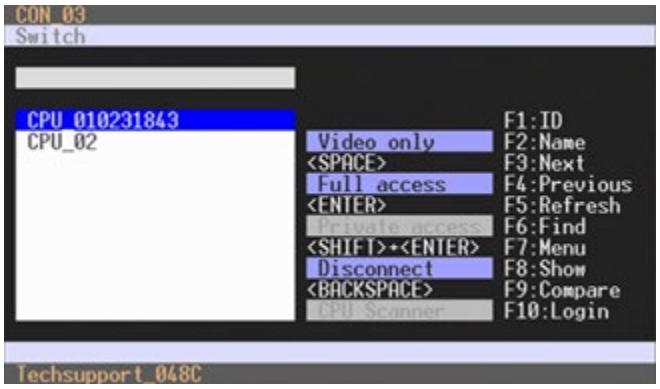


*Fig. 210 Example view **CPU selection list***

The following keyboard commands are available to select the connection type:

Keyboard command	Function
Space	Set a video only connection.
Enter	Set a KVM connection with full access.
Shift + Enter	Set a KVM connection in Private Mode (video sharing disabled).
Backspace	Disconnect the own CON Device from the CPU Device.

Activating the Automatic Scan Mode for CPU Devices

The matrix offers the ability to use a scan mode based on the favorite list of each CON Device or user. The scan mode allows the matrix to switch in sequence between the CPU Devices in the favorite list within a predefined time. All scans are performed in Video Only mode.

To configure the automatic scan mode, refer to chapter 6.7.3, page 119.

To activate the scan mode, proceed as follows:

1. Define a favorite list for the respective CON Device (see chapter 6.7.4, page 122) or users (see chapter 6.4.2, page 95).
2. Press Hot Key + o or the Fast Key to open the OSD.

   The extender OSD opens with the CPU Device selection list.
3. Select one of the CPU Devices in the CPU Device selection list that are defined in your favorite list.
4. Confirm your selection by clicking **CPU Scanner**. The scan will automatically start.

If you have enabled the **Force CPU Scan** option (see chapter 6.7.3, page 119), the scan will automatically start after switching the respective CON Device to any CPU Device from the favorite list without the need to click **CPU Scanner**.

9.1.2 Extended Switching

At least power user rights are required according to the **CON Device ACL** or **User ACL**.

Press F8 to hide inactive CPU Devices to provide a clearer overview. Press F8 again to expand the current view to show inactive CPU Devices.

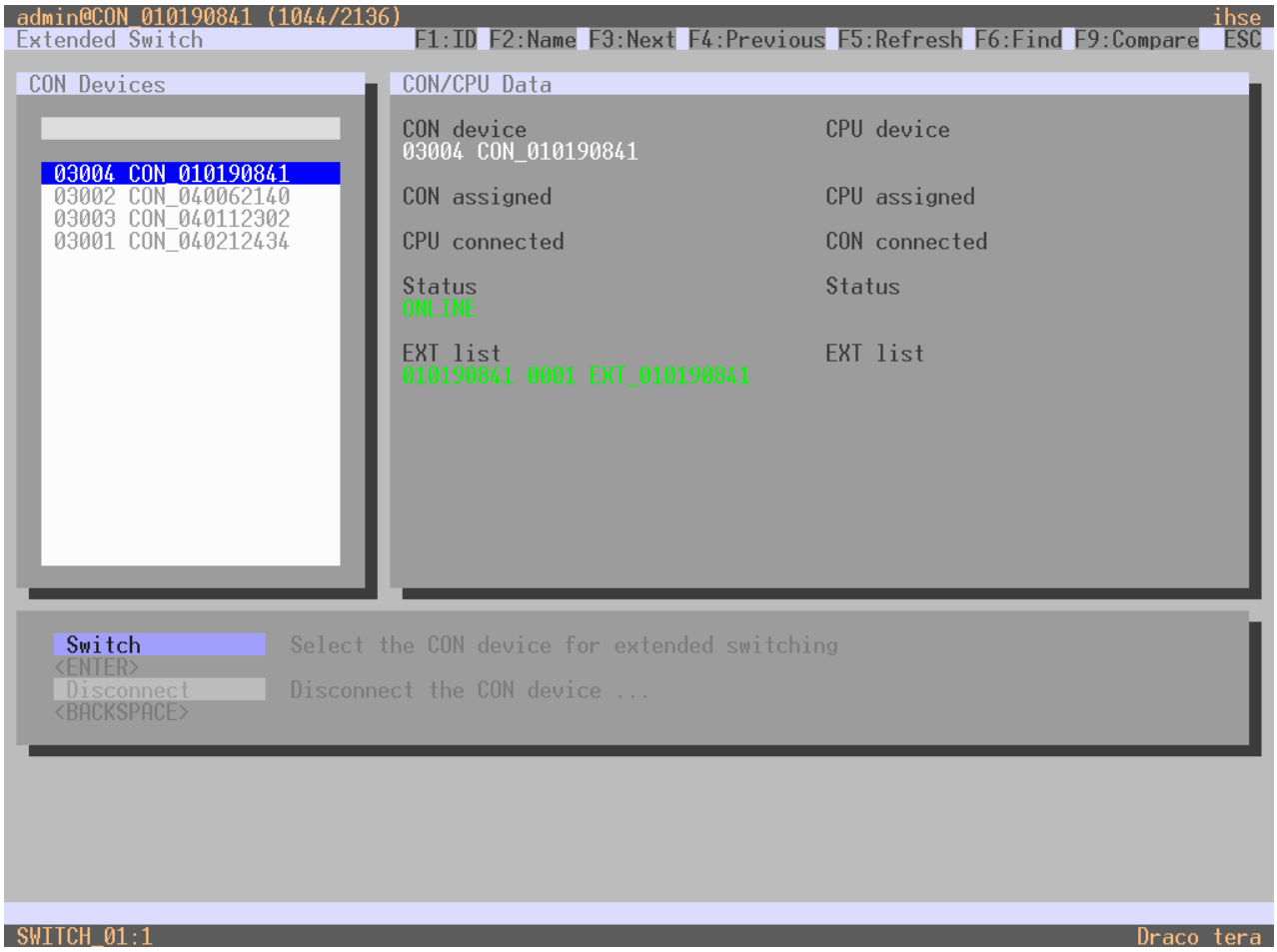


*Fig. 211 OSD Menu **Extended Switch***

The following information is shown in this menu:

Field	Description
CON device	Real CON Device with assigned CON EXT Unit.
CON assigned	Virtual CON Device that is assigned to the real CON Device.
CPU connected	Currently connected CPU Device.
CON status	Current connection status (CON Device).
EXT list	List of all available physical EXT Units.
CPU device	Assigned physical EXT Unit.
CPU assigned	Real CPU Device that is assigned to a virtual CPU Device.
CON connected	Currently connected CON Device.
CPU status	Current connection status (CPU Device).
EXT list	List of all available physical EXT Units

The following keyboard commands are available for switching operations after selecting a CON Device and pressing Enter:

Keyboard command	Function
Space	Set a Video Only connection.
Enter	Set a KVM connection.
Shift + Enter	Set a KVM connection in Private Mode (video sharing disabled).
Backspace	Disconnect the own CON Device from CPU Device.

To switch any CON Device to any available CPU Device, proceed as follows:

1. Click **Switch** in the main menu.
2. Select in the **CON Devices** list on the left-hand side that one that should be switched to a CPU Device.
3. Press Enter.

   The connection types and their corresponding keyboard commands are listed in the lower working area.
4. Select in the **CPU Devices** list on the left hand side that one that should be connected to the open **CON Device**.
5. Press the appropriate keyboard command to confirm the desired connection type.

Switching operations from the user's CON Device can only be performed on CPU Devices that are available in the **CPU Devices** list.

9.1.3 USB 2.0 Switching

Switching of USB 2.0 extender modules basically works like switching of KVM extender modules. The following scenarios to switch USB 2.0 extender modules are possible.

1. An EXT Unit with USB 2.0 will be created and assigned to an already existing device with existing KVM EXT Units (see chapter 6.6.1, page 108 or chapter 6.7.3, page 119).
2. A separate device for the EXT Unit with USB 2.0 will be created without assigning a KVM EXT Unit to that device. This possibility offers a separate switching of the USB 2.0 signal (see chapter 6.6.1, page 108 or chapter 6.7.3, page 119).

Switching of USB 2.0 signals uses Extended Switching functionality (see chapter 9.1.2, page 302).
When using parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to 10 s or more (see chapter 6.3.4, page 80). Otherwise, the connection of the USB 2.0 extender module will not be established due to security and stability reasons.

9.1.4 Switching via Macro List

Next to executing macros via function keys F1 to F16, they can also be executed via Macro List in the OSD. At the same time this specific list offers the possibility to see the content of the various macros including the single commands before executing them. There are displayed 16 of the total 32 macros per page.

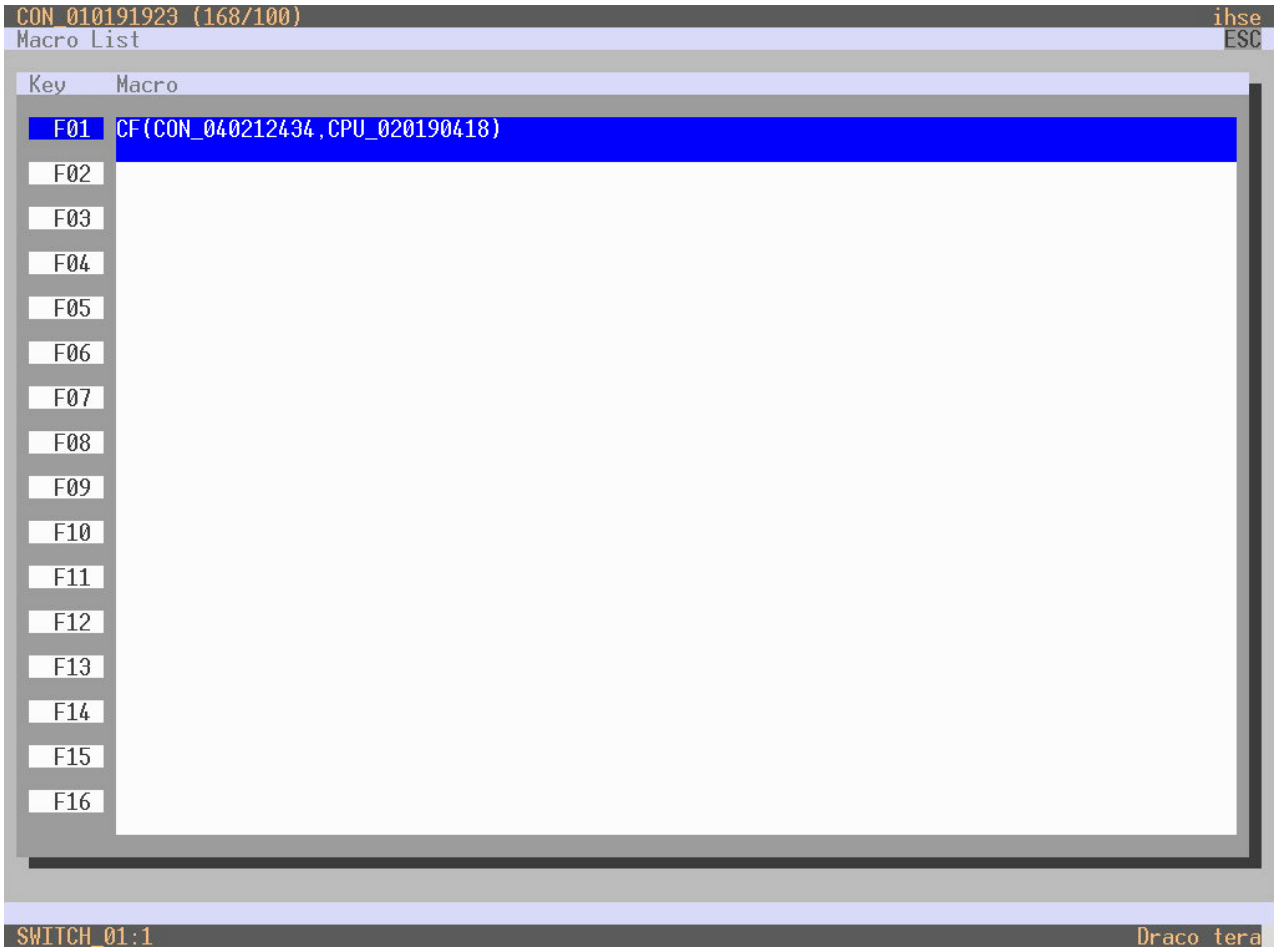


*Fig. 212 OSD Menu **Macro List***

1. Click **Macro List** in the main menu.
2. Ensure CON or user macros have been already configured.
3. Select the respective macro in the list that you want to execute.
4. Press Page Down and select the macro afterwards if you want to execute a macro 17-32 (Shift + F1 to F16).
5. Press Enter to execute the macro.

   The macro will be immediately executed.

If the Macro List should be directly displayed upon opening OSD, activate the option **Show Macro List** in the menu **Configuration > CON Devices** for the respective CON Devices.

9.1.5 Switching of single EXT Units within Devices

You can independently switch CON Devices and CPU Devices with single EXT Units within configurations consisting of CON Devices and CPU Devices with multiple EXT Units.

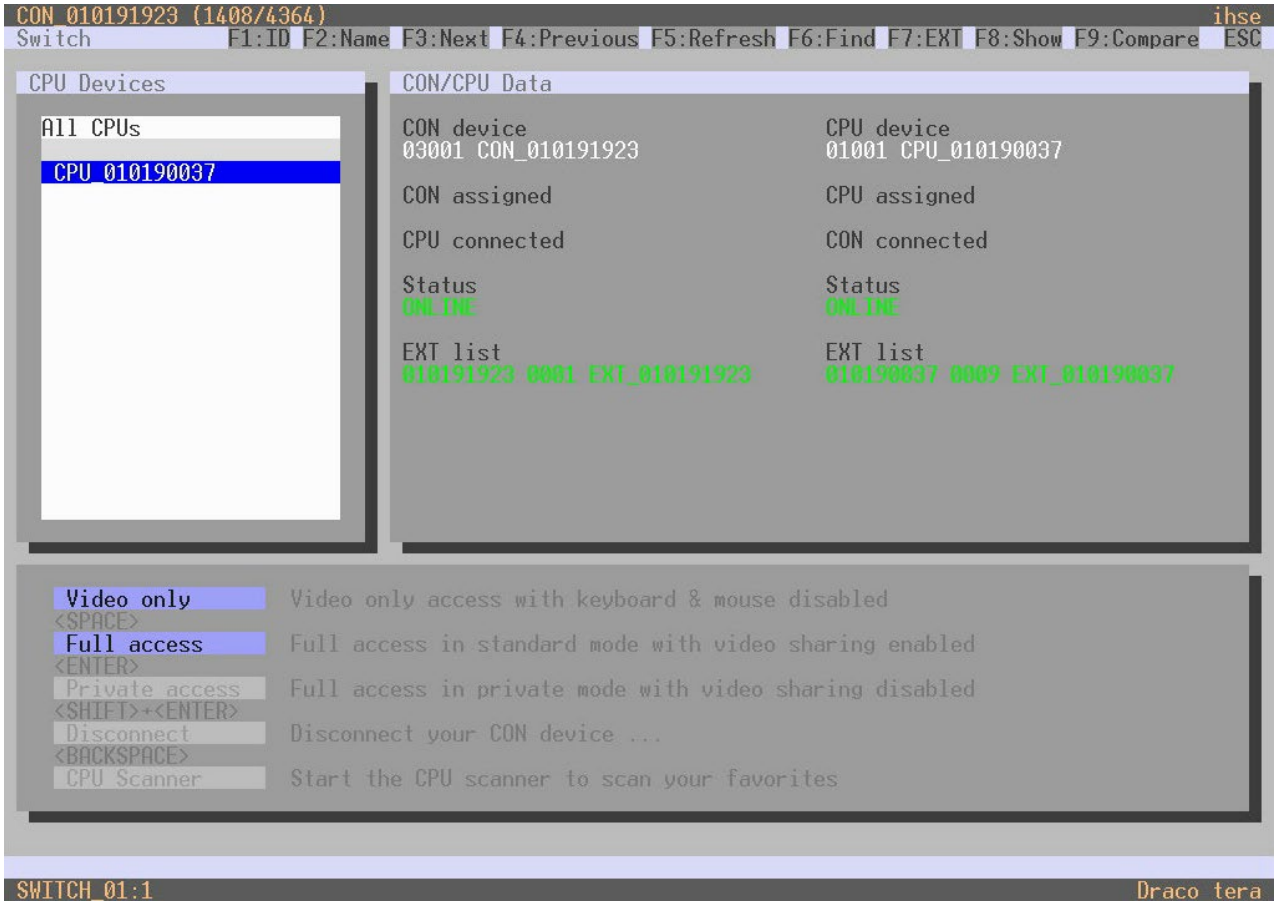


*Fig. 213 OSD Menu **Switch***

To switch a CON Device with a single EXT Unit to a CPU Device with multiple EXT Units, proceed as follows:

1. Click **Switch** in the main menu.
2. Select the respective CPU Device in the CPU Devices list containing the EXT Unit you want to have access to.
3. Press F7 on the keyboard. The standard will change into the switching mode for CON Devices with a single EXT Unit.
4. Select the EXT Unit you want to switch within your CON Device.
5. Press Tab to access the EXT Unit list of the selected CPU Device.
6. Select the CPU EXT Unit you want to switch to.
7. Press Space to execute the switching operation.

Switching of single EXT Units from a Device is only possible in **Video Only** mode. Single EXT Units of a Device that are already switched will be highlighted with "**!**".

9.1.6 Switching a CON Unit to a local Source

CON Units connected to a local source can be locally switched via the matrix. Switching is performed between the local source and the KVM connection and can be executed via OSD or keyboard command (see chapter 8.1.5, page 293).

If you switch to the local source, the KVM connection will be automatically disconnected.

When using CON Units with the possibility to connect a local source in a MSC environment, the local switching will be disabled.

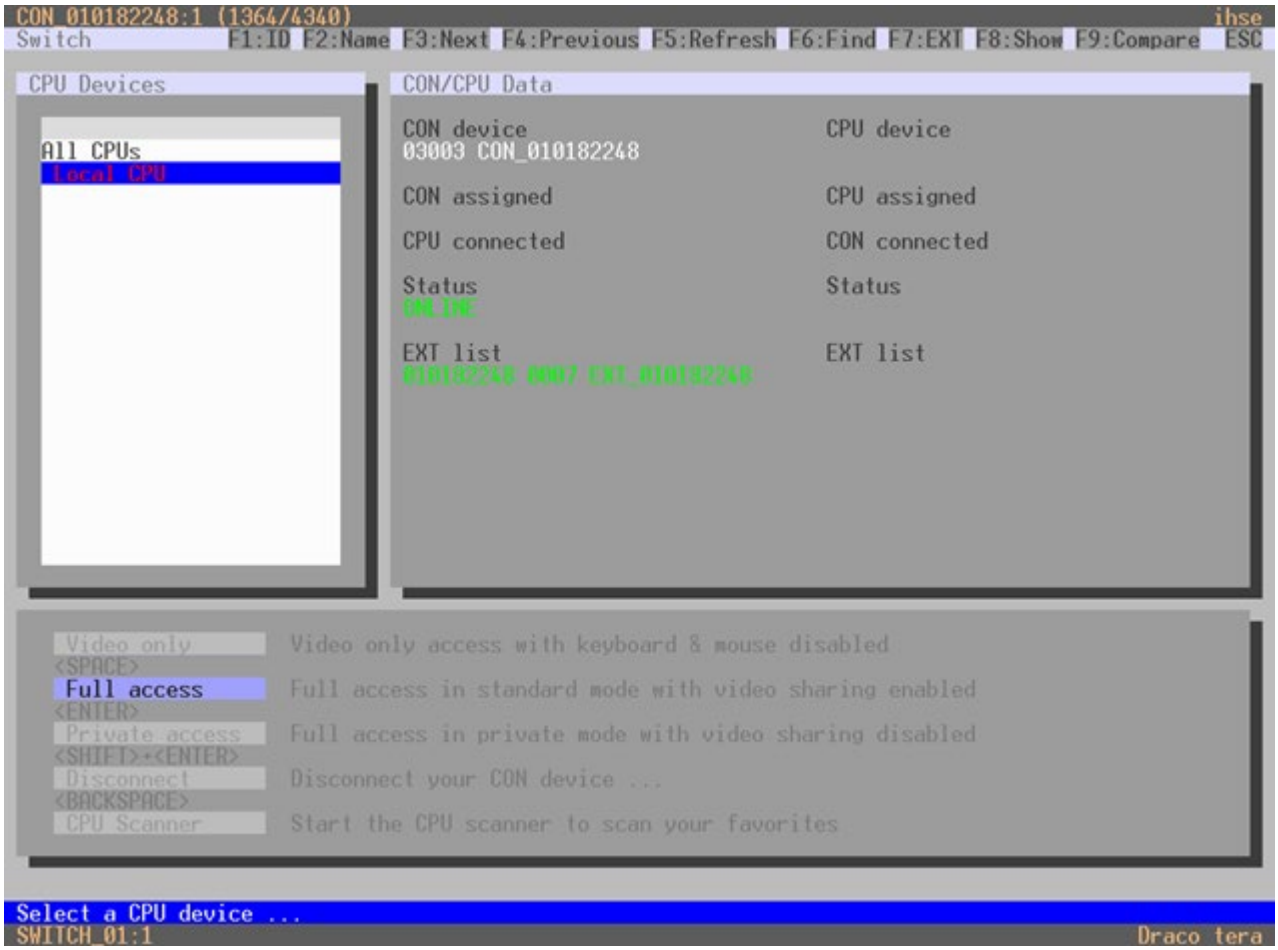


*Fig. 214 OSD Menu **Switch - Local Source***

To switch to a local source, proceed as follows:

1. Press Hot Key + o or the Fast Key to open the OSD.
   All available CPU Devices are listed in the start menu.
2. Switch to the local source in the **Local CPU** list.
   The switching operation to the local source will be performed immediately.

The local source will be only shown in the OSD if the connected CON Unit includes the option for a local connection.

As an alternative, keyboard commands are available to switch to the local source (see chapter 8.1.5, page 293).

9.2 Restarting and Powering down Functions via OSD

NOTICE

Possible damage of boards or the matrix

The file system check phase when the matrix is restarted (indicated with 2x white LEDs) is a very sensitive process.

If the matrix is switched off while restarting, the respective boards may be damaged in its function.

➡ DO NOT power off the matrix while the file system is being checked.

NOTICE

Possible loss of the current configuration

If the matrix is restarted or shut down (indicated with 1x off/1x yellow LEDs), the current configuration is saved.

If the matrix is powered off while shutting down or restarting, the matrix may restart with factory settings.

➡ DO NOT power off the matrix while shutting down or restarting.

9.2.1 Restarting the Matrix

To perform a restart of the matrix, proceed as follows:

➡ Select **Configuration > Restart Matrix** in the main menu.

The current configuration is saved in the permanent memory of the matrix and matrix will be restarted with the current configuration.

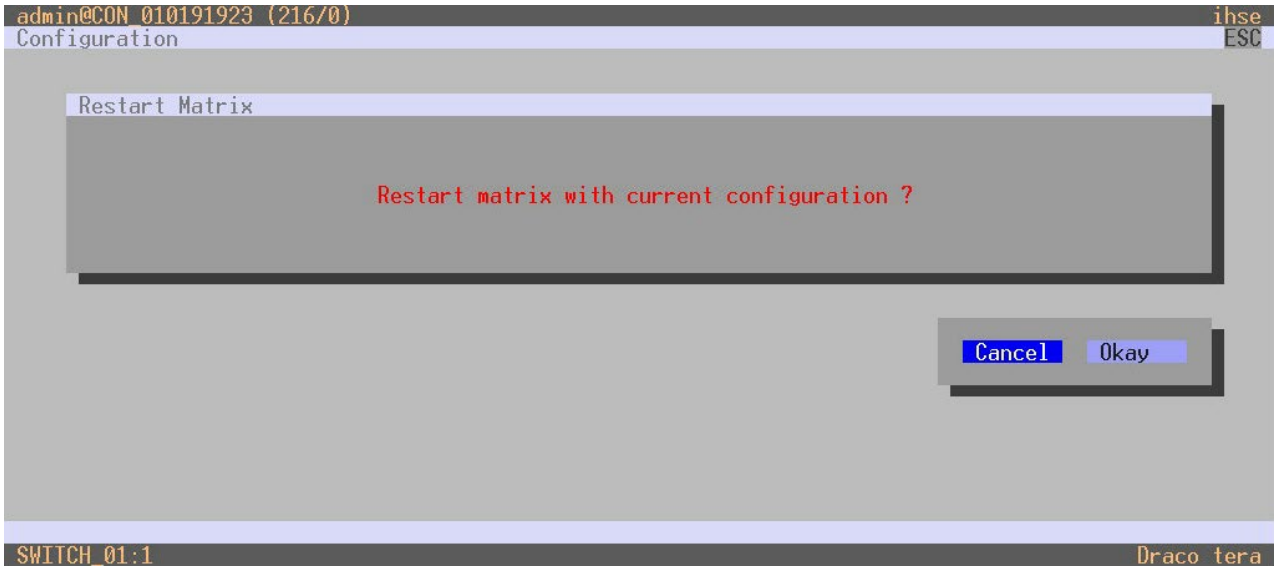


*Fig. 215 OSD Menu **Configuration - Restart Matrix***

9.2.2 Restarting an I/O Board

To perform a restart of an I/O board to which the user's CON Unit is connected, proceed as follows:

➡ Select **Configuration > Restart IO Board** in the main menu.

The I/O board will be restarted.

*Fig. 216 OSD Menu **Configuration - Restart I/O Board***

To restart I/O boards with CPU extender modules, use the restart option of the management software (see chapter 12.2.3, page 320)

9.2.3 Restarting the Controller Board

To perform a restart of the controller board, proceed as follows:

➡ Select **Configuration > Restart CPU Board** in the main menu.

The current configuration of the controller board is saved in the permanent memory of the matrix and the controller board will be restarted with the current configuration.

*Fig. 217 OSD Menu **Configuration - Restart CPU Board***

9.2.4 Powering Down the Matrix

To shut down the system, proceed as follows:

1. Select **Configuration > Shut down Matrix** in the main menu.
2. Click **Okay** to confirm the selection.

   The current configuration of the matrix is saved in the permanent memory of the matrix and the matrix will be shut down.

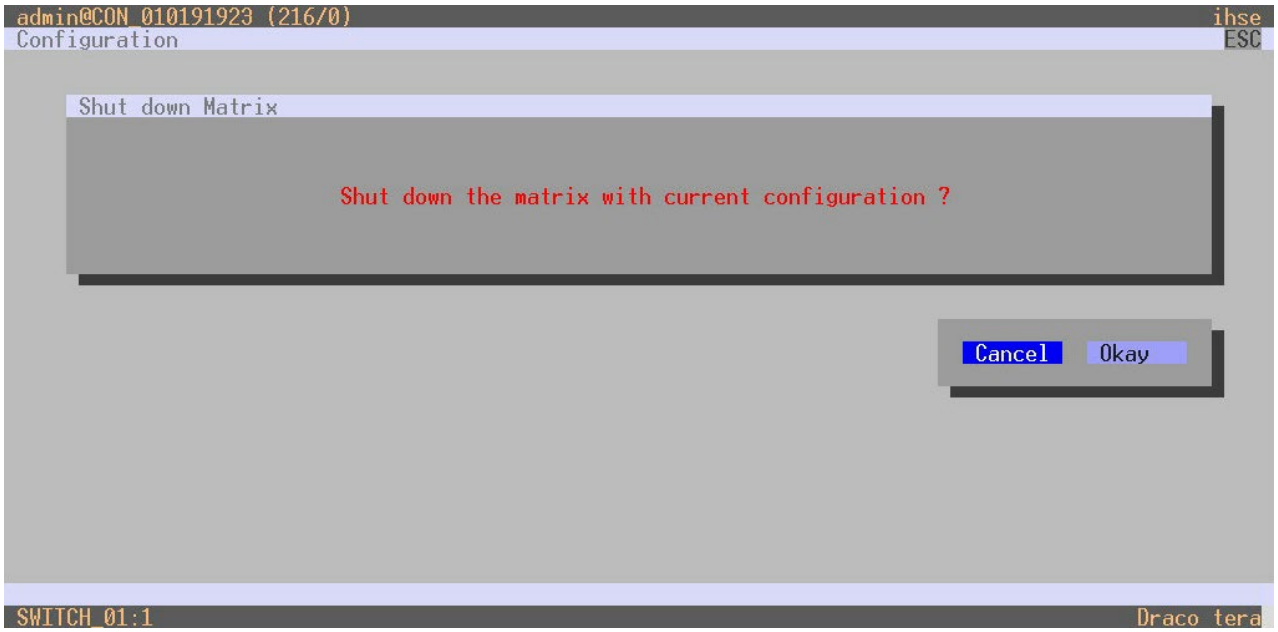


*Fig. 218 OSD Menu **Configuration - Shut down Matrix***

9.2.5 Powering Down the I/O Board

To shut down the I/O board, proceed as follows:

1. Select **Configuration > Shut down IO Board** in the main menu.
2. Click **Okay** to confirm the selection.

   The current configuration of the I/O boards is saved in the permanent memory of the matrix and the I/O board will be shut down.

*Fig. 219 OSD Menu **Configuration - Shut down I/O Board***

10 Operation via Mouse with Multi-Screen Control

The MSC function cannot be guaranteed when using wireless keyboards and mice.

To perform a switching operation by movement of the mouse pointer, proceed as follows:

1. Move the mouse pointer to that edge of the display which borders vertically or horizontally to the adjacent display.
2. Move the mouse pointer beyond the edge of the display.

   The USB-HID control will be switched seamlessly allowing full control of the associated source. The mouse pointer appears on the target display.

The switching operation can also be performed via keyboard (see chapter 8.1.6, page 294).

11 Operation via Serial Interface

The Matrix offers the option to switch via a serial interface (RS232).

Detailed information for the corresponding switching commands is available in form of an API (application programming interface) upon request.

12 Operation via Management Software

12.1 Switching Operation via Management Software

12.1.1 Extended Switching

Switching operations can only be performed in online mode. That means an active network connection is required between the matrix and the management software.
At least power user rights are required according to the **CON Device ACL** or **User ACL**.

You have two options to perform switching operations for the matrix via management software:

Possibility 1

All connected CON Devices and the associated CPU Device connections are shown in columns in the working area in this menu.

1. Click **Control > Extended Switch** in the task area.
2. Click **Activate Edit Mode** in the toolbar.

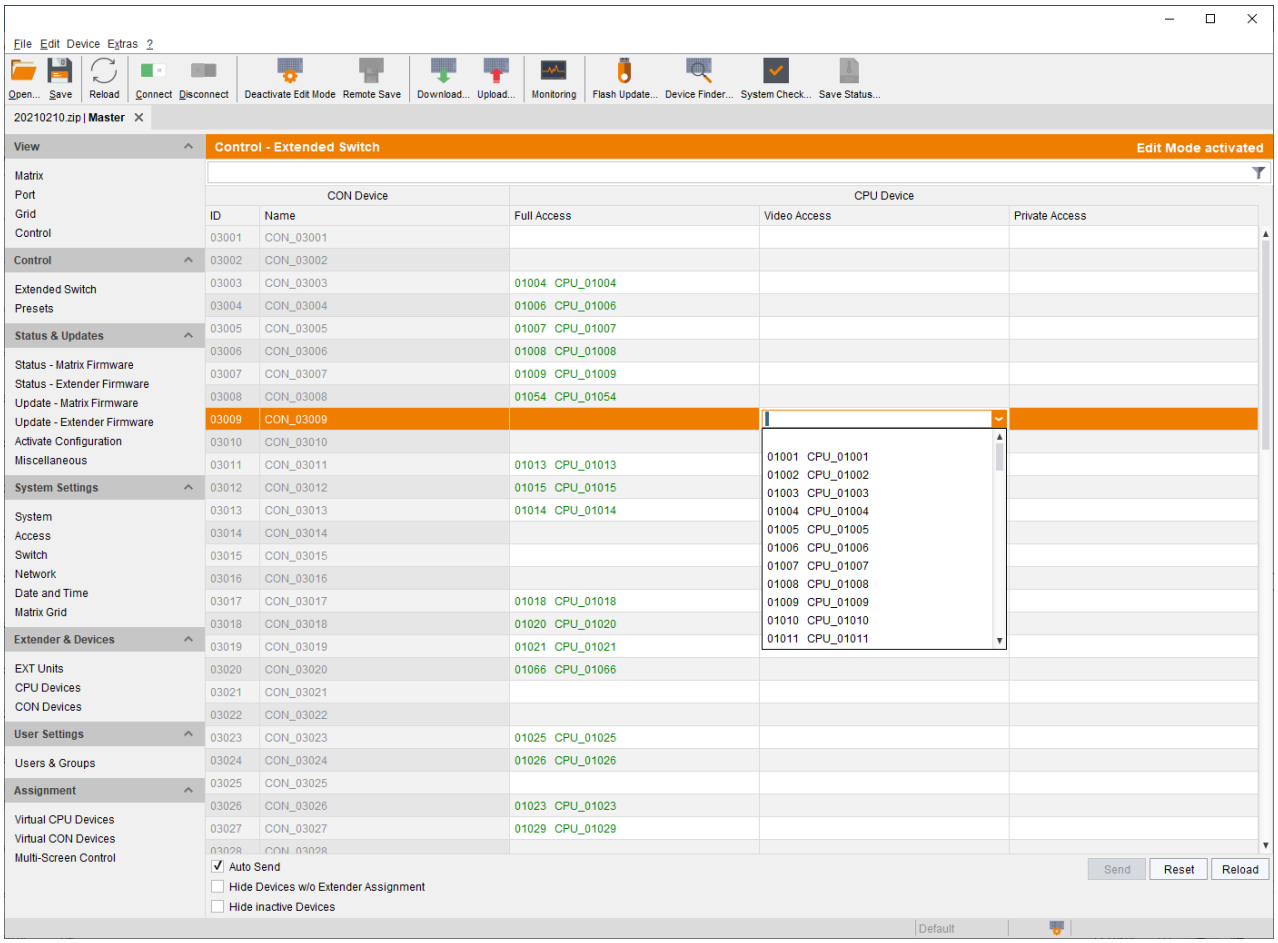


*Fig. 220 Management software menu **Control - Extended Switch***

The following functions are available to perform a switching operation:

Button	Function
Send	Send effected switching operations to the matrix
Reset	Disconnect all existing connections within the matrix
Reload	Reload switching status

To perform a switching operation, proceed as follows:

- ➡ To set a **KVM connection** between a CON Device and a CPU Device, double-click on the corresponding selection box within the **Full Access** column and select the requested CPU Device.
- ➡ To set a **video connection** between a CON Device and a CPU Device, double-click on the corresponding selection box within the **Video Access** column and select the requested CPU Device.
- ➡ To set a **Private Mode** connection between a CON Device and a CPU Device, double-click on the corresponding selection box within the **Private Access** column and select the requested CPU Device.

