

KD-S4x1X-3

4x1 4K 18G HDMI Switcher with
Auto-Switching, Analog & Digital Audio De-Embed

Operating Instructions



4K
@60Hz

18G

444

HDMI[®]
HIGH DEFINITION MULTIMEDIA INTERFACE

Key digital[®]

Engineered for Your Success[™]

Table of Contents

Introduction	1
Quick Setup Guide	2
Application Example	2
Front & Rear Panel Connections, Buttons, and LEDs	3
IR Remote Control	8
RS-232 Commands & Protocol	9
Specifications	11
Important Product Warnings & Safety Instructions:	12
Contacting Key Digital®	13
Warranty Information.	13

Visit product pages for most recent version of the manual, quick setup guide, firmware, control drivers and all additional downloads.



KD-S4x1X-3

Always follow the instructions provided in this Operating Manual.

➤ **Note:** Please visit www.keydigital.com for the latest product documentation and software downloads. Product features and specifications are subject to change without notice.

Introduction

Key Digital® KD-S4x1X-3 are 4K/18G HDMI switchers engineered to offer the best in quality, performance, and reliability, while providing a cost-effective HDMI switching solution. Designed for professional audio video installations in presentation, theater, and gaming spaces, KDS4x1X-2 enables multiple video sources to connect to a single video display while L/R analog and Optical audio de-embed ports may be used to feed audio of the selected source into amplifiers, DSPs, or sound bars. Enable auto-switching to automatically select newly connected/powered sources or sequentially advance from the currently selected source when it is disconnected/powered off. KD-S4x1X-3 HDMI switchers support all SD, HD, VESA and Ultra HD/4K video standards with HDR header information included in a variety of 4K EDID handshakes. The switchers feature push button and optical IR switching, status-monitoring LEDs, and support of HDR10, HDCP 2.2 and 4K.

Key Features

- **HDMI Switching:** 4 HDMI sources to 1 HDMI output/display
- **Ultra HD/4K Support:** 4096x2160 or 3840x2160 24/25/30/60hz at 4:4:4 (signals up to 18Gbps)
- **HDCP Licensing:** Fully licensed and compatible with HDCP 2.2
- **HDR10 (High Dynamic Range):** More life-like images through a greater range of luminance levels
- **Resolution Support:** Supports all SD, HD, and VESA (VGA, SVGA, XGA, WXGA, SXGA, UXGA) up to 4096x2160p.
- **Deep Color Support:** Up to UHD/4K 30Hz 4:4:4/12 bits or 60Hz 4:4:4/8 bit
- **Audio De-embedding:** Audio of the selected HDMI input is output at the digital Optical and analog 3.5mm stereo connectors
- **Auto-Switching:** Automatic selection of newly detected source and switching from newly disconnected source via hot plug detection voltage when enabled
- **Full Buffer System™:** Manages TMDS re-clocking / signal re-generation, HDCP authentication to source & display, and EDID Control handshake
- **EDID Management:** Internal library with 15 internal EDID handshakes including 4K with HDR in addition to native EDID data copied from the output/display
- **Lossless Compressed Digital Audio:** Dolby® TrueHD, Dolby® Digital Plus, DTS-HD Master Audio™, and Dolby® Atmos
- **CEC Pass-thru:** From connected display to selected HDMI source
- **Control:** Front panel button, optical IR, RS-232 via Micro USB Port and included adapter cable
- **Control System Support:** Compass Control® Pro ready. Fully controllable by all IR, and RS-232 supported control systems via open API.

Included Accessories

- Power Supply: SK01T-0500100Z 5V/1A DC power jack, screw-in type
- IR Remote Control: KD-RMSWPROK
- Mounting Brackets: 2 L-shaped
- Control Cable: 6ft RS-232 3.5mm TRS to Micro USB, KD-S2X1XUSB2RS

Quick Setup Guide

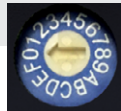
CONNECT:

Test for proper operation of the unit and cables in your system before permanently securing the unit for final installation. Ensure that you leave enough ventilation space to provide sufficient airflow and cooling.

