DISCONTINUED

Telecast Fiber Systems, Inc.
A BELDEN BRAND

User Manual

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TH-EU
KVM Extender

Model:
TH-EU
Series

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1 About This Manual

1.1 Scope

This manual describes how to install your KVM Extender, how to operate it and how to perform trouble shooting.

1.2 Validity

This manual is valid for all devices listed on the front page. The product code is printed on the base of the devices.

1.3 Cautions and Notes

The following symbols are used in this manual:

This symbol indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.

This symbol indicates important information to help you make the best use of this product.

2 Safety Instructions

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

Installation

- ➔ Only use in dry, indoor environments.
- ➔ The KVM Extender and the power supply units can get warm. Do not situate them in an enclosed space without any airflow.
- ➔ Do not place the power supply directly on top of the device.
- ➔ Do not obscure ventilation holes.
- ➔ Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not use a power supply if it appears to be defective or has a damaged case.
- ➔ Connect all power supplies to grounded outlets. In each case, ensure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.
- ➔ Do not connect the link interface to any other equipment, particularly network or telecommunications equipment.
- ➔ Take any required ESD precautions.

Repair

- ➔ Do not attempt to open or repair a power supply unit.
- ➔ Do not attempt to open or repair the KVM Extender. There are no user serviceable parts inside.
- ➔ Please contact your dealer or manufacturer if there is a fault.

3 Description

3.1 Application

The KVM Extender is used to increase the distance between a source (computer, CPU) and its console (keyboard, mouse, and other peripheral devices).

The KVM Extender is designed for use with Multi-mode (fiber) interconnect cables.

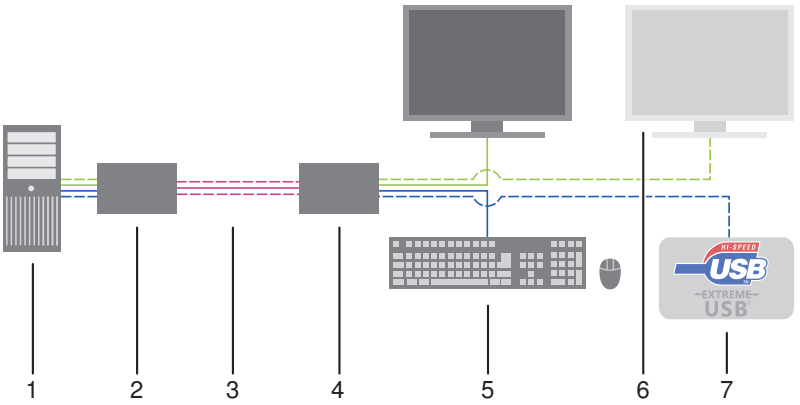
3.2 System Overview

The KVM Extender consists of a CPU Unit and a console unit (CON Unit).

The CPU Unit is connected directly to the source (computer, CPU) using the supplied cables.

The CON Unit is connected to the console (monitor, keyboard and mouse).

The CPU Unit and the CON Unit communicate with each other through the interconnect cables.



System overview

1 Source (computer, CPU)
2 KVM Extender CPU Unit
3 Interconnect cable
4 KVM Extender CON Unit
5 Console (monitor, keyboard, mouse)
6 Second monitor (option, only with Dual-Head devices)
7 USB 2.0 devices (option, only with USB 2.0 devices)

See Chapter 4.3, Page 36 for installation examples.

3.3 Product Range

Model	Description
TH-EU-SH-SL-HID	Single-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 2x USB-HID (keyboard / mouse)
TH-EU-SH-SL-HID-SW	Single-Head KVM Extender for 2x DVI Single Link (up to 1920x1200), 2x USB-HID (keyboard / mouse) with integrated switching function
TH-EU-SH-SL-HID-AS	Single-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 2x USB-HID (keyboard / mouse) and analog audio / serial option
TH-EU-SH-SL-2	Single-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 4x USB 2.0
TH-EU-SH-SL-2-AS	Single-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 4x USB 2.0 and analog audio / serial option
TH-EU-SH-DL-HID	Single-Head-KVM Extender for 1x DVI Dual-Link (up to 2560x2048), 2x USB-HID (keyboard / mouse)
TH-EU-SH-DL-HID-AS	Single-Head-KVM Extender for 1x DVI Dual Link (up to 2560x2048), 2x USB-HID (keyboard / mouse) and analog audio / serial option
THOR-EU-SDT	Single-Head KVM Extender for 1x DVI Dual Link (up to 2560x2048), 4x USB 2.0
TH-EU-SH-DL-2	Single-Head KVM Extender for 1x DVI Dual Link (up to 2560x2048), 4x USB 2.0 and analog audio / serial option
TH-EU-SH-DL-HID-SW	Single-Head KVM Extender for 2x DVI Dual Link (up to 2560x2048), 2x USB-HID (keyboard / mouse) with integrated switching function
TH-EU-DH-SL-HID	Dual-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 4x USB-HID (keyboard / mouse)
TH-EU-DH-SL-HID-AS	Dual-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 2x USB-HID (keyboard / mouse) and analog audio / serial option
TH-EU-DH-SL-2	Dual-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 4x USB 2.0
TH-EU-DH-SL-2-AS	Dual-Head KVM Extender for 1x DVI Single Link (up to 1920x1200), 4x USB 2.0 and analog audio / serial option

3.4 Upgrade Kits

Model	Description
TH-ACCS-114	Mounting plate to mount by screws
TH-ACCS-115	Mounting plate to mount by snap on

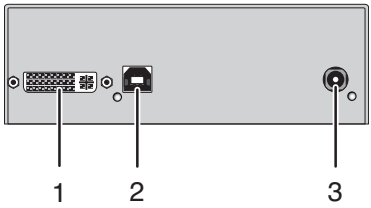
3.5 Accessories

Model	Description
TH-ACCS-112	International power supply unit 100...240VAC / 5VDC / 4 A
TH-ACCS-159	DVI-D splitter cable

3.6 Device Views

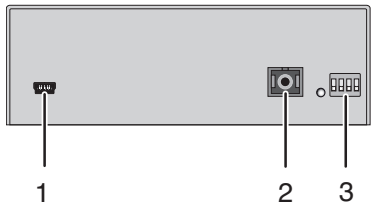
TH-EU-SH-SL-HID

CPU Unit



Rear View

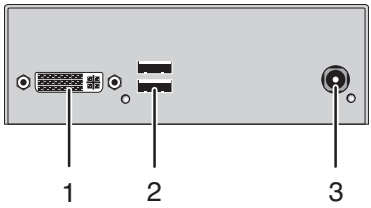
1 To CPU: DVI-D
2 To CPU: USB-HID
3 Connect to 5VDC power supply



Front View

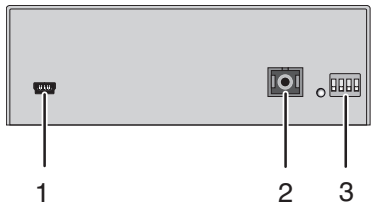
1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply

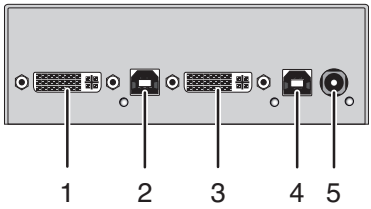


Front View

1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

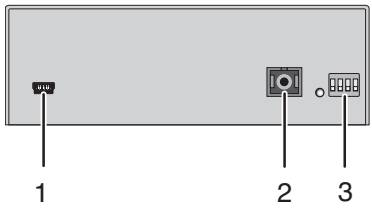
3.6.1 Model TH-EU-SH-SL-HID

CPU Unit



Rear View

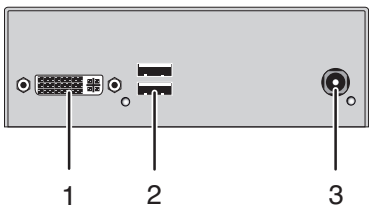
1 To CPU 1: DVI-D
2 To CPU 1: USB-HID
3 To CPU 2: DVI-D
4 To CPU 2: USB-HID
5 Connect to 5VDC power supply



Front View

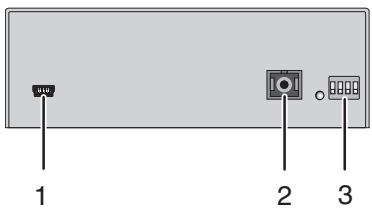
1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply

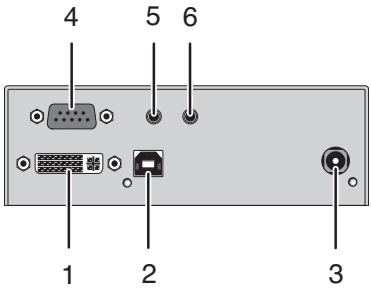


Front View

1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

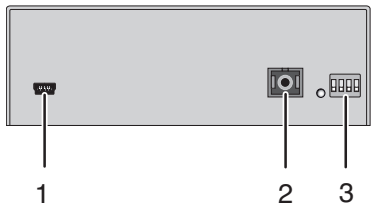
3.6.2 TH-EU-SH-SL-HID-AS

CPU Unit



Rear View

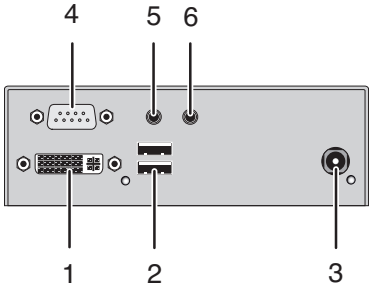
1 To CPU: DVI-D
2 To CPU: USB-HID
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT



Front View

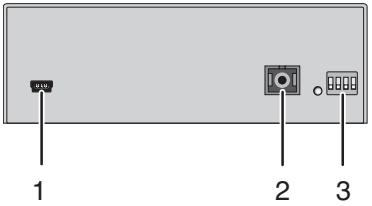
1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT

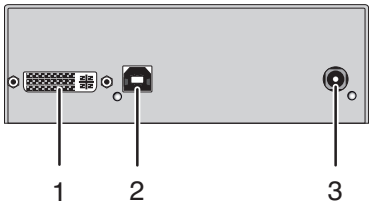


Front View

1 Service port
2 Connect to interconnect cable
3 Configuration DIP switches

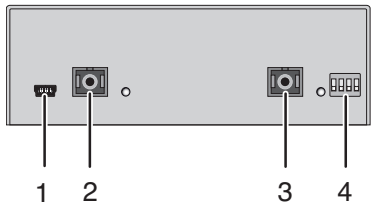
3.6.3 TH-EU-SH-SL-2

CPU Unit



Rear View

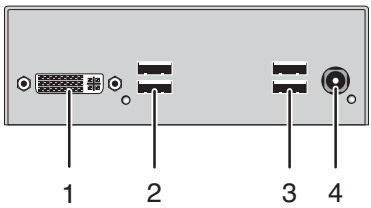
1 To CPU: DVI-D
2 To CPU: USB 2.0
3 Connect to 5VDC power supply



Front View

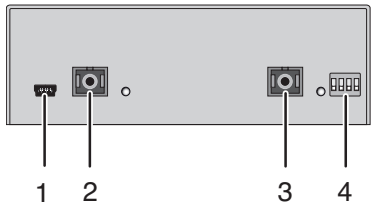
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB 2.0 devices 1
3 Connect to USB 2.0 devices 2
4 Connect to 5VDC power supply

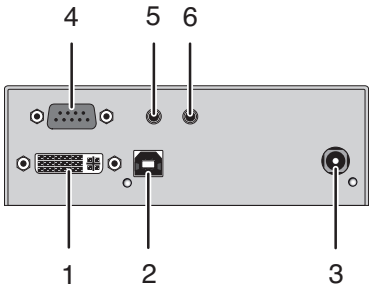


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

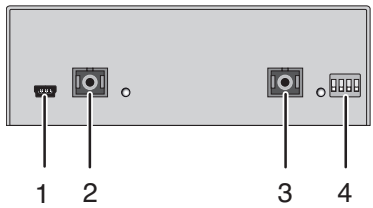
3.6.4 TH-EU-SH-SL-2-AS

CPU Unit



Rear View

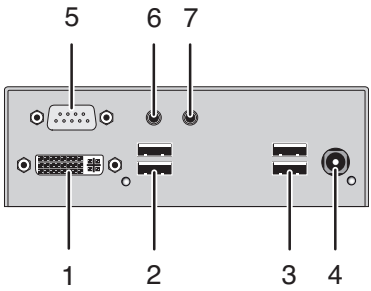
1 To CPU: DVI-D
2 To CPU: USB 2.0
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT



Front View

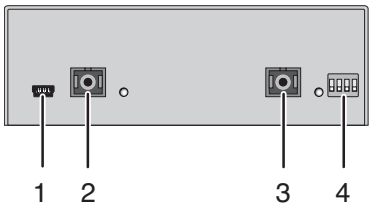
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB 2.0 devices 1
3 Connect to USB 2.0 devices 2
4 Connect to 5VDC power supply
5 Connect to serial (D-Sub 9)
6 Audio IN
7 Audio OUT

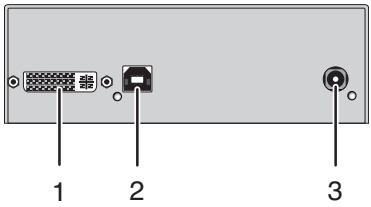


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

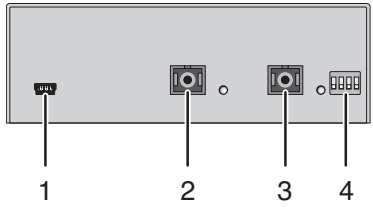
3.6.5 TH-EU-SH-DL-HID

CPU Unit



Rear View

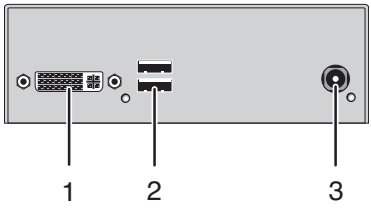
1 To CPU: DVI-D
2 To CPU: USB-HID
3 Connect to 5VDC power supply