If a CPU Device does not have access rights, it will not appear in the list.

If the **Auto Send** checkbox is ticked in the lower left corner of the workspace, the switching operations will be performed immediately without user confirmation by clicking **Send**.
If the **Hide Devices w/o Extender Assignment** function in the left lower corner of the work area is ticked, only CON Devices and CPU Devices that are assigned to EXT Units are shown.

Possibility 2

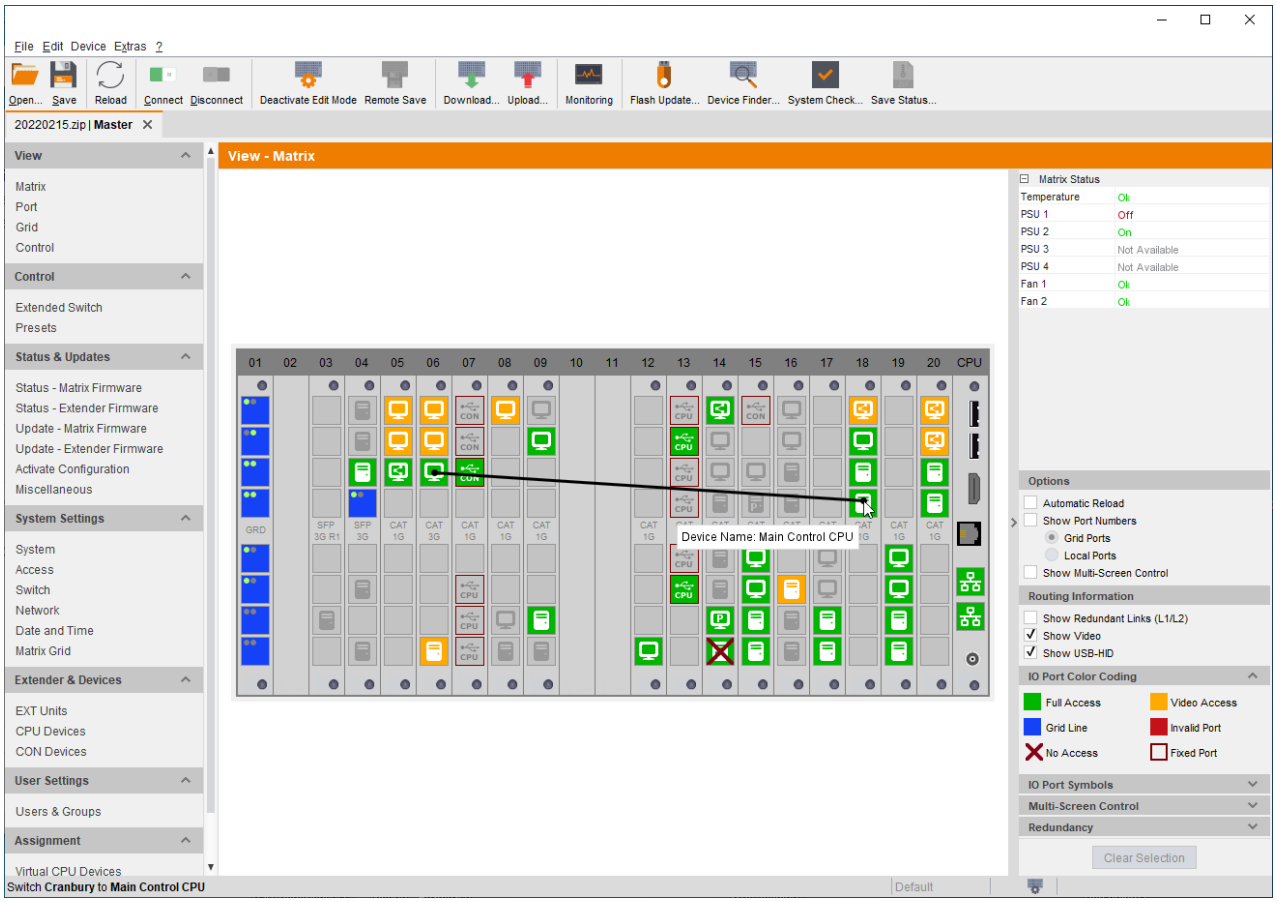


*Fig. 221 Management software menu **View - Matrix***

The following symbols may be shown in the connection overview:

Symbol	Description
	CON Device is connected via **Shared Access** with at least one further CON Device to the same CPU Device. The CON Device has Full Access at the moment.
	CON Device is connected via **Shared Access** with at least one further CON Device to the same CPU Device. The CON Device has a Video Access connection at the moment.

To perform switching operations between CON and CPU Devices proceed as follows:

1. Click **View > Matrix** in the task area or select **View > Port** when using a Matrix Grid.
2. Move the mouse cursor to the port that has to be switched.
3. Hold down the left mouse button and move the cursor to the port that has to be connected to the initial port. The current cursor movement will be displayed by a black auxiliary line.
4. Release the left mouse button.

   A selection menu to select the available switching type (**Full Access**, **Video Access** or **Private Mode**) will be opened.
5. Select the desired switching type.

   The switching operation will be immediately executed. At the same time all EXT Units that are assigned to the involved devices will be switched.

If a port is shown with a red cross on **Matrix View**, the CON Device does not have access rights to the CPU Device connected to that port.

To disconnect existing connection between CON Device and CPU Device, proceed as follows:

1. Click with the right mouse button on the port that is to be disconnected.
2. Click the **Disconnect** function in the context menu.

   The connected ports will be immediately disconnected. At the same time all further connections of the extender modules assigned to the involved devices will be disconnected.

12.1.2 USB 2.0 Switching

Switching of USB 2.0 extender modules basically works like switching of KVM extender modules. The following scenarios to switch USB 2.0 extender modules are possible.

1. An EXT Unit with USB 2.0 will be created and assigned to an already existing device with existing KVM EXT Units (see chapter 7.7.3.3, page 225 or chapter 7.8.3.3, page 243).
2. A separate device for the EXT Unit with USB 2.0 will be created without assigning a KVM EXT Unit to that device. This possibility offers a separate switching of the USB 2.0 signal (see chapter 7.7.3.1, page 224 or chapter 7.8.3.1, page 242).

Switching of USB 2.0 signals uses Extended Switching functionality (see chapter 12.1.1, page 313).
When using parallel operation within the matrix, set the **Release Time** in the **System Settings > Switch** menu to 10 s or more (see chapter 7.4.7, page 163). Otherwise, the connection of the USB 2.0 extender module will not be established due to security and stability reasons.

12.1.3 Predefining Macros

Predefined macros to switch the matrix without loading a new configuration can be created and activated in this menu. This is a function of the management software, not of the matrix. The predefined macros are locally saved on your computer.

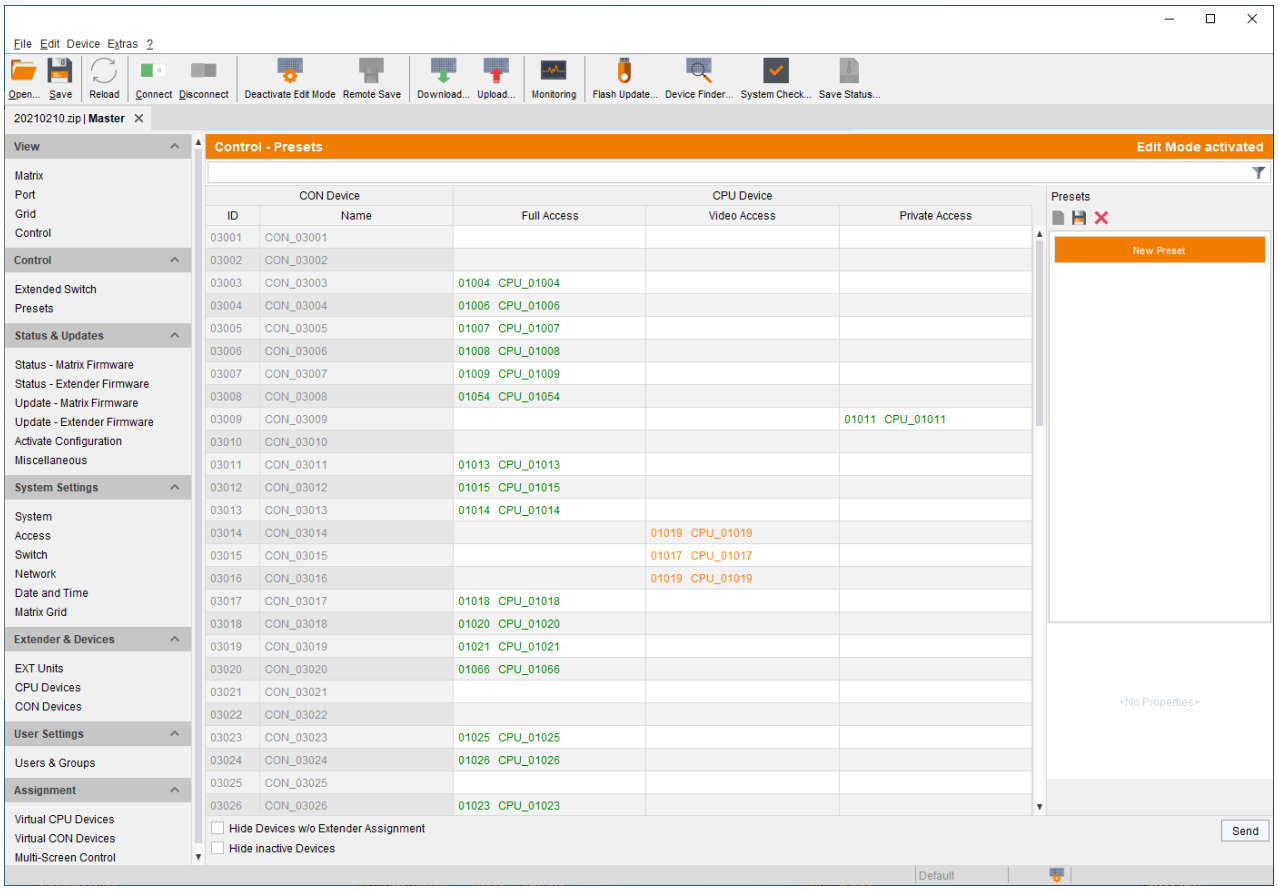


*Fig. 222 Management software menu **Control - Presets***

Creating a new Switch Macro

To create a new switch macro, proceed as follows:

1. Click **Control > Presets** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click (**New**) in the right column of the working area to open a new switch macro.

   You are asked if the existing connections should be taken over for the new switch macro.
4. Click on a device in the corresponding columns (**Full Access**, **Video Only** or **Private Mode**) to drop down the appropriate selection to set the desired switching operations or use the function for a disconnect (**Disconnect CPU**).
5. Click (**Save**) in the right column of the working area to save the created switch macro.

   A save dialog appears.
6. Enter a name for the new switch macro.
7. Click **Ok** in the save dialog to confirm the new preset.

   The new switch macro is listed in the right column.
8. Click **Activate Edit Mode** in the toolbar.

Copying a Switch Macro

To copy a switch macro, proceed as follows:

1. Click **Control > Presets** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click with the right mouse button on a selected switch macro in the right column to copy the current switch macro and click the **Save as...** option in the context menu.
4. Click **Activate Edit Mode** in the toolbar.

Deleting a Switch Macro

To delete a switch macro, proceed as follows:

1. Click **Control > Presets** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select a switch macro to be deleted.
4. Click ✕ (**Delete**) in the right column of the working area to delete the current switch macro or click with the right mouse button on a selected switch macro and click the **Delete...** option in the context menu.
5. Click **Activate Edit Mode** in the toolbar.

Loading a Switch Macro

To load a predefined switching, proceed as follows:

1. Click **Control > Presets** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the switch macro in the right column of the working area that has to be loaded.
4. Click **Send** on the lower right of the working area to activate the selected switch macro.
5. Click **Activate Edit Mode** in the toolbar.

A predefined switch macro can only be activated in online mode.

When loading presets, only those switching operations that are compliant with the hardware and the configuration of the currently used matrix are taken into account.

12.2 Restarting and Powering down Functions via Management Software

NOTICE

Possible damage of boards or the matrix

The file system check phase when the matrix is restarted (indicated with 2x white LEDs) is a very sensitive process.

If the matrix is switched off while restarting, the respective boards may be damaged in its function.

➡ DO NOT power off the matrix while the file system is being checked.

NOTICE

Possible loss of the current configuration

If the matrix is restarted or shut down (indicated with 1x off/1x yellow LEDs), the current configuration is saved.

If the matrix is powered off while shutting down or restarting, the matrix may restart with factory settings.

➡ DO NOT power off the matrix while shutting down or restarting.

12.2.1 Restarting the Matrix

To perform a restart of the matrix, proceed as follows:

1. Click **Device > Advanced Service > Restart Device** in the menu bar.

   An access window appears.
2. Enter the username and password of the administrator.
3. Click **Ok**.

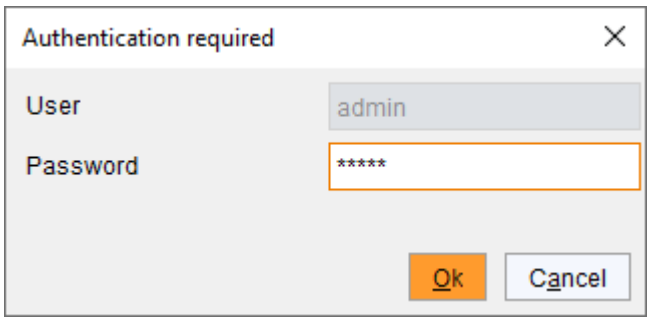


*Fig. 223 Management software dialog **Log in administrator***

A query to restart the matrix appears.

4. Click **Yes** to restart the matrix.

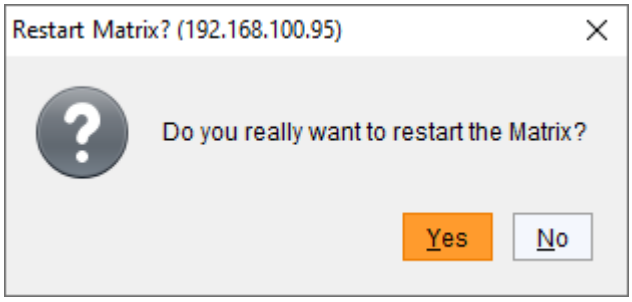


*Fig. 224 Management software dialog **Restart Matrix***

The current configuration is saved in the permanent memory of the matrix and the matrix will be restarted.

12.2.2 Restarting the Controller Board

To perform a restart of the controller board, proceed as follows:

1. Click **View > Matrix** in the task area.
2. Click with the right mouse button on the symbol of a network port of the controller board to be restarted.

   A context menu appears.
3. Click the **Restart CPU Board** function in the context menu.

   Note: The controller board will be restarted immediately without user confirmation. The symbols of the network ports are red for a short time in the overview. When the symbols of the network ports are green again, the restart of the controller board was successful.

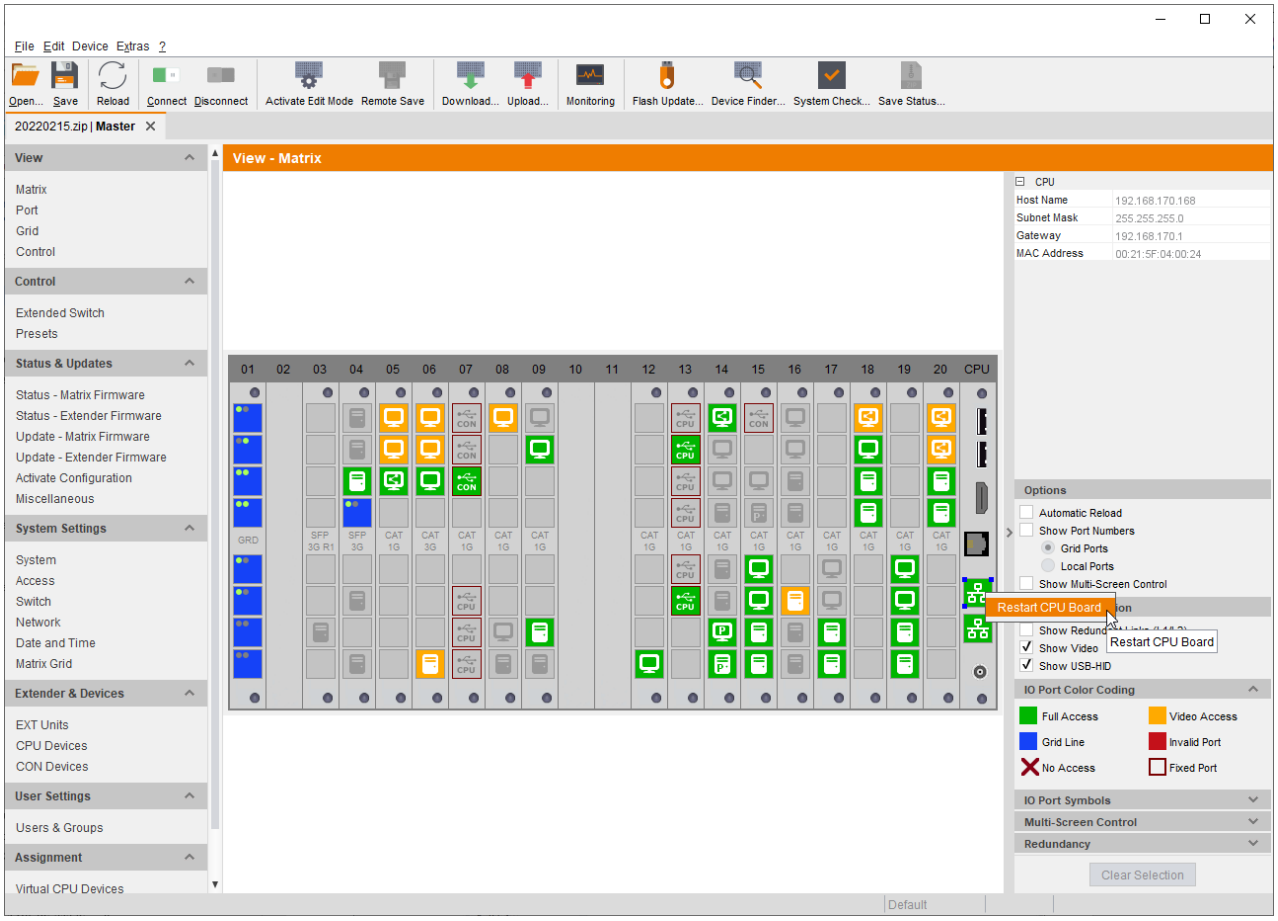


*Fig. 225 Management software **View - Matrix - Restart Controller Board***

12.2.3 Restarting an I/O Board

To perform a restart of the I/O board, proceed as follows:

1. Click **View > Matrix** in the task area.
2. Click with the right mouse button on the symbol of the extender module of the I/O board to be restarted.

   A context menu appears.
3. Click the **Restart I/O Board** function in the context menu.

   Note: The I/O board will be restarted immediately without user confirmation. The I/O board will disappear for a short time in the overview. When the I/O board is visible again, the restart of the I/O board was successful.

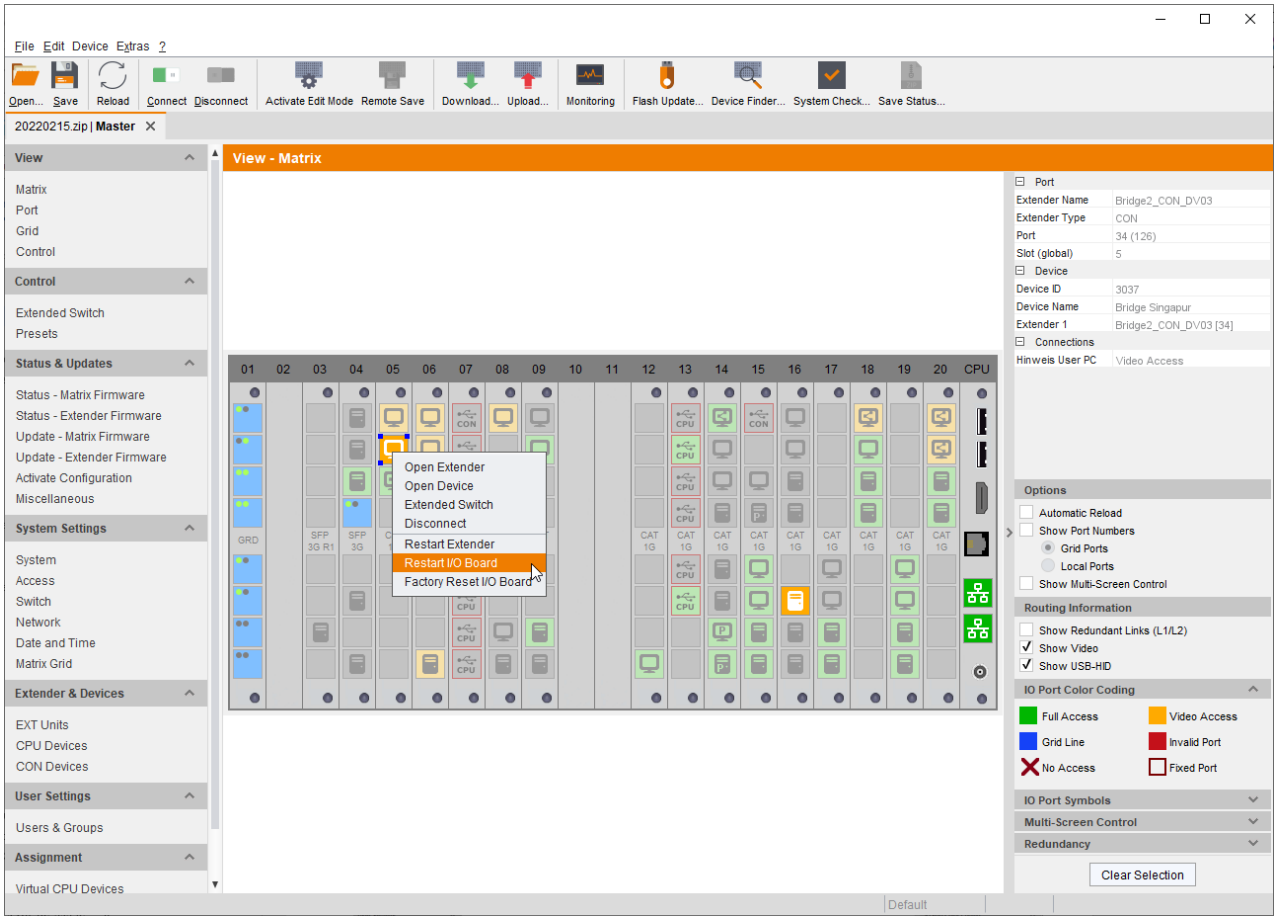


*Fig. 226 Management software **View - Matrix - Restart I/O Board***

12.2.4 Restarting an Extender Module

There are two possibilities to restart an extender module.

Possibility 1

To perform a restart of an extender module, proceed as follows:

1. Select **View > Matrix** in the task area.
2. Click with the right mouse button on the symbol of the extender to be restarted.

   A context menu appears.
3. Select the **Restart Extender** function in the context menu.

   Note: The extender module will be restarted immediately without user confirmation. The extender module symbol will disappear for a short time in the overview. When the symbol is visible again, the restart of the extender module was successful.

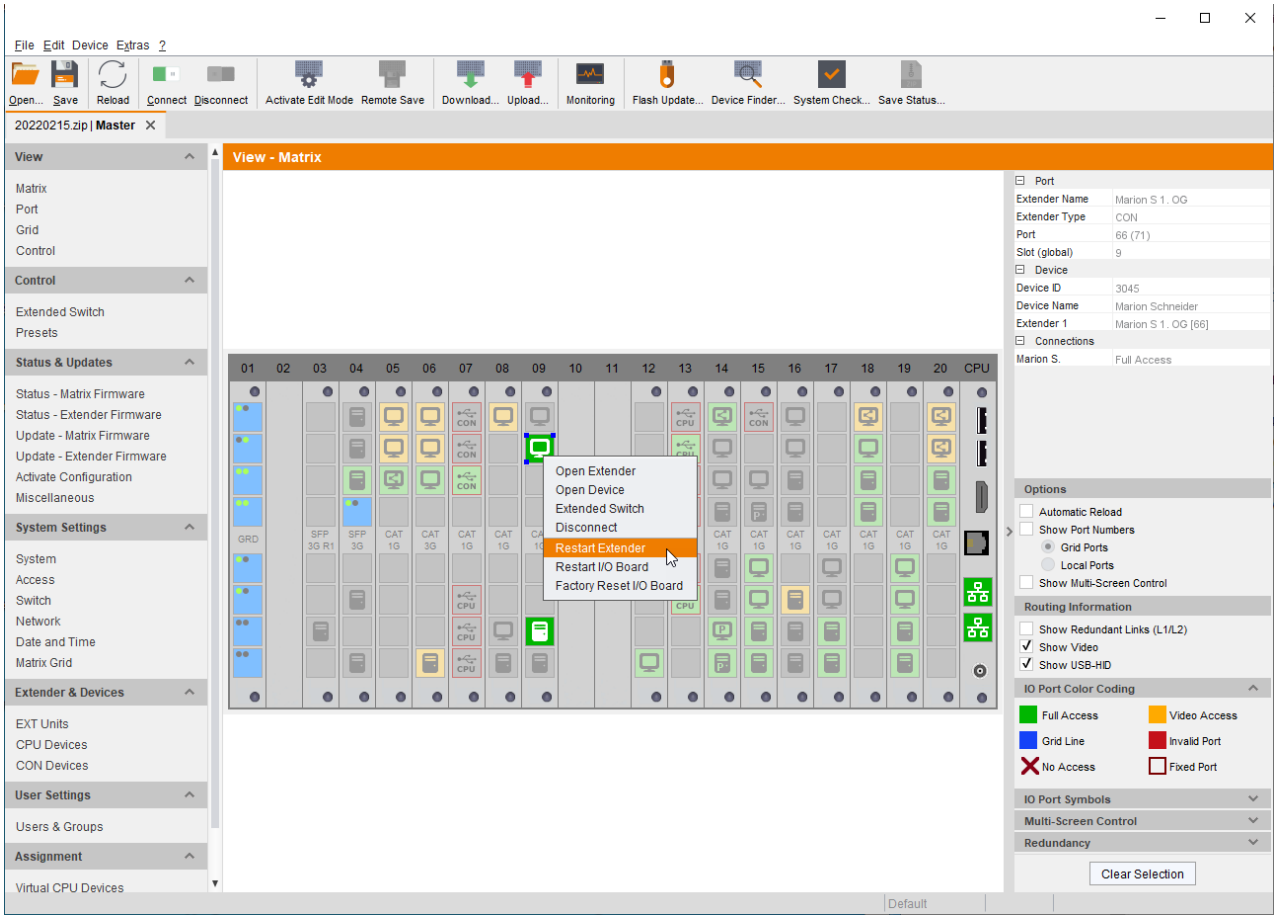


*Fig. 227 Management software **View - Matrix - Restart Extender***

Possibility 2

To perform a restart of an extender module, proceed as follows:

1. Select **Extender & Devices > EXT Units** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the EXT Unit in the EXT Units list whose extender module has to be restarted.
4. Click **Restart Extender** in the lower part of the working area.

   A query for the restart appears.
5. Click **Yes** to restart the extender module.

   The EXT Unit will disappear from the list for a short time. When the EXT Unit is visible again, the restart of the extender module was successful.
6. Click **Deactivate Edit Mode** in the toolbar.

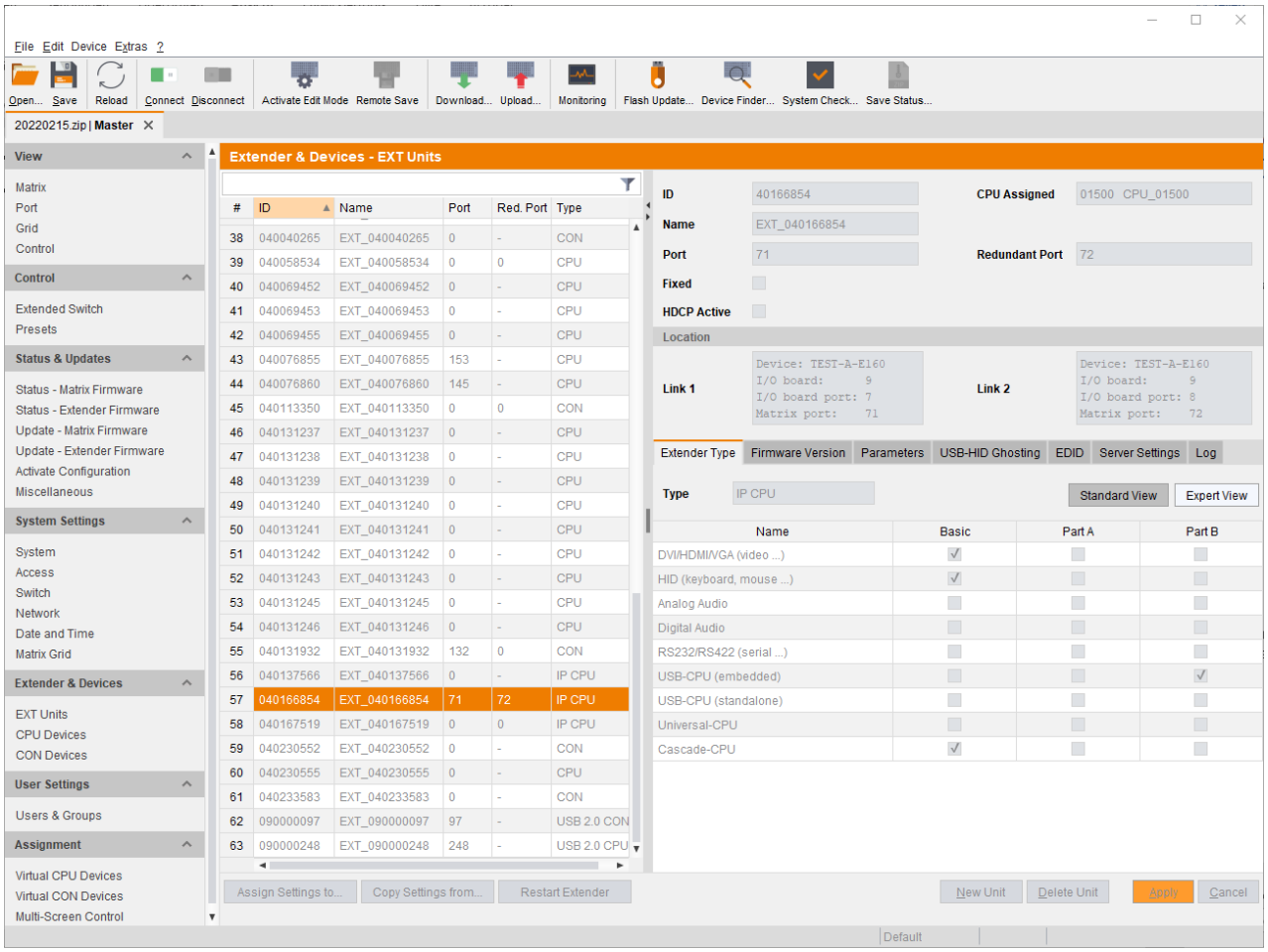


*Fig. 228 Management software menu **Extender & Devices - EXT Units***

12.2.5 Powering Down the Matrix

To shut down the matrix, proceed as follows:

1. Select **Device > Advanced Service > Shut down Matrix** in the menu bar.

   An access window appears.

2. Enter the username and password of the administrator.
3. Click **Ok**.

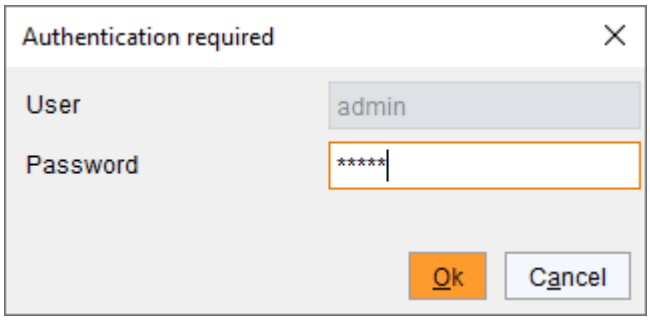


*Fig. 229 Management software dialog **Log in administrator***

A query to shut down the matrix appears.

4. Click **Yes** to start the shutdown.

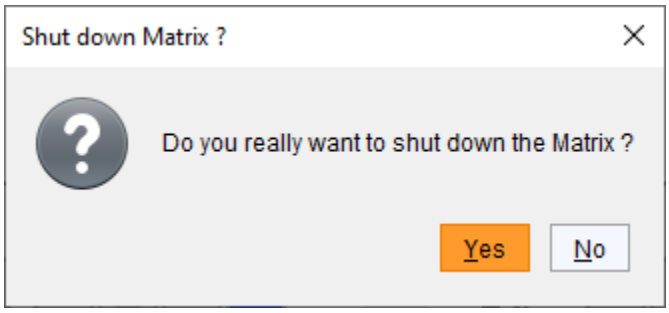


*Fig. 230 Management software dialog **Shut down Matrix***

The current configuration is saved in the permanent memory of the matrix and the matrix will be shut down.

After shutting down, a notification to power off the matrix appears.

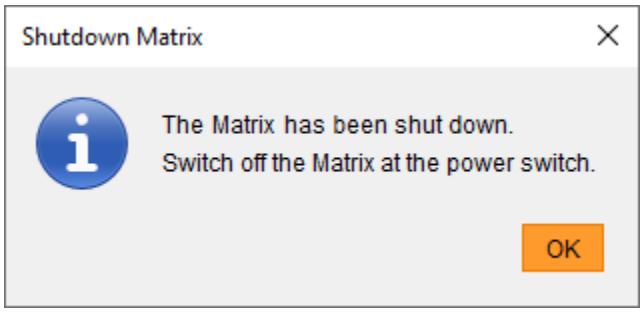


*Fig. 231 Management software notification **Switch off Matrix***

13 Maintenance

13.1 Maintening the Hardware

NOTICE

Possible damage to the mechanical and electronic components

The chassis does not contain any components that require maintenance. If the chassis is nevertheless opened and damaged in the opening process, the manufacturer's warranty is voided.

The chassis, the controller boards, and I/O boards as well as the accessories can be damaged by cleaning with damp or aggressive cleaning agents. If the chassis is nevertheless cleaned with damp or aggressive cleaning agents and damaged in the cleaning process, the manufacturer's warranty will be voided.

