USER MANUAL

ACX1MR, ACX1MT DISPLAYPORT 1.1 SERIES

DKM KVM DP MODULAR EXTENDERS

24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM

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SAFETY INSTRUCTIONS

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

- Only use in dry, indoor environments.
- Only use the device according to this User Manual. Failure to follow these procedures could result in damage to the equipment or injury to the user or installer.
- The KVM Extender and the power supply units can get warm. Do not install components 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 chassis.
- 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.
- To disconnect the device completely from the electric circuit, remove all power cables.
- 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.
- Contact Black Box at 877-877-2269 or info@blackbox.com if there is a fault.

CHAPTER 1: SPECIFICATIONS

1. SPECIFICATIONS

1.1 INTERFACES

1.1.1 DISPLAYPORT

Video

The video interface supports the DisplayPort™ 1.1 standard. All signals that comply with this standard can be transmitted. This includes monitor resolutions up to 4096 x 2160 @ 30 Hz (4K DCI), 3840 x 2160 @ 30 Hz (UHD), 2560 x 1600 @ 60Hz, 2560 x 1440 @ 60Hz, 2560 x 2048 @ 60Hz, 1920 x 1200 @ 60Hz, and 1920 x 1080 @ 60Hz. Data rate is limited to 8.64 Gbit/s.The color depth is 24 bit (4:4:4).

Audio

Various audio formats can be transmitted through the interface.

- Standards: Stereo Linear Pulse Code Modulation (LPCM), DTS, DTS-HD (5.1), Dolby Digital, Dolby Digital Plus (5.1)
- Color Depth: 16 to 24 bit
- Sample-Rate: 32 to 192 kHz

1.1.2 USB-HID

Our devices with USB-HID interface support a maximum of two devices with 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.

Extension

If it is required to extend the USB-HID signals on CON or CPU side (e.g. mounting requirement), the signals can be extended either via a 3.0 m AB cable or a 3.0 m USB A-A extension cable.

NOTE: Only two USB-HID devices are supported concurrently, such as keyboard and mouse or keyboard and touchscreen. 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, webcams or memory devices, choose our devices with transparent USB support.

1.1.3 PS/2

Our devices with PS/2 interface support the use of a PS/2 keyboard and mouse.

Keyboard

Compatible with most PS/2 keyboards, even with various special keyboards. Certain keyboards with additional functions can be run with special firmware.

Mouse

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

1.1.4 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, depending on the upgrade module, with USB high speed (max. 480 Mbit/s) or USB embedded (max. 36/100/480 Mbits, depending on extender type).

Each USB embedded port provides a maximum current of 500 mA (high power). When using a USB high speed interface with 4 USB ports, respectively 2 connectors provides a maximum of 500 mA (high power) and 2 connectors a maximum of 100 mA.

1.1.5 RJ-45 (INTERCONNECT)

Communication between CATx devices requires a 1000BASE-T connection.

Connector wiring must comply with EIA/TIA-568-B (1000BASE-T), with RJ-45 connectors at both ends. All four cable wire pairs are used.

1.1.6 FIBER SFP TYPE LC (INTERCONNECT)

Communication of fiber devices is performed via Gigabit SFPs that are connected to suitable fibers fitted with connectors type LC.

NOTE: The correct function of the device can only be guaranteed with SFPs provided by Black Box.

CAUTION: SFP modules can be damaged by electrostatic discharge (ESD). Please consider ESD handling specifications.

1.1.7 SERIAL INTERFACE

The serial interface option supports a full-duplex transmission with a real hardware handshake up to a Baud rate of 115,200 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 touchscreen can be connected directly to the CON Unit.
- To connect to a serial printer (or any other DTE instead of a 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 115,200 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)

1.1.8 SERIAL INTERFACE RS-422

KVM Extenders with a serial interface RS-422 (DB9) support a differential full duplex transmission up to a Baud rate of 115,200 Baud.

The CPU unit is designed as controlling device and can, for example, be connected directly to video or media servers.

The CON unit is designed as a controlled device and so can be connected directly to remote controllers.

Connection Format	Sony Standard
Speed	Up to 115,200 Baud
Data Format	Format independent
Data Transmission	• Rx + (Receive Data) • Rx – (Receive Data) • Tx + (Transmit Data) • Tx – (Transmit Data)

NOTE: The serial interface only supports one connected device per upgrade module.

1.1.9 ANALOG AUDIO INTERFACE

The analog audio option supports a bidirectional stereo audio transmission, in near-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 to 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.

NOTE: The CON Unit can also provide pre-amplification of a microphone. Open the CON Unit, locate the MIC jumper on the audio board and close the pins.

CHAPTER 1: SPECIFICATIONS

ANALOG AUDIO SPECIFICATIONS

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

ANALOG AUDIO USB 2.0 SPECIFICATIONS

Transmission Format	Digitized virtually CD quality audio, 16 bit (8, 11.025, 16, 22.05, 32, 44.1, 48 KHz)
Signal Level	Line-Level (5 Volt Pk-Pk maximum)
Input Impedance	20 K-Ohm
Connections CPU Unit	(1) USB type B female connector
Connections CON Unit	(2) 3.5-mm stereo jack plugs (audio in and audio out)

1.1.10 DIGITAL AUDIO INTERFACE

The digital audio option supports the unidirectional transmission of digital audio data.

Up to three sources can be connected to the CPU Unit. The active source is transmitted. If several sources are active, the XLR signal takes priority, otherwise the first active signal.

The three connectors on the CON Unit provide concurrent digital audio.

KVM Extenders with the digital audio option include an built-in sample rate converter that provides predefined sample frequencies at the output of the CON Unit.

The user can set directly the following parameters by using a configuration file:

- Activate or deactivate sample rate converter in the Config.txt file on the flash drive of the KVM Extender.
- If the sample rate converter is activated, the following characteristics are valid: 140 dB dynamic range and -120 dB total harmonic distortion + noise.
- Set sample frequency of the sample rate converter by writing the parameter in a new line. The following sample frequencies are available:
  - 32.0 kHz (write SRC32000 in Config.txt file of the CPU unit)
  - 44.1 kHz (write SRC44100 in Config.txt file of the CPU unit)
  - 48.0 kHz (write SRC48000 in Config.txt file of the CPU unit)
  - 96.0 kHz (write SRC96000 in Config.txt file of the CPU unit)
- You can use a delay for converting the sample rate. The time is set in milliseconds and separated from the parameter for the sample rate by a semicolon (e.g. SRC44100;12). You can set the following delays for the sample rates:
  - 32.0 kHz: 3 - 60 ms
  - 44.1 kHz: 2 - 44 ms
  - 48.0 kHz: 2 - 40 ms
  - 96.0 kHz: 1 - 20 ms
- To deactivate the sample rate converter, write SRC_NONE in the Config.txt file of the CPU unit.

Compatibility	AES/EBU, S/PDIF, EIAJ CP1201, IEC 60958
Standards	Dolby Digital, DTS, PCM
Bit Depth	24 bit
Sample Rate	32 to 192 kHz
CPU Unit (Inputs)	• Mini-XLR (AES/EBU; symmetrical, lockable) • Coaxial (S/PDIF; RCA, Cinch) • Optical (S/PDIF; TOSLINK)
CON Unit (Outputs)	• Mini-XLR (AES/EBU; symmetrical, lockable) • Coaxial (S/PDIF; RCA, Cinch) • Optical (S/PDIF; TOSLINK)

1.2 INTERCONNECT CABLE

1.2.1 CATX

A point-to-point connection is required. Operation with several patch fields is possible. Routing over an active network component, such as an Ethernet Hub, Router or Matrix, is not allowed.

CAUTION: Avoid routing CATx cables along power cables.

NOTE: To maintain regulatory EMC compliance, correctly installed shielded CATx cable must be used throughout the interconnection link.

NOTE: To maintain regulatory EMC compliance, all CATx cables need to carry ferrites on both cable ends close to the device.

Type of Interconnect Cable

The KVM Extender requires interconnect cabling specified for Gigabit Ethernet (1000BASE-T). The use of solid-core (AWG24), shielded, CAT5e (or better) is recommended.

CATx Solid-Core Cable AWG24	S/UTP (CAT5e) cable according to EIA/TIA-568-B. Four pairs of wires AWG24. Connection according to EIA/TIA-568-B (1000BASE-T).
CATx Patch Cable AWG26/8	S/UTP (CAT5e) cable according to EIA/TIA-568-B. Four pairs of wires AWG26/8. Connection according to EIA/TIA-568-B (1000BASE-T).

NOTE: The use of flexible cables (patch cables) type AWG26/8 is possible, however the maximum possible extension distance is halved.

MAXIMUM ACCEPTABLE CABLE LENGTH

CATx Installation Cable AWG24	140 m (400 ft.)
CATx Patch Cable AWG26/8	70 m (200 ft.)

1.2.2 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 TYPE	SPECIFICATIONS
Single-mode 9 µm	• Two fibers 9 µm • in-house patch cable • in-house breakout cable • in-house or outdoor breakout cable, resistant • outdoor cable, with protection against rodents
Multi-mode 50 µm	• Two fibers 50 µm • in-house patch cable • in-house or outdoor breakout cable, resistant
Multi-mode 62.5 µm	• Two fibers 62.5 µm • in-house breakout cable • outdoor cable, with protection against rodents

MAXIMUM ACCEPTABLE CABLE LENGTH

CABLE TYPE	MAXIMUM LENGTH
Singlemode 9 µm	10,000 m (32,800 ft)
Singlemode 9 µm XV	5,000 m (16,400 ft)
Multimode 50 µm (OM3)	1,000 m (3,280 ft)
Multimode 50 µm	400 m (1,300 ft)
Multimode 62.5 µm	200 m (650 ft)

NOTE: If you use singlemode SFPs with multimode fibers, you normally can double the maximum acceptable cable length.

TYPE OF CONNECTOR

Connector	LC connector

1.3 SUPPORTED PERIPHERALS

1.3.1 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 devices 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.

NOTE: Concurrent operation of more than two USB-HID devices is not possible even if you use a USB hub.

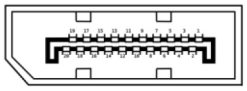
1.3.2 USB 2.0 DEVICES

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

This technology supports all types of USB 2.0 devices, however, we cannot guarantee compatibility with every device on the market. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com if any issues are found.

1.4 CONNECTOR PINOUTS

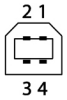
DisplayPort™ CONNECTOR PINOUT



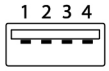
Pin	Signal	Pin	Signal	Pin	Signal
1	ML-LANE3(N)	8	GND	15	AUX CH(P)
2	GND	9	ML-LANE1(P)	16	GND
3	ML-LANE3(P)	10	ML-LANE0(N)	17	AUX CH(N)
4	ML-LANE2(N)	11	GND	18	Hot Plug Detect
5	GND	12	ML-LANE0(P)	19	Power Out Return
6	ML-LANE2(P)	13	Config1/GND	20	Power out n.c.
7	ML-LANE1(N)	14	Config2/GND		

CHAPTER 1: SPECIFICATIONS

USB TYPE B CONNECTOR PINOUT

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

USB TYPE A CONNECTOR PINOUT

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

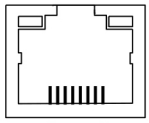
MINI USB TYPE B CONNECTOR PINOUT

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

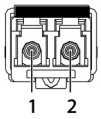
PS/2 CONNECTOR PINOUT

Picture	Pin	Signal
	1	DATA
	2	GND
	3	VCC (+ 5VDC)
	4	CLK
	5	n.c.
	6	n.c.