1. Begin with the KD-S4x1X-3 unit and all input/output devices turned off with power and CAT cables removed
2. Connect your HDMI sources to the input ports of KD-S4x1X-3 unit
3. Connect your HDMI display to the output port of KD-S4x1X-3 unit
4. **BEFORE** connecting power supply to power outlet, screw-in the power supply to the KD-S4x1X-3 unit
5. Connect the analog and/or digital audio amplifiers/receivers via the analog 3.5mm and optical outputs
6. If connecting from control system or BrightSign player, connect supplied USB Micro to RS-232 adapter.
7. After all connections are made, plug-in power supply to power outlet
8. Power on input and output devices

CONFIGURE:

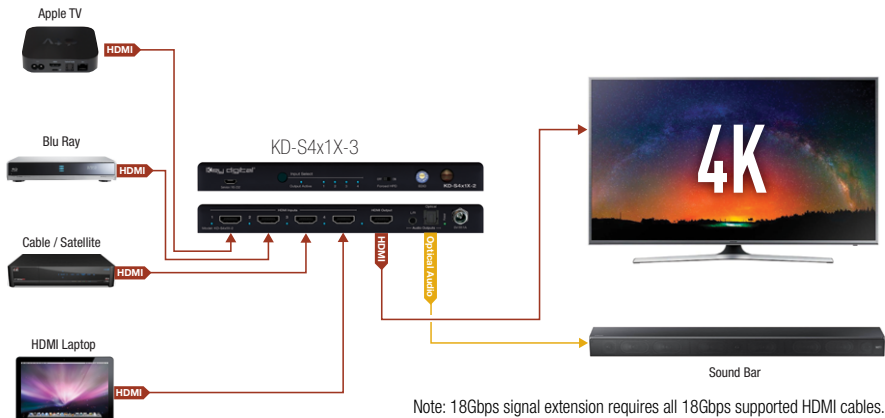
- The default EDID handshake is 4Kx2K@60, 18G, HDR, 2ch audio. Use the EDID rotary dial to choose the desired handshake that will be provided to the connected sources.
- If Auto Switching is desired, enable via the IR remote or RS-232 command.



CONTROL:

- Switch KD-S2x1X/KD-S4x1X via front panel button, IR remote or via RS-232.

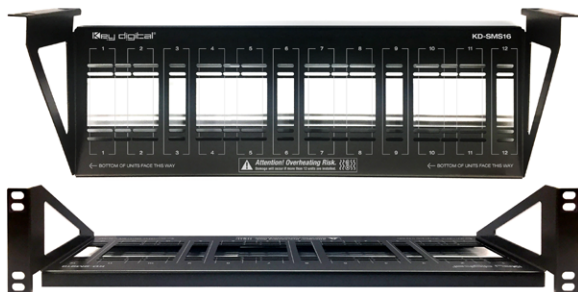
Application Example



Note: 18Gbps signal extension requires all 18Gbps supported HDMI cables.

Rack Mounting:

In addition to mounting with the supplied L-Brackets, multiple KD-S4x1X-3 may be mounted in KD-SMS16 using the side mounting screws. KD-SMS16 is a mounting shelf for Key Digital units with side mounting screw spacing of 2.912", 2.582", or 2.252"



Do NOT exceed 12 units as doing so will result in unit damage by overheating.

Front & Rear Panel Connections, Buttons, and LEDs

REAR PANEL



HDMI Inputs

- The 4 HDMI inputs are located on the left side of the back panel.
- Blue LED illuminates solid to indicate an active HDMI signal is incoming.