➡ DO NOT open the device.

➡ In case of failure, contact the supplier or manufacturer.

➡ Remove dust deposits from the device with a dry, antistatic cloth.

For a 24/7 operation it is recommended that a stock of critical spare parts is maintained, including a chassis.

The matrix contains various components and assemblies that are hot swappable and can be removed and exchanged or maintained during operation. The exchangeable components within the matrix are described from chapter 13.1.1 to 13.1.6.

13.1.1 Replacing a Matrix

13.1.1.1 Creating a Backup File

Preconditions

- The computer running the management software is connected to the matrix via TCP/IP port.
- The management software is running.
- The matrix is connected via management software.

Creating a Backup File

To create and save a backup file locally, please see chapter 7.14.1, page 285.

13.1.1.2 Physical Replacing a Matrix

To physically replace the matrix from the rack, please proceed as follows:

1. Switch off the matrix to be replaced.
2. Disconnect the power supply cables from the matrix.
3. Disconnect the network cable from the matrix.
4. Disconnect the interconnect cables of the extender module from the matrix.
5. Remove the 4 rack mount screws from the chassis of the matrix.
6. Remove the matrix out of the rack.
7. Place the new matrix into the rack.
8. Tighten the 4 rack screws at the chassis of the new matrix.
9. Connect the interconnect cables of the extender modules to the new matrix.
10. Connect the network cable to the new matrix.
11. Connect the power supply cables to the new matrix.
12. Power on the new matrix.

13.1.1.3 Opening and Uploading the Backup Data

Preconditions

- The computer running the management software is connected to the matrix via TCP/IP port.
- The management software is running.
- The matrix is connected via management software.

Opening a locally saved Backup File

To load a locally saved backup file, please see chapter 7.14.2, page 289.

Uploading a Configuration

To upload an opened locally saved backup file, please see chapter 7.14.3, page 289.

13.1.2 Replacing a Controller Board

NOTICE

Damaged controller board due to by switching off the matrix during replacement process

When replacing a controller board, the new one will automatically receive the current matrix configuration. Therefore, it is necessary to perform a correct de-registration of the controller board to be replaced and a correct registration of the new controller board. Switching off the matrix during the replacement process may cause a disfunction or a damage of the controller board.

➡ Observe the steps described in this chapter.

➡ Wait until the old board has been de-registered and the new board has been registered.

➡ Do NOT switch off the matrix while replacing the controller board replacement.

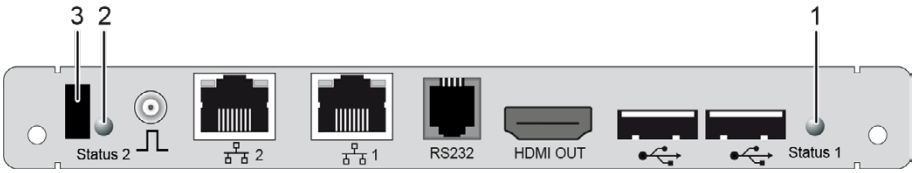


Fig. 232 Interface side - Draco tera controller board 480-CTRL2

1 Controller board status LED 1
2 Controller board status LED 2
3 Locking pin

To replace a controller board, proceed as follows:

1. Pull the locking pin slowly out of the controller board up to the stop.

Wait until the LED 1 illuminates solid green and the LED 2 flashes red (de-registration confirmed, see chapter 3.6.1.1, page 28).

2. Remove all cables from the controller board.
3. Pull the controller board out of the corresponding slot by using the locking pin.
4. Push a new or maintained controller board into the slot.
5. Push the locking pin completely in.

   A successful registration of the controller board will be shown by a permanent green flashing of status LED 1.
6. Connect all cables to the controller board according to the replaced board.

13.1.3 Replacing an I/O-Board

NOTICE

Damaged I/O board due to by switching off the matrix during replacement process

When replacing an I/O board, the new one will automatically receive the current configuration of the replaced I/O board. Therefore, it is necessary to perform a correct de-registration of the I/O board to be replaced and a correct registration of the new I/O board. Switching off the matrix during the replacement process may cause a disfunction or a damage of the I/O board.

- ➡ Observe the steps described in this chapter.
- ➡ Wait until the old board has been de-registered and the new board has been registered.
- ➡ Do NOT switch off the matrix while replacing the I/O board replacement.

The replacement of I/O boards is described using the Cat X I/O board as an example.

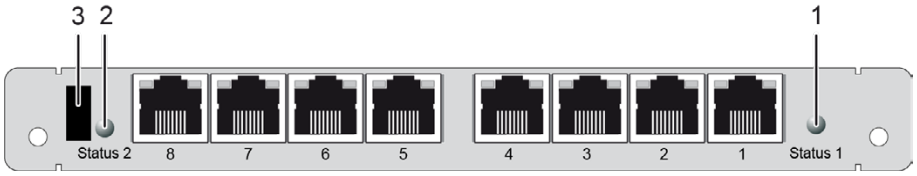


Fig. 233 Interface side - Draco tera Cat X I/O board

1 Controller board status LED 1
2 Controller board status LED 2
3 Locking pin

To replace an I/O board, proceed as follows:

1. Pull the locking pin slowly out of the I/O board up to the stop.

Wait until the LED 1 illuminates solid green and the LED 2 flashes red (de-registration confirmed, see chapter 3.6.2.1, page 30).

2. Remove all cables from the I/O board.
3. Pull the I/O board out of the corresponding slot by using the locking pin.
4. Push a new or maintained I/O board into the slot.
5. Push the locking pin completely in.

   A successful registration of the I/O board will be shown by a permanent green flashing LED 1.
6. Connect all cables to the I/O board according to the replaced board.

13.1.4 Replacing Power Supply Units

13.1.4.1 Power Supply Unit for Draco tera 80/48 Port

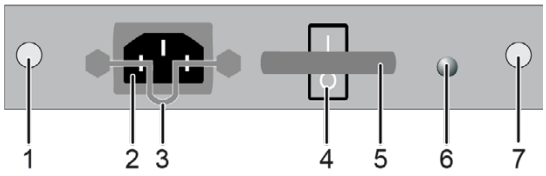


Fig. 234 Power supply unit for Draco tera 40/80 port

1 Locking screw
2 IEC Port
3 Hanger for the power cable
4 On/Off switch
5 Handle to pull out/push in
6 LED for power supply voltage
7 Locking screw

To replace the power supply unit, proceed as follows:

1. Remove the power cord cable.
2. Loosen the locking screws.
3. Pull the power supply unit out of the corresponding slot, using the handle.
4. Before inserting a new power supply, make sure that the on/off switch is in the **I** position.
5. Push a new or maintained power supply unit into the slot until it clicks into place.
6. Tighten the screw.
7. Connect the power cord cable to the power supply unit. The power supply unit will be recognized by the system and can be used afterwards.

13.1.4.2 Power Supply Unit for Draco tera 288/160/152 Port

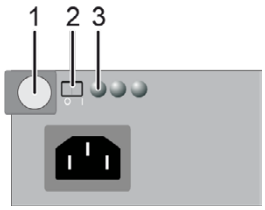


Fig. 235 Power supply unit for Draco tera 288/160/152 port

1 Bracket with locking screw
2 On/Off switch
3 LED for power supply voltage

To replace the power supply unit, proceed as follows:

1. Remove the power cord cable.
2. Loosen the locking screw.
3. Turn the unlocked bracket down.
4. Pull the power supply unit out of the corresponding slot, using the bracket.
5. Before inserting a new power supply, make sure that the on/off switch is in the **I** position.
6. Push a new or maintained power supply unit into the slot until it clicks into place.
7. Turn the bracket down and tighten the screw.
8. Connect the power cord cable to the power supply unit. The power supply unit will be recognized by the system and can be used afterwards.

13.1.4.3 Power Supply Unit for Draco tera 576 Port, Revision 1

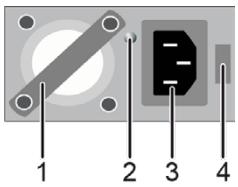


Fig. 236 Power supply unit for Draco tera 576 port, revision 1

1	Handle to pull out/push in	3	IEC Port
2	LED for power supply voltage	4	Locking lever

To replace the power supply unit, proceed as follows:

1. Remove the power cord cable.
2. Move the locking lever to the left and hold it.
3. Pull the power supply unit out of the corresponding slot, using the handle.
4. Push a new or maintained power supply unit into the slot until it clicks into place.
   When it clicks into place, the locking lever moves back in the original position.
5. Connect the power cord cable to the power supply unit. The power supply unit will be recognized by the system and can be used afterwards.

13.1.4.4 Power Supply Unit for Draco tera 576 Port, Revision 2

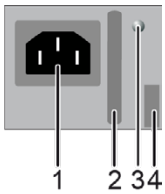


Fig. 237 Power supply unit for Draco tera 576 port, revision 2

1	IEC Port	3	LED for power supply voltage
2	Handle to pull out/push in	4	Locking lever

To replace the power supply unit, proceed as follows:

1. Remove the power cord cable.
2. Move the locking lever to the left and hold it.
3. Pull the power supply unit out of the corresponding slot, using the handle.
4. Push a new or maintained power supply unit into the slot until it clicks into place.
   When it clicks into place, the locking lever moves back in the original position.
5. Connect the power cord cable to the power supply unit. The power supply unit will be recognized by the system and can be used afterwards.

13.1.5 Replacing Fan Trays

NOTICE

Risk of electrostatic discharge

Static electricity can harm delicate components.

➡ Wear an ESD wrist strap before exchanging any part or electric component. You can use the grounding screws for connecting the ESD wrist strap.

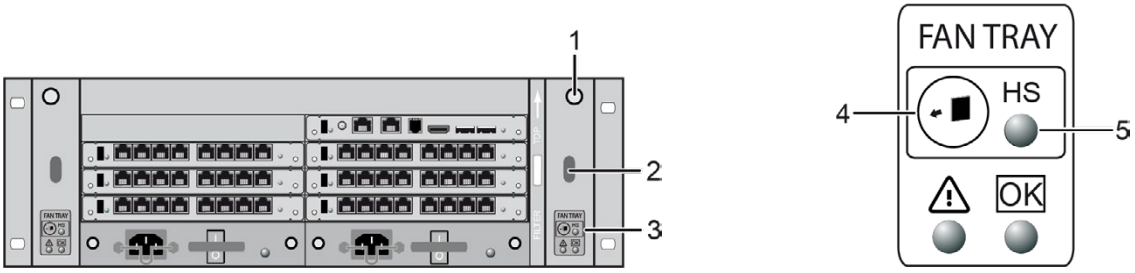


Fig. 238 Example - K048 Right fan tray with detailed view

1 Locking screw
2 Handle
3 Fan tray indication and remove soft button
4 Remove switch
5 Hot-Swap LED

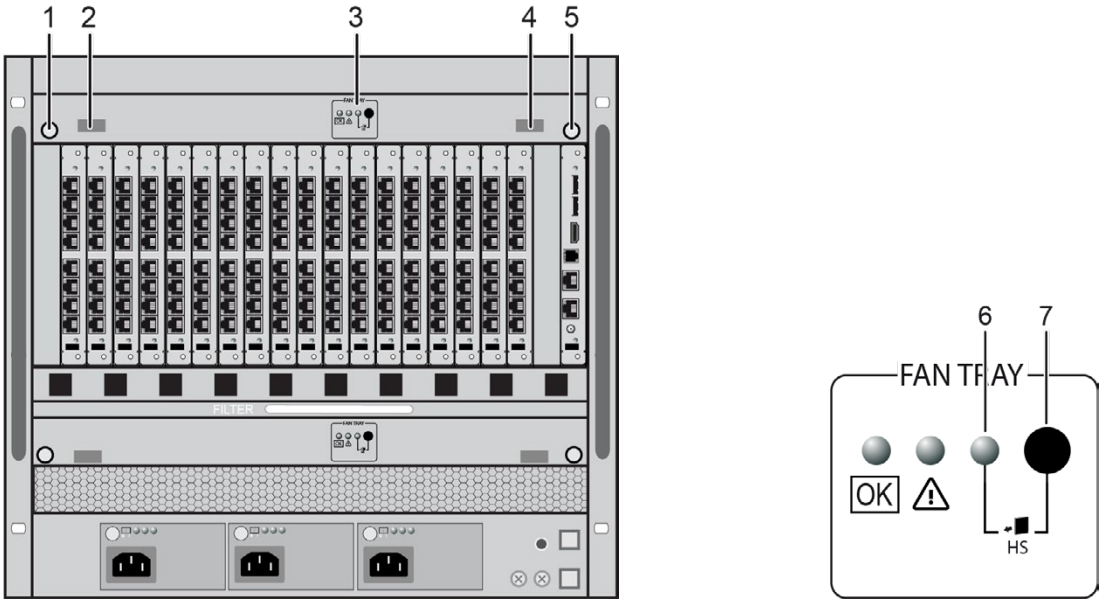


Fig. 239 Example - K160 Upper fan tray with detailed view

1 Locking screw
2 Handle
3 Fan tray indication and remove button
4 Handle
5 Locking screw
6 Hot-Swap LED
7 Remove switch

Hot-Swap LED

Pos.	LED	Description
1	Off	In use
	Flashing blue	Preparing for extraction
	Blue	Ready to remove

To exchange a fan tray, proceed as follows:

1. Unlock the locking screws.
2. Press the remove button.

   The Hot-Swap LED starts flashing. When the Hot-Swap LED illuminates solid, the fan tray is ready to be removed.
3. Hold the handles and pull out the fan tray.
4. Push a new or maintained fan tray into the slot.
5. Lock the fan tray accordingly.

   The fan tray will be recognized by the system and can be used afterwards.

13.1.6 Replacing Air Filters

NOTICE

Risk of overheating

Accumulated dust in the filter pads can decrease the air flow in the chassis. Therefore, the temperature of the matrix can be overheated.

- ➡ Check the filter pads regularly for accumulated dust.
- ➡ Clean the filter pads with low pressure compressed air or suction.
- ➡ Do NOT exceed an inspection cycle of 6 months.
  Depending on the ambient air, the inspection has to be done in a shorter cycle.
- ➡ Replace filter pads or filter trays at regular intervals of no more than one year.

The air filter can be removed by pulling the air filter's handle. To re-install, push the air filter into the guide rails at each side of the shelf regarding the labeled orientation mark until the spring mounted ball lock engage.

13.1.7 Replacing Extender Modules

The physical replacement have to be performed before unassigning an extender module and assigning another extender module.
The replacement of extender modules for CON/CPU Devices is described using a CPU Device as an example.

To unassign an extender module and assign a new extender module, proceed as follows:

1. Click **Extender & Devices > CPU Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the CPU Device whose assigned extender module has to be replaced.
4. Click **Extender Replacement** below the CPU Device list.

   An unassign/assign dialog appears.
5. Select the extender module to be replaced in the **Extender Assigned** list.
6. To remove the highlighted extender module from the **Extender Assigned** list, click ◀.
7. Click **Next >**.

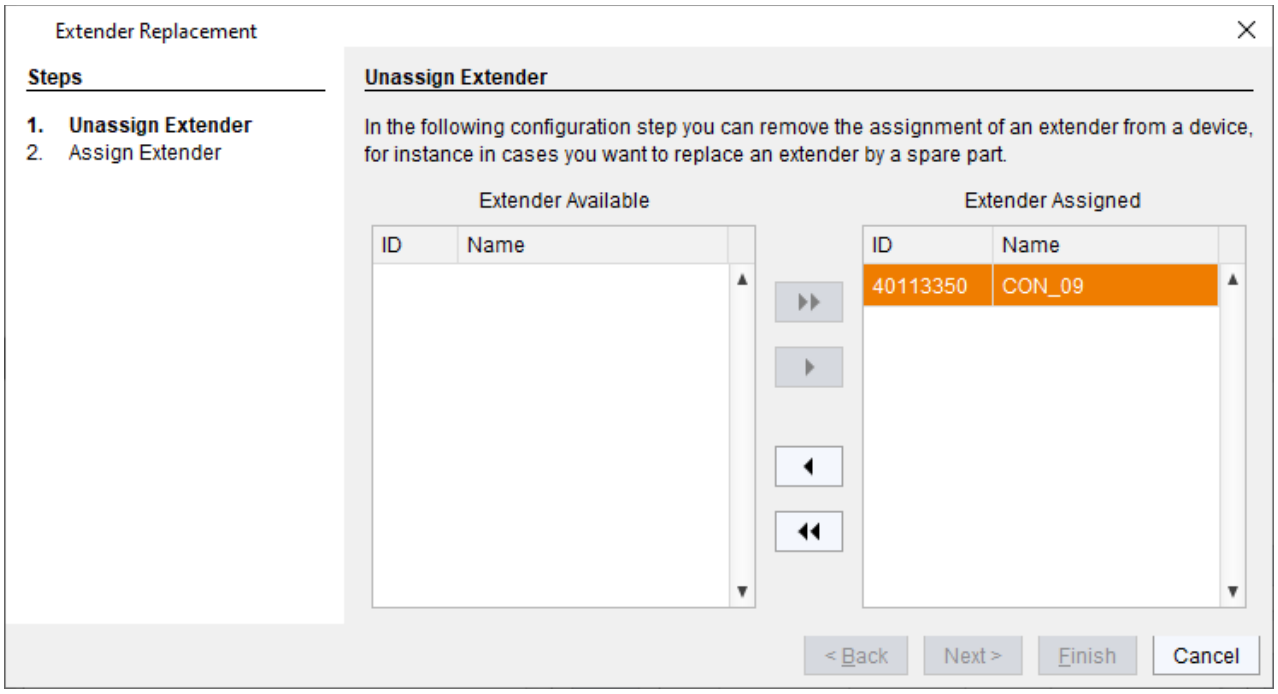


*Fig. 240 Management software Menu **Extender & Devices - CPU Devices - Extender Replacement - Unassign Extender***

A query to start the assignment appears.

8. Select the extender module in the **Extender Available** list that has to be assign to the selected CPU Device.
9. Click ▶ to move the highlighted extender module to the **Extender Assigned** list.
10. Click **Finish**.

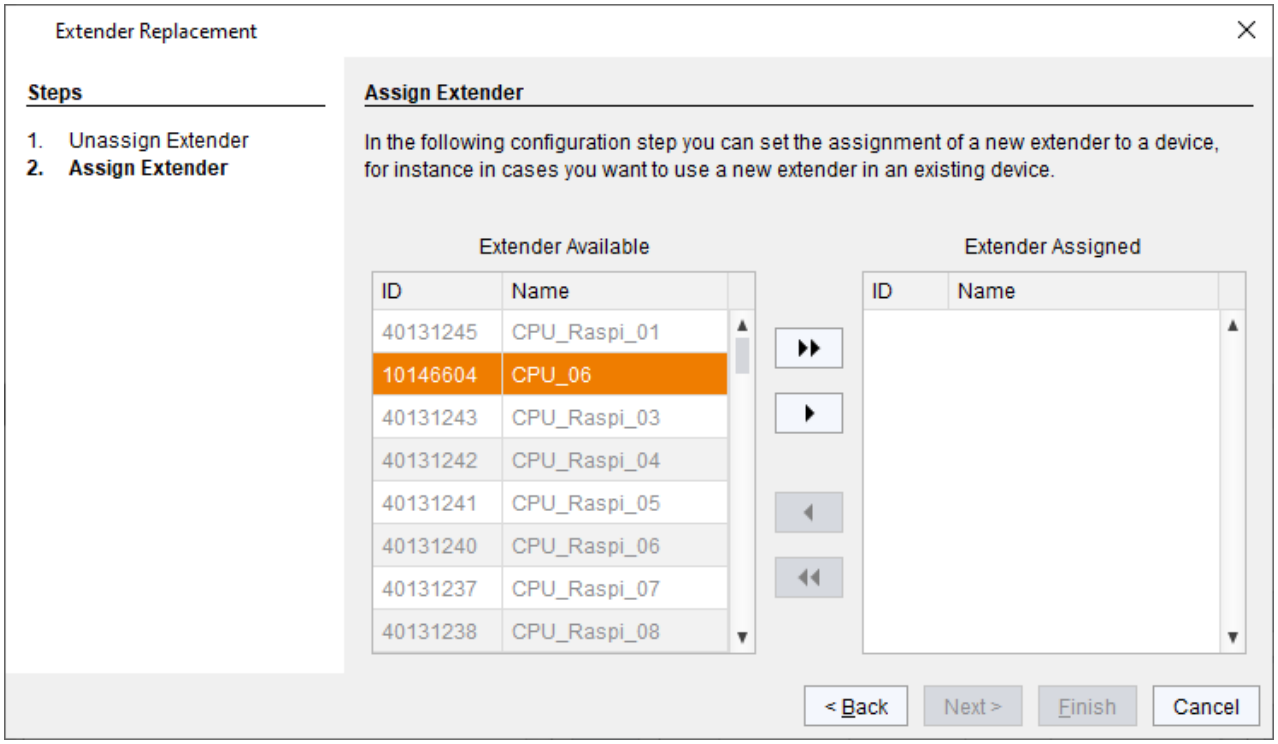


*Fig. 241 Management software Menu **Extender & Devices - CPU Devices - Extender Replacement - Assign Extender***

The extender module is assigned to the selected CPU Device.

11. Click **Deactivate Edit Mode** in the toolbar.

13.2 Maintening the Matrix via OSD

13.2.1 Extender OSD

All extender modules used with the matrix are provided with their own OSD to display the connection status of the CON Device.

Fig. 242 OSD Connection Info - Example view

The following information is shown in the OSD menu:

Field	Description	
CON	Name of CON Device	
CPU	Name and ID of currently connected CPU Device with color coding.	
	Green	The connection to the selected CPU Device is established in Full Access or Private Mode.
	Yellow	The connection to the selected CPU Device is established in Video only.
	Red	The connection to the selected CPU Device cannot be established.
	Note: Possible reasons for any incomplete or non-established connection can be switched off extender modules or insufficiently available Grid lines in Matrix Grid operation. In case of not having a grid line available to establish a connection, the additional message **No more grid lines available** will appear.	
ACCESS	**Full Access**	The CON Device has a KVM connection to the displayed CPU Device.
	Video Access	The CON Device has a video only connection to the displayed CPU Device.
	Private Mode	The CON Device has a Private Mode connection to the displayed CPU Device.
	not connected	The CON Device is not connected to a CPU Device.
SHARED	**x device(s)** shows the number of CON Devices that are connected to the current CPU Device of the CON Device (e.g., 3 devices). If the field remains empty, no other CON Devices are connected to the current CPU Device.	

The name of the CON Device with K/M control will be displayed on those CON Devices that do not have current K/M control. The CON Device is displayed in yellow color under **Access**.

13.2.2 Querying a Status for Diagnosis via OSD

Several statuses can be queried for diagnosis:

*Fig. 243 OSD Menu **Status***

13.2.2.1 Network Status

The current network configuration is displayed in this menu.

➡ Select **Status > Network** in the main menu to query the network configuration.

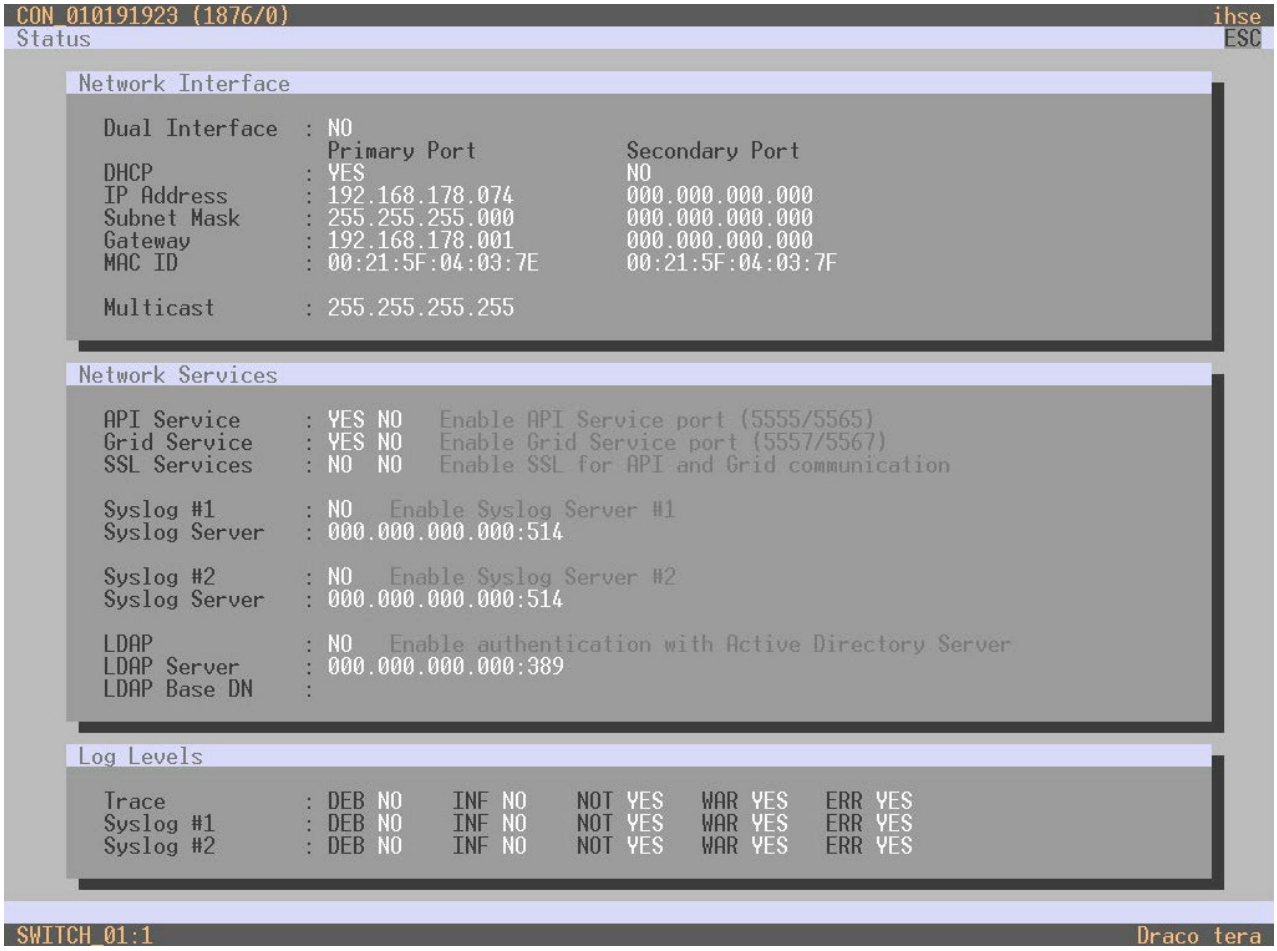


*Fig. 244 OSD Menu **Status - Network***

For information about the network parameters, please refer to chapter 6.3.5, page 82.

13.2.2.2 SNMP Status

The current SNMP status is displayed in this menu.

➡ Select **Status > SNMP** in the main menu to query the SNMP status.

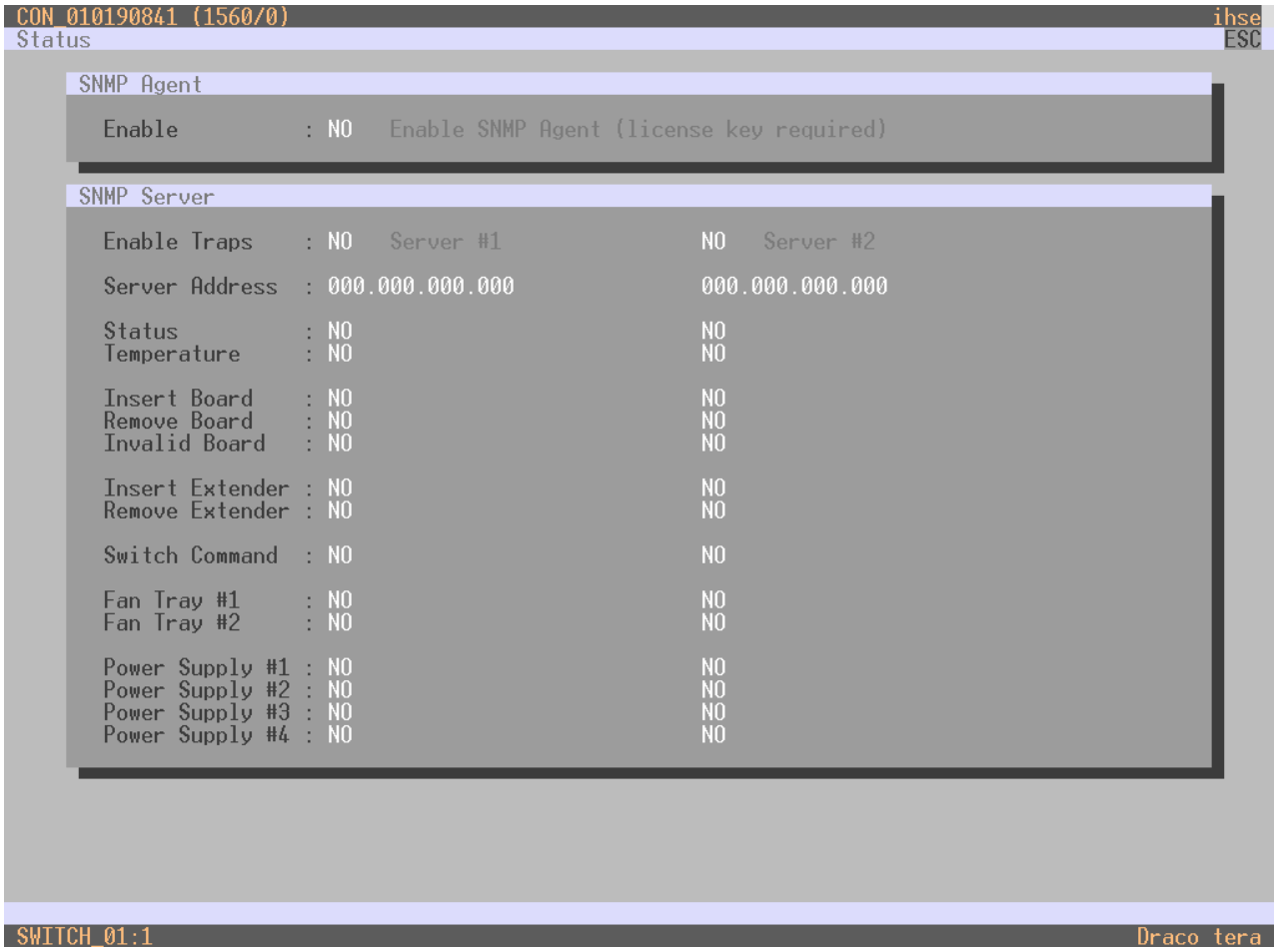


*Fig. 245 OSD Menu **Status - SNMP***

The procedure for activating the SNMP agent or configuring an SNMP server is described in chapter 6.3.7, page 87.

13.2.2.3 Firmware Status

The current firmware status is displayed in this menu.

➡ Select **Status > Firmware** in the main menu to query the firmware status.

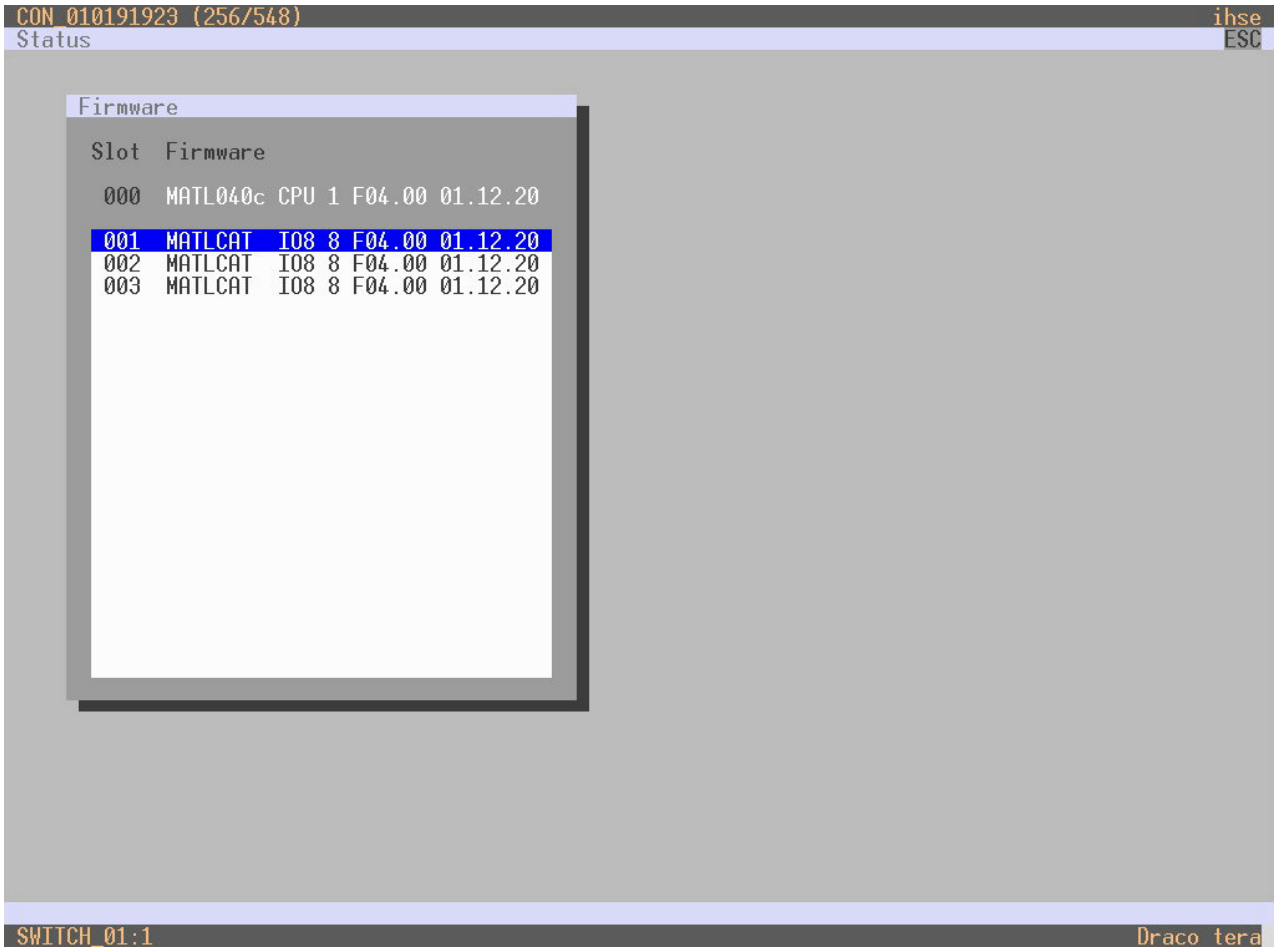


*Fig. 246 OSD Menu **Status - Firmware***

13.2.2.4 Trace

The trace function is used for diagnostic purposes. All recorded events for activities and switching operations of the matrix are displayed in this menu.