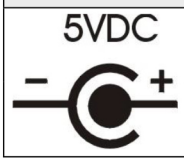
RJ-45 CONNECTOR PINOUT

Picture	Pin	Signal	Pin	Signal
	1	D1+	5	D3–
	2	D1–	6	D2–
	3	D2+	7	D4+
	4	D3+	8	D4–

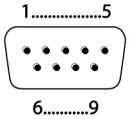
FIBER SFP TYPE LC CONNECTOR PINOUT

Picture	Diode	Signal
	1	Data OUT
	2	Data IN

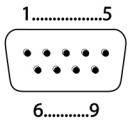
POWER SUPPLY CONNECTOR PINOUT

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

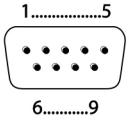
DB9 (SERIAL) RS-232 CONNECTOR PINOUT

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

DB9 (SERIAL) RS-422 CONTROLLED DEVICE CONNECTOR PINOUT

Picture	Pin	Signal	Pin	Signal
	1	GND	6	Rx-GND
	2	RxA	7	RxB
	3	TxB	8	TxA
	4	Tx-GND	9	n.c.
	5	n.c		

DB9 (SERIAL) RS-422 CONTROLLING DEVICE CONNECTOR PINOUT

Picture	Pin	Signal	Pin	Signal
	1	GND	6	Tx-GND
	2	TxA	7	TxB
	3	RxB	8	RxA
	4	Rx-GND	9	n.c.
	5	n.c.		

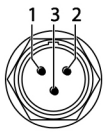
3.5-/6.35-MM STEREO JACK PLUG CONNECTOR PINOUT

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

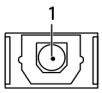
RCA (CINCH) CONNECTOR PINOUT

Picture	Pin	Signal
	1	GND
	2	Data IN / OUT

MINI-XLR CONNECTOR PINOUT

Picture	Pin	Signal
	1	GND
	2	Data +
	3	Data –

TOSLINK CONNECTOR PINOUT

Picture	Diode	Signal
	1	Data IN / OUT

1.5 POWER SUPPLY

AC POWER SUPPLY

MODEL	MAX. CURRENT	MAX. VOLTAGE	FREQUENCY
ACXMODH2R-P-R2	700 mA max.	100 to 240 V	50/60 Hz
ACXMODH6R-R2	1,400 mA max.	100 to 240 V	47 to 63 Hz
ACXMODH6BPAC-R2	1,300 mA max.	100 to 240 V	50/60 Hz
ACXMODH6FPAC-R2	1,300 mA max.	100 to 240 V	50/60 Hz
ACXMODH21R	4,000 mA max.	(2) 100 to 240 V	50/60 Hz

DC POWER SUPPLY

MODEL	MAX. CURRENT	MAX. VOLTAGE
ACXMODH2-R2/2R-R2	3,000 mA	5 VDC
ACXMODH2R-P-R2	5,000 mA	5 VDC
ACXMODH4-R2/4R-R2	5,000 mA	5 VDC
ACXMODH6R-R2	8,000 mA	5 VDC

POWER REQUIREMENT

Power Requirement (per Unit)	KVM Extender: • Single-Head devices: max. 800 mA • Redundancy devices: max. 1,050 mA
	Upgrade Modules: • Analog Audio/Serial: max. 300 mA • Serial (RS-422): max. 150 mA • Digital Audio: max. 300 mA • USB-HID: max. 300 mA • PS/2: max. 650 mA • USB 2.0 embedded: max. 1,100 mA • USB 2.0: max. 2,500 mA

1.6 ENVIRONMENTAL CONDITIONS

ENVIRONMENTAL SPECIFICATIONS

NAME	DESCRIPTION
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
Noise Emission: Sound Pressure Level (SPL)	max 0.21 dBA per fan (ACXMODH6FAN)
Heat Dissipation: Thermal output	Corresponds to power consumption in Watts (W) (see extender configurator on the website)

1.7 SIZE

DEVICES IN THE 2-SLOT ACXMODH2-R2/ACXMODH2R-R2

CPU Unit/CON Unit	1.7" H x 5.7" W x 5.8" D (4.1 x 14.5 x 14.7 cm)
Shipping Box	5.5" H x 8.3" W x 6.5" D (14.0 x 16.5 x 21.0 cm)

DEVICES IN THE 2-SLOT ACXMODH2R-P-R2

CPU Unit/CON Unit	1.7" H x 8.7" W x 5.8" D (4.1 x 22.1 x 14.7 cm)
Shipping Box	4.5" H x 21.7" W x 14.4" D (11.5 x 55.0 x 36.5 cm)

DEVICES IN THE 4-SLOT ACXMODH4-R2/ACXMODH4R-R2

CPU Unit/CON Unit	1.7" H x 11.5" W x 5.8" D (4.1 x 29.3 x 14.7 cm)
Shipping Box	4.5" x 21.7" W x 14.4" D (11.5 x 55.0 x 36.5 cm)

DEVICES IN THE 6-SLOT ACXMODH6R-R2

CPU Unit/CON Unit	1.7" H x 17.4" W x 5.8" D (4.1 x 44.2 x 14.7 cm)
Shipping Box	4.5" H x 29.9" W 14.4" D (11.5 x 76.0 x 36.6 cm)

DEVICES IN THE 6-SLOT ACXMODH6BPAC-R2/ACXMODH6FPAC-R2

CPU Unit/CON Unit	1.7" H x 17.4" W x 9.8" D (4.1 x 44.2 x 25.0 cm)
Shipping Box	6.1" H x 21.7" W x 14.6" D (15.5 x 55.0 x 37.2 cm)

DEVICES IN THE 21-SLOT ACXMODH21R

CPU Unit/CON Unit	6.9" H x 19.0" W x 18.2" D (17.6 x 48.2 x 46.2 cm)
Shipping Box	14.5" H x 25.4" W x 22.6" D (36.8 x 64.5 x 57.4 cm)

1.8 SHIPPING WEIGHT

DEVICES IN THE 2-SLOT ACXMODH2-R2/ACXMODH2R-R2

CPU Unit/CON Unit	1.5 lb. (0.7 kg)
Shipping Box	5.5 lb. (2.5 kg)

DEVICES IN THE 2-SLOT ACXMODH2R-P-R2

CPU Unit/CON Unit	2.4 lb. (1.1 kg)
Shipping Box	6.4 lb. (2.9 kg)

DEVICES IN THE 4-SLOT ACXMODH4-R2/ACXMODH4R-R2

CPU Unit/CON Unit	2.0 lb. (0.9 kg)
Shipping Box	7.5 lb. (3.4 kg)

DEVICES IN THE 6-SLOT ACXMODH6R-R2

CPU Unit/CON Unit	4.2 lb. (1.9 kg)
Shipping Box	11.2 lb. (5.1 kg)

DEVICES IN THE 6-SLOT ACXMODH6BPAC-R2/ACXMODH6FPAC-R2

CPU Unit/CON Unit	5.5 lb. (2.5 kg)
Shipping Box	7.7 lb. (3.5 kg)

DEVICES IN THE 21-SLOT ACXMODH21R

CPU Unit/CON Unit	22.1 lb. (10.9 kg)
Shipping Box	32.0 lb. (14.5 kg)

2. INTRODUCTION

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

2.1 DESCRIPTION

The KVM Extender is used to increase the distance between a source (computer, CPU) and its console (keyboard, mouse, and other peripheral devices). The Extender is designed for use with CATx (Twisted Pair) interconnect cables or fiber interconnect cables.

The KVM Extender with CATx interconnect cables is unsuitable for connection between buildings where a fiber optic based product should be used instead. You can use the KVM Extender with fiber interconnect cables in environments that are subject to electromagnetic interference. Electromagnetic interference can limit the maximum distance and reliability of operation.

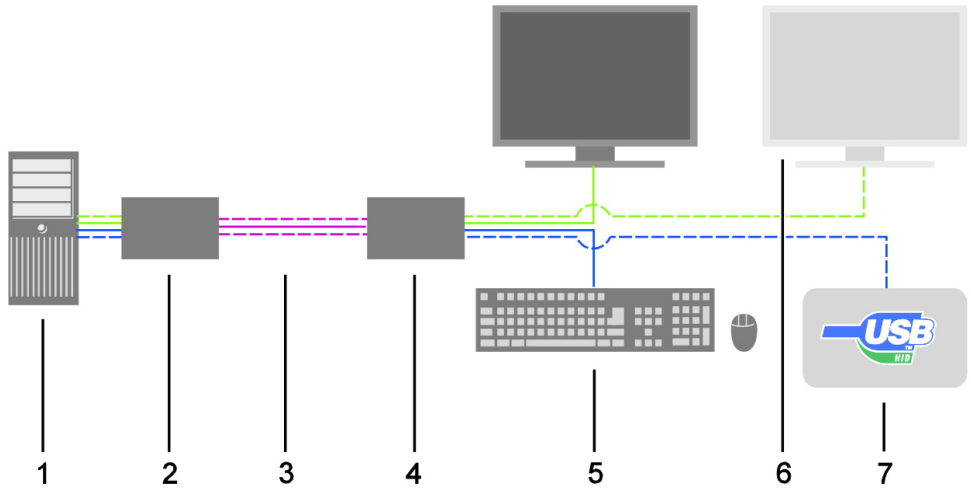
2.2 SYSTEM OVERVIEW

The KVM Extender consists of at least one CPU module and one CON module. The various modules install in a 2-, 4-. or 6-slot chassis at the CPU site and at the CON site (CPU and CON Unit).

The CPU module connects directly to the source (computer, CPU) using the supplied cables.

The CON module connects to the console (monitor, keyboard and mouse).

The CPU Unit and the CON modules 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-HID devices (option, only with 4x USB-HID devices)

2.3 PRODUCT RANGE

2.3.1 PART NUMBERS

Part numbers for Connections via CATx or Fiber Cable

All devices are available in the following versions:

- Connection via CATx cable (x = "C")
- Connection via singlemode fiber cable (x = "S")
- High-speed connection (3.125 Gbit/s) via singlemode fiber cable (x = "X")

NOTE: Fiber devices can be used with multimode and singlemode cables.

Part numbers for CPU Unit and CON Unit

The part numbers for the CPU Unit and the CON Unit can be derived from the part number of the complete device.

- CPU Unit: ACX1MT, ACX2MT
- CON Unit: ACX1MR, ACX2MR

NOTE: All devices in the series are technically compatible with other devices in the family of Black Box extenders.