Front View

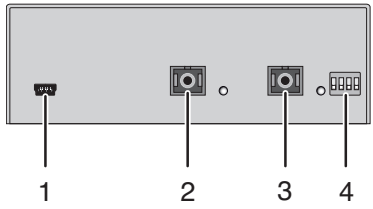
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply

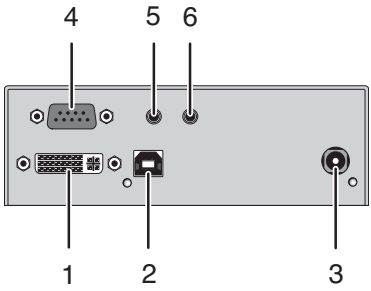


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

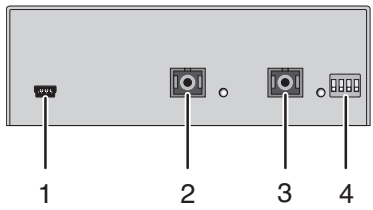
3.6.6 TH-EU-SH-DL-HID-AS

CPU Unit



Rear View

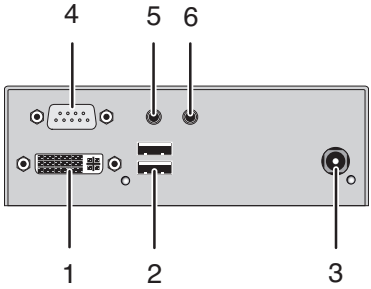
1 To CPU: DVI-D
2 To CPU: USB-HID
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT



Front View

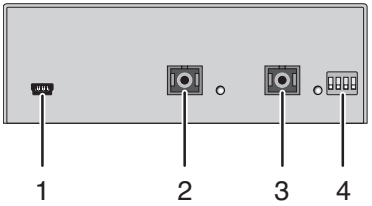
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT

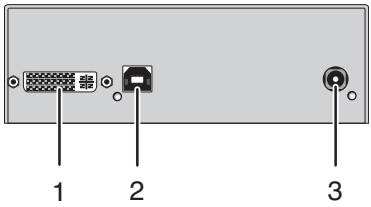


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

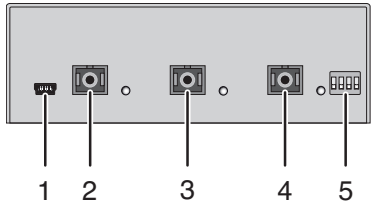
3.6.7 TH-EU-SH-DL-2

CPU Unit



Rear View

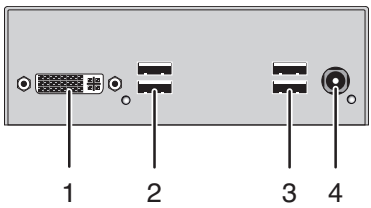
1 To CPU: DVI-D
2 To CPU: USB 2.0
3 Connect to 5VDC power supply



Front View

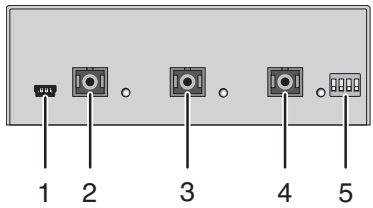
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB 2.0 devices 1
3 Connect to USB 2.0 devices 2
4 Connect to 5VDC power supply

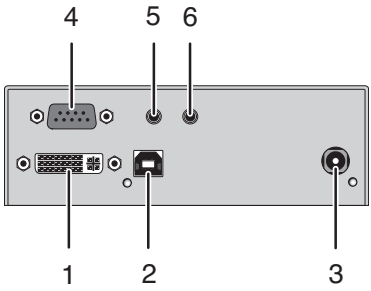


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

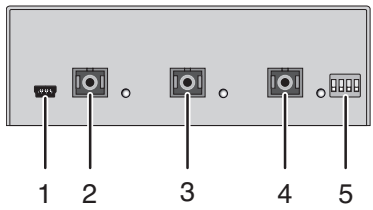
3.6.8 TH-EU-SH-DL-2-AS

CPU Unit



Rear View

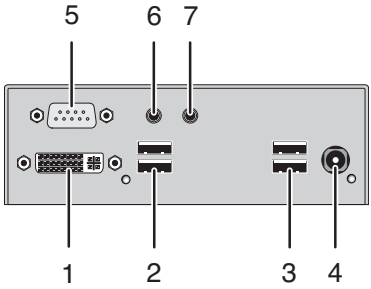
1 To CPU: DVI-D
2 To CPU: USB 2.0
3 Connect to 5VDC power supply
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT



Front View

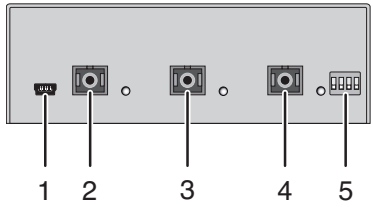
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB 2.0 devices 1
3 Connect to USB 2.0 devices 2
4 Connect to 5VDC power supply
5 Connect to serial (D-Sub 9)
6 Audio IN
7 Audio OUT

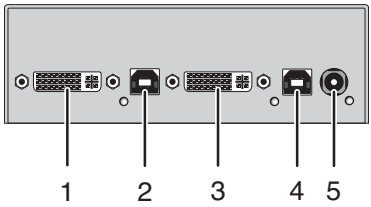


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

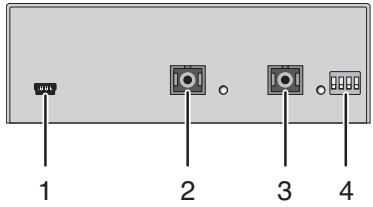
3.6.9 TH-EU-SH-DL-HID-SW

CPU Unit



Rear View

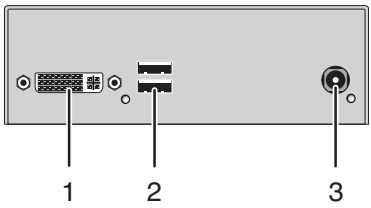
1 To CPU 1: DVI-D
2 To CPU 1: USB-HID
3 To CPU 2: DVI-D
4 To CPU 2: DVI-D
5 Connect to 5VDC power supply



Front View

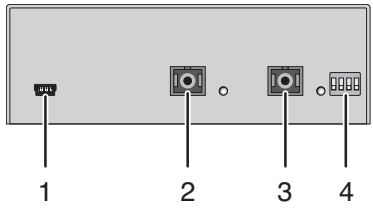
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor
2 Connect to USB-HID devices
3 Connect to 5VDC power supply