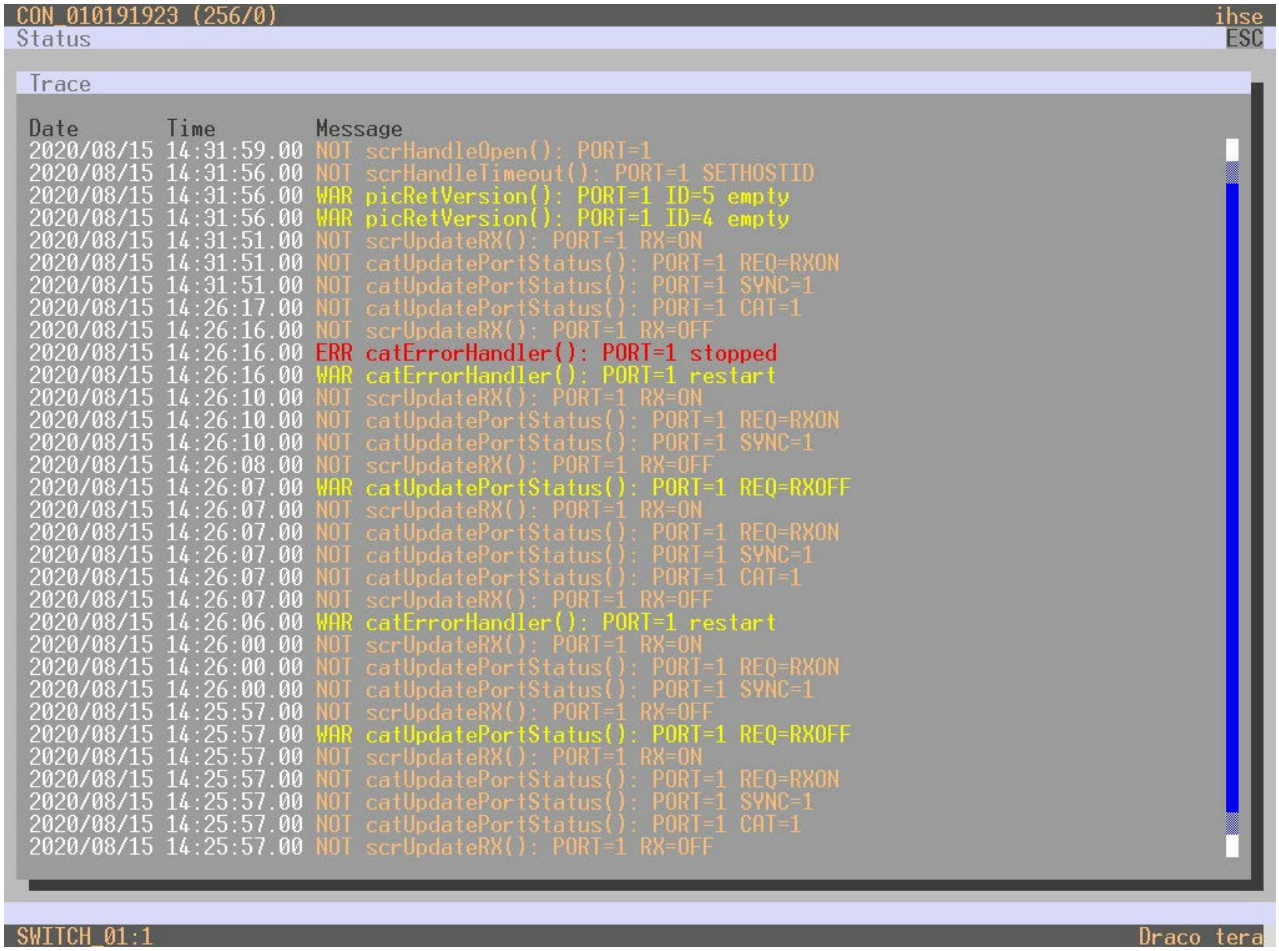


*Fig. 247 OSD Menu **Status - Trace***

The following information is shown in this menu:

Field	Description
Date	Date stamp
Time	Time stamp
Message	Detailed description of the event

To display the recorded events of an I/O board, proceed as follows:

1. Open the OSD of a CON Unit of that I/O board you want to display the recorded events.
2. Select **Status > Trace** in the main menu.

   The recorded events of the I/O board the CON Unit is connected are displayed.

The procedure for activating the SNMP agent or configuring an SNMP server is described in chapter 6.3.7, page 87.

13.2.2.5 Redundancy Function

Extender modules with redundant ports for interconnect cables can be simultaneously operated with both ports at a single matrix or a matrix Grid (from firmware version V04.00).

The ports labeled with **Link 1** at the extender modules is meant for the primary interconnection. If the interconnection on CON Unit or CPU Unit side is interrupted due to any problem, the interconnection will be automatically re-established through the second port labeled with **Link 2**.

For this kind of redundancy function, there is no need for any configuration of the matrix or the extender modules.

If needed, you can manually switch between **Link 1** and **Link 2** at the CON Unit (see chapter 9.1.6, page 307).

➡ Click **Switch** in the main menu.

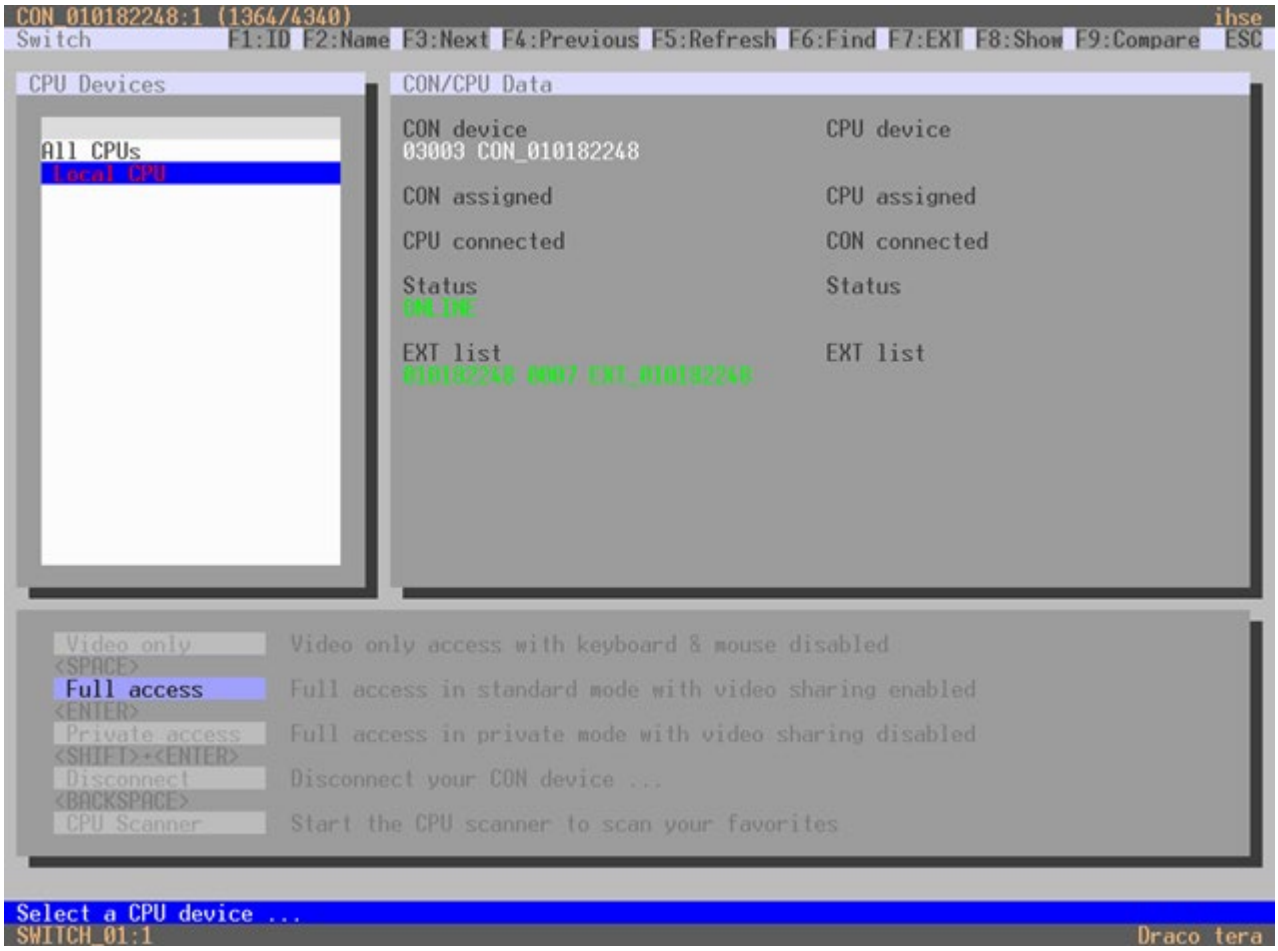


*Fig. 248 OSD Menu **Switch***

When using redundant extender modules, the respectively active connector is shown in this view under **EXT list** in the field **CON/CPU Data**. If the first connector (**Link 1**) is active, it will be highlighted with **:1** behind the respective extender module. If the second connector (**Link 2**) is active, this will be highlighted with **:2**.

13.2.3 Resetting the Matrix to the Factory Settings

NOTICE
If you perform a (factory) reset, all current settings and all configurations stored in the matrix will be lost. This also applies to the network parameters (reset to default IP-address) and the admin password.

NOTICE
If a firmware update has been carried out since the delivery, the latest installed firmware version is retained.

To perform a reset of the matrix to the factory settings, proceed as follows:

1. Select **Configuration > Factory Reset** in the main menu.
2. Click **Okay** to confirm the factory reset.

   The current configuration in the memory of the matrix is deleted and the matrix is reset to the factory settings.

*Fig. 249 OSD Menu **Factory Reset***

13.3 Maintening the Matrix via Management Software

13.3.1 Sending an OSD Message to CON Devices

In case a maintenance for a CPU/CON Device is required in operation mode, the respective user can be informed by an OSD message on the monitor of its CON Device. Sending a message is described using a CON Device selection as an example.

To send a message to a user/CON Device, proceed as follows:

1. Click **Extender & Devices > CON Devices** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Click **Send OSD Message to…** below the CON Devices list

   A dialog to create a message appears.
4. Enter your message in the Message field (maximum 62 characters).
5. Select the value in **Display Time [sec]** to set the display time of the message.
6. Click **Next >**.

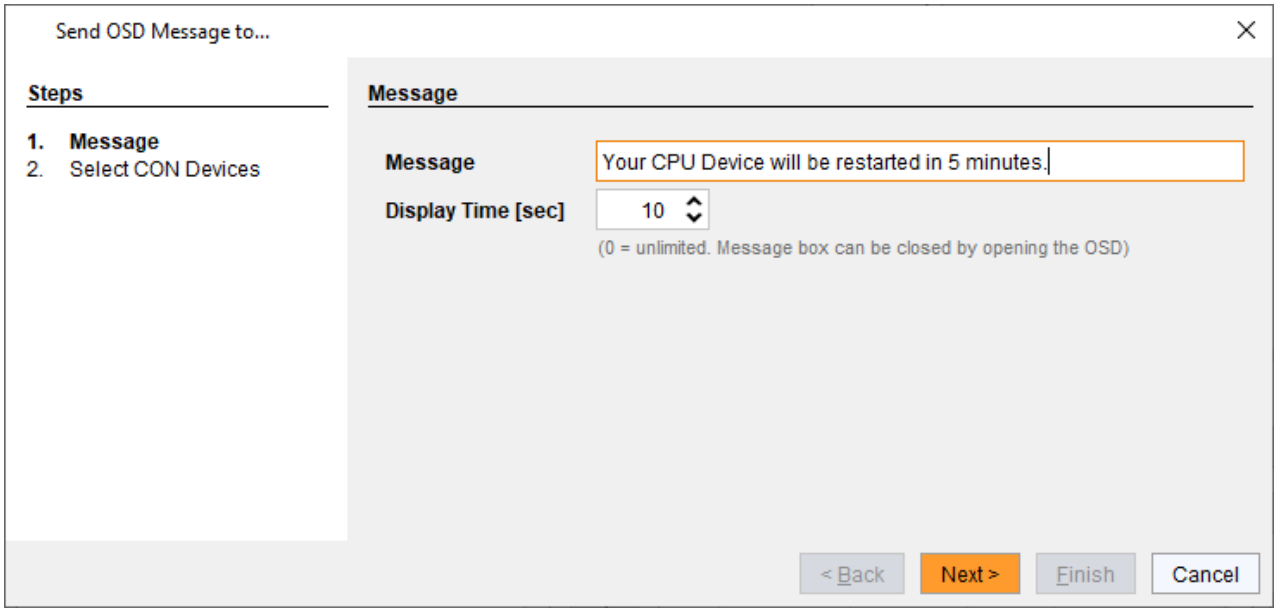


*Fig. 250 Management software menu **Extender & Devices - CON Devices - Send OSD Message to… - Message***

7. Select the CON Device **Available** list which should receive the message. By pressing and holding down Ctrl at the same time, more than one CON Device can be highlighted.
8. Click ▶ to move the highlighted CON Device(s) to the **Send message to…** list. By clicking ▶▶, all CON Devices will be moved to the **Send message to…** list.
9. To remove highlighted CON Device(s) from the **Send message to…** list, click ◀. By clicking ◀◀, all CON Device(s) will be removed from the **Send message to…** list.
10. Click **Finish**.

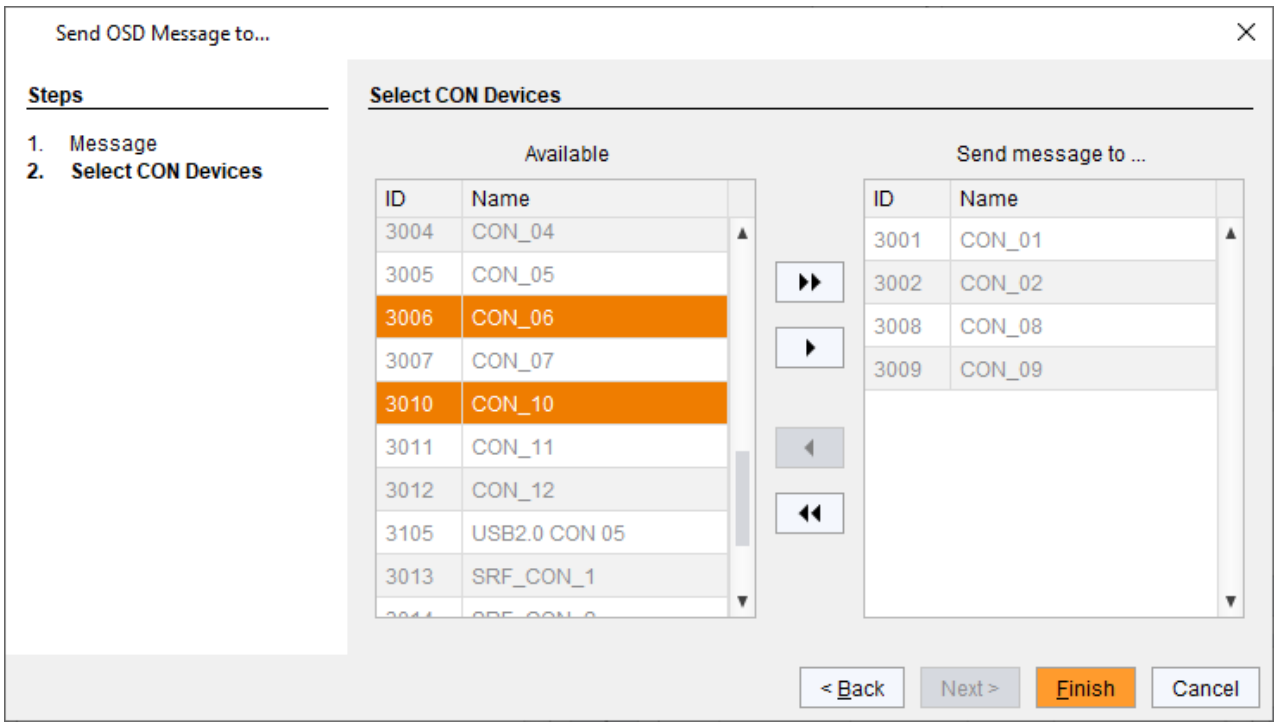


*Fig. 251 Management software menu **Extender & Devices - CON Devices - Send OSD Message to… - Select CON Devices***

The message is immediately sent to all selected CON Device(s).

11. Click **Deactivate Edit Mode** in the toolbar.

13.3.2 Querying a Status via Management Software

13.3.2.1 Device Status

The connections to the matrix are displayed in this menu.

➡ Click **View > Matrix** in the task area to display the current connections.

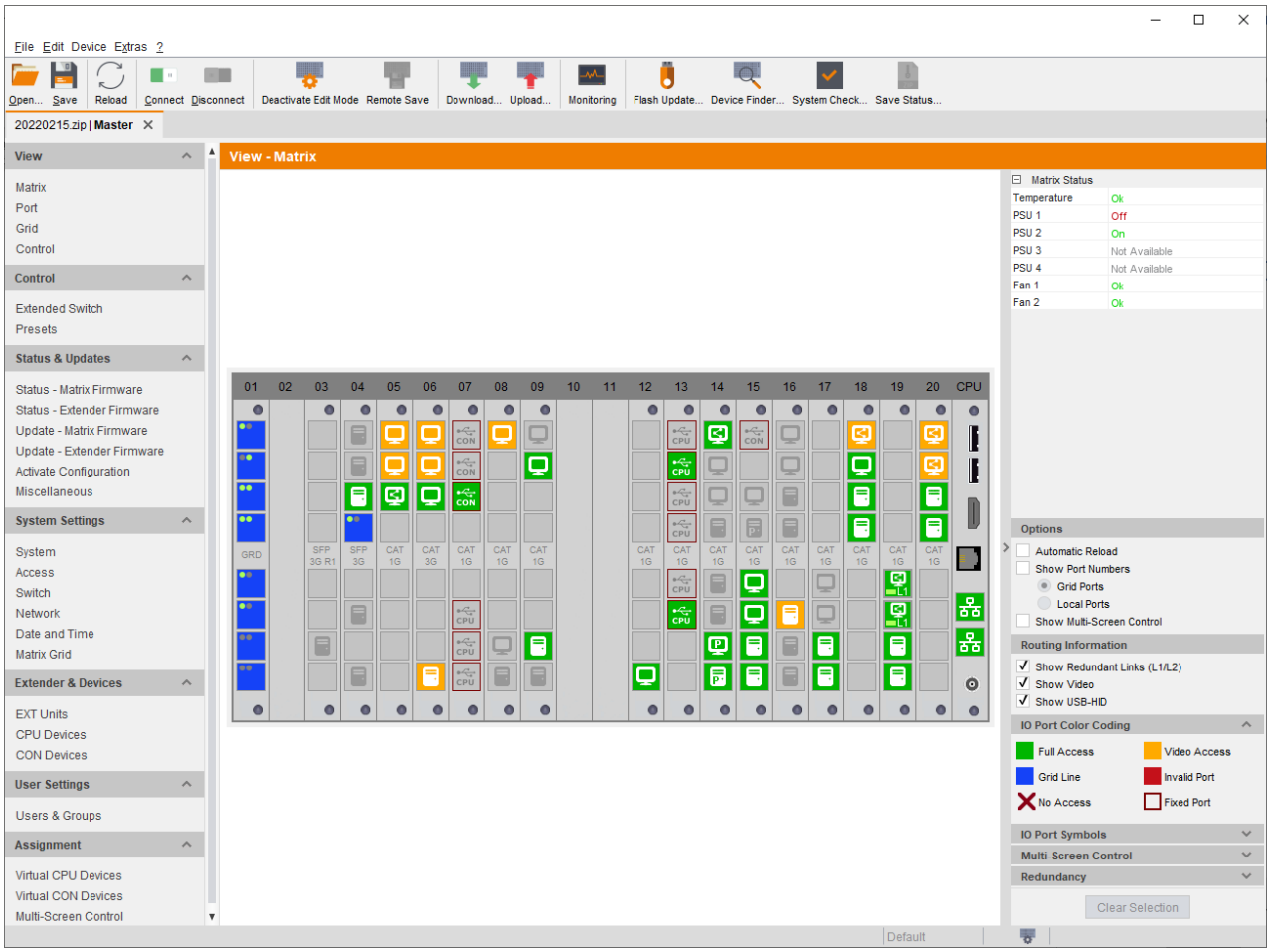


*Fig. 252 Management software menu **View - Matrix***

If a port is currently selected, the port is shown with four static blue squares. All other ports are transparent, except those connected to the currently selected port.

A selection can be cleared by clicking **Clear Selection** in the lower of the panel on the right side of the working area.

Colors for Controller Board Network Ports

Network port color	Description
Grey	Port is connected
Red	Port is not connected or not available

Colors Coding for I/O Board Ports

Port color	Description
Grey	Port not connected
Yellow	Port with video connection
Green	Port with KVM connection
Red	Faulty port
Blue	Port connected to another matrix via Grid Line
Red cross	CON Device to be connected does not have access rights to the respective CPU Device at this port.
Red frame	Fixed port (e.g., for USB 2.0 connections).

Colors Coding for Multi-Screen Control

Port color	Description
Blue	CON Device with connected keyboard and mouse in the MSC setting.
Light blue	CON Device without connected keyboard and mouse in the MSC setting.
Blue frame	Frame around the CON Units that are contained in an MSC setting (Screen Cluster).
Rose	Not available, e.g., if one EXT Unit is set on position 2 and all other EXT Units are set on position 1 in the extender assignment.
Red	Invalid if link 1 and link 2 of a redundant extender module are connected within the same block.

Symbols for I/O Board Ports

Symbol	Description
	Port is connected to a CPU Unit.
	Port is connected to a CPU Unit that is switched to a CON Unit in Private Mode (see chapter 13.2.1, page 333).
	Port is connected to a CON Unit.
	Port is connected to a CON Unit with Shared Access to a CPU Unit.
	Port is connected to a CON Unit that is connected to a CPU Unit in Private Mode (see chapter 13.2.1, page 333).
	Port is connected to a USB 2.0 CPU Unit.
	Port is connected to a USB 2.0 CON Unit.
	Port is configured as Cascade-CON port for cascading of matrices.
	Port is configured as Cascade-CPU port for cascading of matrices.
	Port is a UNI port of an I/O board that can be used for USB 3.0 or SDI switching.
	UNI port is configured as CON port to connect USB 3.0 CON extender modules, for example.
	UNI port is configured as CPU port i to connect USB 3.0 CPU extender modules, for example.

Redundancy Markings

Symbol	Description
L1	Redundant extender module connected with interconnection port 1.
L2	Redundant extender module connected with interconnection port 2.
Light green label	Active link, switched to this interconnection port.

Information panel on the right side of the working area

➡ Click a port with the left mouse button to show the EXT Unit and CPU/CON Device information of the currently selected port in the panel on the right side of the working area.

The following information is available:

Port

Port color	Description
Extender Name	Name of the Ext Unit connected to the selected port.
Extender Type	Type of the selected Ext Unit.
Port	Number of the selected port.
Slot (global)	Slot of the matrix.

Device

Field	Description
Device ID	ID number of the associated CON Device or CPU Device.
Device Name	Name of connected CON Device or CPU Device.
Extender 1…8	Up to 8 assigned EXT Units per CPU/CON Device.

Connections

Field	Description
Connections	Listing of assigned connections to selected port (Full Access or Video Access).

Port's Context Menu

➡ Click a port with the right mouse button to open the context menu with additional functions for the currently selected port.

The following context functions are available:

Field	Description
Open Extender	Open the menu for definition of the currently selected EXT Unit.
Open Device	Open the menu for definition of the currently selected CON/CPU Device.
Extended Switch	Open the menu for execution of switching operations.
Disconnect	Disconnect the switching between CON Device and CPU Device
Restart Extender	Restart the extender module.
Restart I/O Board	Restart the I/O board.
Factory Reset I/O Board	Reset the I/O board.

13.3.2.2 Port Status Matrix Grid

In this menu the connections and the switching status between the various CON and CPU Devices are shown within the Matrix Grid.

The port view is divided into the different Grid matrices. As a result, each matrix is displayed in an optimized view of 24 ports per line to be able to show also a larger number of ports.

➡ Click **View > Port** in the task area to display the current connections.

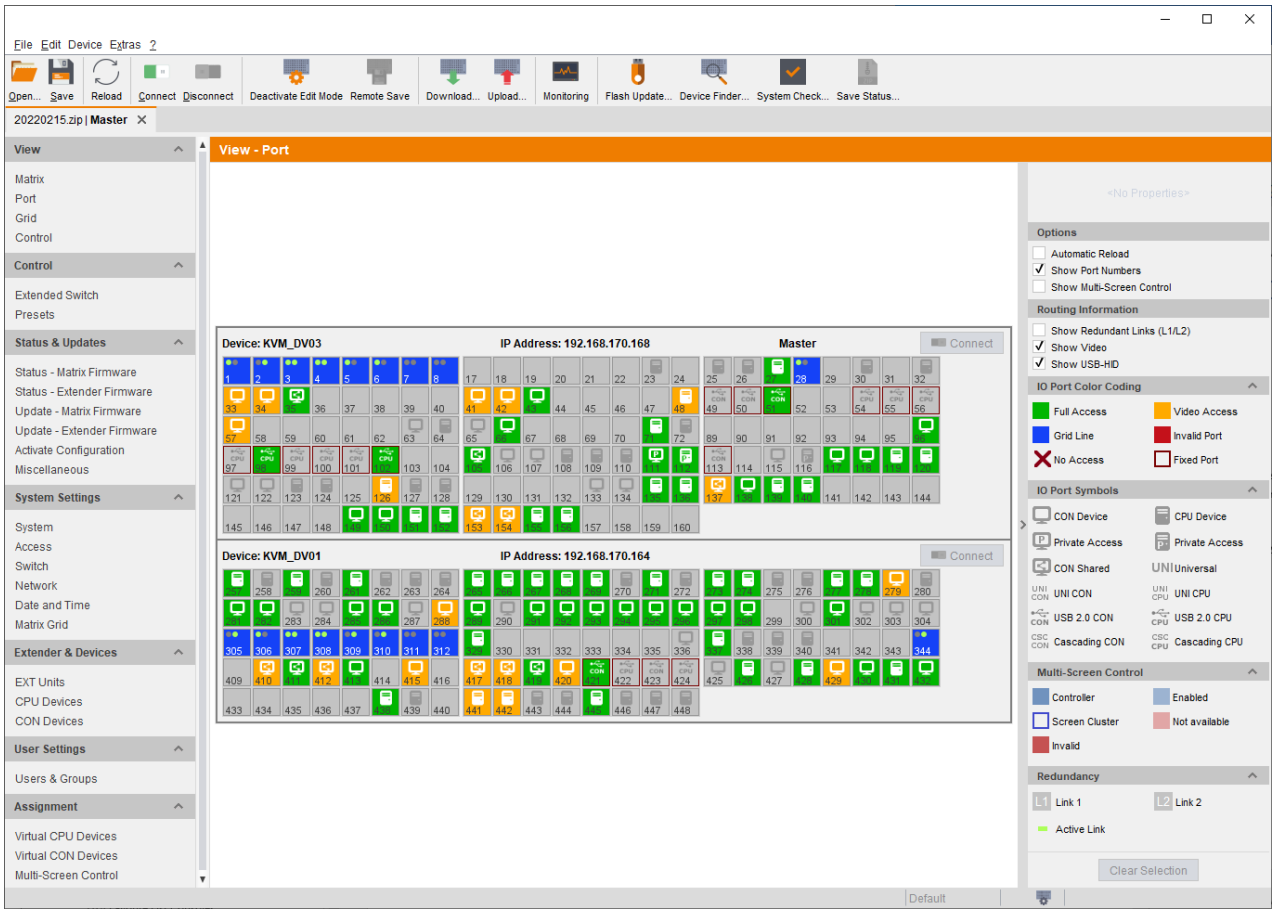


*Fig. 253 Management software menu **View - Matrix***

Functions, colors, and symbols used in the Grid Port View are identical to those in the port status of the Matrix View see chapter 13.3.2.1, page 342.

13.3.2.3 Network Status

The current network status is displayed in this menu.

➡ Click **System Settings > Network** in the task area to query the network configuration.

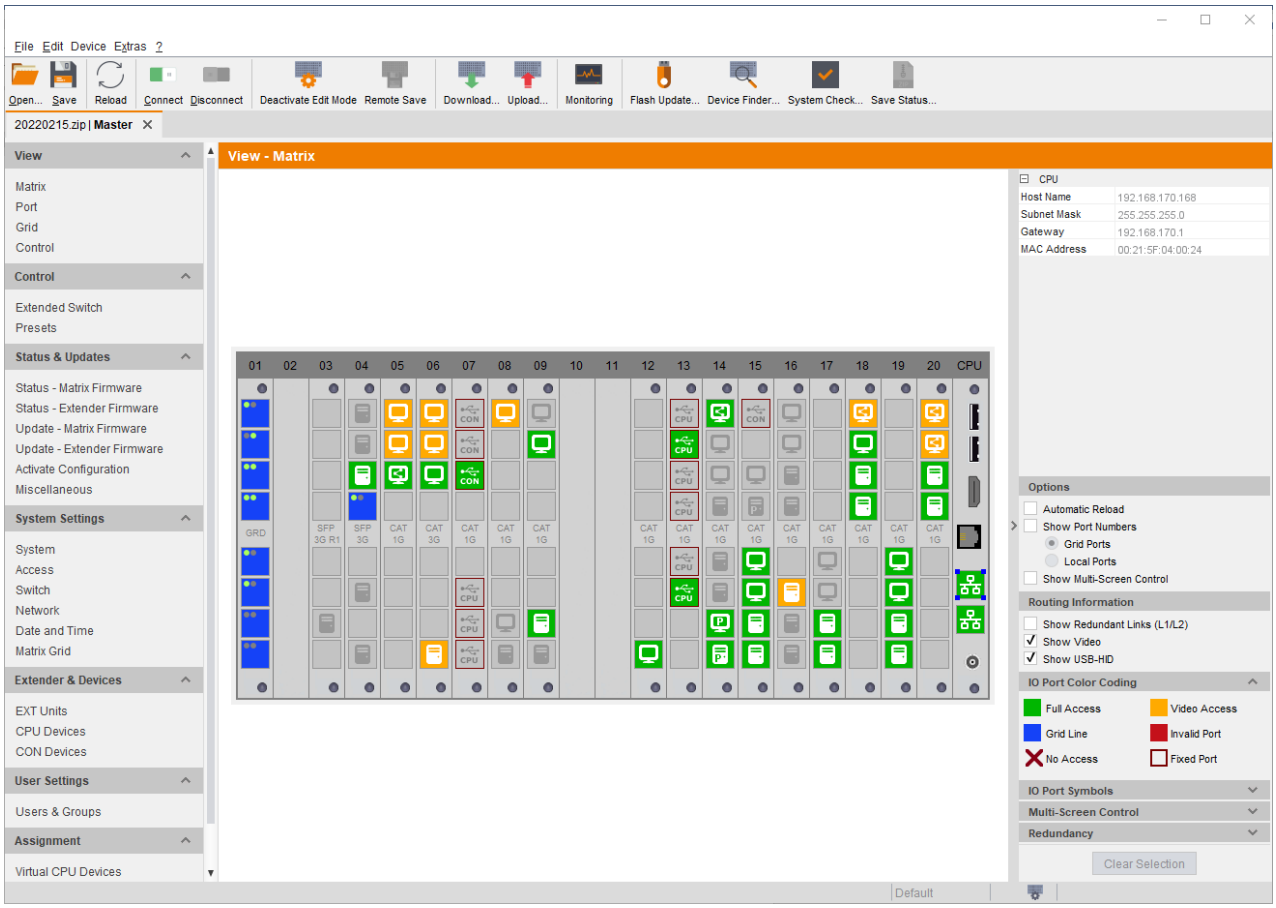


*Fig. 254 Management software menu **View - Matrix***

➡ Click a network port of the controller board with the left mouse button.

The corresponding network status will be displayed in the panel on the right side of the working area. The available information can be faded in or hidden by pressing the left mouse button on the "plus" or "minus" icon.

The following information is available:

Port color	Description
Host Name	IP address if DHCP is not active.
Subnet Mask	Subnet mask if DHCP is not active.
Gateway	Gateway address if DHCP is not active.
MAC Address	MAC address.

13.3.2.4 Matrix Firmware Status

The firmware status of the extender modules is displayed in this menu.

➡ Click **Status & Updates > Status - Matrix Firmware** in the task area to query the current firmware status of the extender modules.