2.3.2 CHASSIS

AVAILABLE CHASSIS

MODEL	DESCRIPTION
ACXMODH2-R2	Empty chassis for up to two boards, one external power supply unit
ACXMODH2R-R2	Empty chassis for up to two boards, one external power supply unit, prepared for redundancy for a second power supply unit (external)
ACXMODH2R-P-R2	Empty chassis for up to two boards, one internal power supply unit, prepared for redundancy for a second power supply unit (external)
ACXMODH2FPAC-R2	Empty chassis for up to two boards, one external power supply unit, backplane
ACXMODH4-R2	Empty chassis for up to four boards, one external power supply unit
ACXMODH4R-R2	Empty chassis for up to four boards, one external power supply unit, prepared for redundancy for a second power supply unit (external)
ACXMODH6R-R2	Empty chassis for up to six boards, one internal power supply unit, prepared for redundancy for a second power supply unit (external)
ACXMODH6BPAC-R2	Empty chassis for up to six boards, active backplane, two internal power supply units (redundancy)
ACXMODH6FPAC-R2	Empty chassis for up to six boards, active backplane, two internal power supply units (redundancy) with connectors on rear side
ACXMODH21R	Empty chassis for up to 21 boards, one internal power supply unit, prepared for redundancy for a second power supply unit (internal)

2.3.3 KVM EXTENDER MODULES

EXTENDER MODULES

MODEL	DESCRIPTION
ACX2MT-DPHS-SM	Single-Head module for (1) DisplayPort™ with (2) USB-HID (up to 1920 x 1200 @ 60 Hz or 4096 x 2160 @ 30 Hz)
ACX2MR-DPHS-SM	
ACX2MT-DPHS-2S	Single-Head module for (1) DisplayPort with (2) USB-HID and redundant connector for interconnect cables (up to 1920 x 1200 @ 60 Hz or 4096 x 2160 @ 30 Hz)
ACX2MR-DPHS-2S	
ACX2MT-DP11ATH-C	DKM Dual-Head DisplayPort 1.1 and USB HID TX or RX card — CATx (up to 1920 x 1200 @ 60Hz dual-head or 3840 x 2160 @ 30Hz single-head)
ACX2MR-DP11ATH-C	
ACX2MT-DP11ATH-SM	DKM Dual-Head DisplayPort 1.1 and USB HID TX or RX card — Fiber (up to 1920 x 1200 @ 60Hz dual-head or 3840 x 2160 @ 30Hz single-head)
ACX2MR-DP11ATH-SM	
ACX2MT-DP11HS-SM	DKM Dual-Head DisplayPort 1.1 and USB HID High-Speed TX or RX card — Fiber (up to 1920 x 1200 @ 60Hz dual-head or 3840 x 2160 @ 30Hz single-head)
ACX2MR-DP11HS-SM	
ACX2MT-DP11ATH-2C	DKM Dual-Head DisplayPort 1.1 and USB HID Redundant TX or RX card — (2) CATx (up to 1920 x 1200 @ 60Hz dual-head or 3840 x 2160 @ 30Hz single-head)
ACX2MR-DP11ATH-2C	
ACX2MT-DP11ATH-2S	DKM Dual-Head DisplayPort 1.1 and USB HID Redundant TX or RX card — (2) Fiber (up to 1920 x 1200 @ 60Hz dual-head or 3840 x 2160 @ 30Hz single-head)
ACX2MR-DP11ATH-2S	

2.3.4 UPGRADE MODULES

UPGRADE MODULES

MODEL	DESCRIPTION
ACX1MT-HID	Upgrade module with (2) USB-HID
ACX1MR-HID	
ACX1MT-G2-EU	Upgrade module with (2) USB 2.0 (uses Icron 2300 chip)
ACX1MR-G2-EU	
ACX1MT-AR	Upgrade module with Analog Audio/Serial RS-232 (bidirectional)
ACX1MR-AR	
ACX1MT-ARP	Upgrade module with Analog Audio/Serial RS-232 (bidirectional) and PS/2
ACX1MR-ARP	
ACX1MT-422	Upgrade module with Analog Audio/Serial RS-422 (bidirectional)
ACX1MR-422	
ACX1MT-DA	Upgrade module with Digital Audio (unidirectional)
ACX1MR-DA	

UPGRADE MODULES (CONTINUED)

MODEL	DESCRIPTION
ACX1MT-ARH	Upgrade module with Analog Audio/Serial RS-232 (bidirectional) and (2) USB-HID
ACX1MR-ARH	
ACX1MT-ARE	Upgrade module with Analog Audio/Serial RS-232 (bidirectional) and (2) USB 2.0
ACX1MR-ARE	
ACX1MT-DAH	Upgrade module with Digital Audio (unidirectional) and (2) USB-HID
ACX1MR-DAH	
ACX1MT-DAE	Upgrade module with Digital Audio (unidirectional) and (2) USB 2.0
ACX1MR-DAE	
ACX1MT-DAX	Upgrade module with Digital Audio (bidirectional)
ACX1MR-DAX	
ACX1MT-ARD	Upgrade module with Digital Audio (unidirectional) and Analog Audio/Serial (bidirectional)
ACX1MR-ARD	

2.3.5 USB 2.0 EXTENDER MODULES

USB 2.0 EXTENDER MODULES

MODEL	DESCRIPTION
ACX1MT-U23-C, ACX1MT-U23-SM	USB 2.0 upgrade module with (4) USB 2.0, fixed port (based on: ICRON 2300 Core)
ACX1MR-U23-C, ACX1MR-U23-SM	

2.4 ACCESSORIES UPGRADE KITS

ACCESSORIES UPGRADE KITS

MODEL	DESCRIPTION
ACXMODHEAR2	19"/1U rackmount kit for 2-slot chassis
ACXMODHEAR2P	19"/1U rackmount kit for 2-slot chassis with internal PSU
ACXMODHEAR4	19"/1U rackmount kit for 4-slot chassis
ACXMODHEAR6	19"/1U rackmount kit for 6-slot chassis
ACXMODH-DMK	DIN Railmount Kit for DKM Modular Housing
ACXMODH-WMK	Deskmount Kit for DKM Modular Housing
ACXMODH2-PS	Power supply for 2-slot chassis (spare or redundancy)
ACXMODH4-PS	Power supply for 4-slot chassis (spare or redundancy)
ACXMODH6-PS	Power supply for 6-slot chassis (spare or redundancy)
ACXMODH21-PS	Power supply for 6-slot-chassis (spare or redundancy)
ACXMODH21-4S	Blind plate 3U/4HP for 2-, 4- and 6-slot chassis
ACXMODH21-8S	Blind plate 3U/8HP for 2-, 4- and 6-slot chassis
ACXMODH6FAN	Fan option for chassis ACXMODH6BPAC/F

NOTE: KVM Extenders and the power supply units can get warm and must not be installed in closed rooms with no air circulation. For rackmount installations, at least 0.5 U (height unit) is required above the extenders for ventilation.

2.5 ACCESSORIES

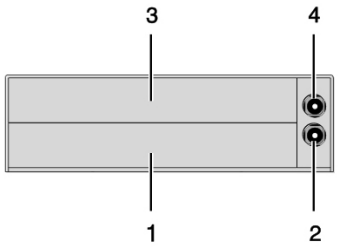
ACCESSORIES

MODEL	DESCRIPTION
EDN12H-0005-MF	Serial cable 1.8 m (RS-232)
USB05-0006	USB cable 1.8 m (Type A to B)
USB05-0010	USB cable 3.0 m (Type A to B)
EVNDVI01-0006	DVI-D cable 1.8 m (DVI-D)
ACXSPL12-S	DVI-D splitter cable
EVHDMI01T-001M	HDMI cable 1.8 m
VCB-DP-0015-MM	DisplayPort™ cable 1.8 m
EJ110-0005	Stereo jack cable 1.6 m (3.5 mm Stereo)

2.6 DEVICE VIEWS

2.6.1 2-SLOT CHASSIS (ACXMODH2-R2/2R-R2)

CPU and CON Unit



Rear View

1 Slot for modules #1

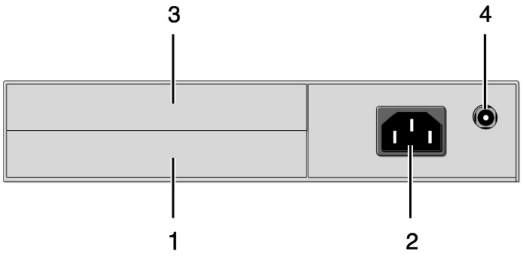
2 Connect to 5-VDC power supply (standard)

3 Slot for modules #2

4 Connect to 5-VDC power supply (redundancy, optional)

2.6.2 2-SLOT CHASSIS (ACXMODH2R-P-R2)

CPU and CON Unit



Rear View

1 Slot for modules #1

2 Connect to power supply (standard)

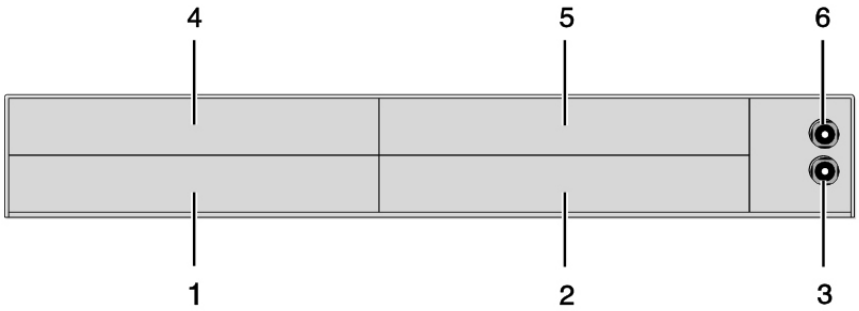
3 Slot for modules #2

4 Connect to 5-VDC power supply (redundancy)

NOTE: The 2-slot chassis with an internal power supply is not equipped with a fuse on its primary side. Therefore, the protection against excessive currents has to be provided by the electrical installation of the building.

2.6.3 4-SLOT CHASSIS (ACXMODH4-R2/4R-R2)

CPU and CON Unit



Rear View

1 Slot for modules #3

2 Slot for modules #1

3 Connect to 5-VDC power supply (standard)

4 Slot for modules #4

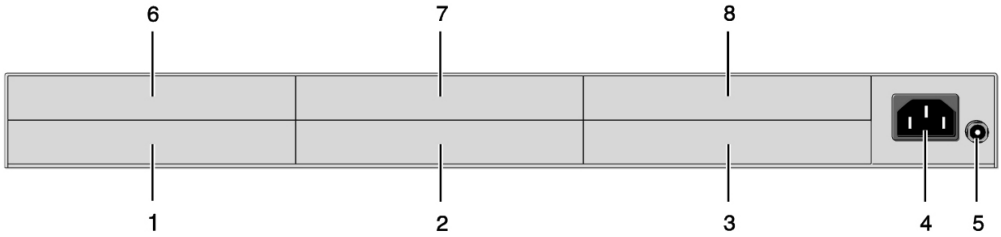
5 Slot for modules #2

6 Connect to 5-VDC power supply (redundancy, optional)

NOTE: For operation with three KVM Extender CON modules and a USB 2.0 CON module in a 4-slot chassis, two power supplies are necessary. In this case, redundancy is not applicable.

2.6.4 6-SLOT CHASSIS (ACXMODH6R-R2)

CPU and CON Unit



Rear View

1 Slot for modules #5

2 Slot for modules #3

3 Slot for modules #1

4 Connect to power supply (standard)

5 Connect to 5VDC power supply (standard)

6 Slot for modules #6

7 Slot for modules #4

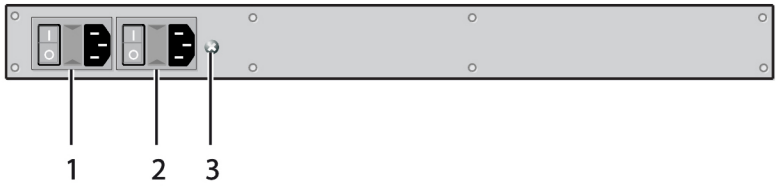
8 Slot for modules #2

NOTE: For operation with KVM Extender modules in a 6-slot chassis, two power supplies are necessary. In this case, redundancy is not applicable.

NOTE: The 6-slot chassis is not equipped with a fuse on its primary side. Therefore, the protection against excessive currents has to be provided by the electrical installation of the building.