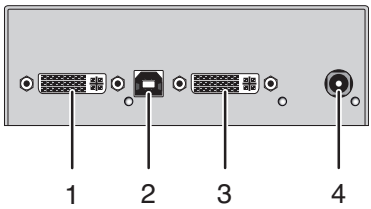


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

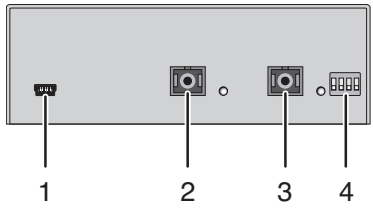
3.6.10 TH-EU-DH-SL-HID

CPU Unit



Rear View

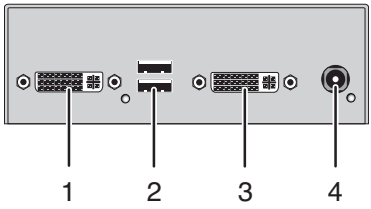
1 To CPU: DVI-D 1
2 To CPU: USB-HID
3 To CPU: DVI-D 2
4 Connect to 5VDC power supply



Front View

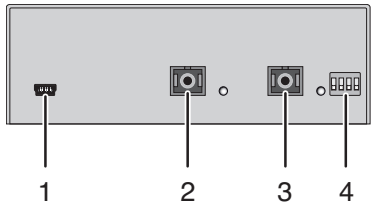
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor 1
2 Connect to USB-HID devices
3 Connect to DVI monitor 2
4 Connect to 5VDC power supply

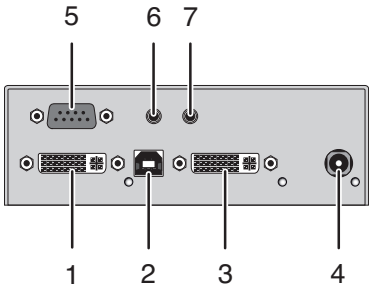


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

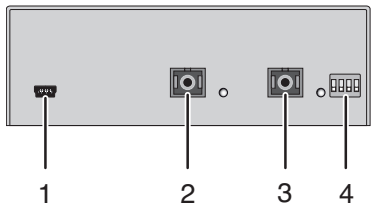
3.6.11 TH-EU-DH-SL-HID-AS

CPU Unit



Rear View

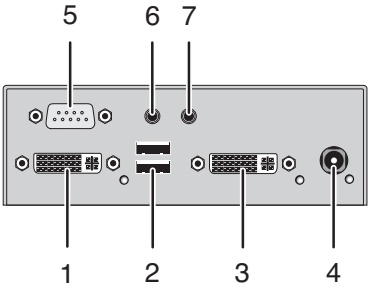
1 To CPU: DVI-D 1
2 To CPU: USB-HID
3 To CPU: DVI-D 2
4 Connect to 5VDC power supply
5 Connect to serial (D-Sub 9)
6 Audio IN
7 Audio OUT



Front View

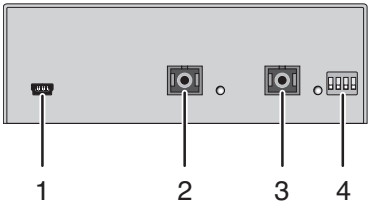
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor 1
2 Connect to USB-HID devices
3 Connect to DVI monitor 2
4 Connect to 5VDC power supply
5 Connect to serial (D-Sub 9)
6 Audio IN
7 Audio OUT

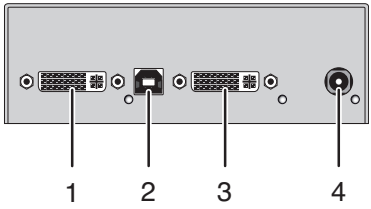


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Configuration DIP switches

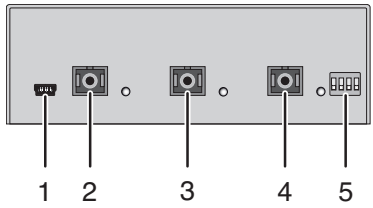
3.6.12 TH-EU-DH-SL-2

CPU Unit



Rear View

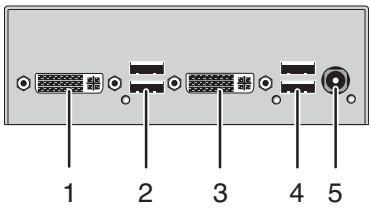
1 To CPU: DVI-D 1
2 To CPU: USB 2.0
3 To CPU: DVI-D 2
4 Connect to 5VDC power supply



Front View

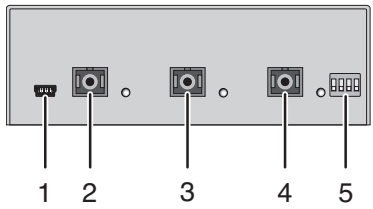
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor 1
2 Connect to USB 2.0 devices 1
3 Connect to DVI monitor 2
4 Connect to USB 2.0 devices 2
5 Connect to 5VDC power supply

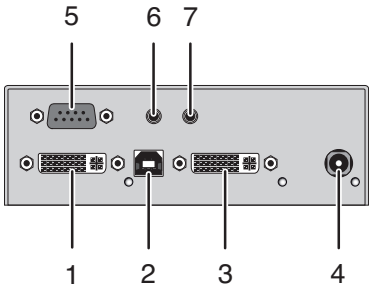


Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

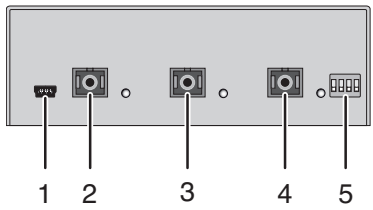
3.6.13 TH-EU-DH-SL-2-AS

CPU Unit



Rear View

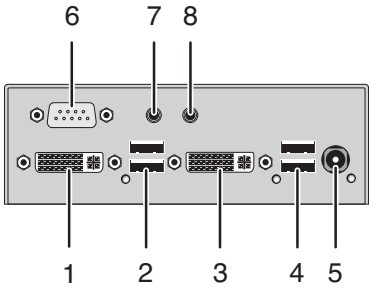
1 To CPU: DVI-D 1
2 To CPU: USB 2.0
3 To CPU: DVI-D 2
4 Connect to 5VDC power supply
5 Connect to serial (D-Sub 9)
6 Audio IN
7 Audio OUT



Front View

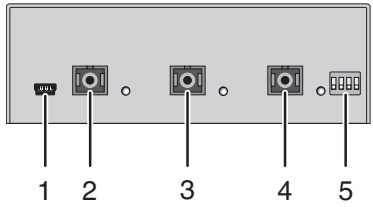
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

CON Unit



Rear View

1 Connect to DVI monitor 1
2 Connect to USB 2.0 devices 1
3 Connect to DVI monitor 2
4 Connect to USB 2.0 devices 2
5 Connect to 5VDC power supply
6 Connect to serial (D-Sub 9)
7 Audio IN
8 Audio OUT



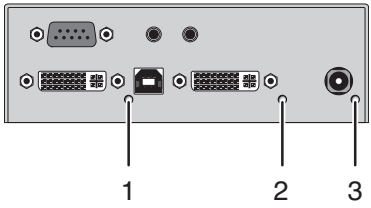
Front View

1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to interconnect cable 3
5 Configuration DIP switches