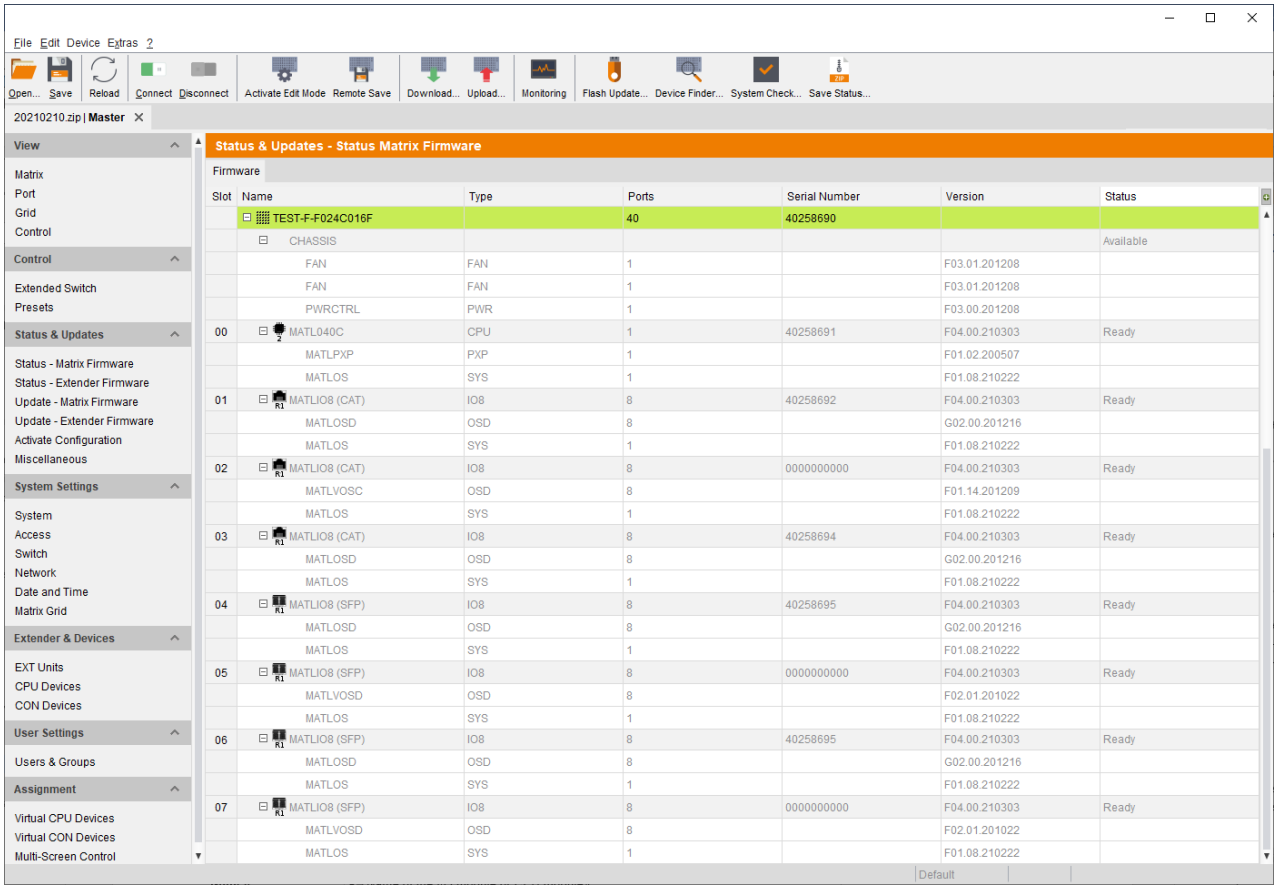


*Fig. 255 Management software menu **Status & Updates - Status - Matrix Firmware***

The following information is displayed in the working area:

Column	Description
Slot	Slot number of the I/O board or CPU extender module
Name	• Name of the chassis or I/O board • Name of the chassis firmware or I/O board firmware
Type	Type of the chassis firmware or I/O board firmware
Ports	Number of ports
Serial Number	Serial number of the I/O board or CPU extender module
Version	Installed firmware version
Status	Status of the chassis or I/O board

The tree view can be expanded and collapsed by clicking with the left mouse button once on the **+** and **-** symbols in the **Name** column to show and hide detailed information.
By clicking with the left mouse button once on the **+** and **-** symbol in the upper right corner of the working area, you can expand and collapse all information in the tree view.

13.3.2.5 Extender Module Firmware Status

The firmware status of the extender modules with its name, type, and version is displayed in this menu.

➡ Click **Status & Updates > Status - Extender Firmware** in the task area to query the current firmware status of the extender modules.

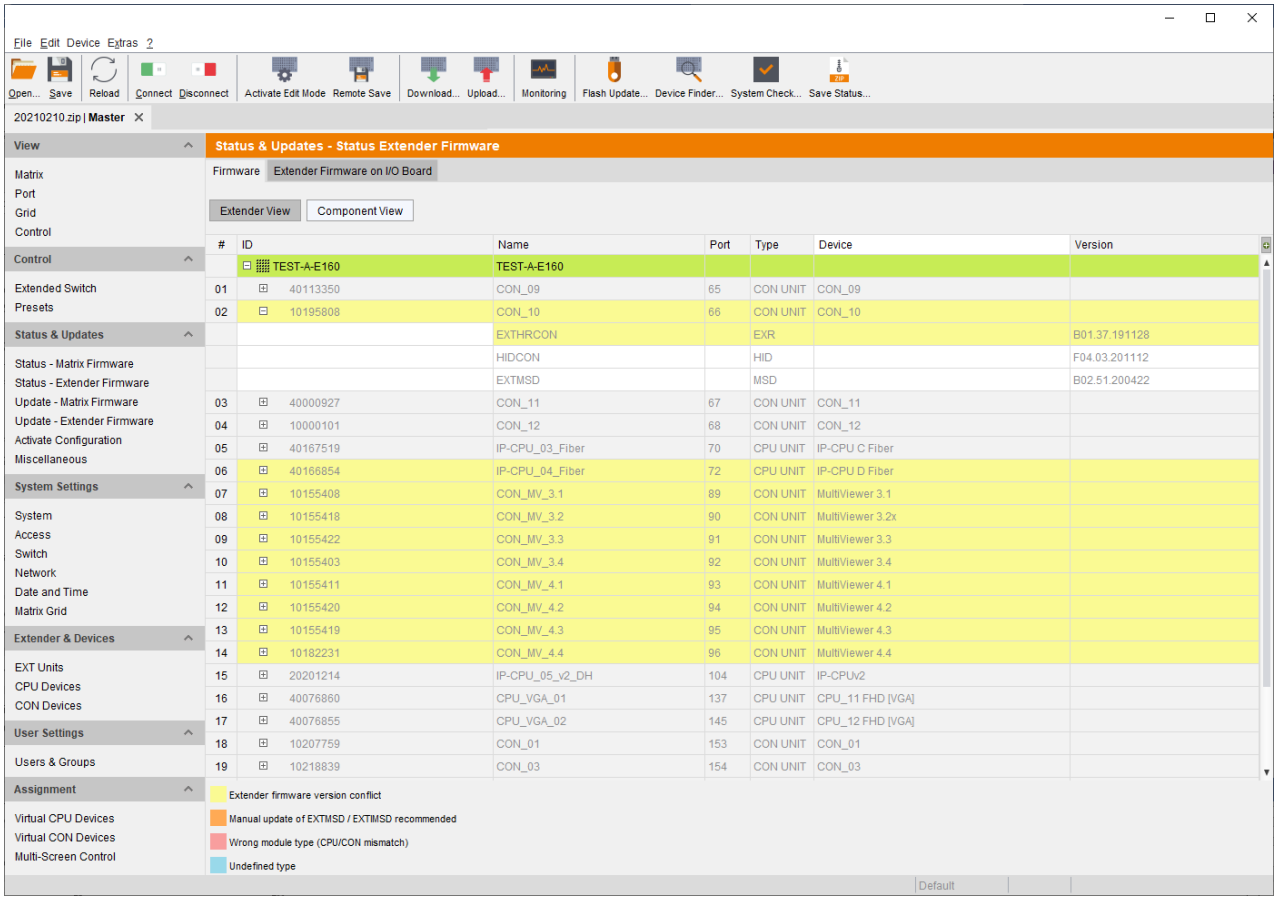


*Fig. 256 Management software menu **Status & Updates - Status Extender Firmware - Firmware***

The following information is displayed in the working area:

Column	Description
ID	Numerical value of the extender module ID
Name	Name of the EXT Unit and the extender module firmware
Port	Port number of the matrix, the extender module is physically connected
Type	Type of the CON/CPU Unit and firmware
Device	Name of the CON Device/CPU Device the EXT Unit is assigned to
Version	Installed firmware version

Firmware types to be updated or firmware conflicts are highlighted in color:

- Extender firmware version conflict
- Manual update of EXTMSD/EXTIMSD recommended*
- Wrong module (CPU/CON mismatch)
- Undefined type

* Only for firmware versions older than V2.25 (EXTMSD) and V1.13 (EXTIMSD) and only if instructed by the manufacturer's technical support or if the release notes indicate dependencies between extender module firmware files. EXT*MSD requires manual update via the Mini-USB service port at the extender modules.

The tree view can be expanded and collapsed by clicking with the left mouse button once on the **+** and **-** symbols in the **ID** column to show and hide detailed information.
By clicking with the left mouse button once on the **+** and **-** symbol in the upper right corner of the working area, you can expand and collapse all information in the tree view.

13.3.2.6 Extender Module Firmware Status on I/O Board

The extender modules firmware currently stored in the memory on the I/O board via extender module firmware update in Parallel Mode is displayed with its name, type, and version in this menu. The firmware can be passed to the extender modules, if necessary, using the update step of the Parallel Mode (see page 365).

1. Click **Status & Updates > Status - Extender Firmware** in the task area to query the current firmware status of the extender modules.
2. Click the **Extender Firmware Status on I/O Board** tab in the working area.

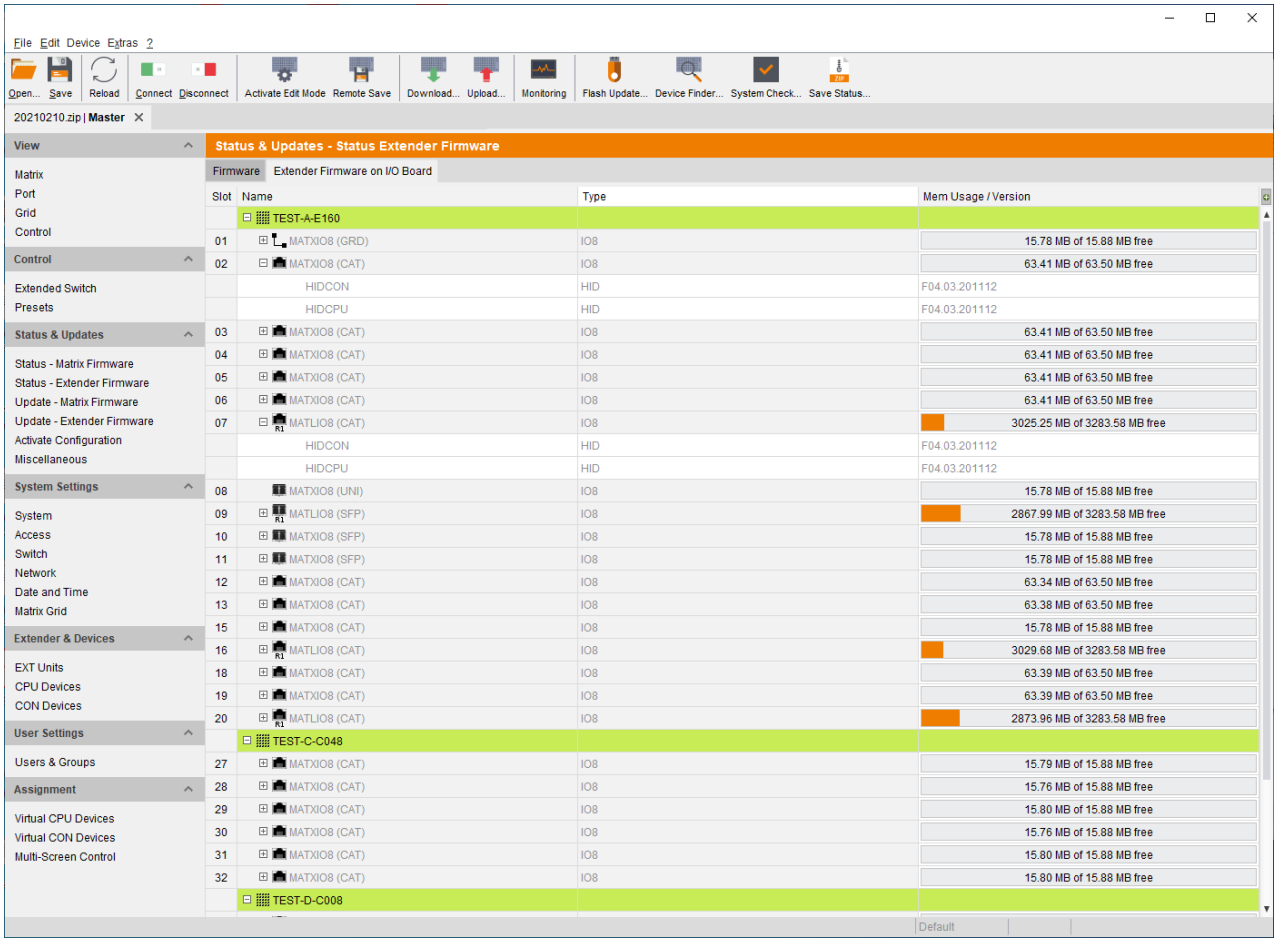


*Fig. 257 Management software menu **Status & Updates - Status Extender Firmware - Extender Firmware on IO Board***

The following information is displayed in the working area:

Column	Description
Slot	Slot number of the I/O board.
Name	Name of the I/O board and the extender module firmware.
Type	Type of the I/O board and the extender module firmware.
Mem Usage/Version	• Free memory on the I/O board (in MB). • Firmware version of the I/O board.

The tree view can be expanded and collapsed by clicking with the left mouse button once on the **+** and **-** symbols in the **Name** column to show and hide detailed information.
By clicking with the left mouse button once on the **+** and **-** symbol in the upper right corner of the working area, you can expand and collapse all information in the tree view.

13.3.2.7 Syslog Monitoring

The Syslog function offers a complete logging of the matrix activities, switching operations and surveillance of the function of critical components like fans or power supply units in this menu. During logging the activities are written continuously into log files and stored locally.

Logging of system activities depends on the settings. With enabled option, the logging starts when the tool is opened (see page 169) or when the **Monitoring** menu is opened. Logging remains active when the tab is closed, but ends when the management software is closed.

NOTICE
Syslog messages are transmitted via UDP. Therefore, port 514 within the used network should not be blocked, e.g., by a firewall.

The procedure for activating the Syslog function is described in chapter 7.4.9, page 168.

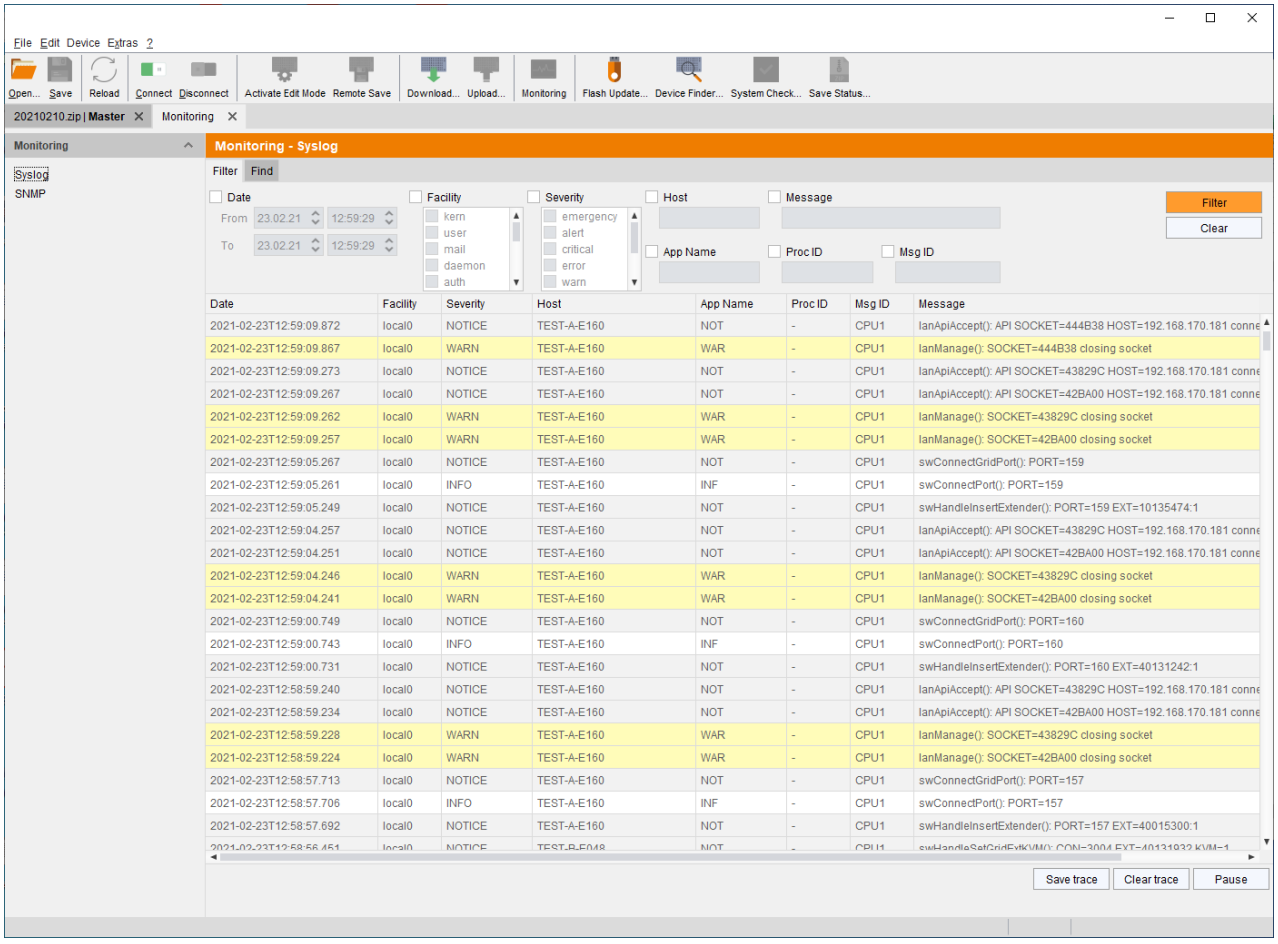


*Fig. 258 Management software menu **Monitoring - Syslog***

To open the Syslog monitoring, proceed as follows:

➡ Click **Monitoring** in the toolbar.

The logged Syslog messages are displayed in the working area.

Filter Function

To filter relevant messages from the multitude of logged activities of the matrix, the extender modules and the chassis, the Syslog monitoring offers several filter options.

To set and activate a filter, proceed as follows:

1. Tick the respective checkbox(es) to set the desired filter option(s).
2. Click **Filter** to apply the filter settings.
3. Click **Clear** to reset the filter settings.

The following filter options are available:

Option	Description
Date	Messages for a defined date range will be filtered.
Facility	Messages for a defined facility will be filtered.
Severity	Messages for a defined severity will be filtered.
Host	Messages for a defined host will be filtered.
Message	Messages with defined text parts will be filtered.

Filter options are not valid within the locally stored log files.

Recording Function

Several options are available for the messages displayed in the Syslog file.

➡ To save the displayed messages (filtered or unfiltered), click **Save trace**.
The messages are saved in a Syslog file (extension .csv).

➡ To clear the view with the displayed messages, click **Clear trace**.
The recorded messages will be kept.

➡ To pause the display of messages, click **Pause**.
During the pause, the messages will be recorded continuously.

➡ To display the messages recorded in the background during the pause, click **Pause** again.
All messages recorded in the background will be displayed immediately.

Find Function

The find function can be used to find specific Syslog messages from a variety of logged activities and relevant messages from the matrix, extender modules, and chassis.

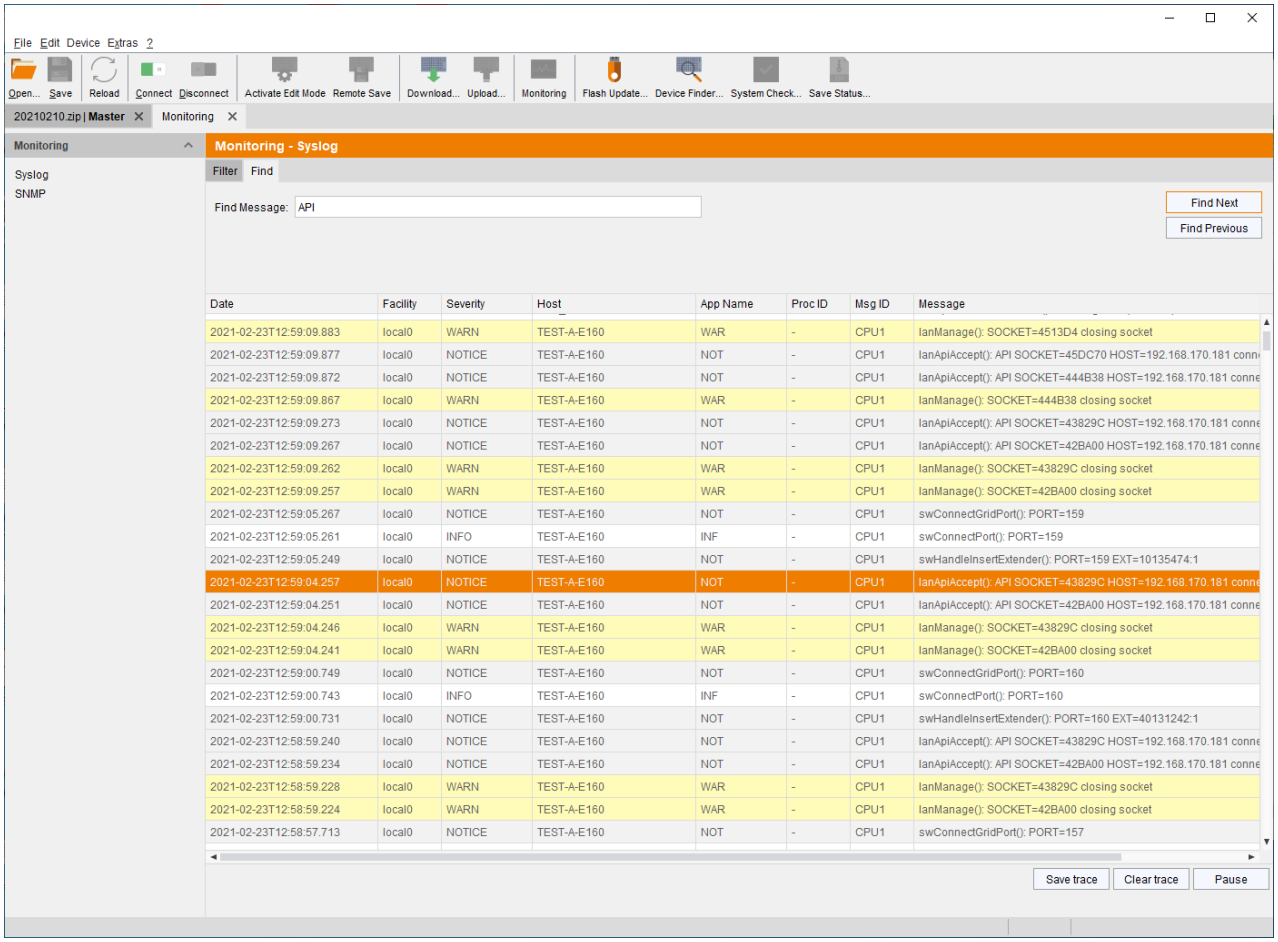


*Fig. 259 Management software menu **Monitoring - Syslog - Example for search result***

To find specific Syslog messages, proceed as follows:

1. Click **Monitoring** in the toolbar.
2. Click the **Find** tab in the working area.

   The recorded Syslog messages are displayed in the working area.
3. Enter a search term in the **Find Message** search field.
4. Click **Find Next**.

   The first message with the entered search term is highlighted.
5. Click **Find Next** again to find another message with this search term.

   The next message with the entered search term is highlighted.

Possible search terms would be, e.g., the port ID (e.g., Port=160), API, etc.
To go back to the previous search result, click **Find Previous**.

13.3.2.8 SNMP Monitoring

The SNMP function allows all function-critical and safety-critical elements of the matrix, the extender modules, and the chassis to be monitored and queried. This function complies with the RFC 1157 conformal standard.

NOTICE

When using SNMP monitoring, for reasons of access security, the use of a dedicated network according to the IT-Grundschutz-Kompendium (IT Baseline Protection) is recommended. The read only community for the MIB file is **kvm**.

The procedure for activating the SNMP agent or configuring an SNMP server is described in chapter 7.4.10, page 172.

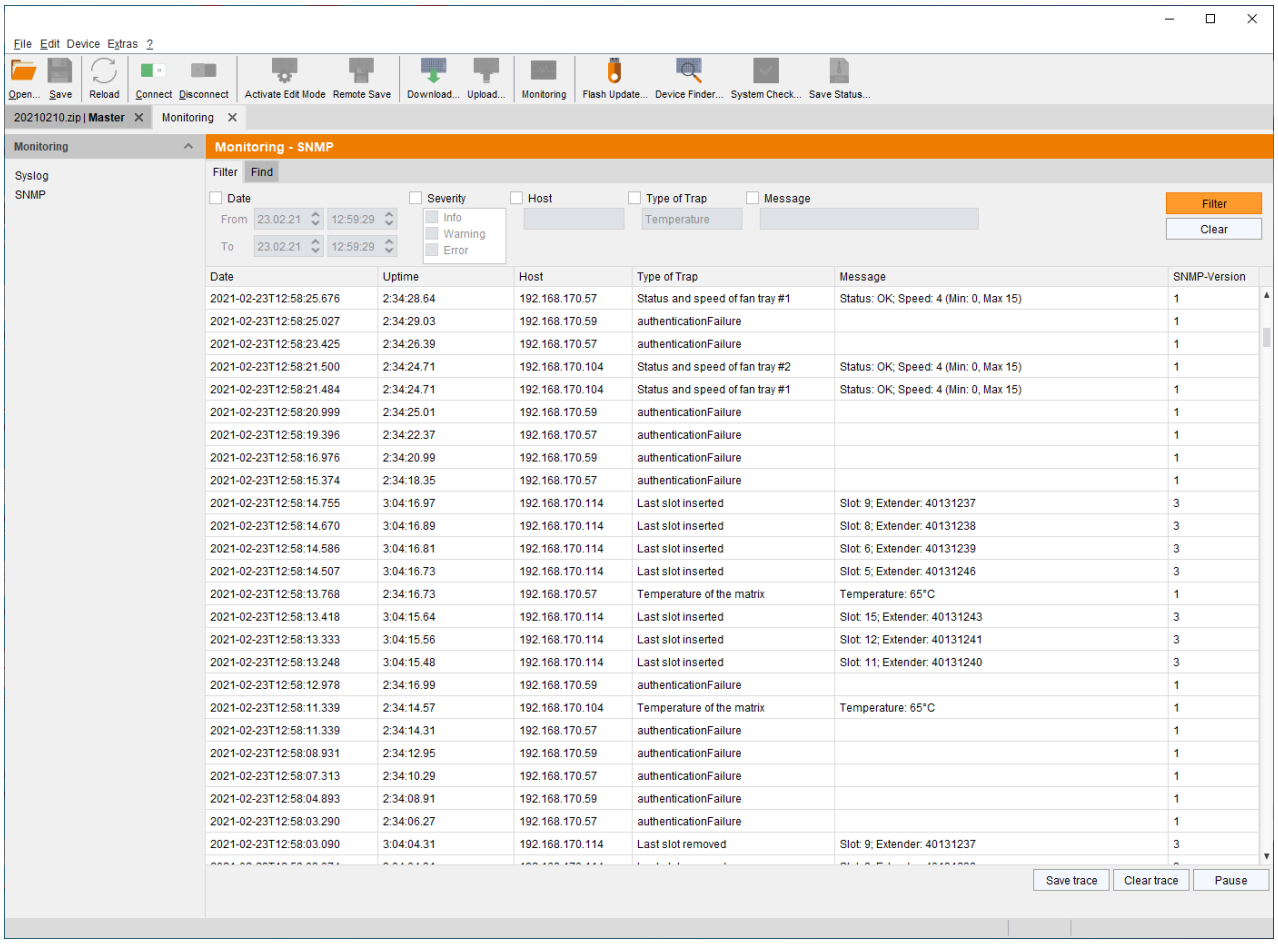


*Fig. 260 Management software menu **Monitoring - SNMP***

To open the SNMP monitoring, proceed as follows:

1. Click **Monitoring** in the toolbar.
2. Click **SNMP** in the task area.

   The logged SNMP messages are displayed in the working area.

Filter Function

To filter relevant messages from the multitude of logged activities of the matrix, the extender modules and the chassis, the SNMP monitoring offers several filter options.

To set and activate a filter, proceed as follows:

1. Tick the respective checkbox(es) to set the desired filter option(s).
2. Click **Filter** to apply the filter settings.
3. Click **Clear** to reset the filter settings.

The following filter options are available:

Option	Description
Date	Messages for a defined date range will be filtered.
Facility	Messages for a defined facility will be filtered.
Severity	Messages for a defined severity will be filtered.
Host	Messages for a defined host will be filtered.
Message	Messages with defined text parts will be filtered.

Filter options are not valid within the locally stored log files.

Recording Function

Several options are available for the messages displayed in the SNMP log.

➡ To save the displayed messages (filtered or unfiltered), click **Save trace**.
The messages are saved in a SNMP file (extension .csv).

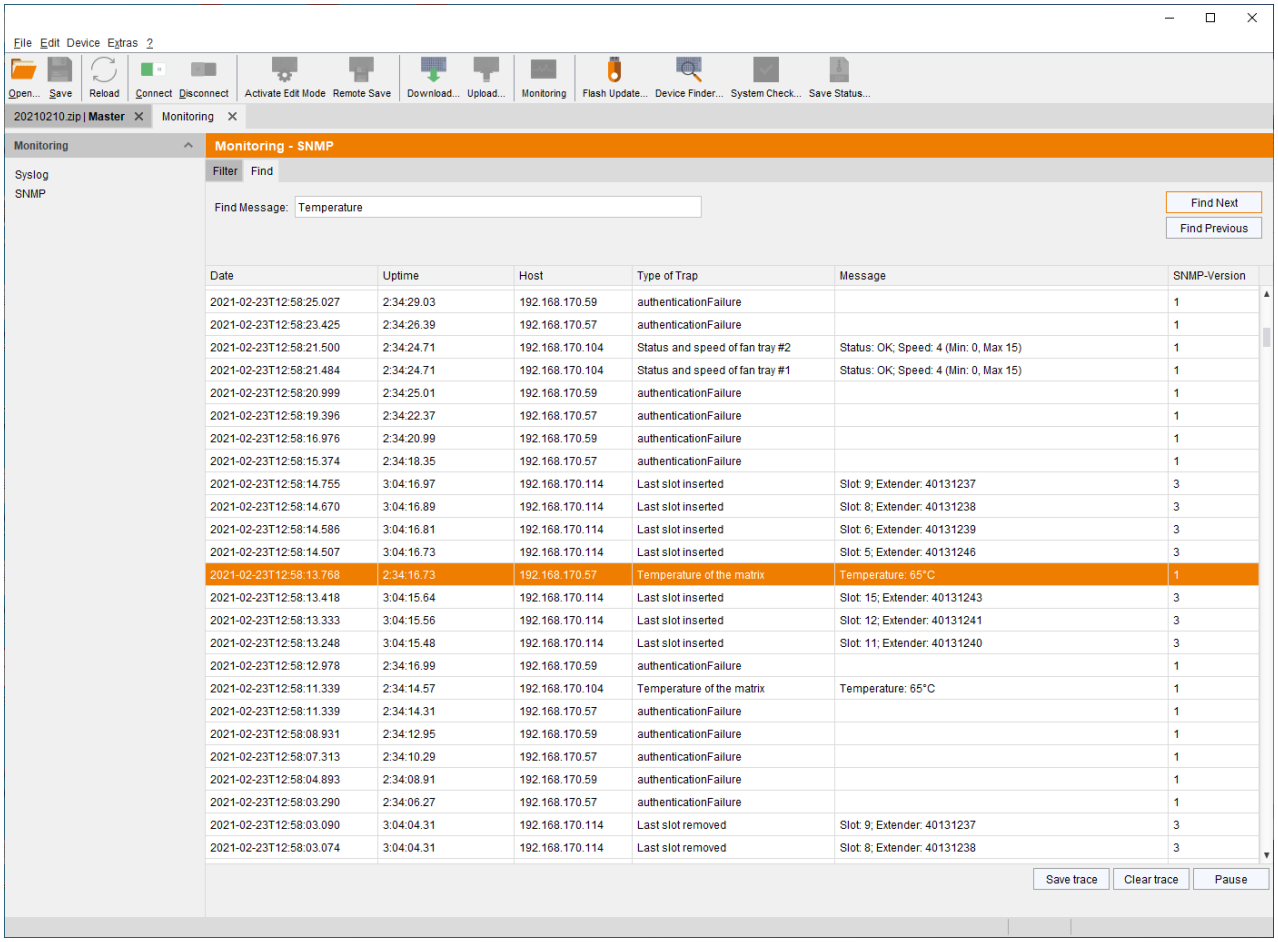
➡ To clear the view with the displayed messages, click **Clear trace**.
The recorded messages will be kept.

➡ To pause the display of messages, click **Pause**.
During the pause, the messages will be recorded continuously.

➡ To display the messages recorded in the background during the pause, click **Pause** again.
All messages recorded in the background will be displayed immediately.

Find Function

The find function can be used to find specific SNMP messages from a variety of logged activities and relevant messages from the matrix, extender modules, and chassis.



Date	Uptime	Host	Type of Trap	Message	SNMP-Version
2021-02-23T12:58:25.027	2:34:29.03	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:23.425	2:34:26.39	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:21.500	2:34:24.71	192.168.170.104	Status and speed of fan tray #2	Status: OK; Speed: 4 (Min: 0, Max 15)	1
2021-02-23T12:58:21.484	2:34:24.71	192.168.170.104	Status and speed of fan tray #1	Status: OK; Speed: 4 (Min: 0, Max 15)	1
2021-02-23T12:58:20.999	2:34:25.01	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:19.396	2:34:22.37	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:16.976	2:34:20.99	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:15.374	2:34:18.35	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:14.755	3:04:16.97	192.168.170.114	Last slot inserted	Slot: 9; Extender: 40131237	3
2021-02-23T12:58:14.670	3:04:16.89	192.168.170.114	Last slot inserted	Slot: 8; Extender: 40131238	3
2021-02-23T12:58:14.586	3:04:16.81	192.168.170.114	Last slot inserted	Slot: 6; Extender: 40131239	3
2021-02-23T12:58:14.507	3:04:16.73	192.168.170.114	Last slot inserted	Slot: 5; Extender: 40131246	3
2021-02-23T12:58:13.768	2:34:16.73	192.168.170.57	Temperature of the matrix	Temperature: 65°C	1
2021-02-23T12:58:13.418	3:04:15.64	192.168.170.114	Last slot inserted	Slot: 15; Extender: 40131243	3
2021-02-23T12:58:13.333	3:04:15.56	192.168.170.114	Last slot inserted	Slot: 12; Extender: 40131241	3
2021-02-23T12:58:13.248	3:04:15.48	192.168.170.114	Last slot inserted	Slot: 11; Extender: 40131240	3
2021-02-23T12:58:12.978	2:34:16.99	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:11.339	2:34:14.57	192.168.170.104	Temperature of the matrix	Temperature: 65°C	1
2021-02-23T12:58:11.339	2:34:14.31	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:08.931	2:34:12.95	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:07.313	2:34:10.29	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:04.893	2:34:08.91	192.168.170.59	authenticationFailure		1
2021-02-23T12:58:03.290	2:34:06.27	192.168.170.57	authenticationFailure		1
2021-02-23T12:58:03.090	3:04:04.31	192.168.170.114	Last slot removed	Slot: 9; Extender: 40131237	3
2021-02-23T12:58:03.074	3:04:04.31	192.168.170.114	Last slot removed	Slot: 8; Extender: 40131238	3

*Fig. 261 Management software menu **Monitoring - SNMP - Example for search result***

To find specific SNMP messages, proceed as follows:

1. Click **Monitoring** in the toolbar.
2. Click the **Find** tab in the working area.

   The recorded SNMP messages are displayed in the working area.
3. Enter a search term in the **Find Message** search field.
4. Click **Find Next**.