2.6.5 6-SLOT CHASSIS ACXMODH6BPAC-R2

CPU and CON Unit

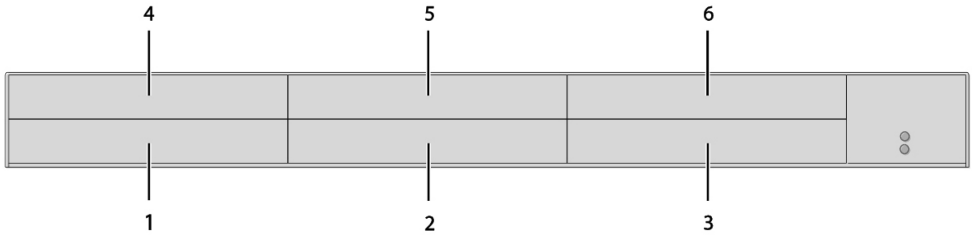


Front View

1 Connect to power supply 1

2 Connect to power supply 2 (redundancy)

3 Grounding



Rear View

1 Slot for modules #5

2 Slot for modules #3

3 Slot for modules #1

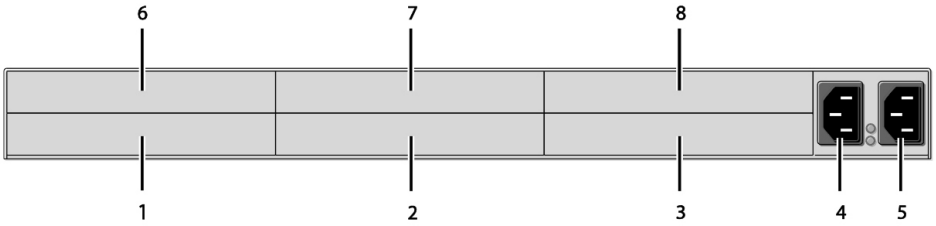
4 Slot for modules #6

5 Slot for modules #4

6 Slot for modules #2

2.6.6 6-SLOT CHASSIS (ACXMODH6FPAC-R2)

CPU and CON Unit



Rear View

1 Slot for modules #5

2 Slot for modules #3

3 Slot for modules #1

4 Connect to power supply 1

5 Connect to power supply 2 (redundancy)

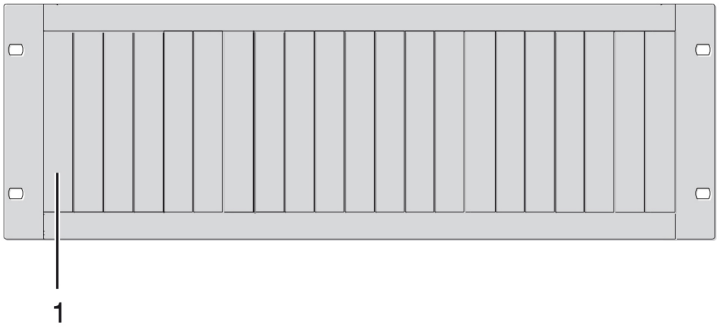
6 Slot for modules #6

7 Slot for modules #4

8 Slot for modules #2

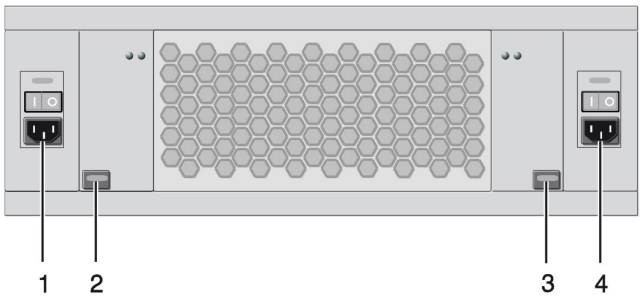
2.6.7 21-SLOT CHASSIS (ACXMODH21R)

CPU and CON Unit



Rear view

1 Slots for modules #1 - #21



Front View

1 Connect to power supply 2

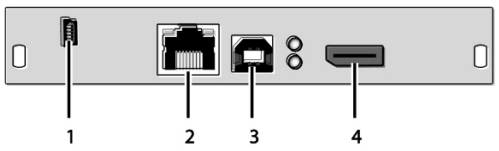
2 Locking for power supply 2 (redundancy)

3 Locking for power supply 1 (standard)

4 Connect to power supply 1

2.6.8 MODEL ACX2MT-DPH-C/ACX2MR-DPH-C

CPU Module



Rear View

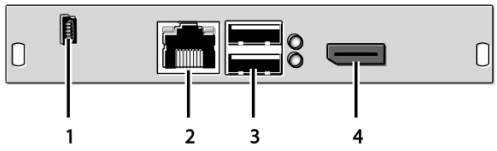
1 Service port

2 Connect to interconnect cable

3 To CPU: USB-HID

4 To CPU: DisplayPort™

CON Module



Rear View

1 Service port

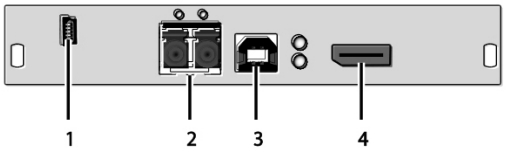
2 Connect to interconnect cable

3 Connect to USB-HID devices

4 Connect to DisplayPort monitor

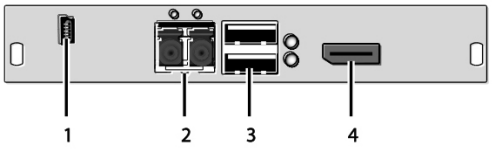
2.6.9 MODEL ACX2MT-DPH-SM/ACX2MR-DPH-SM

CPU Module



Rear View
1 Service port
2 Connect to interconnect cable
3 To CPU: USB-HID
4 To CPU: DisplayPort™

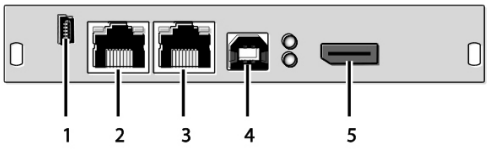
CON Module



Rear View
1 Service port
2 Connect to interconnect cable
3 Connect to USB-HID devices
4 Connect to DisplayPort monitor

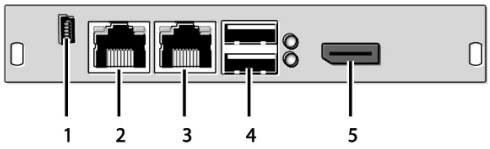
2.6.10 MODEL ACX2MT-DPH-2C/ACX2MR-DPH-2C

CPU Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 To CPU: USB-HID
5 To CPU: DisplayPort

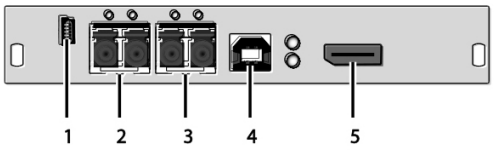
CON Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to USB-HID devices
5 Connect to DisplayPort monitor

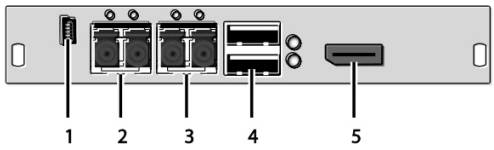
2.6.11 MODEL ACX2MT-DPH-2S/ACX2MR-DPH-2S

CPU Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 To CPU: USB-HID
5 To CPU: DisplayPort™

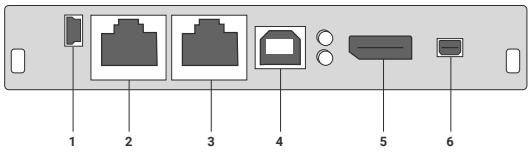
CON Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to USB-HID devices
5 Connect to DisplayPort monitor

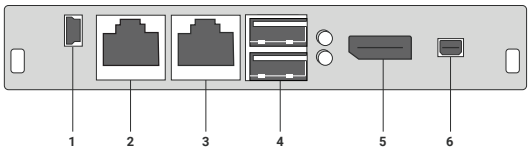
2.6.12 MODEL ACX2MR-DP11ATH-2C/ACX2MT-DP11ATH-2C

CPU Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 To CPU: USB-HID
5 To CPU: DisplayPort
6 To CPU: Mini DisplayPort

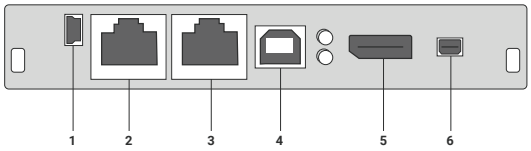
CON Module



Rear View
1 Service port
2 Connect to interconnect cable 1
3 Connect to interconnect cable 2
4 Connect to USB-HID devices
5 Connect to DisplayPort monitor
6 Connect to Mini DisplayPort monitor