3.7 Status LEDs

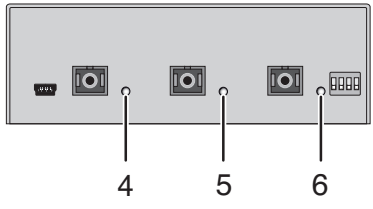
The KVM Extender is fitted with the following LEDs for status indication at CPU Unit and CON Unit:

CPU Unit



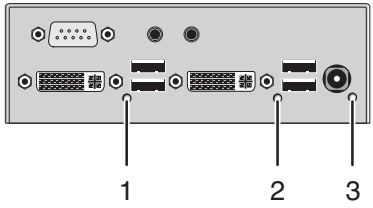
Rear View

CPU Unit



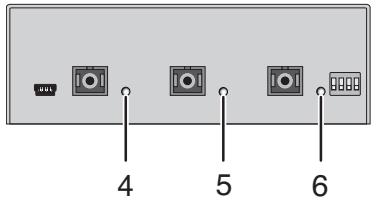
Front View

CON Unit



Rear View

CON Unit



Front View

Pos.	LED	Status	Description
1	**Video OK 1** (red)	Off	• CPU Unit: No DVI signal from video source (computer, CPU) detected • CON Unit: No DVI signal from CPU Unit or no monitor detected
		Flashing	Monitor DDC is being transmitted from the console monitor
		On	DVI signal from video source available
2	**Video OK 2** (red, optional)	Off	• No DVI signal from video source (computer, CPU) detected • CON Unit: No DVI signal from CPU Unit or no monitor detected
		Flashing	Monitor DDC is being transmitted from the console monitor
		On	DVI signal from video source available
3	**Power** (red)	Off	Device not ready
		On	Device ready
4	**Link Status USB** (green, optional)	Off	No connection via interconnect cable
		On	Connection available
5	**Link Status Video 2** (green, optional)	Off	No connection via interconnect cable
		Flashing	Connection failing
		On	Connection available
6	**Link Status Video 1** (green)	Off	No connection via interconnect cable
		Flashing	Connection failing
		On	Connection available

4 Installation

4.1 Package Contents

Your extender package contains the following items:

KVM Extender pair (CPU Unit and CON Unit)

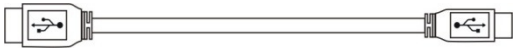
2x 5VDC international power supply unit

2x country specific power cord

Quick Setup

DVI video cable (1.8 m, DVI-D male-to-male)

USB cable (1.8 m, type A to type B)

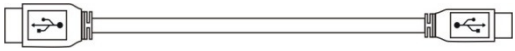


Additional content for Dual-Head devices:

DVI video cable (1.8 m, DVI-D male-to-male)

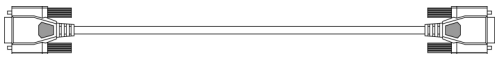
Additional content for devices with integrated switching function:

USB cable (1.8 m, type A to type B)



Additional content for Analog Audio / Serial option:

Serial cable (1.8 m, RS232 male connector)



Stereo jack cable (1.6 m, 3.5 mm male connector)

If anything is missing, contact your dealer.

4.2 System Setup

First time users are recommended to setup the system with the CPU Unit and the CON Unit in the same room as a test setup. This will allow you to identify and solve any cabling problems, and experiment with your system more conveniently.

➔ Please verify that interconnect cables, interfaces, and handling of the devices comply with the requirements (see Chapter 7, Page 41).

1. Switch off all devices.

CON Unit Installation

2. Connect your monitor(s), keyboard and mouse to the CON Unit.
3. Connect the CON Unit with the interconnect cable(s).
4. Connect the 5VDC power supply to the CON Unit.

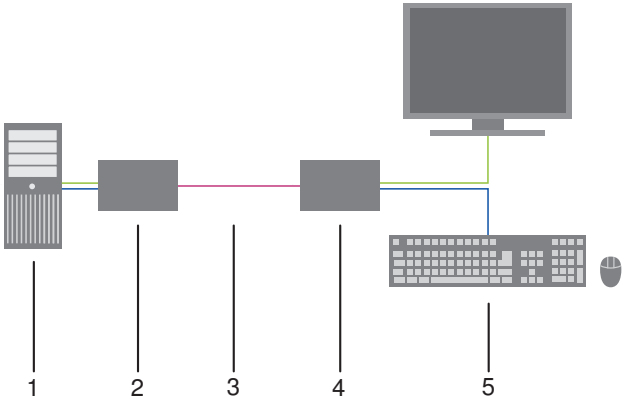
CPU Unit Installation

5. Connect the source (computer, CPU) with the supplied cables to the CPU Unit. Please ensure the cables are not strained.
6. Connect the CPU Unit to the interconnect cable(s).
7. Connect the 5VDC power supply to the CPU Unit.
8. Power up the system.

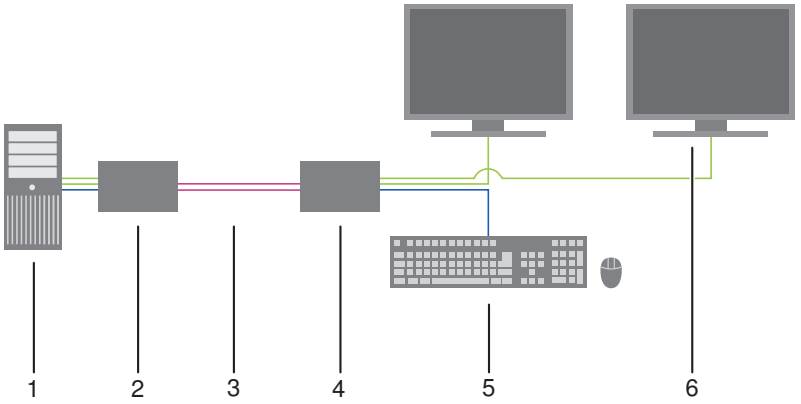
To power up the system, the following sequence is recommended: Monitor – CON Unit – CPU Unit – source.

4.3 Example Applications

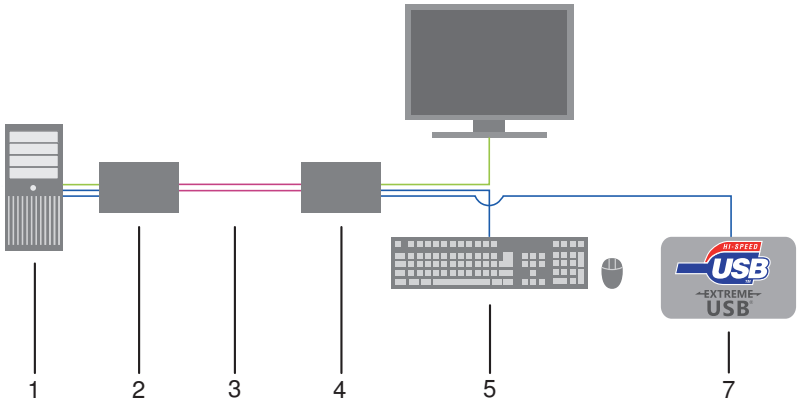
This section illustrates typical installations of KVM Extenders:



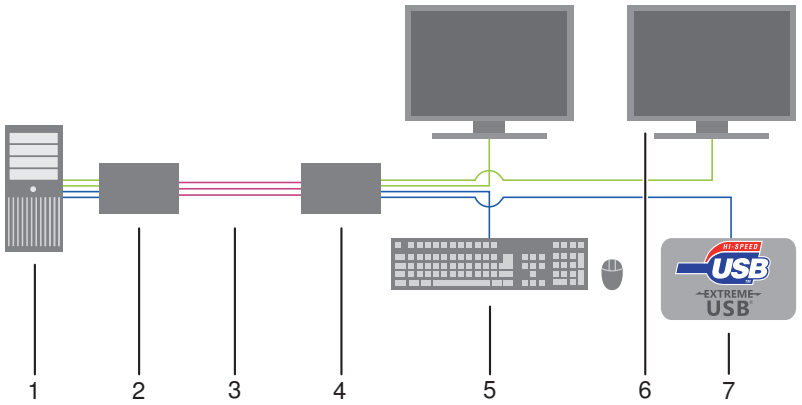
KVM Extender (Single-Head)



KVM Extender (Dual-Head)



KVM Extender (Single-Head with USB 2.0)



KVM Extender (Dual-Head with USB 2.0)

1 Source (computer, CPU)
2 KVM Extender CPU Unit
3 Interconnect cable
4 KVM Extender CON Unit
5 Console (monitor, keyboard, mouse)
6 Second monitor (option, only with Dual-Head devices)
7 USB 2.0 devices (option, only with USB 2.0 devices)

5 Configuration

5.1 Transmission Parameters

In default configuration, the device adapts dynamically to monitor resolution and image content. This configuration is suitable for almost all conditions and should only be modified if image quality is not fully satisfactory.

5.1.1 Device Settings

Both CPU unit and CON unit have four DIP switches that are used to set the KVM Extender to the respective operation mode, depending from the respective device.

DIP settings have to be performed both CPU and CON unit into the same positions.

DIP	Function
Switch Position	Switch down Switch up Not used
	Single Link mode (default in combination with Single Link devices)
	Dual Link mode (default in combination with Dual Link devices)
	Operation with switching function (default in combination with models with integrated switching function)
	Operation with USB-HID / analog audio / serial, no HDCP possible (default in combination with USB-HID / analog audio / serial devices)
	Operation with HDCP, no USB-HID / analog audio / seriell possible (default with USB 2.0 devices without analog audio / serial)

By operation with HDCP the transmission of USB-HID and analog audio signals is blocked.

5.2 Command Mode

During normal use, the console keyboard functions in the usual manner. However, for all KVM Extenders with USB-HID support, you can set the keyboard into a Command Mode by using a specific 'Hot Key' sequence. While in Command Mode, several functions are performed via keyboard commands. To exit Command Mode, press <Esc>.

While in Command Mode, the LEDs Shift and Scroll on the console keyboard will flash.

In Command Mode normal keyboard and mouse operation will cease. Only selected keyboard commands are available.

The following table lists the keyboard commands to enter and to exit Command Mode and to change the 'Hot Key' sequence:

Function	Keyboard Command
Enter Command Mode (default)	<Ctrl> + <Left Shift> links + <i> ('Hot Key') (until 20.11.2009)
	2x <Left Shift> ('Hot Key') (since 20.11.2009)
Exit Command Mode	<Esc>
Change 'Hot Key' sequence	<Left Ctrl> + <Left Shift> + <c>, <'Hot Key' Code>, <Enter>

The 'Hot Key' sequence to enter Command Mode can be changed. The following table lists the 'Hot Key' Codes for the available key sequences:

'Hot Key'-Code	'Hot Key'
1	<Left Ctrl> + <Left Shift> + <i>
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>

6 Operation

6.1 Download of DDC Information

1. Please make sure that the monitor is on (both monitors in case of Dual-Head devices).
2. Disconnect the monitor cable from the CON Unit and connect the monitor cable again (In the case of Dual-Head devices, disconnect and connect monitor cables successively).

   The DDC information will be read from the console monitor, transmitted to the CPU Unit and stored there internally.

   To show successful reprogramming the LED Video “OK” flashes at both CON Unit and CPU Unit for about one second.

   The CPU will now be able to read the actual monitor DDC information and so allow the required video resolution to be selected.

6.2 Switching Function (option)

If your KVM Extender has a built in switching function as an option, two sources (computer, CPU) can be connected to the CPU unit. You can switch at the CON unit between two sources (Computer, CPU) via keyboard command.

1. By executing the 'Hot Key', the KVM Extender is set into command mode.
2. If you want to switch the console to of one of both CPUs that are available, you will have to enter the port number of the respective CPU (1 or 2). Afterwards you have to confirm the switching with the <Enter> key. The console is now switched to the respective CPU.

7 Specifications

7.1 Interfaces

7.1.1 DVI-D Single Link

The video interface supports the DVI-D protocol. All signals that comply to DVI-D Single Link norm can be transmitted. This includes e.g. monitor resolutions such as 1920x1200@60Hz, Full HD (1080p) or 2K HD (up to 2048x1152). Data rate is limited to 165 MPixel/s.

Transmission of interlaced video signals, such as 1920x1080i, cannot be guaranteed.

7.1.2 USB-HID

Our devices with an USB-HID interface support a maximum of two devices compliant with the USB-HID protocol. Each USB-HID port provides a maximum current of 100 mA.

Keyboard

Compatible with most USB keyboards. Certain keyboards with additional functions may require custom firmware to operate. Keyboards with an integral USB Hub (Mac keyboards e.g.) are also supported.

Mouse

Compatible with most 2-button, 3-button and scroll mice.

Other USB-HID devices

The proprietary USB emulation also supports certain other USB-HID devices, such as specific touch screens, graphic tablets, barcode scanners or special keyboards. Support cannot be guaranteed, however, for every USB-HID device.

Only two USB-HID devices are supported concurrently, such as keyboard and mouse or keyboard and touch screen. A hub is allowed, but it does not increase the number of HID devices allowed.

To support other USB 'non-HID' devices, such as scanners, web cams or memory devices, choose our devices with transparent USB support.

7.1.3 USB 2.0 (transparent)

KVM Extender models with transparent USB 2.0 support allow the connection of **all** types of USB 2.0 devices (without restriction). USB 2.0 data transfer is supported with USB high speed (max. 480 Mbit/s).

Each USB 2.0 port provides a maximum current of 500 mA (high power).

7.1.4 Fiber Type SC (Interconnect)

The communication of fiber devices is performed via interfaces that have to be connected by suitable fibers of connector type SC.

7.1.5 Serial Interface

The serial interface option supports a full-duplex transmission with a real hardware handshake up to a Baud rate of 19,200 Baud.

The CON Unit is cabled as DTE (Data Terminal Equipment, like CPU output) and can be connected directly to DCE devices (Data Communication Equipment).

- A touch screen can be connected directly to the CON Unit.
- To connect to a serial printer (or any other DTE instead of DCE device), you need a null modem cable (crossed cable) between CON Unit and the device.

Operation of several devices:

The serial interface transmits 6 signals (3 for each direction). Normally, 4 of the 6 signals are handshake signals (in addition to RxD and TxD).