   The first message with the entered search term is highlighted.
5. Click **Find Next** again to find another message with this search term.

   The next message with the entered search term is highlighted.

Possible search terms would be, e.g., temperature, fan, or the serial number of an extender module (e.g., 40131237). To go back to the previous search result, click **Find Previous**.

13.3.2.9 Redundancy Function

Extender modules with redundant ports for interconnect cables can be simultaneously operated with both ports at a single matrix or a matrix Grid (from firmware version V04.00).

The ports labeled with **Link 1** at the extender modules is meant for the primary interconnection. If the interconnection on CON Unit or CPU Unit side is interrupted due to any problem, the interconnection will be automatically re-established through the second port labeled with **Link 2**.

For this kind of redundancy function, there is no need for any configuration of the matrix or the extender modules.

If needed, manually switching between link 1 and link 2 at the CON Unit is possible (see chapter 9.1.6, page 307).

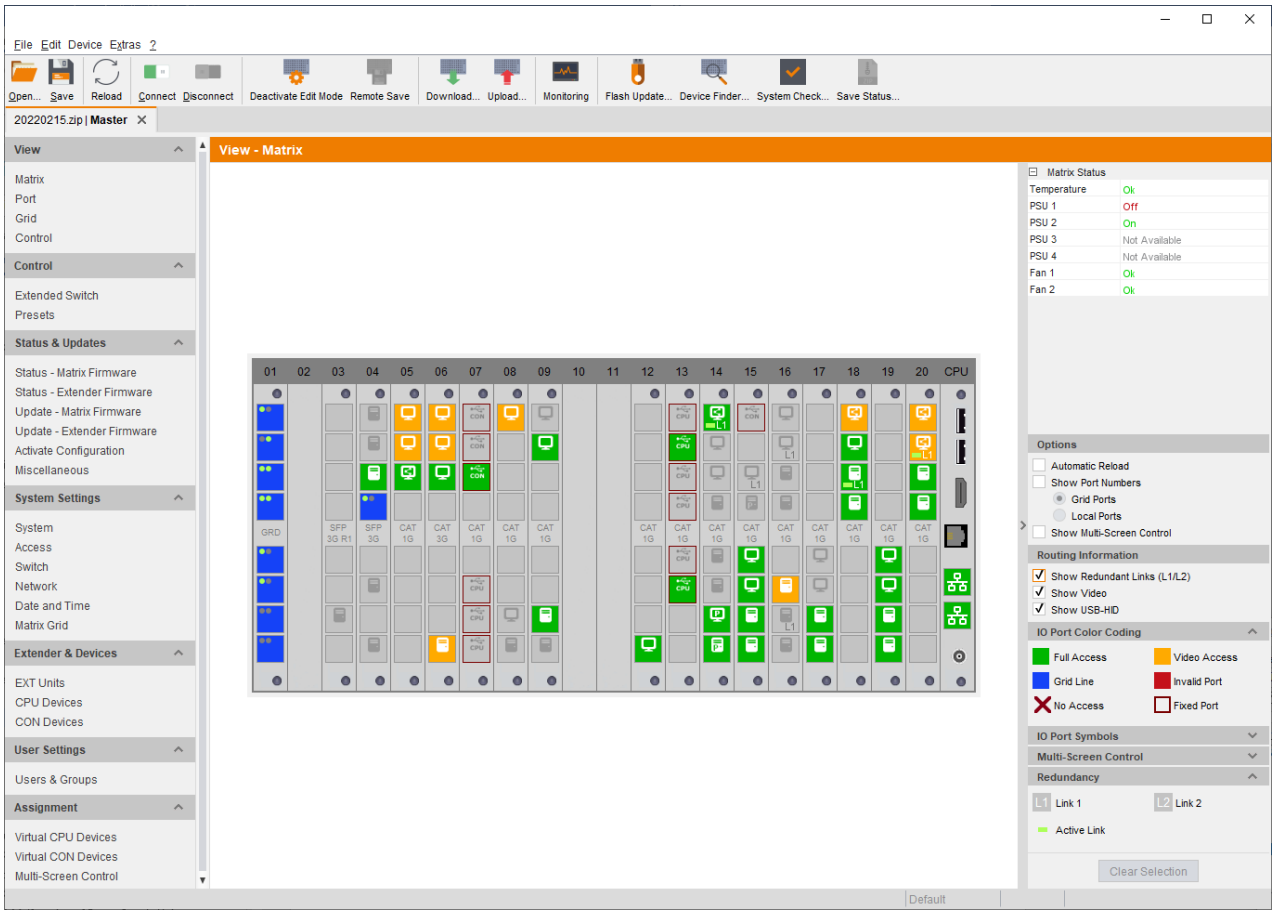


*Fig. 262 Management software menu **View - Matrix***

To check the connection status of the redundant extender modules, proceed as follows:

1. Click **View > Matrix** in the task area.
2. Tick the **Show Redundant Links (L1/L2)** checkbox under **Routing Information** on the right side of the working area.
3. Expand the **Redundancy** menu in the panel on the right side of the working area to receive the respective legend information.
4. Redundant ports are highlighted in the matrix view with L1 and L2. The respectively active link is highlighted with a light green label.

13.3.2.10 System Check

The system check offers a diagnostic function for checking the device configuration. The feature indicates non-optimal as well as incorrect settings and displays issues instructions. The system check is only used to check plausibility and does not make any active configuration changes.

The following configuration parts are checked:

- Matrix Firmware
- Extender Module Firmware
- Multi-Screen Control
- EXT Units
- CPU Devices
- CON Devices
- Users
- Macros
- System Configuration
- Matrix Grid

The following notification levels can be shown:

Level	Description
Info	Information about system parts.
Ok	System checks completed without any abnormalities.
Warning	System checks revealed abnormalities in the configuration that point to incomplete parts of the configuration, firmware differences, duplications, or unconnected extender modules, but without being system critical.
Error	System checks revealed errors in the configuration that can have both functional and system critical influences on the system.

NOTICE

If the messages **Warning** or **Error** are generated by the system check function, the respective problem will be described, and an issue instruction will be provided.

NOTICE

The system check of the matrix may take several minutes. The KVM system and the management software can be used without restrictions during this time.

To start the system check, proceed as follows:

1. Click **System Check** in the tool bar.

   A query appears to check the system.
2. Click **Yes** to start the system check.

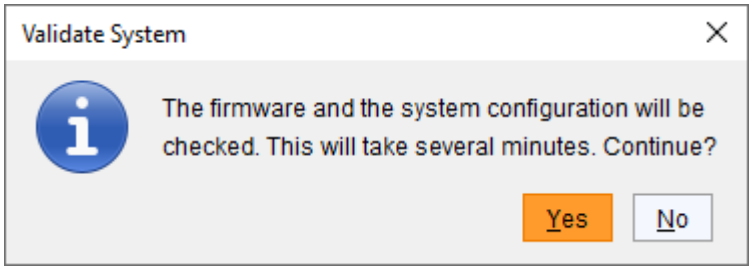


*Fig. 263 Management software dialog **Validate System***

A report is displayed after the system check.

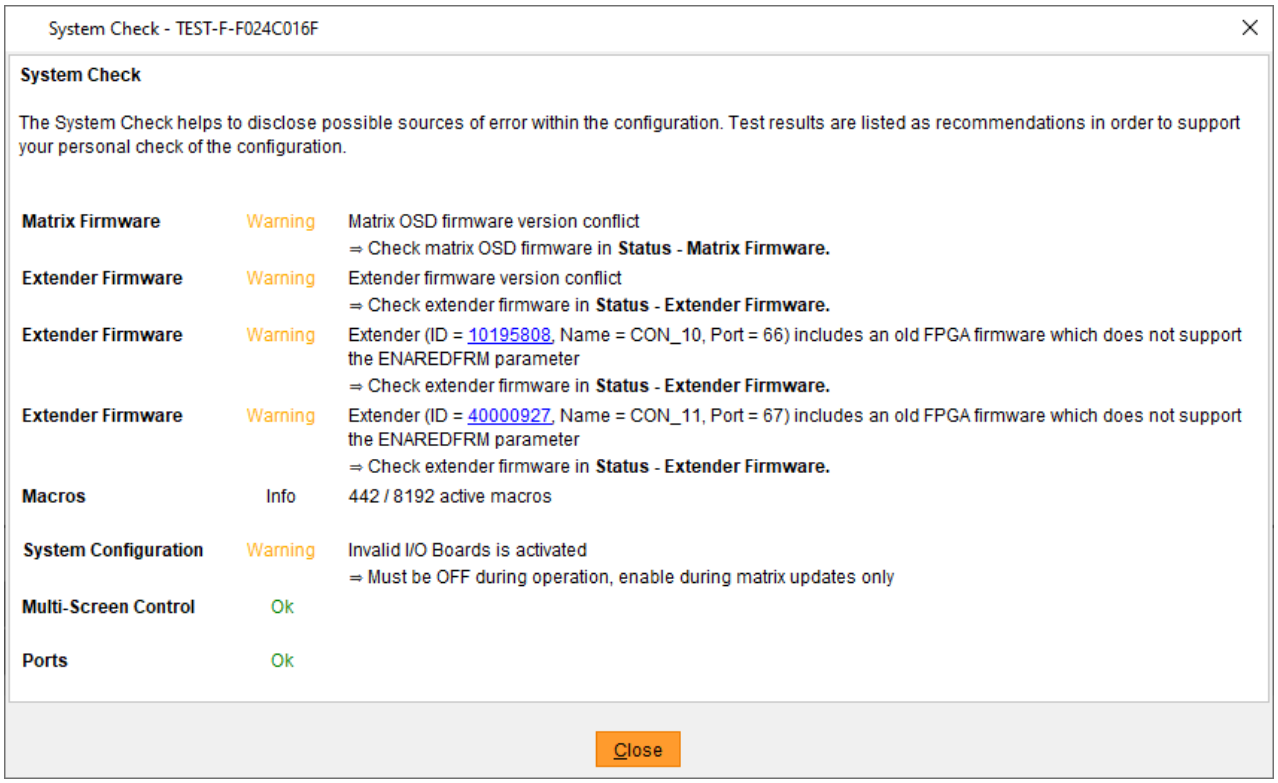


*Fig. 264 Management software report **System Check***

13.3.2.11 Network Check

The network check checks the firewall settings for the ports available in the network.

NOTICE
Available ports are shown in green. If a port is not available, the corresponding entry appears in red, and instructions are displayed.

To start the network check, proceed as follows:

1. Click **Extras > Network Check** in the menu bar.
   A query appears with an input field for the IP address of the matrix to be queried.
2. Enter the IP address of the matrix.
3. Click **Start network check** to start the network check.
   The availability of the ports is shown after a short moment.

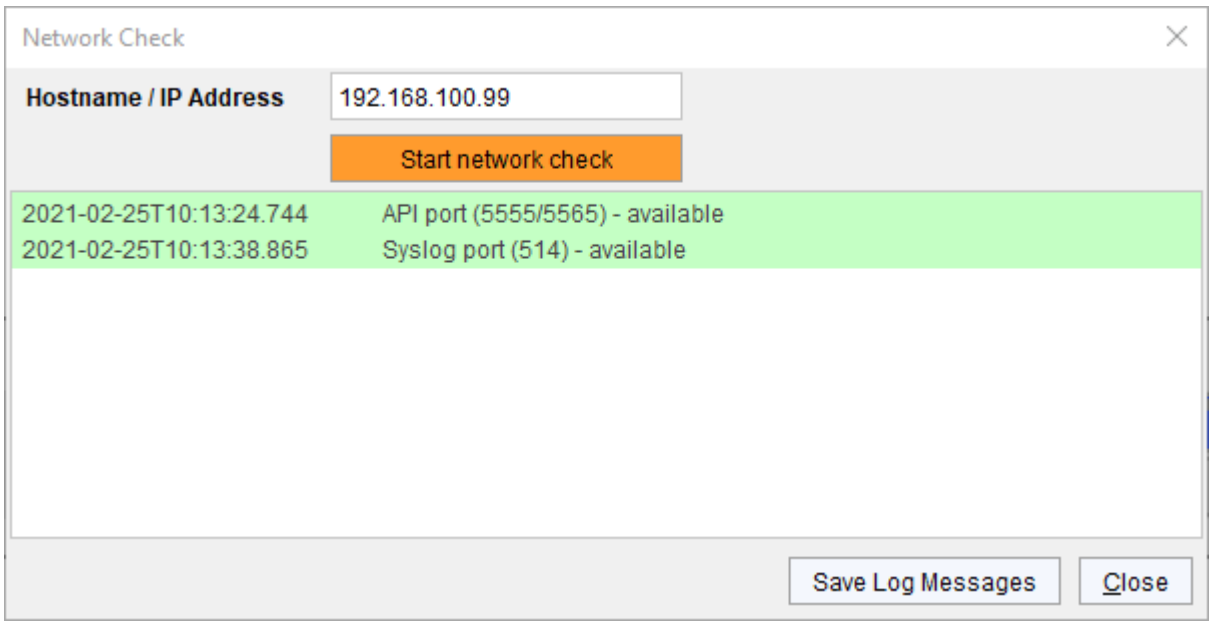


*Fig. 265 Management software report **Network Check - Available ports***

13.3.3 Updating the Matrix Firmware

NOTICE

To process successful firmware updates and avoid failures:

- ➡ Only use computers to update the matrices that are not integrated into the KVM system.
- ➡ Ensure that the computer used for the update is not set into standby mode or sleep mode during the update.
- ➡ Save your configuration locally before starting the update.
- ➡ Proceed an update via direct LAN connection for reasons of network stability.

NOTICE

Ensure that all USB 2.0 extender modules are only connected to the provided ports (fixed ports) before you start the matrix update. Non-compliance may affect the stability of the update.

The firmware update of MATLOS.tfw has to be performed step by step. After each firmware update, the matrix has to be restarted.

E.g., if you want to update your current firmware MATLOS version F01.05 to F01.08, proceed as follows:

- ➡ Then update with version F01.06 and restart the matrix.
- ➡ Then update with version F01.07 and restart the matrix.
- ➡ Then update with version F01.08 and restart the matrix.

If required, the update files can be requested from the TechSupport.

The firmware of the matrix can be updated in this menu.

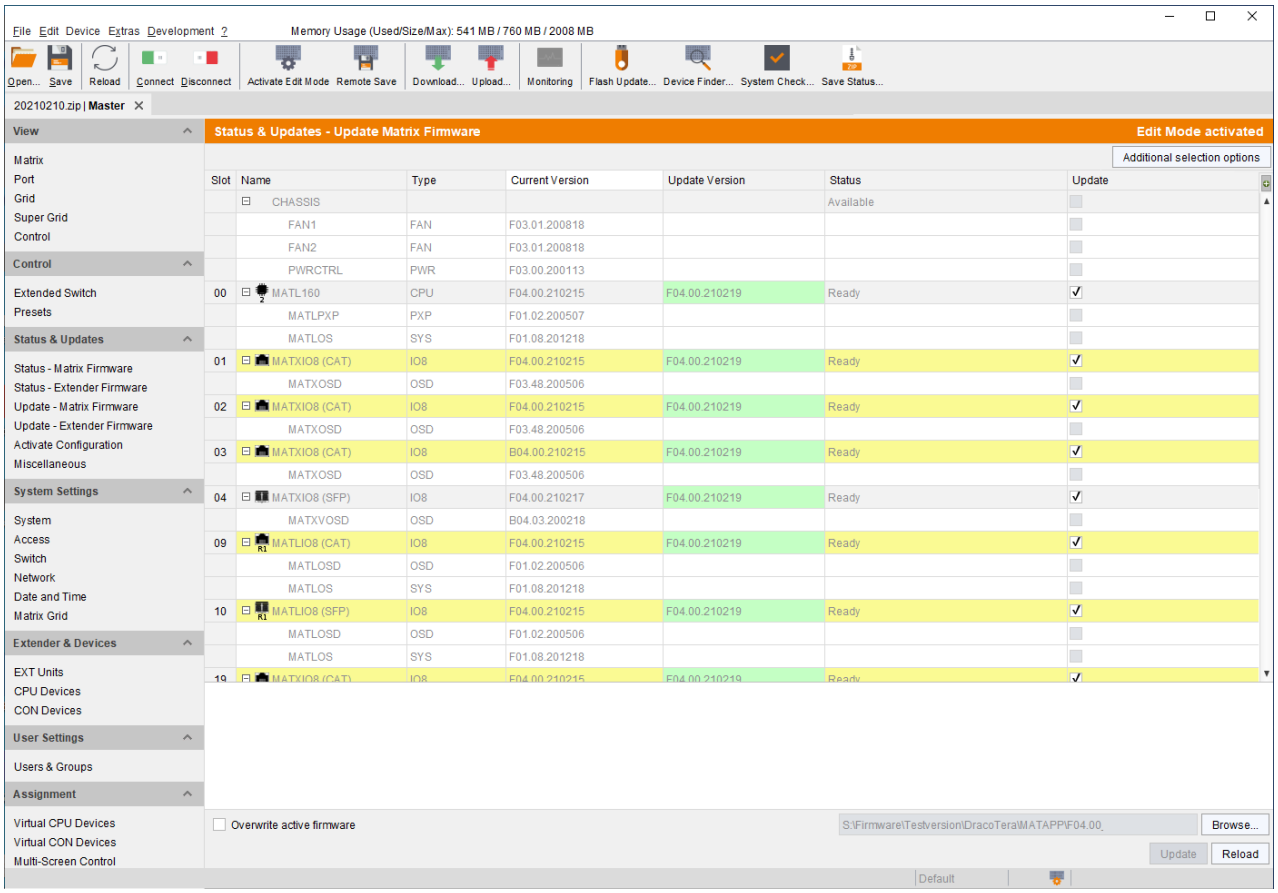


*Fig. 266 Management software menu **Status & Updates - Update Matrix Firmware***

The following information is displayed in the working area:

Option	Description
Name	• Name of the chassis or I/O board • Name of the chassis firmware or I/O board firmware
Type	Type of the chassis firmware or I/O board firmware
Current Version	Installed firmware version
Update Version	Firmware version available for the update
Status	Module availability
Update	Selected/deselected for firmware update The deselection is only available if the **Enable single I/O board update on compact switch** option is activated in the default settings.

The following options are available in the **Additional selection options** drop-down menu on the right upper side in the working area:

Option	Description
Expand Tree View	Expand the tree view to show detailed information. This allows to select or deselect individual firmware to be updated.
Collapse Tree View	Collapse the tree view to hide detailed information. An individual selection of firmware to be updated is not possible.
Select All	Select all available firmware to be updated
Deselect All	Deselect all selected firmware

Preparation

If the Syslog function has not been set yet, we recommend activating the Syslog function (see chapter 7.4.9, page 168) before updating the firmware to log the update in case of update errors.

We recommend using a central location for firmware files, e.g., by using the management software's option menu under **Extras > Options > Default Settings > Firmware Directory**.

Performing the Update

NOTICE

Possible damage of boards or the matrix

A running update process (indicated with 2x white LEDs) is a very sensitive process.

If the matrix is switched off while an update process is running, the respective boards and the matrix will be damaged in their function.

➡ DO NOT power off the matrix while an update process is running.

To update the matrix firmware, proceed as follows:

1. Click **Status & Updates > Update - Matrix Firmware** in the task area.

   All updateable components of the matrix will be automatically selected and highlighted in green.
2. Deselect updateable components of the matrix if not all components should be updated.

   A query dialog appears, asking which update variant should be executed.
3. Click **Update** in the lower part of the working area to start the update.

   A query to save the matrix status appears.

4. Click **Save Matrix Status** to save the matrix status locally or click **Skip** if the status is already saved.

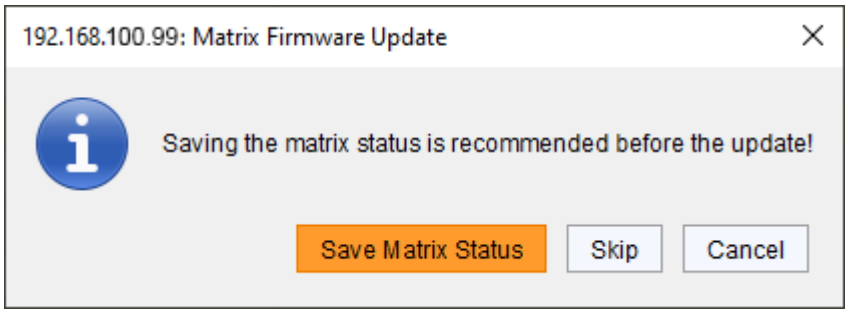


*Fig. 267 Management software dialog **Save matrix status***

5. The progress of the update is displayed in the working area.
   After the update, a query to restart the matrix appears.
6. Click **Yes** to restart the matrix.
   Restarting the matrix may take several minutes, and the matrix is not available during the restart.

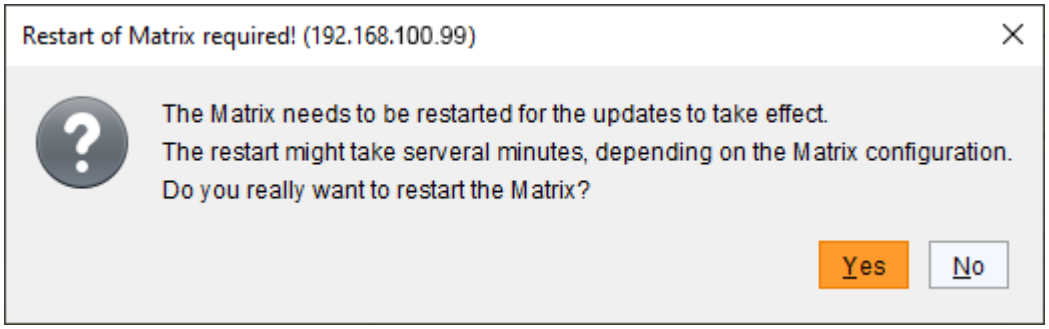


*Fig. 268 Management software dialog **Restart matrix***

The updated firmware is displayed in the working area.

13.3.4 Updating the Extender Module Firmware

13.3.4.1 Updating the Extender Module Firmware via Management Software

To update connected extender modules via management software, the extender modules have to be connected to the matrix with interconnection port 1. The firmware of the extender modules can be updated via management software, except for the xxxMSD firmware type that has to be updated via Mini-USB service port if necessary.

The firmware type is part of the file name such as the MSD firmware the file extension .pfw, e.g., EXTMSD.pfw.

An update of the xxxMSD firmware is usually not necessary. In rare cases, an update may only be necessary to expand the functionality of certain extender modules for specific requirements. In this case, please contact the manufacturer's technical support in advance.

If required, the update files can be requested from the manufacturer's technical support.

Please refer to the user manual of the respective extender module if a manually firmware update of extender modules has to be performed.

Preparation

If the Syslog function has not been set yet, we recommend activating the Syslog function (see chapter 7.4.9, page 168) before updating the firmware to log the update in case of update errors.

We recommend using a central location for firmware files, e.g., by using the management software's option menu under **Extras > Options > Default Settings > Firmware Directory**.

NOTICE

Possible failures when updating the extender module firmware

In case the xxxMSD firmware part of one or more extender modules require an update, there may be dependencies between the new contents of xxxMSD firmware files and other extender module firmware files. In this case, installing other firmware files before updating xxxMSD firmware files could lead to failed updates.

To process successful firmware updates:

- ➡ Please check the release notes of the firmware package for dependencies between the extender module firmware files.
- ➡ If you got information from the manufacturer's technical support that an update of xxxMSD firmware files of certain extender modules is required, please update these firmware files via Mini-USB service port of the respective extender module (see chapter 13.3.4.2, page 370).

There are two possibilities to update the extender modules via matrix:

- **Parallel Mode:**
  By default, used for parallel updates of several extender modules.
  The extender modules of all selected I/O boards are updated in parallel.
  Advantage: The Parallel Mode offers the fastest method for updating the extender modules.
- **Sequential Mode:**
  Option to update extender modules sequentially, extender module by extender module, after the update of the previous extender module is completed.
  Advantage: The Sequential Mode offers the possibility to select/deselect individual firmware to be updated.

We recommend updating the firmware of the extender modules via the Parallel Mode.

Performing the Update in Parallel Mode (Standard Update)

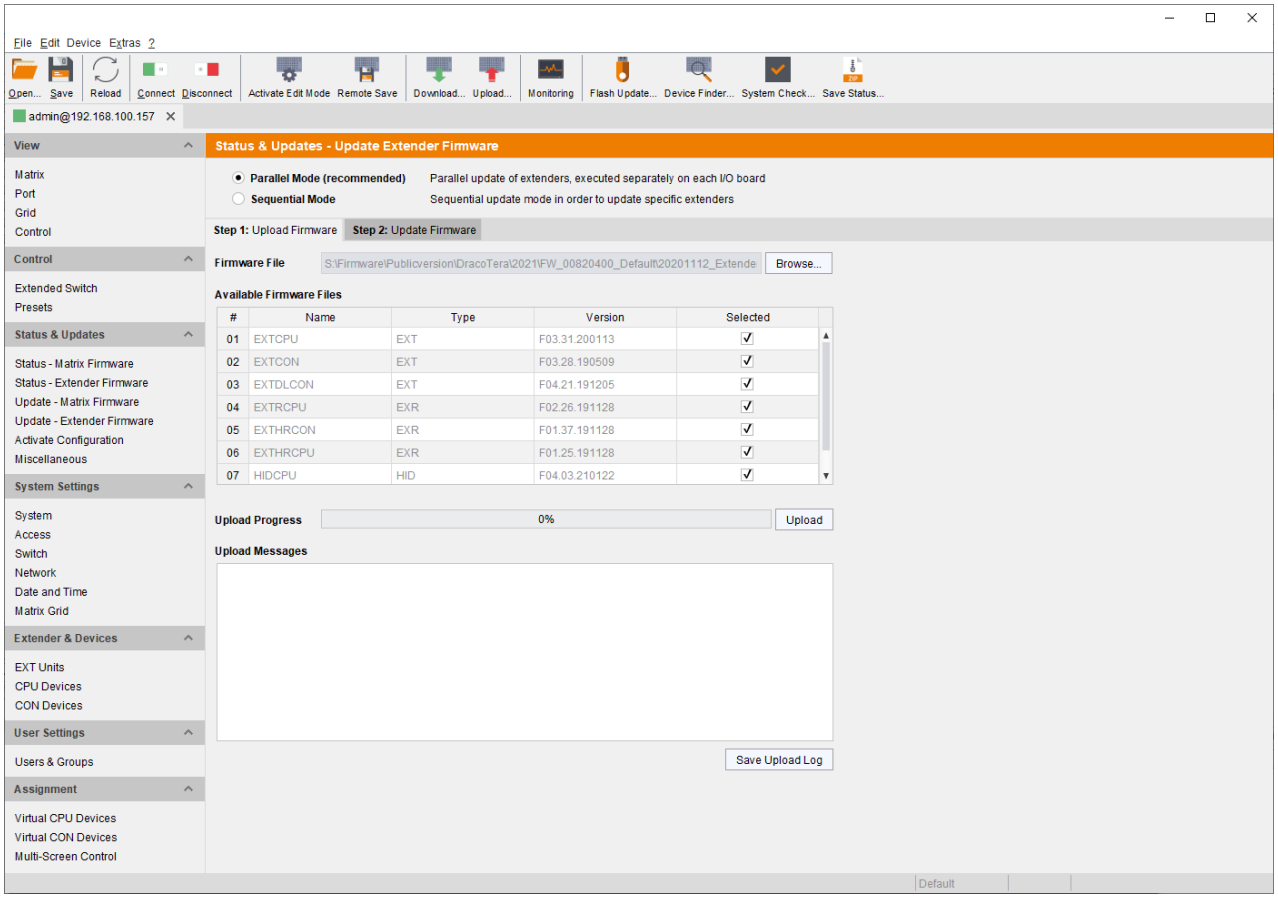


*Fig. 269 Management software menu **Status & Updates - Update Extender Firmware - Parallel Mode - Upload***

Uploading the Extender Module Firmware to the Memory on the I/O Board

To upload the extender module firmware to be currently stored in the memory on the I/O board to be passed to the extender modules, if necessary, proceed as follows:

1. Click **Status & Updates > Update - Extender Firmware** in the task area.

   The **Parallel Mode** for the standard update will be selected by default and the **Upload Firmware** tab will be opened.

2. Before the actual update process, all firmware files have to be uploaded to the respective I/O boards to which the extender modules to be updated are connected. If a newer firmware is available, appropriate I/O boards will be automatically selected for the upload in the **Selected** column and highlighted in green.
3. Click **Upload** to start the upload and distribution of the update files.

By performing the upload process, no update files will be installed. The update process can be performed later. If there are not all extender module firmware files selected, the upload of the extender module firmware files will be performed in sequence.

A query to update the extender module firmware appears finishing the upload process successful.

4. Click **Yes** if you want to directly start the actual update process.

   The **Update Firmware** tab will open immediately.

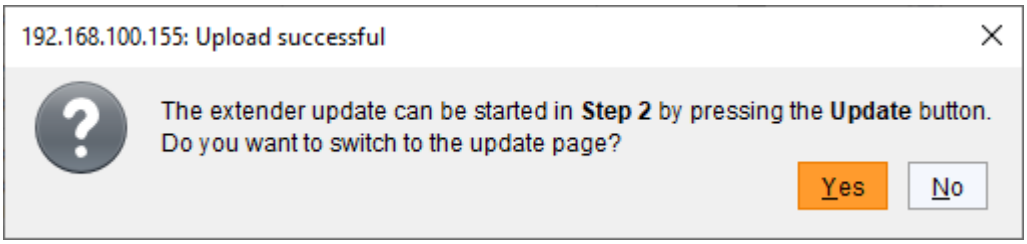


*Fig. 270 Management software dialog **Status & Updates - Update Extender Firmware - Parallel Mode - Update***

Updating the Extender Module Firmware by passing the Extender Module Firmware from the Memory of the I/O Board

When updating an identical or an older firmware version than the version currently installed, the **Enable Downgrade** checkbox in the upper part of the working area must be ticked.

To update the extender module firmware via standard update, proceed as follows:

1. Click **Update** to start the update.

Just before the update process, all I/O boards will be set into the **Service Mode** and retrieved gradually after finishing the respective updates. During Service Mode, all matrix functions are disabled on the I/O boards on which an update is currently performed. An OSD picture indicates the activation of the Service Mode and is displayed on all monitors connected to those CON Units that are connected to the matrix.

2. The progress of the update is displayed in the working area.
3. Check the update messages in the message field after the update if the updates for all extender modules have been installed correctly.

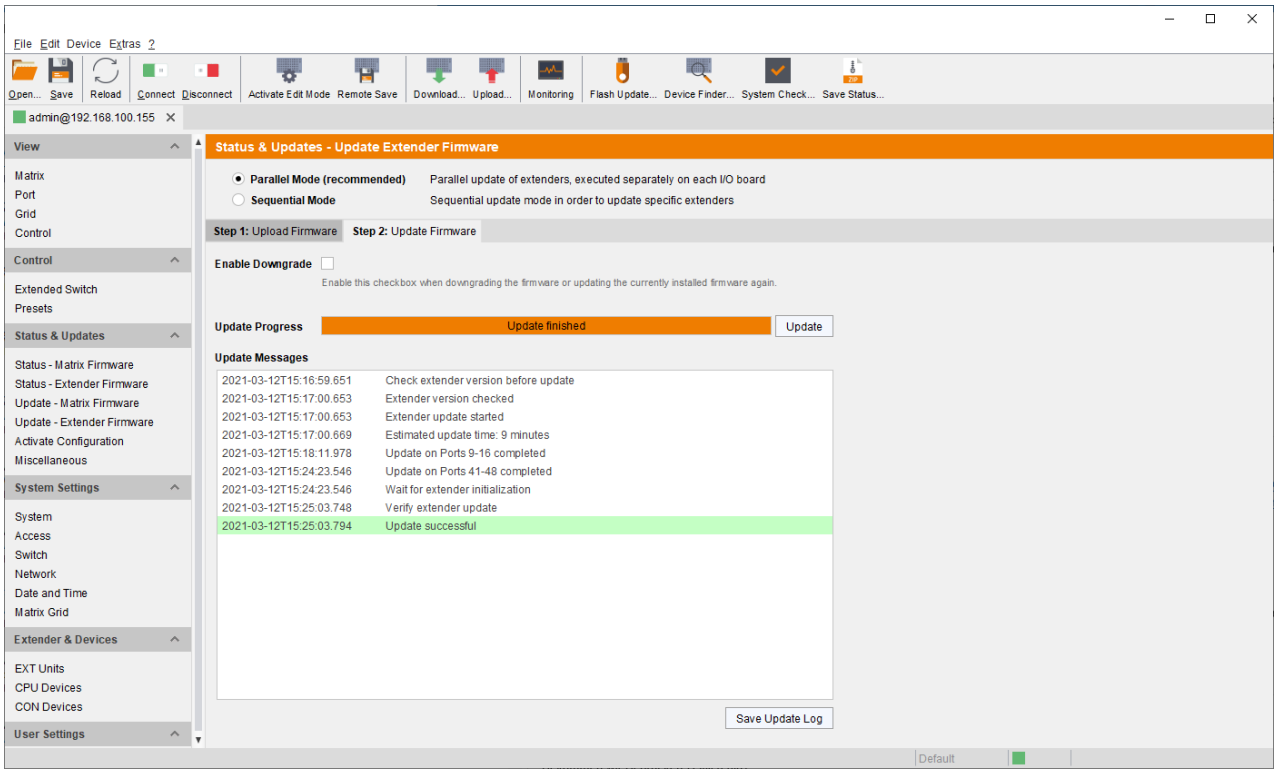


*Fig. 271 Management software menu **Status & Updates - Update Extender Firmware - Parallel Mode - Update***

Performing the Update in Sequential Mode (Expert Update)

In the Sequential Mode, individual firmware to be updated can be selected/deselected in this menu.