2.6.13 MODEL ACX2MR-DP11ATH-2C/ACX2MT-DP11ATH-2C

CPU Module



Rear View

1 Service port

2 Connect to interconnect cable 1

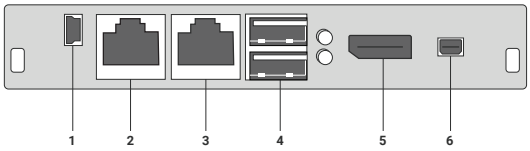
3 Connect to interconnect cable 2

4 To CPU: USB-HID

5 To CPU: DisplayPort™

6 To CPU: Mini DisplayPort

CON Module



Rear View

1 Service port

2 Connect to interconnect cable 1

3 Connect to interconnect cable 2

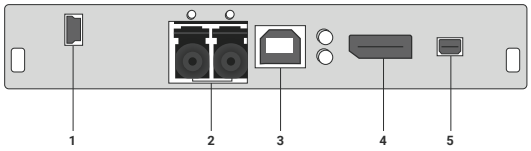
4 Connect to USB-HID devices

5 Connect to DisplayPort monitor

6 Connect to Mini DisplayPort monitor

2.6.14 MODEL ACX2MR-DP11ATH-SM/ACX2MT-DP11ATH-SM

CPU Module



Rear View

1 Service port

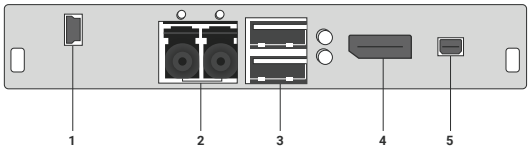
2 Connect to interconnect cable

3 To CPU: USB-HID

4 To CPU: DisplayPort

5 To CPU: Mini DisplayPort

CON Module



Rear View

1 Service port

2 Connect to interconnect cable

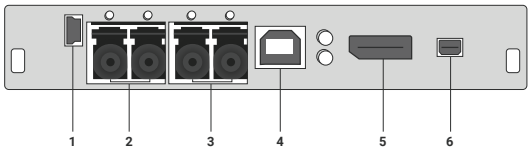
3 Connect to USB-HID devices

4 Connect to DisplayPort monitor

5 Connect to Mini DisplayPort monitor

2.6.15 MODEL ACX2MR-DP11ATH-2S/ACX2MT-DP11ATH-2S

CPU Module



Rear View

1 Service port

2 Connect to interconnect cable 1

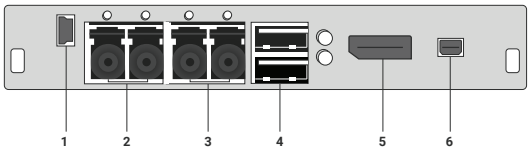
3 Connect to interconnect cable 2

4 To CPU: USB-HID

5 To CPU: DisplayPort™

6 To CPU: Mini DisplayPort

CON Module



Rear View

1 Service port

2 Connect to interconnect cable 1

3 Connect to interconnect cable 2

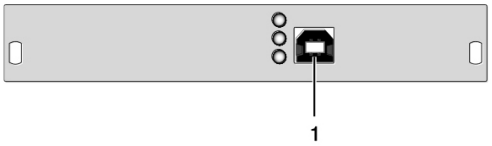
4 Connect to USB-HID devices

5 Connect to DisplayPort monitor

6 Connect to Mini DisplayPort monitor

2.6.16 MODEL ACX1MT-HID/ACX1MR-HID

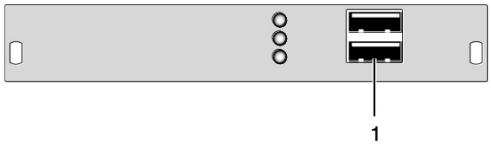
CPU Module



Rear View

1 To CPU: USB-HID

CON Module

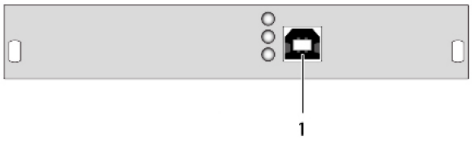


Rear View

1 Connect to USB-HID devices

2.6.17 MODEL ACX1MT-G2-EU/ACX1MR-G2-EU

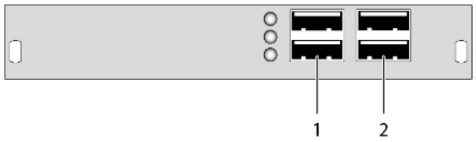
CPU Module



Rear View

1 To CPU: USB 2.0

CON Module

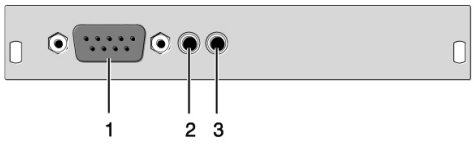


Rear View

1 Connect to USB 2.0 devices
2 Connect to USB 2.0 devices

2.6.18 MODEL ACX1MT-AR/ACX1MR-AR

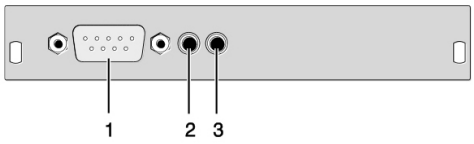
CPU Module



Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT

CON Module

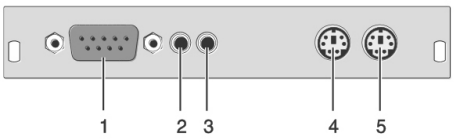


Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT

2.6.19 MODEL ACX1MT-ARP/ACX1MR-ARP

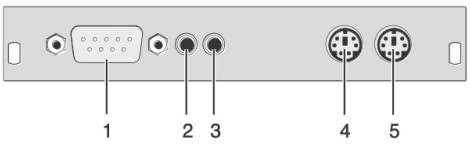
CPU Module



Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 To CPU: PS/2 mouse
5 To CPU: PS/2 keyboard

CON Module

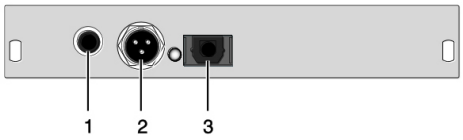


Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 Connect to PS/2 mouse
5 Connect to PS/2 keyboard

2.6.20 MODEL ACX1MT-DA/ACX1MR-DA

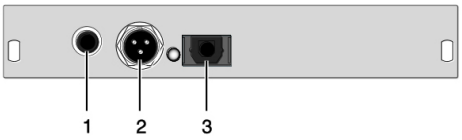
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)

CON Module

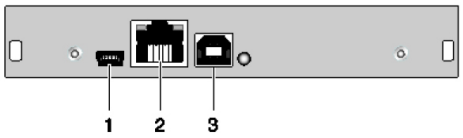


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)

2.6.21 ACX1MT-U23-C/ACX1MR-U23-C

CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB 2.0

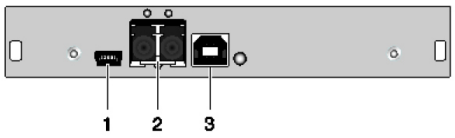
CON Module

Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB 2.0 devices

2.6.22 MODEL ACX1MT-U23-SM/ACX1MR-U23-SM

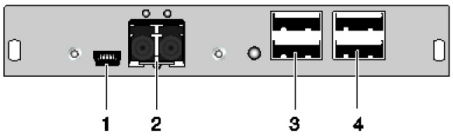
CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB 2.0

CON Module



Rear View

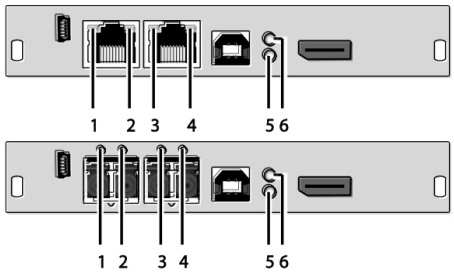
1 Service port
2 Connect to interconnect cable
3 Connect to USB 2.0 devices

2.7 STATUS LEDS

2.7.1 STATUS KVM EXTENDER MODULE

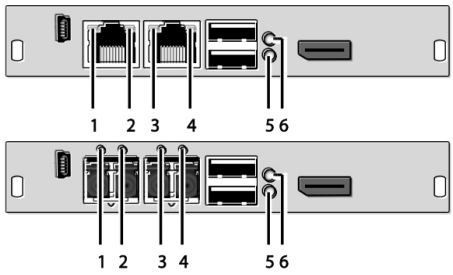
The KVM Extender module is fitted with a multi color LED on both sides for overall status indication and with two further LEDs on the back side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

LED 1 and 2: Connection Status Link 1

LED 3 and 4: Connection Status Link 2

LEDS 3 AND 4

POSITION	LED	STATUS	DESCRIPTION
1, 3	Failure LED (green)	Off	Connection available
		On or Flashing	Connection failure (flashing for about 20 s following a connection failure)
2, 4	Status LED (green)	Flashing	No connection via interconnect cable
		On	Connection available

LED 5: USB and Video Status Video Channel 1 (Single Link)

LED 6: USB and Video Status Video Channel 2 (Dual Link, 4K)

LEDS 5 AND 6

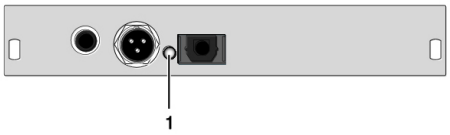
LED COLOR	DESCRIPTION
Red	Device ready
Violet	Connection and USB signal (interconnect) available
Green	Connection and video signal available
Light Blue	Connection, USB and video signal available (operating status)

2.7.2 STATUS UPGRADE MODULE DIGITAL AUDIO

LED 1: Digital Audio Status

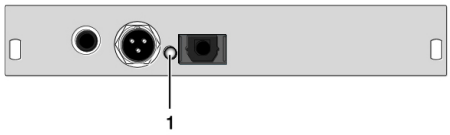
The upgrade module digital audio is fitted with a further multi-color LED on the rear side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

LED 1: DIGITAL AUDIO STATUS

LED COLOR	DESCRIPTION
Red	No signal
Light Blue	Static: CPU Unit: S/PDIF signal (RCA) available; Flashing: CPU Unit: Digital noise
Violet	Static: CPU Unit: AES/EBU signal (Mini-XLR) available; Flashing: CPU Unit: Digital noise
Blue	Static: CPU Unit: S/PDIF signal (TOSLINK) available; Flashing: CPU Unit: Digital noise
Green	CON Unit: Signal available

2.7.3 STATUS UPGRADE MODULE USB-HID

The upgrade module USB-HID is fitted with three further LEDs on the rear side for indication of the connection status.

CPU Module

Rear View

CON Module

Rear View

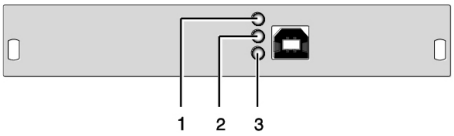
LEDS

POSITION	LED	STATUS	DESCRIPTION
1, 2	Device LED (orange)	Off	No USB-HID device or not supported
		Flashing fast	USB-HID device active
		On	USB-HID device ready or KVM Extender in command mode
3	Status LED (orange)	Off	• No power supply voltage • CPU Unit: KVM Extender in command mode or no connection • CON Unit: Keyboard in command mode
		Flashing slowly	CON Unit: KVM Extender in command mode or no connection
		Flashing fast	Operating status

2.7.4 STATUS UPGRADE MODULE USB 2.0 EMBEDDED

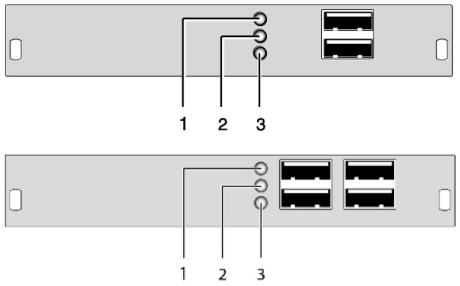
The upgrade module USB 2.0 embedded is fitted with three further LEDs on the rear side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

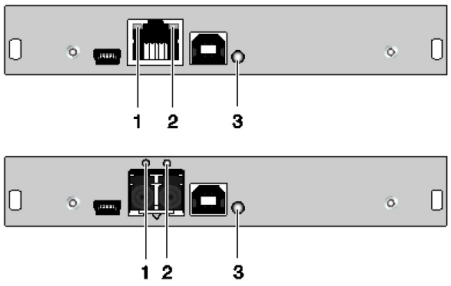
LEDS

POSITION	LED	STATUS	DESCRIPTION
1	Status LED (green)	Off	No USB 2.0 device connected
		Flashing slowly	USB 2.0 device connected
2	Status LED (green)	Off	No connection to source (computer, CPU) available
		Flashing slowly	• Connection to source (computer, CPU) available • No USB 2.0 device connected
		On	• Connection to source (computer, CPU) available • USB 2.0 device(s) connected
3	Status LED (green)	Off	No connection between CON and CPU module
		On	Connection between CON and CPU module available

2.7.5 STATUS UPGRADE MODULE USB 2.0 V1

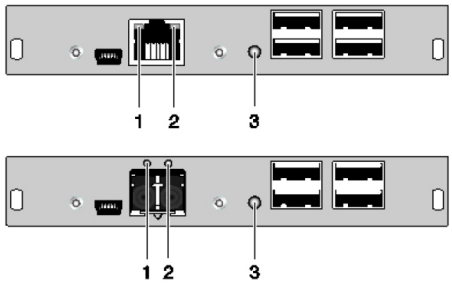
The upgrade module USB 2.0 is fitted with a multi color LED on both sides for overall status indication and with two further LEDs on the back side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

LEDS

POSITION	LED	STATUS	DESCRIPTION
1	Failure LED (green)	Off	Connection available
		On or Flashing	Connection failure (flashing for about 20 s following a connection failure)
2	Status LED (green)	Off	No connection via interconnect cable
		On	Connection available

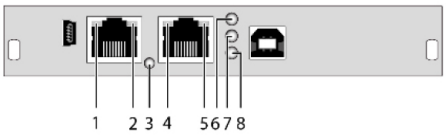
LED 3: USB 2.0 STATUS

LED COLOR	DESCRIPTION
Red	Device ready
Green	Only connection available, no USB 2.0 signal
Green/light blue flashing	Connection available, no USB 2.0 device connected
Light Blue	Connection and USB 2.0 signal available (operating status)

2.7.6 STATUS UPGRADE MODULE USB 2.0 V2

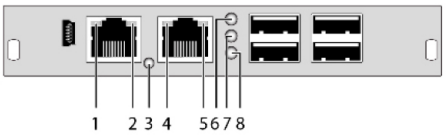
The upgrade module USB 2.0 is fitted with a multi color LED on both sides for overall status indication and with two further LEDs on the back side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

LEDS

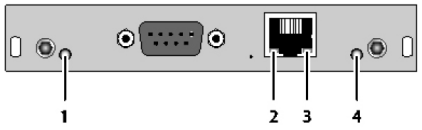
POSITION	LED	STATUS	DESCRIPTION
1, 4	Failure LED (green)	Off	Connection available
		On or flashing	Connection failure (flashing for about 20 s following a connection failure)
2, 5	Status LED (green)	Off	No connection via interconnect cable
		On	Connection available
6	Status LED (green)	Off	No USB 2.0 device connected
		Flashing slowly	USB 2.0 device connected
7	Status LED (green)	Off	No connection to source (computer, CPU) available
		Flashing slowly	• Connection to source (computer, CPU) available • No USB 2.0 device connected
		On	• Connection to source (computer, CPU) available • USB 2.0 device connected
9	Status LED (green)	Off	No connection between CON and CPU module
		On	Connection between CON and CPU module available

LED 3: USB 2.0 STATUS

LED COLOR	DESCRIPTION
Red	Device ready, no Matrix connection
Violet	Connection to Matrix available
Green	USB 1.1 connection available
Light Blue	USB 2.0 connection available
Blue	Debug mode

2.7.7 STATUS MONITORING MODULE SNMP

The monitoring module SNMP is fitted with a multi color LED on both sides for overall status indication and with two further LEDs for indication of the network status.