The following configurations, however, can be realized using special adapter splitting cables:

- Three single 2-wire transmissions
- Two transmissions with a handshake signal
- A serial mouse and a single 2-wire transmission.

In this case, choose X-ON / X-OFF software handshake for traffic control at printer and PC.

Connection Format	DTE (Data Terminal Equipment)
Speed	Up to 19,200 Baud
Data Format	Format independent
Data Transmission	• RxD (Receive Data) • TxD (Transmit Data)
Traffic Control	The following signals are transmitted (hardware handshake): • RTS (Request To Send) • CTS (Clear To Send) • DTR (Data Terminal Ready) • DSR (Data Set Ready)

7.1.6 Analog Audio Interface

The Analog Audio option supports a bidirectional stereo audio transmission, in nearly CD quality.

The audio interface is a 'line level' interface and it is designed to transmit the signals of a sound card (or another 'line level' device) as well as to allow the connection of active speakers to the CON Unit.

Stereo audio can be transmitted bidirectionally at the same time.

Connection of a microphone:

Connect the microphone to the 'audio' input of the CON Unit. There are two ways to establish this connection:

- The output of the CPU Unit is connected with the microphone input of the sound card (red). Adjust the sound card to provide an additional amplification (20 dB).
- The output of the CPU Unit is connected to the audio input of the sound card (blue). Choose this connection if the microphone has its own pre-amplifier.

The CON Unit can do the pre-amplification of the microphone as well. Open the CON Unit, locate the 'MIC' jumper on the audio board and close the pins.

Transmission Format	Digitized virtually CD quality audio (16 bit, 38.4 KHz)
Signal Level	Line-Level (5 Volt Pk-Pk maximum)
Input Impedance	47 KOhm
Connections CPU Unit	2x 3.5 mm stereo jack plug (audio in & audio out)
Connections CON Unit	2x 3.5 mm stereo jack plug (audio in & audio out)

7.2 Interconnect Cable

7.2.1 Fiber

A point-to-point connection is necessary. Operation with multiple patch panels is allowed. Routing over active network components, such as Ethernet Hubs, Switches or Routers, is not allowed.

Type of Interconnect Cable

(Cable notations according to VDE)

Type of cable	Specifications
Multi-Mode 50µm	• One fiber 50µm • I-V(ZN)H 2G50 (in-house patch cable) • I/AD(ZN)H 4G50 (in-house or outdoor breakout cable, resistant)
Multi-Mode 62.5µm	• One fiber 62.5µm • I-V(ZN)HH 2G62.5 (in-house breakout cable) • A/DQ(ZN)B2Y 4G62.5 (outdoor cable, with protection against rodents)

Maximum Acceptable Cable Length

Type of cable	Maximum Acceptable Cable Length
Multi-Mode 50µm (OM3)	1,000 m (3,280 ft)
Multi-Mode 50µm	400 m (1,300 ft)
Multi-Mode 62.5µm	200 m (650 ft)

Type of Connector

Connector	SC Connector

7.3 Supported Peripherals

7.3.1 USB-HID Devices

The KVM Extender will support most USB-HID devices, including the vast majority of keyboards and mice currently on the market. Many other kinds of HID device such as bar-code scanners and touch screens may also be compatible

It is not possible to guarantee support for all available USB-HID devices. In certain cases, custom firmware may be required.

USB-HID (and other) devices that are not supported as standard will normally operate with our devices featuring transparent USB support.

Please note that concurrent operation of more than two USB-HID devices is not possible even if you use a USB hub.

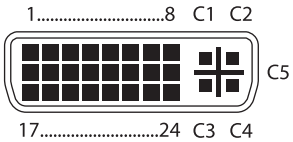
7.3.2 USB 2.0 Devices

KVM Extender models featuring a transparent USB 2.0 connection use Extreme USB Technology from Icron Technologies.

This technology supports **all** types of USB 2.0 devices; however the manufacturer cannot guarantee compatibility with every device on the market. Please contact your dealer if any issues are found.

7.4 Connector Pinouts

Connector DVI-D Single-Link

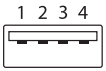


Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S data 2–	9	T.M.D.S data 1–	17	T.M.D.S data 0–
2	T.M.D.S data 2+	10	T.M.D.S data 1+	18	T.M.D.S data 0+
3	T.M.D.S data 2 GND	11	T.M.D.S data 1 GND	19	T.M.D.S data 0 GND
4	n.c.	12	n.c.	20	n.c.
5	n.c.	13	n.c.	21	n.c.
6	DDC Input (SCL)	14	+5VDC high impedance	22	T.M.D.S clock GND
7	DDC Output (SDA)	15	GND	23	T.M.D.S clock +
8	Internal use	16	Hot Plug recognition	24	T.M.D.S clock –
C1	Internal use			C3	Internal use
C2	n.c.	C5	GND	C4	Internal use

Connector USB Type B

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	GND	Black

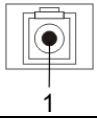
Connector USB Type A

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	GND	Black

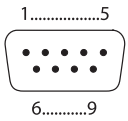
Connector Mini USB Type B

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	n.c.	–
	5	GND	Black

Fiber Optic Type SC

Picture	Diode	Signal
	1	Data IN / OUT

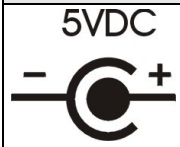
D-Sub 9 (Serial)

Picture	Pin	Signal	Pin	Signal
	1	n.c.	6	DTR
	2	CTS	7	TxD
	3	RTS	8	RxD
	4	DSR	9	n.c.
	5	GND		

3.5 mm Stereo Jack Plug

Picture	Pin	Signal
	1	GND
	2	Audio IN / OUT L
	3	Audio IN / OUT R

Power Supply

Picture	Pin	Signal
	Inside	VCC (+5VDC)
	Outside	GND

7.5 Power Supply

Voltage	5VDC
Power Requirement (per unit)	• Single-Head devices: max. 800 mA • Dual-Head devices: max. 950 mA • USB 2.0 devices: max. 1,500 mA (CPU) max. 3,500 mA (CON)

7.6 Environmental Conditions

Operating Temperature	41 to 113°F (5 to 45°C)
Storage Temperature	–13 to 140°F (–25 to 60°C)
Relative Humidity	Max. 80% non-condensing

7.7 Size

CPU Unit / CON Unit	180 x 130 x 43 mm (7.1" x 5.1" x 1.7")
Shipping Box	290 x 200 x 140 mm (11.4" x 7.9" x 5.5")

7.8 Shipping Weight

CPU Unit / CON Unit	0.8 kg (1.7 lb)
Shipping Box	3.4 kg (7.5 lb)

8 Troubleshooting

8.1 Blank Screen

Diagnosis	Possible Reason	Measure
LED **Power** off	Power supply	➔ Check power supply units and the connection to the power network.
LED **Link Status Video 1** / **2** off	Connection between CON Unit and CPU Unit	➔ Check interconnect cables and connections.
CPU unit: LED **Video OK** off	No video signal detected by source (computer, CPU)	➔ Check DVI-D cable to CPU ➔ Download DDC information from console monitors (see Chapter 6.1, Page 40). Reboot CPU if necessary.
CON unit: LED **Video OK** off	No monitor detected	➔ Check connection, length and quality of the DVI-D cable to monitor, tighten cable thumbscrews.
	No video signal detected from CPU Unit	➔ Check connection, length and quality of interconnect cables between the units. ➔ Download DDC information from console monitors (see Chapter 6.1, Page 40). Reboot CPU if necessary.
	Device configuration not suitable for device	➔ Set DIP switches according to device type.