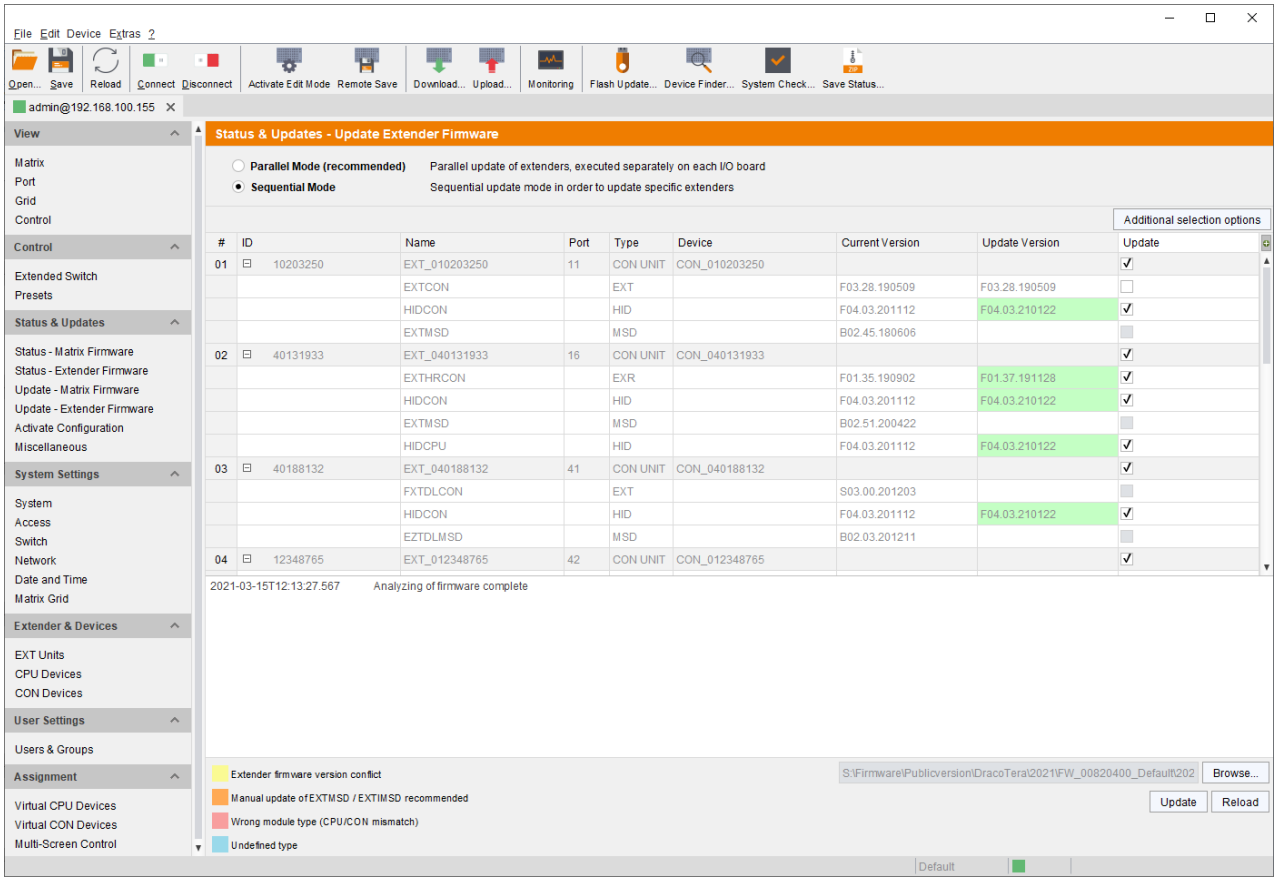


*Fig. 272 Management software menu **Status & Updates - Update Extender Firmware - Sequential Mode***

The following information is displayed in the working area:

Option	Description
ID	Numerical value of the extender module ID
Name	Name of the EXT Unit and the extender module firmware
Port	Port number of the matrix, the extender module is physically connected
Type	Type of the CON/CPU Unit and firmware type
Device	Name of the CON Device/CPU Device the EXT Unit is assigned to
Current Version	Installed firmware version
Update Version	Firmware version available for the update
Update	Select/deselect for firmware update

Firmware types to be updated or firmware conflicts are highlighted in color:

- Extender firmware version conflict
- Manual update of EXTMSD/EXTIMSD recommended*
- Wrong module (CPU/CON mismatch)
- Undefined type

* Only for firmware versions older than V2.25 (EXTMSD) and V1.13 (EXTIMSD) and only if instructed by the manufacturer's technical support or if the release notes indicate dependencies between extender module firmware files. EXT*MSD requires manual update via the Mini-USB service port at the extender modules.

Option	Description
Expand Tree View	Expand the tree view to show detailed information. This allows to select or deselect individual firmware to be updated.
Collapse Tree View	Collapse the tree view to hide detailed information. An individual selection of firmware to be updated is not possible.
Select All	Select all available firmware to be updated
Deselect All	Select all selected firmware

To update the extender module firmware via sequential update, proceed as follows:

1. Click **Status & Updates > Update - Extender Firmware** in the task area.
2. Click **Activate Edit Mode** in the toolbar.
3. Select the **Sequential Mode** option in the upper part of the working area.

   All updateable firmware will be automatically selected and highlighted in green.
4. Click **Update** in the lower part of the working area to start the update.

In Sequential Mode the extender module that is being updated is set into the Service Mode, all others continue to run and can be used. The I/O boards are not affected and continue to run. An OSD picture indicates the activation of the Service Mode and is displayed on the monitor connected to the CON Unit that is currently updated.

   After update completion of the respective extender module, the Service Mode of the extender module will be quit.
5. After the update, check the messages in the message box to ensure that the updates for all extender modules were installed correctly.

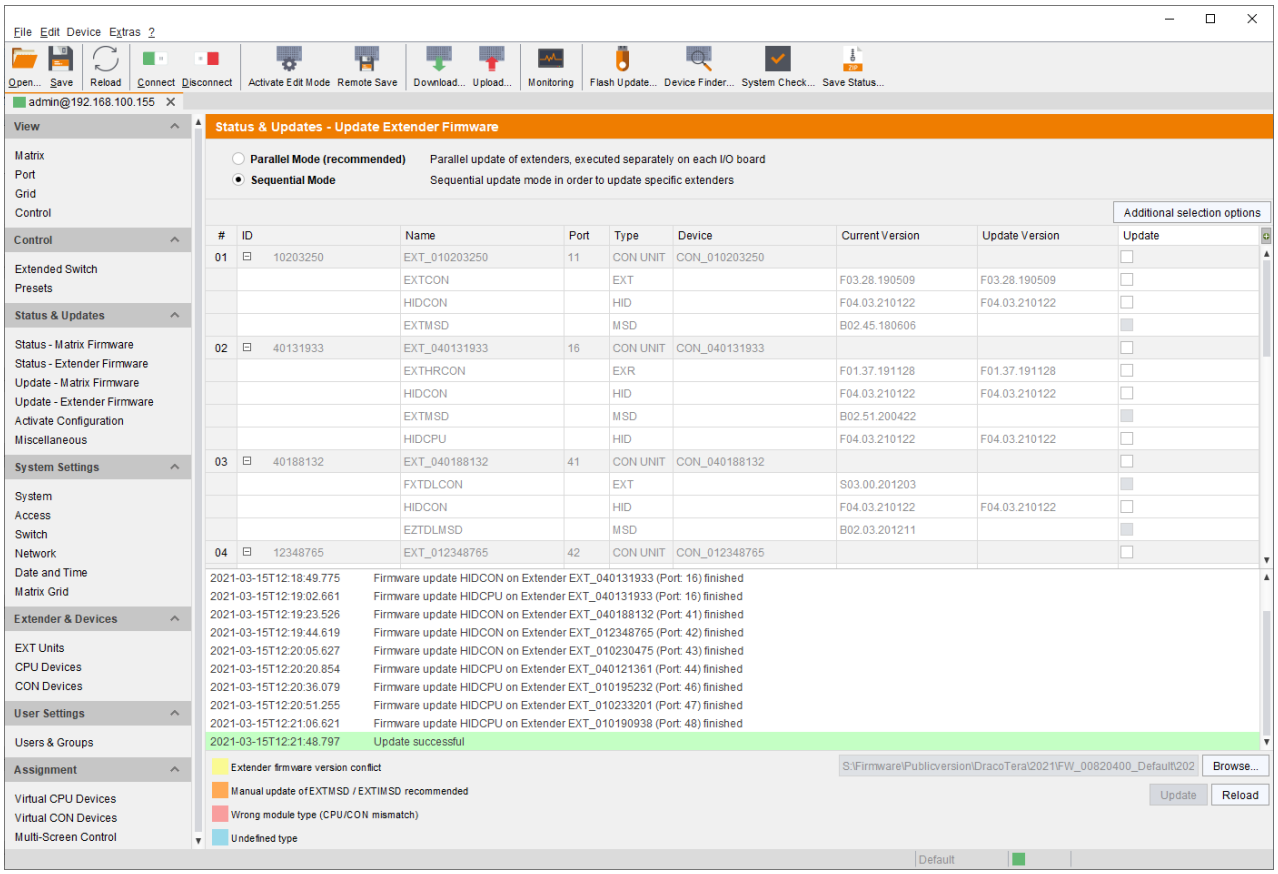


*Fig. 273 Management software menu **Status & Updates - Update Extender Firmware - Sequential Mode***

6. Click **Deactivate Edit Mode** in the toolbar.

13.3.4.2 Updating the Extender Module Firmware via Mini-USB

For a parallel flash update of several extender modules, proceed as follows:

- ➡ Using mini-USB cables, connect as many extender modules to USB ports on your computer running the management software as USB ports are available.
- ➡ Run the management software as often as extender modules are connected.
- ➡ Proceed as described below and select a different extender module to be updated in each running management software.

To perform a firmware update of extender modules using the management software, proceed as follows.

1. Run the management software.
2. Click **Flash Update** in the toolbar.
3. Click **Extender Update via Mini-USB flash drive**.

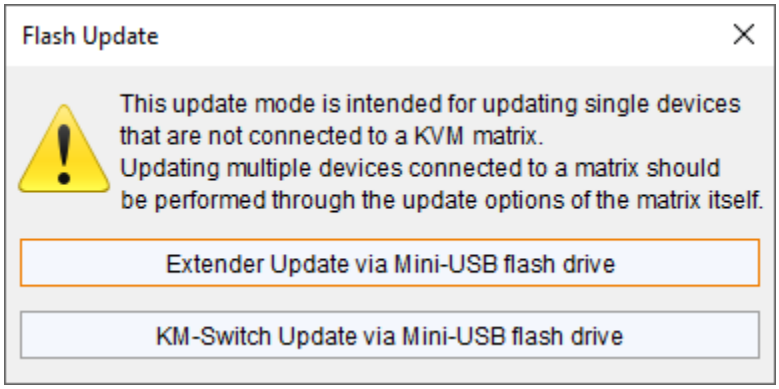


*Fig. 274 Management software **Flash Update***

The update dialog appears.

4. Connect the extender module to your computer running the management software using a Mini-USB cable.
5. Power up the extender module.
6. Click **Search Extender**.

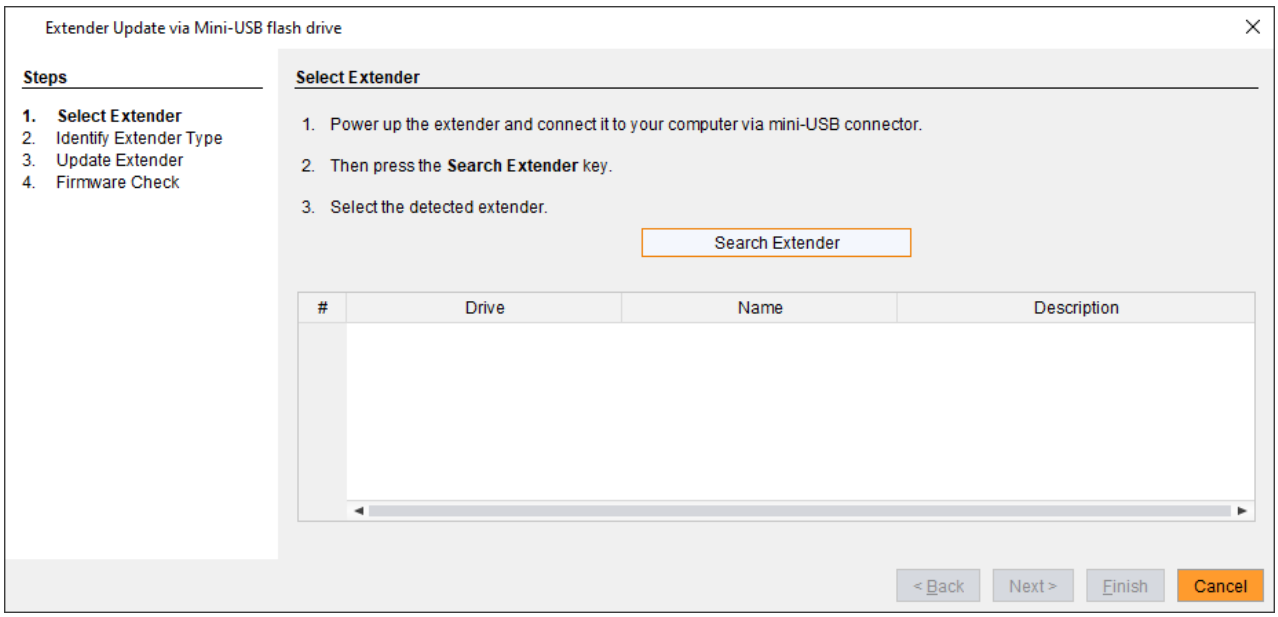


*Fig. 275 Management software **Flash Update - Search Extender***

The flash drive of the connected extender module is displayed in the drive overview.

7. Select the flash drive of the extender module to be updated.
8. Click **Next >**.

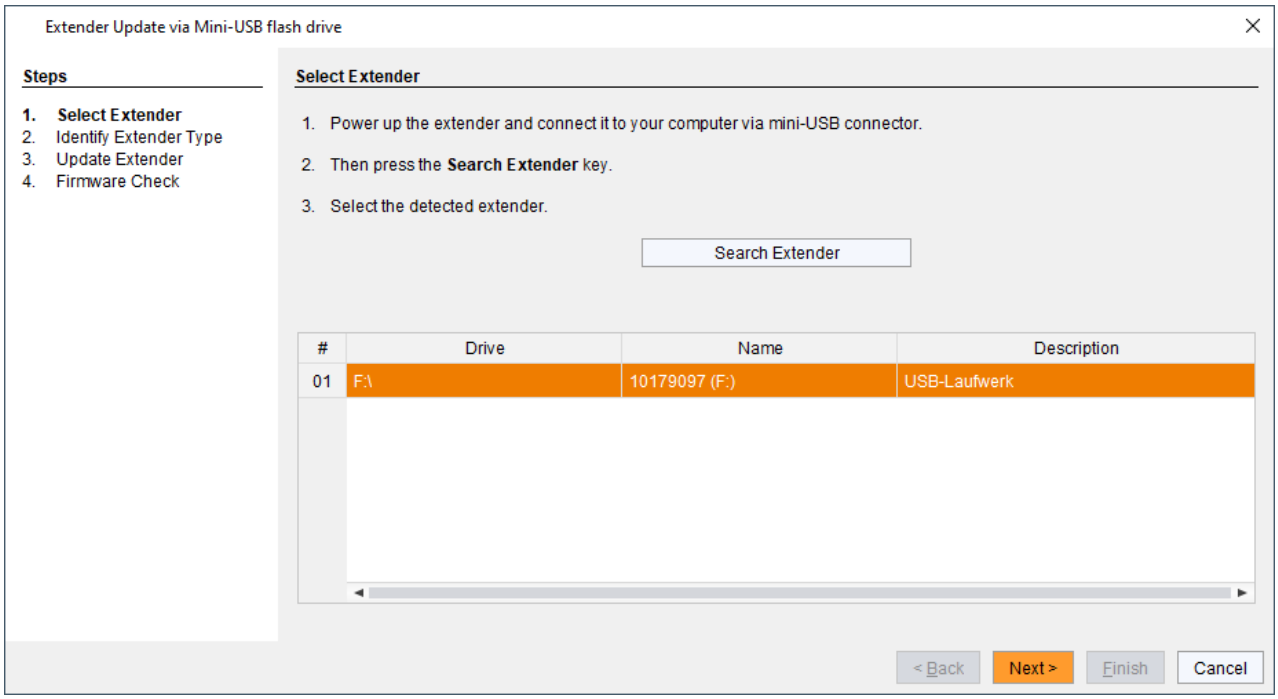


*Fig. 276 Management software **Flash Update - Select Extender***

The identification of the extender module type automatically starts.

After successful identification, the extender module specific firmware is displayed in the **Status Log** area.

9. Click **Next >** after successful identification.

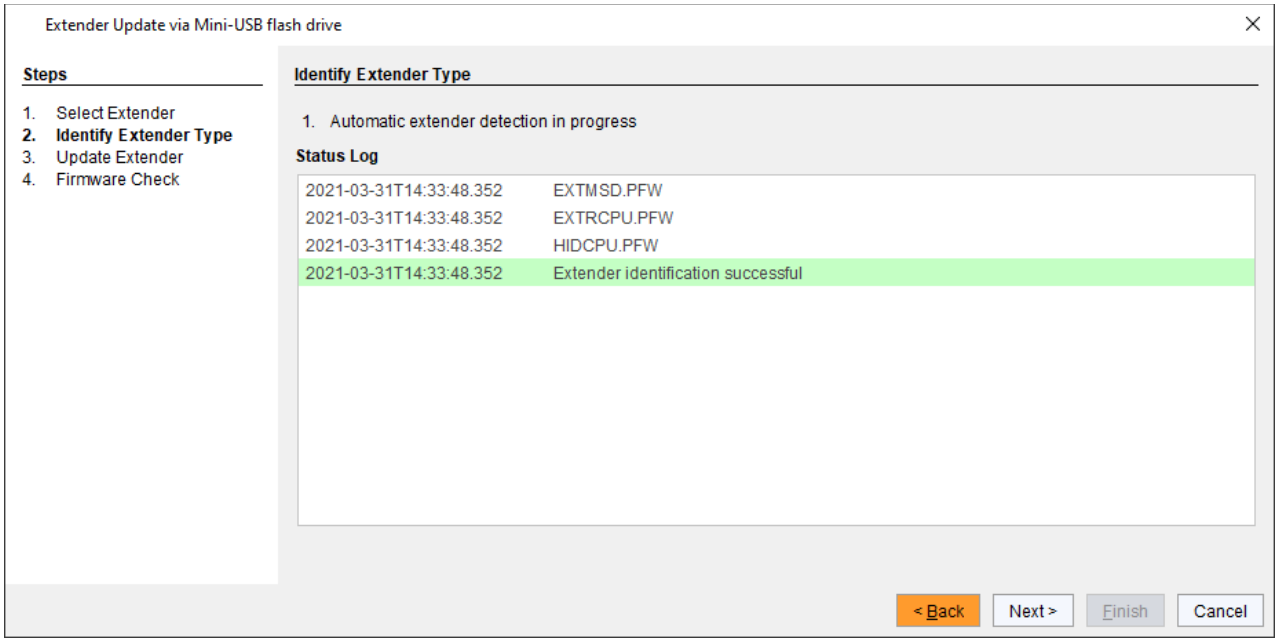


*Fig. 277 Management software **Flash Update - Identify Extender Type***

10. Click **Browse…** to go to the location the update files are saved.

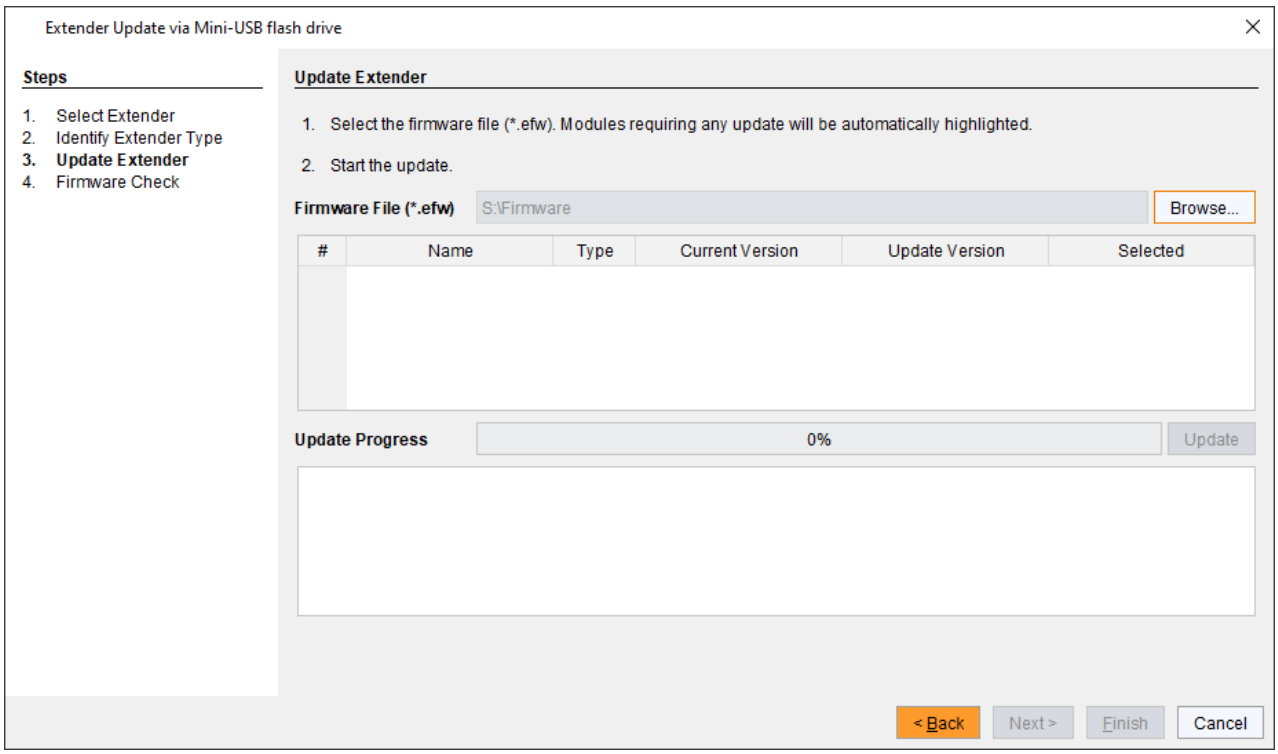


*Fig. 278 Management software **Flash Update - Update Extender - Select files***

11. Select the update files and click **Select** in the selection dialog.
    The firmware available for the extender module is displayed.
    Firmware requiring any update will be automatically highlighted.
12. Click **Update** to start the update process.

After the update of an MSD firmware, the extender module will automatically be restarted.

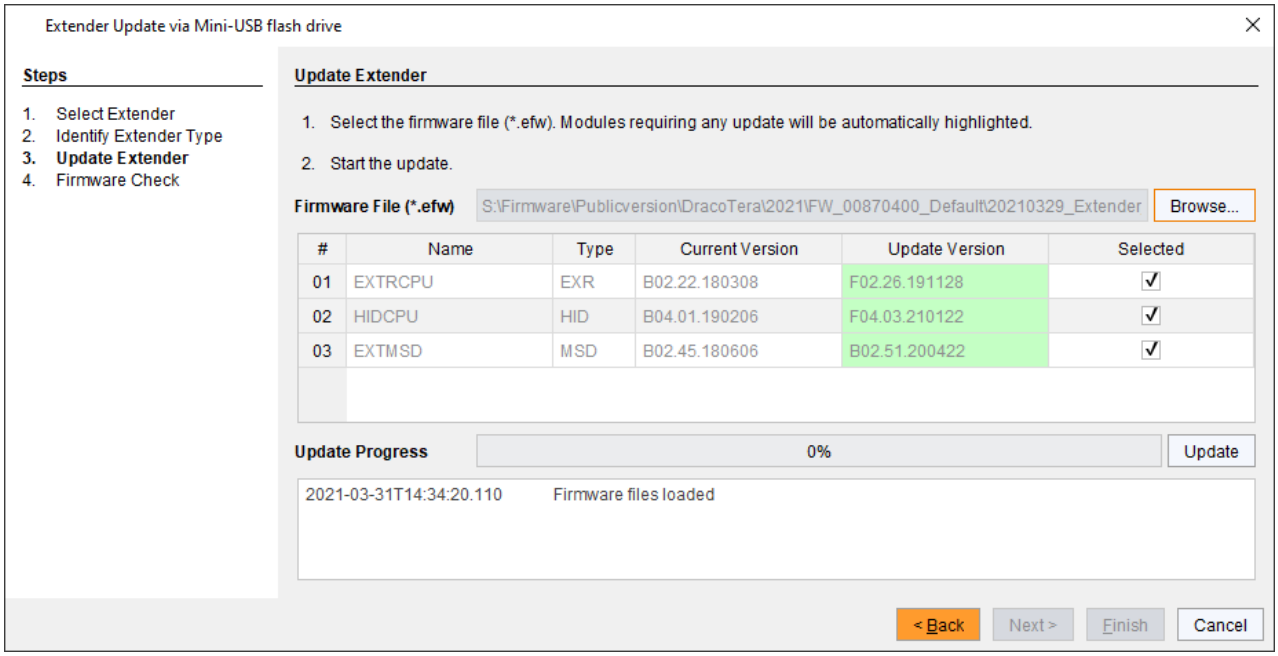


*Fig. 279 Management software **Flash Update - Update Extender - Load files***

A green highlighted message appears when the firmware update has been completed.

13. Click **Next >** to verify the update.

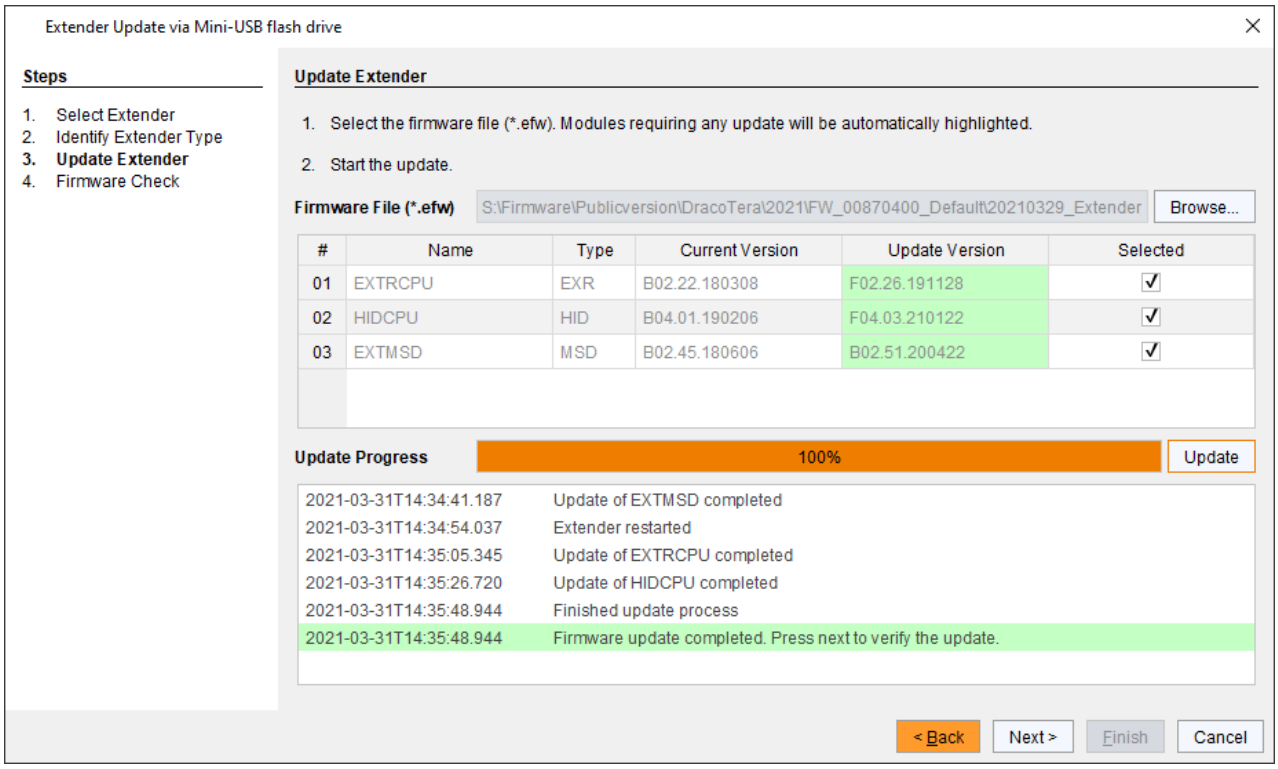


*Fig. 280 Management software **Flash Update - Update Extender - Firmware update completed***

14. Click **Next >**.
15. Manually power off the extender module.
16. Power on the extender module.

    The extender module restarts, and validation begins automatically. The completion of the validation is displayed in the **Status Log** area.

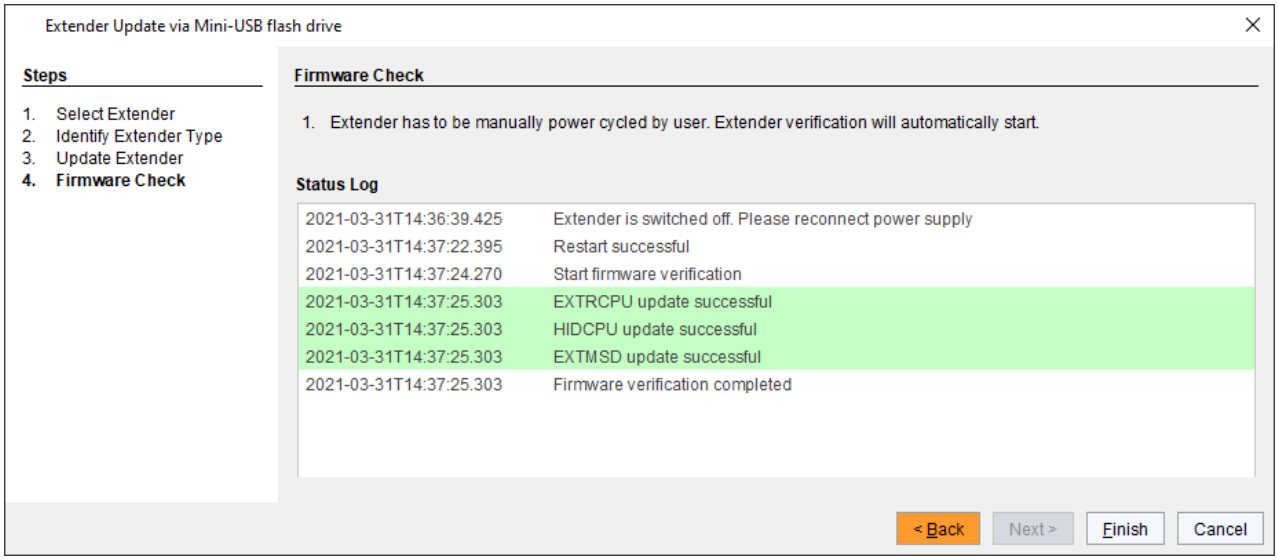


*Fig. 281 Management software **Flash Update - Firmware Check - Firmware verification completed***

17. Click **Finish**.

    The firmware update of the extender module is completed.

    A dialog appears offering to update another extender module.
18. Click **Yes** to update another extender module or click **No** and **Finish** to quit the Update dialog.

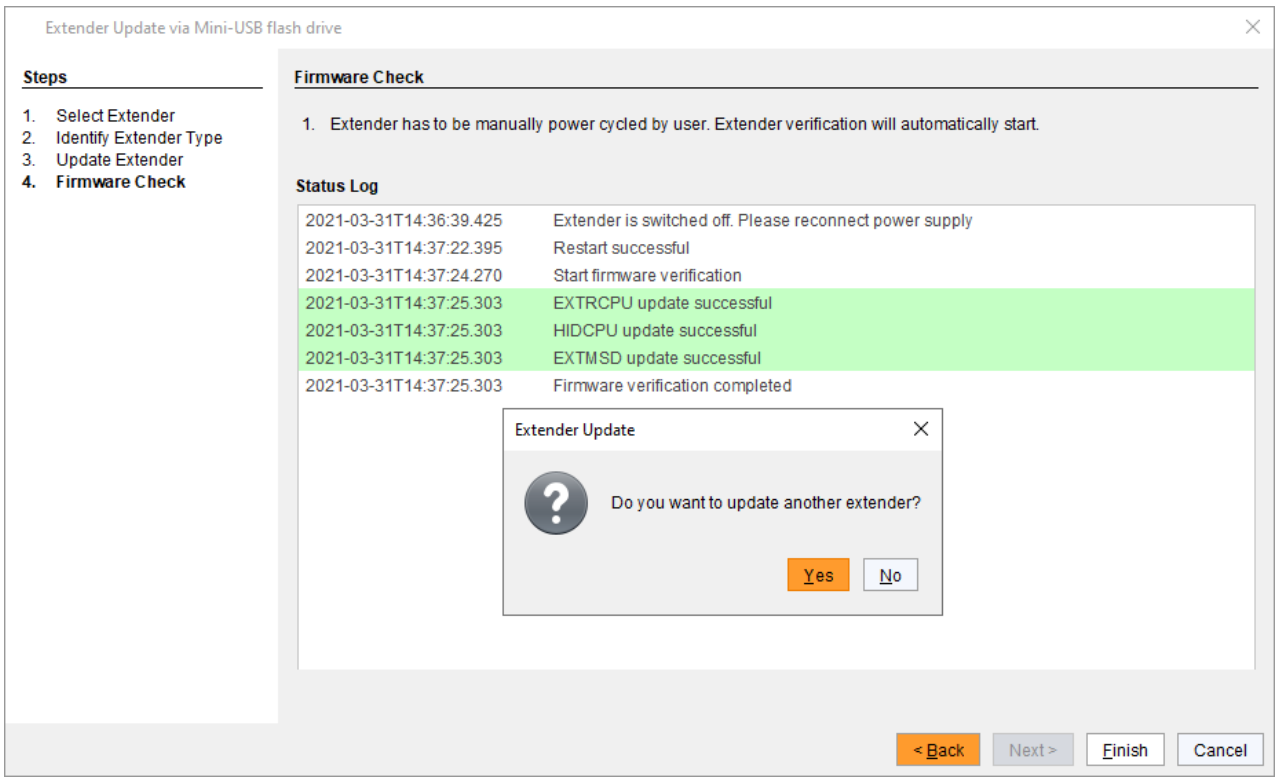


*Fig. 282 Management software **Flash Update - Firmware Check - Complete firmware update***

13.3.5 Resetting the Matrix and the Boards

13.3.5.1 Resetting the Matrix to the Factory Settings

NOTICE
If you perform a (factory) reset, all current settings and all configurations stored in the matrix will be lost. This also applies to the network parameters (reset to default IP-address) and the admin password.

NOTICE
If a firmware update has been carried out since the delivery, the latest installed firmware version is retained.

To perform a reset of the matrix, proceed as follows:

1. Select **Device > Advanced Service > Factory Reset > Factory Reset** in the menu bar.

   An access window appears.
2. Enter the username and password of the administrator.
3. Click **Ok**.

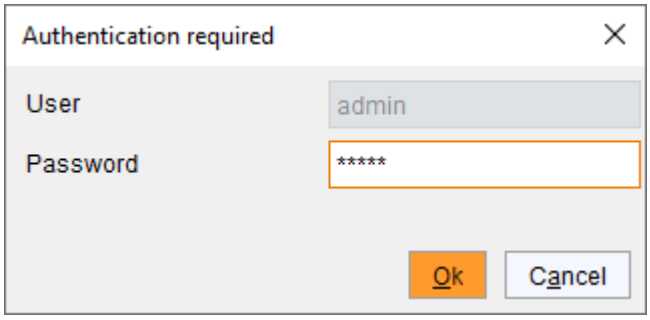


*Fig. 283 Management software dialog **Log in administrator***

A query to reset the matrix appears.