Rear view

STATUS LEDS OF THE SNMP BOARD

POSITION	LED	STATUS	DESCRIPTION
1	Status 1	White	SNMP board is in registration process
		Blue flashing	Registration of the SNMP board has started
		Red flashing	Registration in progress
		Green flashing	Operating condition
		Green	SNMP board de-registered
4	Status 2	White	SNMP board is in registration process

NOTE: Due to variations in LED type “white” might also appear as light purple or light blue.

STATUS LEDS OF THE NETWORK PORT

POSITION	LED	STATUS	DESCRIPTION
2	Link status (orange)	Off	Port not activated
		Flashing	Port activated, no connection via network cable
3	Link status (green)	Off	Port not activated
		Flashing	Port activated, no connection via network cable

3. INSTALLATION

3.1 PACKAGE CONTENTS

Your extender package contains the following items:

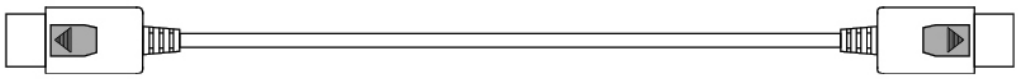
KVM Extender:

KVM Extender pair (CPU Unit and CON Unit) in the chassis

(1) (redundancy 2) 5-VDC international power supply unit per KVM Extender unit

(1) (redundancy 2x) country-specific power cord

DisplayPort™ video cable (2.0 m, DisplayPort male-to-male)



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

Additional content for upgrade module Analog Audio/Serial:

Serial cable (1.8 m, D-Sub 9 male connector)

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

Additional content for upgrade module Digital Audio:
RCA cable (2.5 m, Cinch male connector)

TOSLINK cable (1.8 m, F05 male connector)

Additional content for upgrade module USB-HID:
USB cable (1.8 m, USB type A to type B)

Additional content for upgrade module PS/2:
(2) PS/2 cables (1.8 m, 6-pole connector)

Additional content for upgrade module USB 2.0 embedded:
USB cable (1.8 m, USB type A to type B)

Additional content for upgrade module USB 2.0:

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

If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

3.2 SYSTEM SETUP

We recommend that first-time users set up 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.

3.2.1 KVM EXTENDER SETUP

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) to the CPU Unit with the supplied cables. Make sure that 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.

3.2.2 SETUP OF UPGRADE MODULES

The modules can be hot plugged.

Upgrade Module Analog Audio/Serial:

1. Connect the audio source to the CPU Unit (e.g. CPU audio output with audio input, CPU audio input with audio output).
2. Connect the audio output on the CON Unit to headphones or suitable speakers.
3. Connect the audio input on the CON Unit to a suitable microphone.

Upgrade Module Serial RS-422:

1. Connect the CPU to the CPU Unit by using the serial cable.
2. Connect the CON Unit to the serial connector of the input device.

Upgrade Module Digital Audio:

1. Connect the digital audio source to the audio input of the CPU Unit.
2. Connect the audio output of the CON Unit to suitable speakers or audio amplifiers.

NOTE: If several active sources are connected, Mini-XLR input takes priority. The audio signal is available at all outputs.

Upgrade Module Balanced Audio:

1. Connect the digital audio source to the balanced audio input of the CPU Unit.
2. Connect the audio output of the CON Unit to suitable speakers or audio amplifiers.

Upgrade Module USB-HID:

1. Connect the CPU to the CPU Unit (USB-HID 2).
2. Connect the USB-HID devices to the CON Unit (Connect to USB-HID devices 2).

Upgrade Module PS/2:

1. Connect the CPU to a CPU unit with cables for PS/2 devices.
2. Connect the PS/2 devices to the CON unit (Connector to PS/2 devices).

Upgrade Module USB 2.0 Embedded:

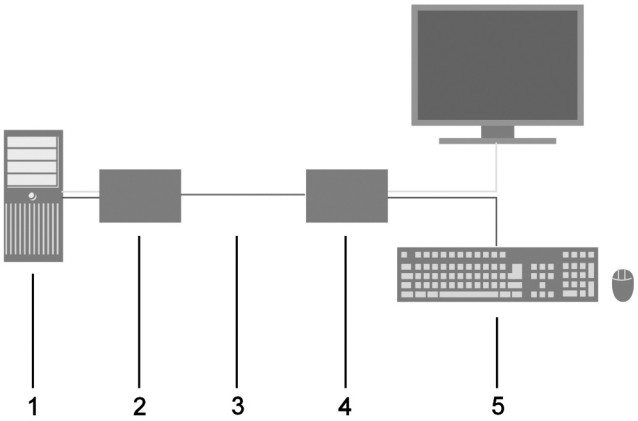
1. Connect the CPU to the CPU Unit (USB 2.0).
2. Connect the USB 2.0 devices to the CON Unit (Connect to USB 2.0 devices).

Upgrade Module USB 2.0:

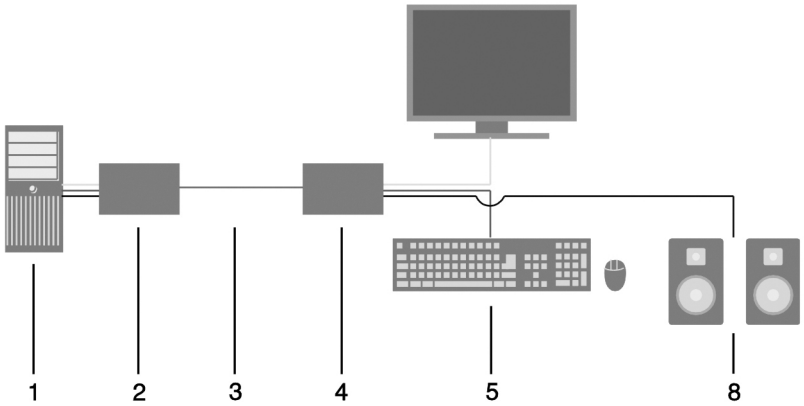
1. Connect the CPU to the CPU Unit (USB 2.0).
2. Connect the USB 2.0 devices to the CON Unit (Connect to USB 2.0 devices).

3.3 EXAMPLE APPLICATIONS

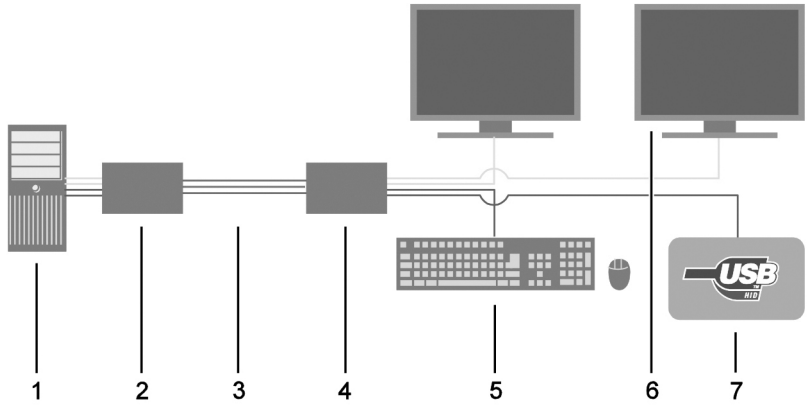
This section illustrates typical installations of KVM Extenders.



KVM EXTENDER (SINGLE-HEAD)



KVM EXTENDER (SINGLE-HEAD WITH DIGITAL/ANALOG AUDIO)



KVM EXTENDER (DUAL-HEAD WITH 4 USB-HID)

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 2x USB 2.0 devices)
8 Audio sink (optional, only with devices with Analog Audio/Serial option or Digital Audio option)

3.4 OVERVIEW UPGRADE MODULES

Section 2.3.4 lists available upgrade modules for the KVM Extender.

4. CONFIGURATION

4.1 TRANSMISSION PARAMETERS

The device operates with a proprietary compression method.

In the 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. In exceptional cases the displayed video image may exhibit “frame dropping” (loss of single pictures) or color effects.

4.2 DDC SETTINGS

By default, the device transmits the factory preset DDC information to the CPU. This information is suitable in most cases.

Downloading of the DDC information of the console monitor can be performed during normal operation.

For special requirements, DDC information can be retrieved and uploaded as a binary file to both the CPU Unit and the CON Unit.

Connect your computer with a USB mini cable to the service port of the CPU Unit or CON Unit.

The data area of the unit is now accessible as a flash drive “Extender.”

Uploading DDC Information

Copy the binary file containing your specific DDC information to the flash drive of the CPU Unit or CON Unit.

The current DDC information is replaced.

Retrieving DDC Information

Copy the file “DDC-EDID.bin” on the flash drive of the CPU Unit to your computer.

To open the binary file, you have to install a suitable software, e.g. WinDDCwrite, on your computer. Contact your dealer for this purpose.

Reset to Factory DDC Information

Delete the file called “DDC-EDID.bin” on the flash drive of the CPU Unit. By deleting this file, the factory DDC Information is restored.

4.3 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 Hotkey sequence. While in Command Mode, several functions are performed via keyboard commands. To exit Command Mode, press <Esc>.

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

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

If no keyboard command is executed within 10 s after activating Command Mode, it will be automatically deactivated.

The following table lists the keyboard commands to enter and to exit Command Mode and to change the Hotkey sequence.

KEYBOARD COMMANDS

FUNCTION	KEYBOARD COMMAND
Enter Command Mode (default)	2x <Left Shift> / (Hotkey)
Exit Command Mode	<Esc>
Change Hotkey sequence	<current Hotkey>, <c>, <new Hotkey code>, <Enter> Until 2011-30-09: <Left Ctrl> + <Left Shift> + <c>, <Hotkey Code>, <Enter>

<Key> + <Key> Press keys simultaneously

<Key>, <Key> Press keys successively

2x <Key> Press key quickly, twice in a row (similar to a mouse double-click)

The Hotkey sequence to enter Command Mode can be changed. The following table lists the Hotkey Codes for the available key sequences.

HOTKEY CODES

HOTKEY CODE	HOTKEY
0	Freely selectable (from 2012-01-12)
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>

Set freely selectable Hotkey (exemplary)

To set a freely-selectable Hotkey (e.g. 2x <Space>), use the following keyboard sequence:

<current Hotkey>, <c>, <0>, <Space>, <Enter>

Reset Hotkey

To set a Hotkey back to default settings of the extender, press the key combination <Right Shift> + <Del> within 5 s after plugging in a keyboard.