8.2 Interference

Diagnosis	Possible Reason	Measure
Incorrect video display	Cable connection disturbed	➔ Check connection, length and quality of the DVI-D cable to monitor, tighten cable thumbscrews. ➔ Check connection, length and quality of interconnect cables between the units.

8.3 USB-HID

Diagnosis	Possible Reason	Measure
Keyboard LEDs **Shift** and **Scroll** are flashing	Keyboard in Command Mode	➔ Press <Esc> to leave Command Mode.
USB device without function	No USB-HID device	➔ Connect USB-HID device.
	Problems with USB connection	➔ Check connection of USB cable to USB-HID device. ➔ Remove DVI and power cable and restart CON Unit. Connect power cable first.
	USB-HID device is not supported	➔ Contact dealer if necessary.

8.4 USB 2.0

Diagnosis	Possible Reason	Measure
LED **Link Status USB** off	Connection between CON Unit and CPU Unit	➔ Check interconnect cable and connectors.
USB device without function	USB 2.0 device is not supported	➔ Check installation at the CPU, also the necessary drivers. ➔ New connection of the USB 2.0 device. ➔ Contact dealer if necessary.

9 Technical Support

Prior to contacting support please ensure you have read this manual, and then installed and set-up your KVM Extender as recommended.

9.1 Support Checklist

To efficiently handle your request it is necessary to complete our checklist for support and problem cases. Keep the following information available before you call:

- Company, name, phone number and email
- Type and serial number of the device (see bottom of device)
- Date and number of sales receipt, name of dealer if necessary
- Issue date of the existing manual
- Nature, circumstances and duration of the problem
- Involved components (such as graphic source/CPU, OS, graphic card, monitor, USB-HID/USB 2.0 devices, interconnect cable) including manufacturer and model number
- Results from any testing you have done

9.2 Shipping Checklist

1. To return your device, contact your dealer to obtain a RMA number (Return-Material-Authorization).
2. Package your devices carefully, preferably using the original box. Add all pieces which you received originally.
3. Note your RMA number visibly on your shipment.

Devices that are sent in without a RMA number cannot be accepted. The shipment will be sent back without being opened, postage unpaid.

10 Regulatory and Standards Compliance

10.1 CE Declaration of Conformity

The products listed below in the form as delivered comply with the provisions of the following European Directives:

2004/108/EG Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

CE Marking 2009

The products comply with the following harmonized standards for Information Technology Equipment:

- EN 55022:2006 + A1:2007 (Class A)
- EN 55024:1998 + A1:2001 + A2:2003

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety instructions and installation guidelines noted in this manual shall be considered in detail. Compliance with the specifications for cable lengths and types is mandatory.

Use 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.

10.2 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.

10.3 WEEE

The manufacturer complies with the EC Directive 2002/96/EG on the prevention of waste electrical and electronic equipment (WEEE).

The device labels carry a respective marking.

10.4 RoHS

This device complies with the EC Directive 2002/95/EG on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS).

The device labels carry a respective marking.

11 Glossary

The following terms are commonly used in this guide or in video and KVM technology:

Term	Explanation
AES/EBU	Digital audio standard that is officially known as AES3 and that is used for carrying digital audio signals between devices.
Cat X	Any Cat 5e (Cat 6, Cat 7) cable
CGA	The Color Graphics Adapter (CGA) is an old analog graphic standard with up to 16 displayable colors and a maximum resolution of 640x400 pixels.
Component Video	The Component Video (YPbPr) is a high-quality video standard that consists of three independently and separately transmittable video signals, the luminance signal and two color difference signals.
Composite Video	The Composite Video is also called FBAS and it is part of the PAL TV standard.
CON Unit	Component of a KVM Extender or Media Extender to connect to the console (monitor(s), keyboard and mouse; optionally also with USB 2.0 devices)
CPU Unit	Component of a KVM Extender or Media Extender to connect to a source (computer, CPU)
DDC	The Display Data Channel (DDC) is a serial communication interface between monitor and source (computer, CPU. 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 (computer, CPU) from two consoles
Dual-Head	A system with two video connections
Dual-Link	A DVI-D interface for resolutions up to 2560x2048 by signal transmission of up to 330 MPixel/s (24-bit)
DVI	Digital video standard, introduced by the Digital Display Working Group (http://www.ddwg.org). Single Link and Dual Link standard are distinguTelecast Fiber Systems, Inc.d. The signals have TMDS level.

Term	Explanation
DVI-I	A combined signal (digital and analog) that allows running a VGA monitor at a DVI-I port – in contrast to DVI-D (see DVI).
Fiber	Single-mode or multi-mode fiber cables
EGA	The Enhanced Graphics Adapter (EGA) is an old analog graphic standard, introduced by IBM in 1984. A D-Sub 9 connector is used for connection.
FBAS	The analog color video baseband signal (FBAS) is also called Composite Video and it is part of the PAL TV standard.
Console	Keyboard, mouse and monitor
KVM	Keyboard, video and mouse
Mini-XLR	Industrial standard for electrical plug connections (3 pole) for the transmission of digital audio and control signals
Multi-mode	62.5µ multi-mode fiber cable or 50µ multi-mode fiber cable
OSD	The On-Screen-Display is used to display information or to operate a device.
Quad-Head	A system with four video connections
RCA (Cinch)	A not standardized plug connection for transmission of electrical audio and video signals, especially with coaxial cables
SFP	SFPs (Small Form Factor Pluggable) are pluggable interface modules for Gigabit connections. SFP modules are available for Cat X and fiber interconnect cables.
S/PDIF	A digital audio interconnect that is used in consumer audio equipment over relatively short distances.
Single-Head	A system with one video connection
Single Link	A DVI-D interface for resolutions up to 1920x1200 by signal transmission of up to 165 MPixel/s (24-bit). Alternative frequencies are Full HD (1080p), 2K HD (2048x1080) and 2048x1152.
Single-mode	9µ single-mode fiber cable
S-Video (Y/C)	The S-Video (Y/C) is a video format transmitting luminance and chrominance signals separately. Thereby it has a higher quality standard than FBAS.

Term	Explanation
TOSLINK	Standardized fiber connection system for digital transmission of audio signals (F05 plug connection)
Triple-Head	A system with three video connections
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 HID devices include keyboards, mice, graphics tablets and touch screens. Storage, video and audio devices are **not** HID.
VGA	Video Graphics Array (VGA) is a computer graphics standard with a typical resolution of 640x480 pixels and up to 262,144 colors. It can be seen as a follower of the graphics standards MDA, CGA and EGA.