4. Click **Yes** to reset the device.

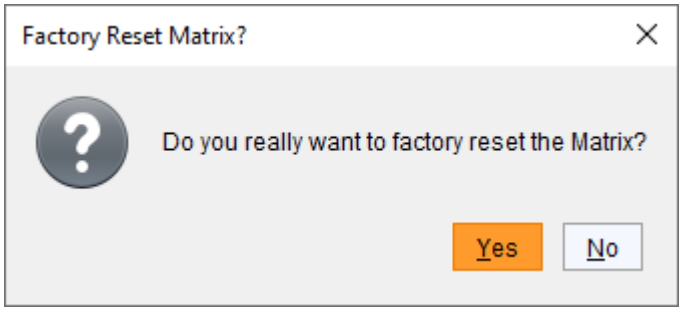


*Fig. 284 Management software dialog **Factory Reset Matrix***

The matrix is reset to factory settings.

13.3.5.2 Resetting an I/O Board to the Factory Settings

NOTICE
If you perform a (factory) reset, all current settings and all configurations of the I/O board will be lost.

NOTICE
If a firmware update has been carried out since the delivery, the latest installed firmware version is retained.

To perform a reset of an I/O board, proceed as follows:

1. Select **View > Matrix** in the task area.
2. Click with the right mouse button on the symbol of an extender module of the I/O board to be reset.

   A context menu appears.
3. Select the **Factory Reset I/O Board** function in the context menu.

   Note: The I/O board will be restarted immediately without user confirmation. The I/O board will disappear for a short time in the overview. When the I/O board and the extender modules are visible again, the reset of the I/O board was successful.

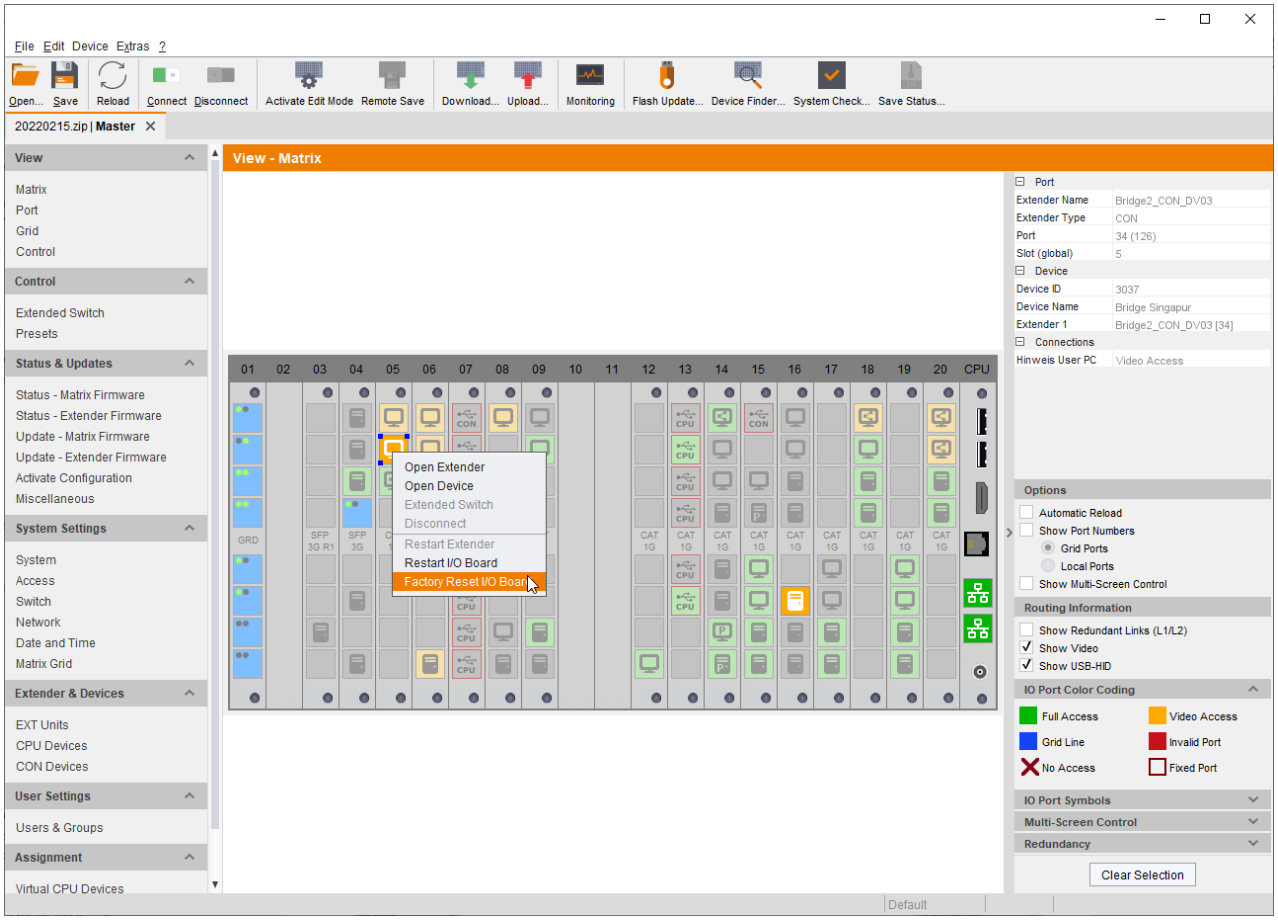


*Fig. 285 Management software **View - Matrix - Context menu***

14 Troubleshooting

The following chapters provide help in case of problems with the matrix. The content of this help is based on an already functioning extender module. Before operating your extender modules with the matrix, please make sure that the extender modules work via a direct point-to-point connection. A Cat X or fiber optic coupler can be used to support this. In case of problems in this regard, please refer to the manuals of the respective extender modules if necessary.

14.1 External Failure

Diagnosis	Possible reason	Measure
The matrix cannot be started anymore.	Fuse at the standard appliance outlet.	➡ Check the fuse.

14.2 Video Interference

Diagnosis	Possible reason	Measure
Opening of the OSD is not possible.	No OSD jumper set.	➡ Set jumper 11 on the CON Unit.
Incorrect video display.	Cable connection disturbed.	➡ Check the connection, length, and quality of the interconnect cable to the units.

14.3 Malfunction of Fans

Diagnosis	Possible reason	Measure
Fans only run under full load.	Communication to fan tray is not working.	➡ Remove and reinstall the fan tray. ➡ Swap both fan trays to the other slot. ➡ Restart the matrix.
Fans do not run, and the LED **OK** is on.	Fans defective.	➡ Contact your distributor.
Fans do not run, and the LED **OK** is off.	Power supply.	➡ Check power supply and power connection.

14.4 Malfunction of Power Supply Units

Diagnosis	Possible reason	Measure
The matrix cannot be started.	Power supply units are not locked correctly.	➡ Check lock and plug-in of the power supply units.
	No power voltage available.	➡ Check if the power supply cables are connected correctly.
	Power supply units are not switched on.	➡ Check the switch on the power supply units.

14.5 Network Error

Diagnosis	Possible reason	Measure
Network settings are not assumed after editing.	Restart of the matrix not yet completed.	➡ Restart the matrix.

14.6 Failure at the Matrix

Diagnosis	Possible reason	Measure
Serial control is not impossible or only restrictedly possible.	Computer and matrix are operating at different Baud rates.	➡ Change the Baud rate in the matrix and computer (see chapter 15.1.3, page 380).
Port definition as USB 2.0 invalid.	Restart of the matrix not yet completed.	➡ Restart the matrix.
No OSD access possible.	Wrong Hot Key.	➡ Reset the Hot Key if necessary (see chapter 4.1, from page 47).

14.7 Failure at the Interconnection Port

14.7.1 Error Indication at the 1G Cat X Port

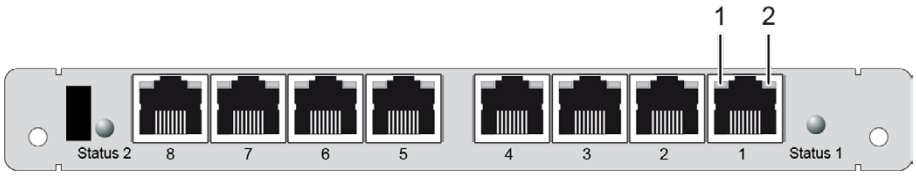


Fig. 286 Interface side - Link Connection LEDs, Draco tera I/O board,1G Cat X

Diagnosis	Possible reason	Measure
LED 2 is flashing orange, and LED 1 is off.	Connections CON Unit, matrix, and CPU Unit.	➡ Check connecting cables and ports (cable break, CPU/CON Unit offline). ➡ Connect a 3G extender module only to a 3G port. ➡ Contact your distributor, if necessary.

14.7.2 Error Indication at the 3G Cat X Port

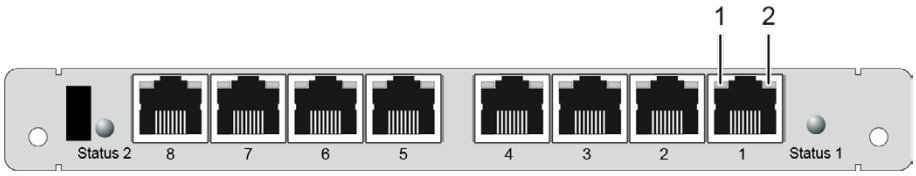


Fig. 287 Interface side - Link Connection LEDs, Draco tera I/O board,3G Cat X

Diagnosis	Possible reason	Measure
LED 2 is flashing red, and LED 1 is off.	Connections CON Unit, matrix, and CPU Unit.	➡ Check connecting cables and ports (cable break, CPU/CON Unit offline). ➡ Connect a 1G extender module only to a 1G port. ➡ Contact your distributor, if necessary.

14.7.3 Error Indication at the Fiber Port

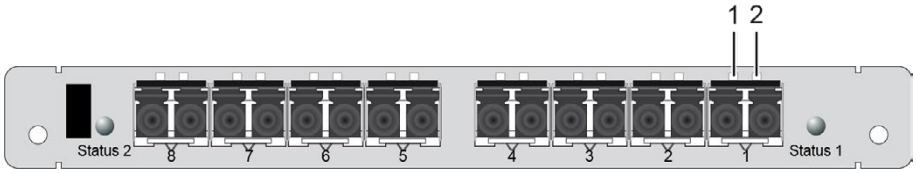


Fig. 288 Interface side - Link Connection LEDs, Draco tera I/O board,1G and 3G fiber

Diagnosis	Possible reason	Measure
LED 1 or LED 2 flashing red	Connections CON Unit, matrix, and CPU Unit.	➡ Check connecting cables and ports (cable break, CPU/CON Unit offline). ➡ Connect a 1G extender module only to a 1G port. ➡ Connect a 3G extender module only to a 3G port. ➡ Contact your distributor, if necessary.

14.8 Blank Screen

Diagnosis	Possible reason	Measure
The LEDs of the power supply units are off.	Power supply voltage.	➡ Check the connection to the power network.
Monitors remains dark after switching operation	Switching to a port without connected source.	➡ Switch to a port with a connected source.
	Connections CON Unit, matrix, and CPU Unit.	➡ Check connecting cables and ports (no cable, cable break, CPU/CON Unit offline, CPU/CON Unit connected to the wrong port, see chapter 14.7, from page 378).

For further measures see user manual of the respective extender module series.

15 Specifications

15.1 Interfaces

15.1.1 Controller Board

15.1.1.1 RJ45 (Network)

The devices offer a 1000BASE-T interface to establish a network connection to a computer. All four wire pairs are used in both directions. The cabling is suitable for a full duplex operation.

15.1.2 HDMI (for 480-CTRL)

The HDMI output is used to display an on-screen configuration menu on a connected monitor.

Parameters	Values
Resolution with frame rate	1920 px x 1080 px @ 60 Hz
Color depth/color component	6 bit (4:4:4)
Effective data rate	Max. 2.7 Gbit/s

15.1.3 RS-232 (Serial)

Communication takes place with a transmission speed of up to 115.2 kBd, regardless of the file format. The transmission takes place with eight data bits and a stop bit, but without a parity bit. Limited hardware handshake (DSR) is possible.

15.1.4 I/O Boards

15.1.4.1 RJ45 (Interconnect 1G)

Cat X devices offer a 1000BASE-T interface to establish an interconnection between Cat X devices. All four wire pairs are used in both directions. The cabling is suitable for a full duplex operation.

15.1.4.2 RJ45 (Interconnect 3G)

Cat X devices offer a 2,5GBASE-T interface to establish an interconnection between Cat X devices. All four wire pairs are used in both directions. The cabling is suitable for a full duplex operation.

15.1.4.3 Fiber SFP Type LC (Interconnect)

The communication of fiber devices is performed via Gigabit SFPs that are connected to suitable fibers fitted with connectors type LC (see (chapter 15.2.2, page 382).

NOTICE

The correct function of the device can only be guaranteed with SFPs provided by the manufacturer.

NOTICE

SFP modules can be damaged by electrostatic discharge (ESD).

➡ Please consider ESD handling specifications.

15.2 Interconnect Cable

15.2.1 Cat X

NOTICE

Transmission problems

Routing over an active network component, such as an Ethernet Hub, Router or Matrix, is not allowed. Operation with several patch fields is possible.

➡ Establish a point-to-point connection.

➡ Avoid routing Cat X cables along power cables.

NOTICE

Exceeding the limit of the device class

The use of unshielded Cat X cables with higher electromagnetic emissions/radiation can exceed the limit values for the specified device class.

➡ Correctly install shielded Cat X cable throughout interconnection, to maintain regulatory EMC compliance.

NOTICE

Exceeding limit values for electromagnetic radiation

The limit values for the electromagnetic radiation of the device are complied with if ferrites are mounted on both sides of all Cat X cables near the device. With installed ferrites, the devices meet the EU guidelines for electromagnetic compatibility. The operation of the devices without mounted ferrites leads to a loss of conformity with the EU directives.

➡ Mount ferrites on both sides of all Cat X cables near the device to maintain regulatory EMC compliance.

Type of Interconnect Cable

The KVM extender modules require interconnect cabling specified for Gigabit Ethernet (1000BASE-T). The use of solid core (AWG24), shielded, Cat 5e (or better) is recommended.

Type of cable	Specification
Cat X installation cable AWG24	S/UTP (Cat 5e) cable according to EIA/TIA-568, standard 568-A or 568-B. Four pairs of wires AWG24. We recommend using standard 568-A, but standard 568-B is also supported.
Cat X patch cable AWG26/8	S/UTP (Cat 5e) cable according to EIA/TIA-568, standard 568-A or 568-B. Four pairs of wires AWG26/8. We recommend using standard 568-A, but standard 568-B is also supported.

The use of flexible cables (patch cables) type AWG26/8 is possible; however, the maximum possible extension distance is halved.

Maximum Transmission Range for Video and USB-HID Signals (End-to-End Connection)

Type of cable	Maximum transmission range
Cat X installation cable AWG24	140 m (460 ft)
Cat X patch cable AWG26/8	70 m (230 ft)

15.2.2 Fiber

NOTICE

Transmission problems

Routing over an active network component, such as an Ethernet Hub, Router or Matrix, is not allowed. Operation with several patch fields is possible.

➡ Establish a point-to-point connection.

➡ Avoid routing Cat X cables along power cables.

Type of Interconnect Cable*

Type of cable	Specification
Single-mode 9 µm	• Two fibers 9 µm • I-V(ZN)H 2E9 (in-house patch cable) • I-V(ZN)HH 2E9 (in-house breakout cable) • I/AD(ZN)H 4E9 (in-house or outdoor breakout cable, resistant) • A/DQ(ZN)B2Y 4G9 (outdoor cable, with protection against rodents)
Multi-mode 50 µm	• Two fibers 50 µm • I-V(ZN)H 2G50 (in-house patch cable) • I/AD(ZN)H 4G50 (in-house or outdoor breakout cable, resistant)

* Cable notations according to VDE

Maximum Transmission Range for Video and USB-HID Signals (End-to-End Connection)

Type of cable	Maximum transmission range
Single-mode 9 µm	10,000 m (32,808 ft)
Single-mode 9 µm XV	5,000 m (16,404 ft)
Multi-mode 50 µm (OM3)	1,000 m (3,280 ft)
Multi-mode 50 µm	400 m (1,312 ft)

Using single-mode SFPs with multi-mode fibers, the ranges can be increased.

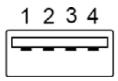
Type of Connector

Connector	Type
Plug-in connector	LC-Connector

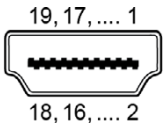
15.3 Connector Pinouts

15.3.1 Controller Board

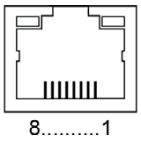
15.3.1.1 USB, Type A

Connector	Pin	Signal	Color
	1	+5 V (DC)	Red
	2	D -	White
	3	D +	Green
	4	GND	Black

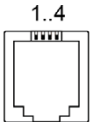
15.3.1.2 HDMI

Connector	Pin	Signal	Pin	Signal
	1	TMDS data 2+	11	TMDS clock GND
	2	TMDS data 2 GND	12	TMDS clock-
	3	TMDS data 2-	13	CEC
	4	TMDS data 1+	14	Not connected
	5	TMDS data 1 GND	15	DDC Input (SCL)
	6	TMDS data 1-	16	DDC Output (SDA)
	7	TMDS data 0+	17	DDC/CEC/HEC GND
	8	TMDS data 0 GND	18	+5 V (DC) high impedance
	9	TMDS data 0-	19	Hot Plug recognition
	10	TMDS clock+	-	-

15.3.1.3 RJ45 (Network)

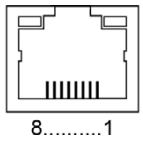
Connector	Pin	Signal	Pin	Signal
	1	D1+	5	Not connected
	2	D1-	6	D2-
	3	D2+	7	Not connected
	4	Not connected	8	Not connected

15.3.1.4 RJ10 (Serial), DCE

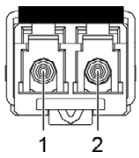
Connector	Pin	Signal	Pin	Signal
	1	TxD	3	Not connected
	2	RxD	4	GND

15.3.2 I/O Boards

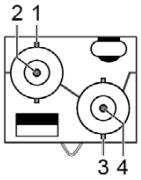
15.3.2.1 RJ45 (Interconnect)

Connector	Pin	Signal	Pin	Signal
	1	D1+	5	D3-
	2	D1-	6	D2-
	3	D2+	7	D4+
	4	D3+	8	D4-

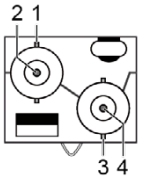
15.3.2.2 Fiber SFP Type LC

Connector	Diode	Signal
	1	Data OUT
	2	Data IN

15.3.2.3 HD-BNC (SDI CPU)

Connector	Diode	Signal
	1	GND
	2	Data IN
	3	GND
	4	Data OUT

15.3.2.4 HD-BNC (SDI CON)

Connector	Diode	Signal
	1	GND
	2	Data OUT
	3	GND
	4	Data OUT

15.4 Power Supply, Current Draw and Power Consumption

15.4.1 Draco tera enterprise Chassis

The following table contains the current draw and power consumption for the empty chassis with one included controller board.

Product type	Current draw	Power consumption	Max. voltage	Frequency
K480-048-R1	4,300 mA	63 W	90 to 264 V	47-63 Hz
K480-080-R1	6,634 mA	96 W	100 to 240 V	50/60 Hz
K480-152-R1	17,467 mA	241 W	100 to 240 V	50/60 Hz
K480-160-R1	17,467 mA	241 W	100 to 240 V	50/60 Hz
K480-288-R1	17,467 mA	241 W	100 to 240 V	50/60 Hz
K480-576-R1	23,267 mA	304 W	100 to 240 V	50/60 Hz
K480-576S-R1	23,267 mA	304 W	100 to 240 V	50/60 Hz
K480-576-R2**	tbd	tbd	tbd	tbd
K480-576S-R2**	tbd	tbd	tbd	tbd

* Available on demand from Q2/2022.

The following table contains the maximum current draw and power consumption of matrices in relation to the mandatory/delivered/maximum amount of powered power supply units.

	With mandatory power supply units*		With delivered power supply units		With maximum power supply units	
Product type	Current draw	Power consumption	Current draw	Power consumption	Current draw	Power consumption
K480-048-R1	25,000 mA	362 W	25,000 mA	362 W	50,000 mA	723 W
K480-080-R1	25,000 mA	362 W	25,000 mA	362 W	50,000 mA	723 W
K480-152-R1	51,000 mA	690 W	100,000 mA	1,380 W	150,000 mA	2,070 W
K480-160-R1	51,000 mA	690 W	100,000 mA	1,380 W	150,000 mA	2,070 W
K480-288-R1	73,000 mA	984 W	141,666 mA	1,968 W	212,500 mA	2,952 W
K480-576-R1*	175,000 mA	2,283 W	350,000 mA	2,283 W	350,000 mA	4,566 W
K480-576S-R1*	175,000 mA	2,283 W	350,000 mA	2,283 W	350,000 mA	4,566 W
K480-576-R2*/**	tbd	tbd	tbd	tbd	tbd	tbd
K480-576S-R2*/**	tbd	tbd	tbd	tbd	tbd	tbd

* It is mandatory to operate all matrices K480-576 with minimum 2 power supply units.

** Available on demand from Q2/2022.

The redundancy of the power supplies is lost if too many cards with high current draw/power consumption are used in the chassis. For limitations see the Draco System Designer under https://dsd.ihse.com/designer

15.4.2 Draco tera enterprise I/O and Controller Boards

Product type	Maximum current draw	Power consumption per board in chassis K048 to K576-R1*
480-C8R1	1.000 mA	17 to 23 W
480-C8X	1.700 mA	27 to 32 W
480-C8BDG	1.000 mA	17 to 23 W
480-S8R1	1.000 mA	17 to 23 W
480-S8X	1.000 mA	17 to 23 W
480-S8BDG	1.000 mA	17 to 23 W
480-UNI16	1.350 mA	22 to 27 W
480-GRD-S8-R1	800 mA	14 to 20 W
480-CTRL2	800 mA	14 to 20 W
480-576-SC**	20 mA	3 to 10 W

* Values will probably differ with the new power supply unit of 480-576-R2.

** Available on demand from Q2/2022.

15.5 Environmental Conditions and Emissions

Parameter	Value	
Operating Temperature	5 to 45 °C (41 to 113 °F)	
Storage Temperature	-25 to 60 °C (-13 to 140 °F)	
Relative Humidity	Max. 80% non-condensing	
Operating Altitude	Max. 2.500 m (7,500 ft)	
Heat Dissipation	Corresponds to power consumption in Watt (W)	
Sound Pressure Level (SPL)	K480-048-R1	max. 58 dBA per fan
	K480-080-R1	max. 46 dBA per fan
	152-R1	max. 65 dBA per fan
	160-R1	
	288-R1	
	K480-576-R1/576S-R1	
	K480-576-R2/576S-R2	

15.6 Dimensions

15.6.1 Draco tera enterprise Chassis

Product/ Packaging	Dimension	Dimension incl. accessories and shipping box
K480-048-R1	483 x 133 x 230 mm (19.0" x 5.2" x 9.1")	640 x 570 x 316 mm (25.2" x 22.4" x 12.4")
K480-080-R1	483 x 178 x 230 mm (19.0" x 7.0" x 9.1")	640 x 570 x 360 mm (25.2" x 22.4" x 14.2")
K480-152-R1	483 x 400 x 330 mm (19.0" x 15.7" x 13.0")	650 x 680 x 540 mm (25.6" x 26.8" x 21.3")
K480-160-R1	483 x 400 x 330 mm (19.0" x 15.7" x 13.0")	650 x 680 x 540 mm (25.6" x 26.8" x 21.3")
K480-288-R1	483 x 578 x 330 mm (19.0" x 22.8" x 13.0")	650 x 680 x 760 mm (25.6" x 26.8" x 29.9")
K480-576-R1	483 x 1108 x 435 mm (19.0" x 43.6" x 17.1")	800 x 1200 x 950 mm (31.5" x 47.4" x 37.4")
K480-576S-R1	483 x 1108 x 435 mm (19.0" x 43.6" x 17.1")	800 x 1200 x 950 mm (31.5" x 47.4" x 37.4")
K480-576-R2*	483 x 1108 x 435 mm (19.0" x 43.6" x 17.1")	800 x 1200 x 950 mm (31.5" x 47.4" x 37.4")
K480-576S-R2*	483 x 1108 x 435 mm (19.0" x 43.6" x 17.1")	800 x 1200 x 950 mm (31.5" x 47.4" x 37.4")

15.6.2 Draco tera enterprise Boards

Product	Dimension	Dimension incl. accessories and shipping box
Boards	205 x 170 x 20 mm	250 x 191 x 38 mm

15.7 Weight

15.7.1 Draco tera enterprise Chassis

Product	Weight of chassis with minimum equipment*	Max. weight of fully equipped chassis	Weight of fully equipped chassis incl. accessories and shipping box
K480-048-R1	5.1 kg (11.2 lb)	9.2 kg (20.3 lb)	12.6 kg (27.8 lb)
K480-080-R1	9.8 kg (21.6 lb)	15.4 kg (34 lb)	18.8 kg (41.4 lb)
K480-152-R1	23 kg (50.7 lb)	32.4 kg (71.4 lb)	35.8 kg (78.9 lb)
K480-160-R1	22.8 kg (50.3 lb)	32.3 kg (71.2 lb)	35.7 kg (78.7 lb)
K480-288-R1	27.7 kg (61.1 lb)	43.3 kg (95.5 lb)	46.7 kg (103 lb)
K480-576-R1	57.1 kg (125.9 lb)	87.8 kg (193.6 lb)	95.7 kg (211 lb)
K480-576S-R1	57.1 kg (125.9 lb)	87.8 kg (193.6 lb)	95.7 kg (211 lb)
K480-576-R2**	57.1 kg (125.9 lb)	87.7 kg (193.4 lb)	95.6 kg (210.8 lb)
K480-576S-R2**	57.1 kg (125.9 lb)	87.7 kg (193.4 lb)	95.6 kg (210.8 lb)

* Minimum equipment, see chapter 3.3.1, page 20.

** Available on demand from Q2/2022.

15.7.2 Draco tera enterprise I/O and Controller Boards

Product	Max. weight	Weight incl. shipping box
480-C8R1	230 g	280 g
480-C8X	230 g	280 g
480-C8BDG	230 g	280 g
480-S8R1	366 g	416 g
480-S8X	366 g	416 g
480-S8BDG	366 g	416 g
480-UNI16	314 g	364 g
480-GRD-S8-R1	205 g	255 g
480-CTRL2	204 g	254 g
480-576-SC	170 g	220 g

15.8 MTBF

The following table contains the mean time between failure (MTBF) in power-on hours (POH). The estimate is based on the FIT rates of the parts included. FIT rates are based on normalized environmental conditions of T = 60°C and activation energy (E_a) of 0.7 eV. Calculations are based on 90% confidence limit.

We estimate that inside the housing, temperature will be 15°C higher than the ambient temperature. Therefore, the MTBF calculation refers to an ambient temperature of 45°C. The humidity is limited to 60%.

Under these standard conditions, the MTBF for the components of the Draco tera enterprise matrices are estimated as follows:

Component	MTBF
Draco tera chassis K480-48-R1	350,000 POH
Draco tera chassis K480-80-R1	320,000 POH
Draco tera chassis K480-152-R1/160-R1	310,000 POH
Draco tera chassis K480-288-R1	260,000 POH
Draco tera chassis K480-576-R1	72,000 POH
Draco tera chassis K480-576S-R1	50,000 POH
Draco tera chassis K480-576-R2*	tbd
Draco tera chassis K480-576S-R2*	tbd
Draco tera Controller Board CTRL2	480,000 POH
Draco tera I/O Board Cat X	410,000 POH
Draco tera I/O Board SFP	500,000 POH
Draco tera power supply unit K480-048-R1/080-R1	130,000 POH
Draco tera power supply unit K480-152-R1/160-R1/288-R1	200,000 POH
Draco tera power supply unit K480-576-R1/576S-R1	500,000 POH
Draco tera power supply unit K480-576-R2/576S-R2*	tbd

* Available on demand from Q2/2022.

16 Technical Support

Prior to contacting support, please ensure you have read this manual, and then installed and set-up your matrix as recommended.

16.1 Support Checklist

To efficiently handle your request, it is necessary that you complete a support request checklist (Download). Please ensure that you have the following information available before you call:

- Company, name, phone number and email,
- Type and serial number of the device (see bottom of the device),
- Date and number of sales receipt and name of distributor, if necessary,
- Issue date of the existing manual,
- Nature, circumstances, and duration of the problem,
- Components included in the system (such as graphic source, OS, graphic card, monitor, USB-HID/USB 2.0 devices, interconnect cable) including manufacturer and model number,
- Results from any testing you have done.

16.2 Shipping Checklist

1. To return your device, you need an RMA number (Return-Material-Authorization). Therefore, please contact your distributor.
2. Package your devices carefully. Add all pieces which you received originally. Preferably use the original box.
3. Note your RMA number visibly on your shipment.

Devices that are sent in without an RMA number will not be accepted. The shipment will be sent back without being opened; postage unpaid.

17 Certificates/Directives

17.1 North American Regulatory Compliance

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded cables must be used with this equipment to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All power supplies are certified to the relevant major international safety standards.

17.2 WEEE

The manufacturer complies with the EU Directive 2012/19/EU on the prevention of waste electrical and electronic equipment (WEEE).

The device labels carry a respective marking.

17.3 Product Safety

The product safety of the following devices is proven by the compliance to the listed standards.

Type	Standards
K480-288	• EN 60950-1/A12:2011 • IEC 60950-1/A1:2010 • UL 60950-1-2007 • CAN/CSA-C22.2 No. 60950-1:2007
K480-160	
K480-080	
K480-040	

The compliance to the standards is verified and confirmed by TÜV Süd, Germany.

18 Glossary

The following terms are commonly used in this manual or in video and KVM technology.

Term	Description
Auto Disconnect	Matrix function that allows an automatic disconnect between a CON Device and a CPU Device if the OSD is opened via this CON Device.
Auto Logout	Matrix function that describes the duration of inactivity after the user has been logged out from the OSD at this CON Device.
Cat X	Interface to connect any Cat 5e (Cat 6, Cat 7) cable.
CON Device	Logical object that summarizes several EXT Units of physical extender modules (CON Units) to switch more complex sink systems via matrix.
CON Timeout	Matrix function that allows an automatic disconnect of the own CON Device from the connected CPU Device after a predefined time.
CON Unit	Decoder extender module to connect to the console (monitor(s), keyboard, and mouse; optionally also with USB 2.0 devices).
Console	Monitor, keyboard, mouse, media control, external switching solution, etc.
Console ACL	Console Access Control List is a list that shows the respective switching rights for the various CON Devices.
CPU Auto Connect	Matrix function that allows an automatic connection establishment between the own CON Device and a random CPU Device that is available.
CPU Device	Logical object that summarizes several EXT Units of physical extender modules (CPU Units) to switch more complex source systems via matrix.
CPU Timeout	Matrix function that allows the user to disconnect after a predefined period of inactivity from the respective CPU Device.
CPU Unit	Encoder extender module to connect to a source.
DDC	Display Data Channel (DDC) is a serial communication interface between monitor and source. It allows a data exchange via monitor cable and an automatic installation and configuration of a monitor driver by the operating system.
Dual Access	A system to operate a source from two sinks (consoles).
Dual-Head	A system with two video connections
EXT Unit	Logical object for representing and managing an extender module physically connected directly to the matrix. Add-on modules, if applicable, are included in the EXT Unit of the respective extender module. Dual-Head extender modules will be managed as two independent EXT Units.
Fiber	Interface to connect single-mode or multi-mode fiber cables.
Force Connect	Matrix function that allows to switch with the own CON Device to a CPU Device that is already used and in doing so to take keyboard and mouse control. The connected CON Device so far loses K/M control but keeps video control.
Force Disconnect	Matrix function that allows to switch with the own CON Device to a CPU Device that is already used and in doing so to take KVM control. The connected CON Device so far loses complete KVM control.
HDMI	An interface for an all-digital transmission of audio and video data.
KVM	Keyboard, video, and mouse.
Keyboard Connect	Matrix function that allows taking over the keyboard control of an inactive CON Device.
Macro Keys	Programmable keys that can execute a stringing together of commands to the matrix.

Term	Description
Mouse Connect	Matrix function that allows taking the mouse control of an inactive CON Device.
MTBF	Mean Time Between Failure (MTBF) is measured in power-on hours.
Multi-mode	50 µm multi-mode fiber cable.
MSC	Control of USB-HID of up to eight sources at one sink with only one connected mouse or keyboard. The sink can consist of up to eight monitors, or up to sixteen monitors when operating Dual-Head Sources. In a matrix system, Multi-Screen Control (MSC) can be set up at multiple sinks.
Non-Blocking Access	Matrix configuration where no user can be disturbed by an activity of another user.
OSD	The On-Screen-Display is used to display information or to operate a device.
OSD Timeout	Matrix function that closes the OSD automatically after a predefined period of inactivity.
POH	Power-on hours corresponds to the average operating time
Quad-Head	A system with four video connections
Release Time	Matrix function that allows a CON Device that is connected with the same CPU Device to release the K/M control after a predefined time.
Service Mode	Defined maintenance condition that allows updating of extender modules that are connected to the matrix.
SFP	SFPs (Small Form Factor Pluggable) are pluggable interface modules for Gigabit connections. SFP modules are available for Cat X and fiber interconnect cables.
Single-Head	A system with one video connection
Single-mode	9 µm single-mode fiber cable
Tie Line	Communication connection to and between extender modules in a network environment.
USB-HID	USB-HID devices (Human Interface Device) allow for data input. There is no need for a special driver during installation; “New USB-HID device found” is reported. Typical USB-HID devices include keyboards, mice, graphics tablets and touch screens. Storage, video, and audio devices are **not** HID.
User ACL	User Access Control List is a list that shows the respective switching rights for the various users.
Video Sharing	Matrix function that allows switching from the user’s CON Device to any CPU Device with video.

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20 Change log

This table offers an overview of the most important changes available through firmware updates, such as new functions, changed configuration or operation.

Edition	Date	Firmware version	Software version	Chapter	New functions/changes
REV01.01	2022-08-15	Latest version, see chapter 1.1	V5.1.0.0 2022-01-17	3.5.1.6, 15.3.2.4	Changed: figure, figure legend and part number Added: pinout
REV01.00	2022-02-28	Latest version, see chapter 1.1	V5.1.0.0 2022-01-17		Initial user manual, completely reworked, see Release Notes