4.4 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 (computer, CPU) by two or more consoles within a KVM matrix.

The next table lists the keyboard commands for the configuration of USB-HID Ghosting.

CONFIGURATION COMMANDS FOR USB-HID GHOSTING

FUNCTION	KEYBOARD COMMAND
Writes the device descriptions of the input devices connected to the CON Unit into the CPU Unit. Activating the emulation in the CPU Unit.	<Hotkey>, <h>, <w>, <Enter>
Activates the emulation of already stored device descriptions in the CPU Unit	<Hotkey>, <h>, <e>, <Enter>
Deactivates 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 (computer, CPU).	<Hotkey, <h>, <d>, <Enter>
Deactivates 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 (computer, CPU).	<Hotkey, <h>, <r>, <Enter>

NOTE: When using a USB combo device as a USB-HID input device, switching to a CPU Unit with activated USB-HID Ghosting may cause limited functionality.

4.5 CONFIGURATION FILE

The KVM Extender contains a configuration file (Config.txt) to set specific parameters and to read out device and video information. You can find it on the flash drive of the KVM Extender. The flash drive can be opened by a mini USB connection to a computer.

The configuration file can be edited with all common text editors.

NOTE: After setting a parameter, the KVM Extender needs to be restarted.

NOTE: To ensure correct identification and acceptance of the parameters, the start command #CFG has to be written into the first line of the Config.txt file.

4.5.1 PARAMETERS FOR CPU UNITS

You can write the following parameters into the configuration file of a CPU Unit.

DDC MANAGEMENT

PARAMETER	FUNCTION
ENAHPDET	Enable hotplug switch for K238-5x series
LOCKEDID	Activate DDC write protection

DIGITAL AUDIO

PARAMETER	FUNCTION
SRC32000	Activate sample rate conversion, sample rate 32 kHz (only with digital audio upgrade module)
SRC44100	Activate sample rate conversion, sample rate 44.1 kHz (only with digital audio upgrade module)
SRC48000	Activate sample rate conversion, sample rate 48 kHz (only with digital audio upgrade module)
SRC96000	Activate sample rate conversion, sample rate 96 kHz (only with digital audio upgrade module)
SRC_NONE	Deactivate sample rate conversion (only with digital audio upgrade module)

COMPRESSION

PARAMETER	FUNCTION
MEDCPRATE	Activate medium compression rate
MINCPRATE	Activate low compression rate
MAXCPRATE	Activate high compression rate
ENADITHER	Activate dithering filter for Mac OS systems

SHARED OPERATION

PARAMETER	FUNCTION
RELEASETIME=n	Release timer n = 0...9 seconds for Mouse and Keyboard Connect, without parameter = 10 seconds

4.5.2 PARAMETERS FOR CON UNITS

You can write the following parameters into the configuration file of a CON Unit.

OUTPUT SETTINGS

PARAMETER	FUNCTION
1080p50Hz	Always display 50 Hz when using 1920 x 1080
DISEXTOSD	Deactivate extender OSD
ENAFRAME	Show orange colored frame when losing extender connection
ENAHOLDPIC	Show last transmitted picture highlighted by an orange colored frame when losing connection
ENALOSTMR	Activate LOS timer
ENADDCTX	Activate DDC transmission by unplugging and connecting the monitor back to the CON Unit
CENTERMODE	Simulate the native resolution of Dual-Link monitors by an additional black frame in order to enable Instant Switching.
PARAM=V	Simultaneous output of DVI-D and VGA signal
ENAAUDIO	Enable RS-232 or RS-422 and analog audio during video only connections

4.5.3 PARAMETERS FOR CPU UND CON UNITS

You have to write the following parameters into the configuration file of both CON Unit and CPU Unit.

LOCAL SWITCHING

PARAMETER	FUNCTION
BLANKSCR	Activate dark switching between local and remote console by keyboard or mouse event (only with HDMI extenders and local control by an USB-HID CON upgrade module)
PRIVATEMODE	Activate switching of video and control between local and remote console by keyboard commands (only with HDMI extenders and local control by an USB-HID CON upgrade module)

USB 2.0 EMBEDDED

PARAMETER	FUNCTION
ENAUSB11	Activate USB 1.1 mode for USB 2.0 embedded upgrade modules (only with USB 2.0 embedded upgrade module)
DISUSBAUD	Disable USB audio codec
ENAMICAMP	Activate microphone amplifier

5. OPERATION

5.1 DOWNLOAD OF DDC INFORMATION

By default, data from the internal DDC list is reported to the source (computer, CPU). If these are not optimal settings for the display device, the DDC information of the console monitor can be downloaded and stored internally. The devices have to be configured accordingly.

On all KVM Extenders with USB-HID support, the user can load the DDC information of the console monitor via keyboard command under operating conditions.

1. Enter Command Mode with the Hotkey.
2. Press the <a> key to download the DDC information of the console monitor.

   The screen will go black for a short time.

   At the same time Command Mode is closed and the keyboard LEDs return to previous status.
3. Restart the corresponding source (computer, CPU).

   The video mode has been readjusted. Screen quality should be optimal. The CPU should now show the console monitor as the current screen, together with the available video resolutions.

   The DDC information of the console monitor was loaded once. Reloading is possible by repeating the operation.

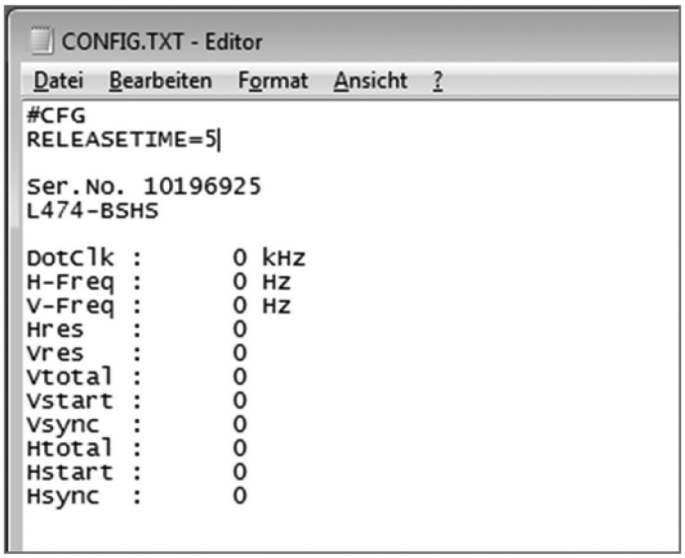
5.2 PARALLEL OPERATION OF REDUNDANT CPU UNITS

CPU Units with a redundant connector for interconnect cables offer the possibility for a competing control by two connected CON Units.

Taking over control is performed using a keyboard and/or mouse. The release timer function determines the release time of the input devices at one of the CON Units after that control can be taken over from the second CON Unit.

To configure a redundant CPU Unit for the operation with two parallel controlling CON Units, proceed as follows:

1. Connect a redundant CPU Unit to any source (computer, CPU) by using a mini USB connection.
2. Open the file “Config.txt” that is located on the appearing flash drive of the extender.
3. Activate the release timer by writing the parameter RELEASETIME=n into the second line. The variable “n” defines the time in seconds and has to be replaced by the numbers 0 to 9 (e.g. RELEASETIME=5). If this parameter is not activated at all, the release time is set to 2 seconds by default. The parameter RELEASETIME=X deactivates the shared operation.
4. Save your changes.
5. Reboot the CPU Unit.



EXAMPLE VIEW – CONFIG.TXT

NOTE: When using redundant CPU Units in combination with a KVM matrix, the function of competing control will be automatically deactivated in the extender and will have to be performed by the KVM matrix.

6. TROUBLESHOOTING

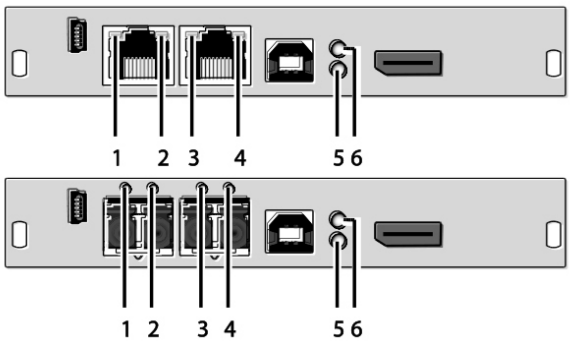
6.1 GENERAL FAILURES

GENERAL FAILURES

DIAGNOSIS	POSSIBLE REASON	MEASURE
Config.txt parameter without function	Parameter not set or saved	Write parameter into Config.txt file and save changes.
	Start Command #CFG not set	Write start command #CFG into first line of the Config.txt file.
	Parameter written incorrectly	Check correct spelling and capitalization.
	Extender not restarted	Restart extender.

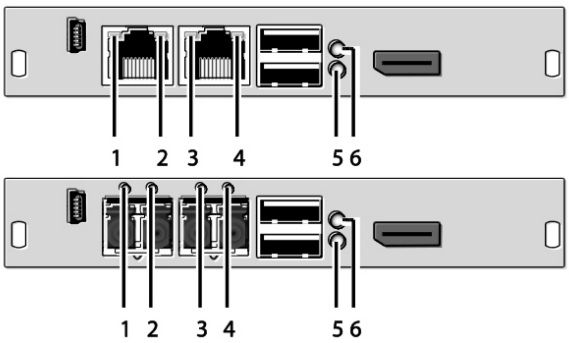
6.2 BLANK SCREEN

CPU Module



Rear View

CON Module



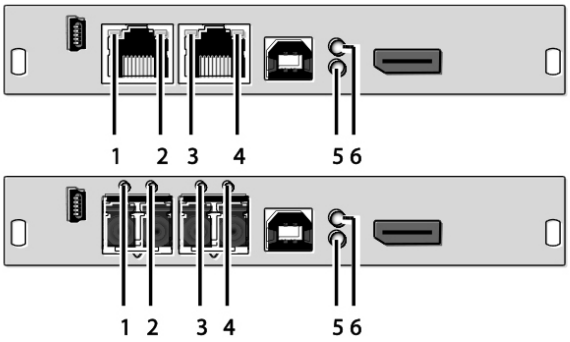
Rear View

BLANK SCREEN TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
LED 5, 6 off	Power supply	Check power supply units and the connection to the power network.
LED 1, 3 on or LED 2, 4 off	Connection between CON Unit and CPU Unit	Check interconnect cables and connections.
CPU Unit: LED 5, 6 red or violet	No video signal detected by source (computer, CPU)	• Check video cable to CPU • Download DDC information from console monitors (see Chapter 6.1, Page 54). • Reboot CPU if necessary.
CON Unit: LED 5, 6 red or violet	No monitor detected	Check connection, length and quality of the video 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. • Reboot CPU if necessary.

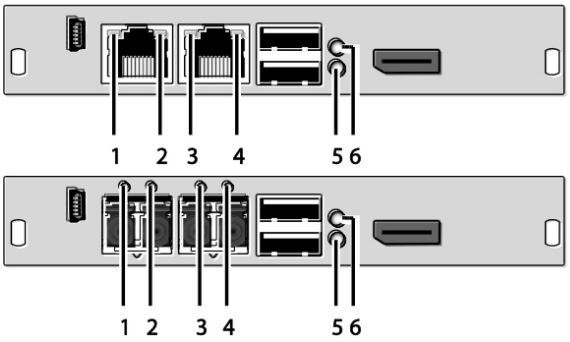
6.3 USB-HID

CPU Module



Rear View

CON Module



Rear View

USB-HID TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
Keyboard LEDs Shift and Scroll are blinking	Keyboard in Command Mode	Press <Esc> to leave Command Mode.
CPU Unit: LED 5, 6 green or violet	No USB connection to CPU	• Check connection of USB cable to CPU; select another USB port if necessary. • Remove USB and power cable and restart CPU. Connect power cable first.
CON Unit: LED 5, 6 greenor violet	Problems with USB connection	• Check connection of USB cable to USB-HID device. • Remove video and power cable and restart CON Unit. Connect power cable first.
USB device without function	No USB-HID device	Connect USB-HID device.
	USB-HID device is not supported	Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

6.4 SERIAL CONNECTION

SERIAL CONNECTION TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
Serial device not operational	Settings of the serial interface	Check Baud rate and general settings.
	No serial connection to CPU	Check connection via serial cable.
	No serial connection to end device (e.g. touch screen, keyboard)	• Connect serial end device and switch it on. • Check connection via serial cable.
Touch screen not operational	Hardware handshake	Adjust serial interface to X-ON/X-OFF software handshake.

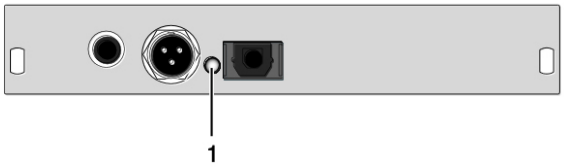
6.5 ANALOG AUDIO

ANALOG AUDIO TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
CON Unit: No signal at audio output	No audio connection to CPU/audio source	• Connect analog audio source. • Check audio cable.
	No Signal	• Switch analog audio source on. • Activate analog output at CPU/audio source.
	No audio connection to audio sink (e.g. speakers)	• Connect analog audio sink and switch it on. • Check connection of audio cable.
CPU Unit: No signal at audio output (microphone)	No audio connection to audio source (microphone)	• Connect analog audio source (microphone). • Check connection of audio cable.
	No signal	• Switch analog audio source on. • Activate analog output at audio source.
	No audio connection to audio sink (e.g. CPU)	• Check connection to CPU. • Check connection of audio cable. • Check audio configuration.

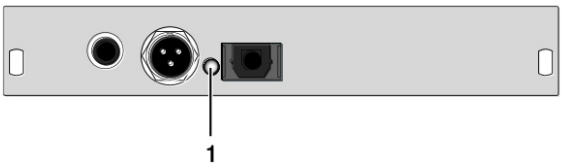
6.6 DIGITAL AUDIO

CPU Module



Rear View

CON Module



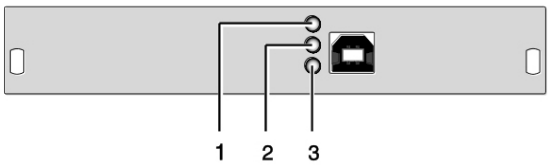
Rear View

DIGITAL AUDIO TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
CPU Unit: LED 1 red	No audio connection to CPU/audio source	• Connect digital audio source. • Check connection of audio cable.
	No signal	• Switch digital audio source on. • Activate digital output at CPU/audio source.
CON Unit: LED 1 red	No audio connection to audio sink (e.g. speakers)	• Connect digital audio sink. • Check connection of audio cable.
	No signal	Check signal at CPU Unit.
No signal/LEDs 1 OK	Digital Silence at active audio source	• Check LEDs at CPU Unit. • Check audio format. • Change audio input.

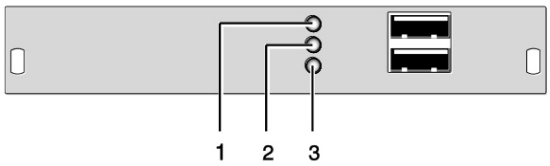
6.7 UPGRADE MODULE USB-HID

CPU Module



Rear View

CON Module



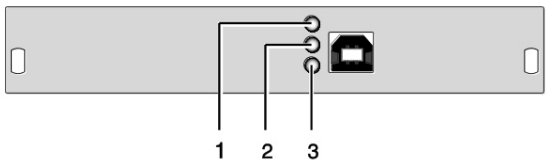
Rear View

UPGRADE MODULE USB-HID TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
LED 1/2 off	Device at higher/lower USB-HID port not detected	• Check connection of USB cable to USB-HID device. • Connect USB-HID device. • Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com
CPU Unit: LED 3 off	Connection between CON Unit and CPU Unit	Check interconnect cable and connectors.
CON Unit: LED 3 off	Keyboard in Command Mode	Press <Esc> to leave Command Mode.
CON Unit: LED 3 flashing slowly	Connection between CON Unit and CPU Unit	Check interconnect cable and connections.
	Keyboard in Command Mode	Press <Esc> to leave Command Mode.

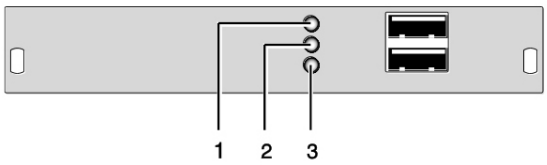
6.8 USB 2.0 EMBEDDED

CPU Module



Rear View

CON Module



Rear View

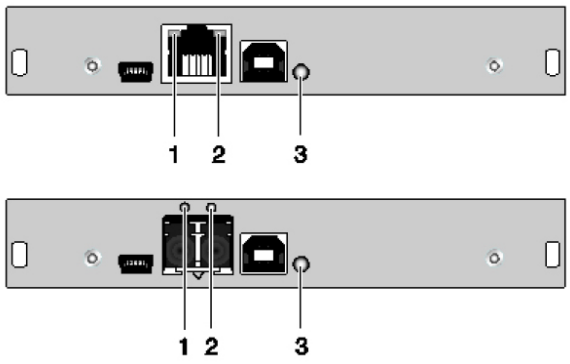
USB 2.0 EMBEDDED TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
CPU & CON Unit: LED 3 off	No connection to CPU	• Check connection USB cable to CPU; select another USB port if necessary. • Remove USB and power cable and restart CPU. Connect power cable first.
CPU & CON Unit: LED 2 off	No connection between CON Unit and CPU Unit	Check interconnect cable and connectors.
CPU & CON Unit: LED 2 off and USB 2.0 device without function	No USB 2.0 device	Connect USB 2.0 device.
	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 Black Box Technical Support at 877-877-2269 or info@blackbox.com

CHAPTER 6: TROUBLESHOOTING

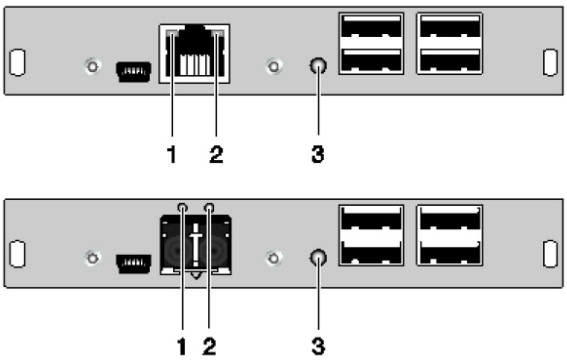
6.9 USB 2.0

CPU Module



Rear View

CON Module



Rear View

USB 2.0 TROUBLESHOOTING

DIAGNOSIS	POSSIBLE REASON	MEASURE
CPU Unit: All LEDs off	No connection to CPU	• Check connection USB cable to CPU; select another USB port if necessary. • Remove USB and power cable and restart CPU. Connect power cable first.
CON Unit: LED 3 red	Connection between CON Unit and CPU Unit	Check interconnect cable and connectors.
CON Unit: LED 3 flashing green/ light blue and USB 2.0 device without function	No USB 2.0 device	Connect USB 2.0 device.
	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 Black Box Technical Support at 877-877-2269 or info@blackbox.com

CHAPTER 7: TECHNICAL SUPPORT

7. TECHNICAL SUPPORT

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

7.1 SUPPORT CHECKLIST

To efficiently handle your request it is necessary that you complete a support request checklist. Make sure 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 device)
- Date and number of sales receipt
- Nature, circumstances and duration of the problem
- Components included in the system (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

7.2 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 that 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.

APPENDIX A: REGULATORY INFORMATION

APPENDIX A. REGULATORY INFORMATION

A.1 FCC CLASS A STATEMENT

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.

A.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.

APPENDIX A: REGULATORY INFORMATION

A.3 ROHS 2

This device complies with the Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2, RoHS II). The device labels carry a respective marking.

A.4 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

APPENDIX B: GLOSSARY

APPENDIX B. GLOSSARY

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

AES/EBU: Digital audio standard that is officially known as AES3 and that is used for carrying digital audio signals between devices.

CATx: Any CAT5e (CAT6, CAT7) cable

CGA: Color Graphics Adapter (CGA) is an old analog graphic standard with up to 16 displayable colors and a maximum resolution of 640 x 400 pixels.

Component Video: 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: Composite Video is also called CVBS 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)

Console: Keyboard, mouse and monitor

CPU Unit: Component of a KVM Extender or Media Extender to connect to a source (computer, CPU)

CVBS: The analog color video baseband signal (CVBS) is also called Composite Video and it is part of the PAL TV standard.

DDC: 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.

DisplayPort™: A VESA standardized interface for an all-digital transmission of audio and video data. It is differentiated between the DisplayPort standards 1.1 and 1.2. The signals have LVDS level.

Dual Access: A system to operate a source (computer, CPU) from two consoles.

Dual Link: A DVI-D interface for resolutions up to 2560 x 2048 by signal transmission of up to 330 MPixel/s (24-bit).

Dual-Head: A system with two video connections.

DVI: Digital video standard, introduced by the Digital Display Working Group (http://www.ddwg.org). Single Link and Dual Link standard are distinguished. The signals have TMDS level.

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).

EGA: The Enhanced Graphics Adapter (EGA) is an old analog graphic standard, introduced by IBM in 1984. A DB9 connector is used for connection.

Fiber: Singlemode or multimode fiber cables.

HDMI: An interface for an all-digital transmission of audio and video data. It is differentiated between the HDMI standards 1.0 to 1.4a. The signals have TMDS level.

KVM: Keyboard, video, and mouse

Mini-XLR: Industrial standard for electrical plug connections (3-pole) for the transmission of digital audio and control signals

Multimode: 62.5µ multimode fiber cable or 50µ multimode 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 non-standard plug connection for transmission of electrical audio and video signals, especially with coaxial cables

S/PDIF: A digital audio interconnect that is used in consumer audio equipment over relatively short distances.

SFP: SFPs (Small Form Factor Pluggable) are pluggable interface modules for Gigabit connections. SFP modules are available for CATx and fiber interconnect cables.

Single-Link: A DVI-D interface for resolutions up to 1920 x 1200 by signal transmission of up to 165 MPixel/s (24-bit). Alternative frequencies are Full HD (1080p), 2K HD (2048 x 1080) and 2048 x 1152.

Single-Head: A system with one video connection

Singlemode: 9 µ singlemode fiber cable

APPENDIX B: GLOSSARY

S-Video (Y/C): S-Video (Y/C) is a video format transmitting luminance and chrominance signals separately. Thereby it has a higher quality standard than CVBS.

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 touchscreens. Storage, video, and audio devices are not HID.

VGA: Video Graphics Array (VGA) is a computer graphics standard with a typical resolution of 640 x 480 pixels and up to 262,144 colors. It can be seen as a follower of the graphics standards MDA, CGA, and EGA.

DISCLAIMER/TRADEMARKS

DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

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