HDMI Output

- 1 HDMI located on the center to right side of the back panel.
- Blue LED illuminates solid when Hot Plug Detection (HPD) is received from the connected display/output device

HDMI Input/Output Port Specifications

- › Supports up to UHD/4K @ 50/60 fps [4:4:4], 18Gbps signals
- › See Supported standard 4K Video Formats table
- › Supports HDR10
- › Compliant with HDCP 2.2 and previous
- › Supports lossless compressed audio formats including Dolby® TrueHD, Dolby® Digital Plus, Dolby Atmos®, and DTS-HD Master Audio™
- › CEC pass-through to selected HDMI source
- › For Display Port sources/monitors, use active converters

Supported standard 4K Video Formats:

	Resolution	Bandwidth
1	4K@24/25/30 [4:4:4] 8bit	< 10.2Gbps
2	4K@24/25/30 [4:2:2] 8/10/12bit	< 10.2Gbps
3	4K@50/60 [4:2:0] 8bit	< 10.2Gbps
4	4K@24/25/30 [4:4:4] 10/12bit	< 18Gbps
5	4K@50/60 [4:2:2] 8/10/12bit	< 18Gbps
6	4K@50/60 [4:2:0] 10/12bit	< 18Gbps
7	4K@50/60 [4:4:4] 8bit	< 18Gbps



Analog L/R Audio Output

- › 3.5mm stereo jack with de-embedded audio from the selected HDMI source
- › Automatically mutes if audio formatting is not PCM 2ch



Optical Audio Output

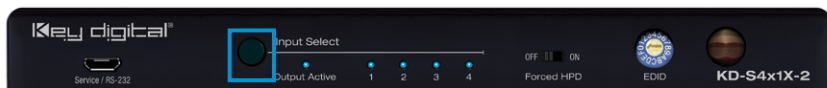
- › Optical audio output with de-embedded audio from the selected HDMI source
- › SPDIF IEC 60958 format
- › Supports multi-channel Dolby® and DTS™ surround formats up to 5.1
- › Automatically mutes if audio formatting is not PCM, Dolby®, or DTS™

Audio Ports Specifications

- › Each audio output drives audio signals up to 2VRMS with a sampling rate of 192KHz
- › There are no volume or tone control features
- › There are no DSP features

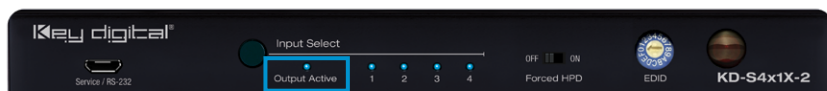
Audio Input Signal Format	Audio L/R Output	Digital Audio Output (Optical)
2ch PCM	Pass-Through	Pass-Through
Multi-Channel PCM	Front L/R Pass-Through	MUTE
Dolby DTS	MUTE	Pass-Through
HD Audio	MUTE	MUTE

FRONT PANEL



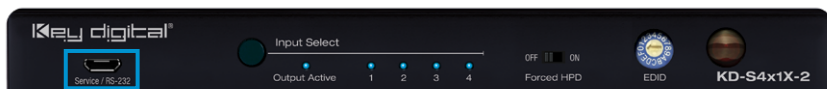
Input Select button

- › Used to choose which connected source is output to the connected display/device
- › Selecting a source with the Input Select button or IR remote will disable Auto Sensing Mode
- › **To factory reset the unit**, press and hold for approx. 10 seconds until the front LEDs blink twice



Output Active LED

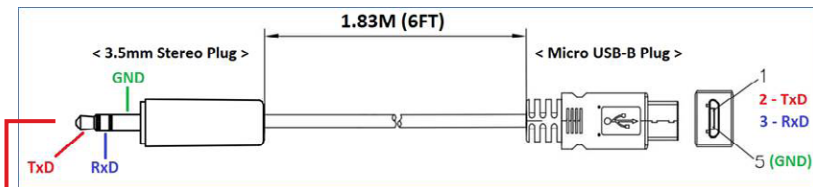
- › Blue LED illuminates solid when Hot Plug Detection (HPD) is received from the connected display/output device



Micro USB port

- › Used for RS-232 configuration and control from PC or control system
- › Used for firmware updates (consult with Key Digital tech support before updating firmware)

- » Supports USB driver for Windows 10, 7, XP, Mac, Linux
- » Will register as "Prolific USB-to-Serial Comm Port in Device Manager
- » Can be used as RS-232 control port. Baud rate is 57,600.
- » Use included 3.5mm TRS to Micro USB-B cable:

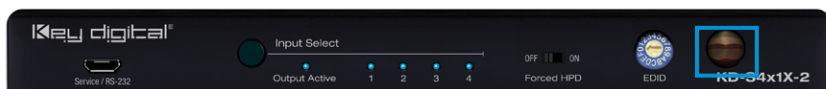


Brightsign Player -
XT1144



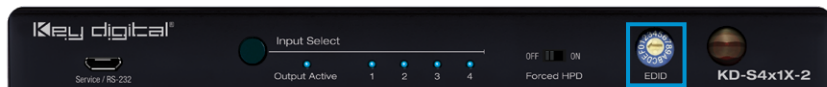
Forced HPD Troubleshooting Tool

- » When ON, Hot Plug Detection voltage is fixed on to the connected display
- » Standard HPD behavior when set to OFF position



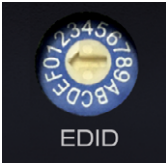
IR Sensor

- » Used to collect line-of-sight IR from remote control
- » Receives signals from a 90° angle at up to 30ft away.
- » Mount an IR emitter from Compass Control Pro or to control by another professional control system



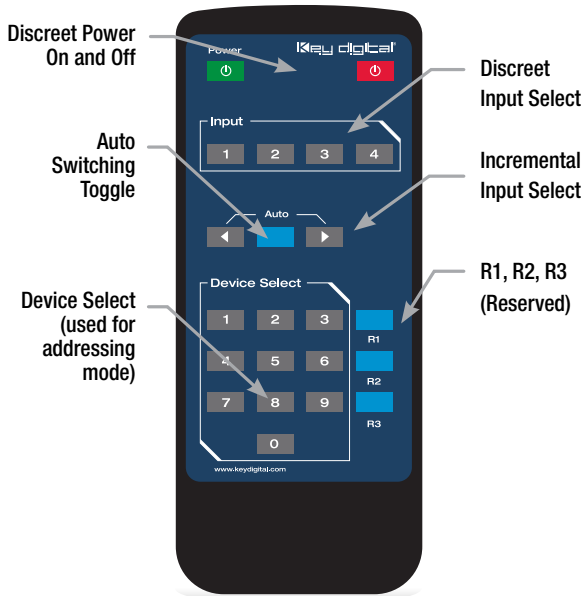
EDID Handshaking Rotary

- » EDID authentication is provided from the unit to the connected inputs/sources.
- » The EDID file (AKA “handshake”) is selected using the EDID rotary on the unit and provides a list of compatible video and audio formats as well as digital data, informing the source device what it should output.
- » Most sources will comply with a new EDID file without a power-cycle, but devices do behave differently
 - » Adjustments may speed up sync time during source selection.

Position	EDID Handshake Description	EDID Rotary
0	Copy EDID from HDMI Output	 <p>Note: Default position is “A”</p> <p>IMPORTANT: Please apply light pressure to the EDID rotary when making your selection.</p>
1	1920x1080p, 2CH AUDIO	
2	1920x 1080p, DOLBY/DTS 5.1	
3	1920x 1080p, HD AUDIO	
4	1920x 1200p, 2CH AUDIO	
5	1920x 1200p, DOLBY/DTS 5.1	
6	1920x 1200p, HD AUDIO	
7	4Kx2K@60, 10.2G, HDR, 2CH AUDIO	
8	4Kx2K@60, 10.2G, HDR, DOLBY/DTS 5.1	
9	4Kx2K@60, 10.2G, HDR, HD AUDIO	
A	4Kx2K@60, 18G, HDR, 2CH AUDIO	
B	4Kx2K@60, 18G, HDR, DOLBY/DTS 5.1	
C	4Kx2K@60, 18G, HDR, HD AUDIO	
D	1280x720p@60 DVI	
E	1920x1080p@60 DVI	
F	1920x1080i, 2CH AUDIO	

IR Remote Control

Model: KDRMSWPROK (uses CR2025 battery). Please note that some remote buttons may have no functionality.



Auto Switching Mode

- When enabled, a newly detected active source is automatically selected.
- If current source is disconnected or becomes inactive, switch sequentially advances to an active input/source.
- Manual source selection via push-button, IR, or RS-232 is still possible when enabled.
- Auto Switching mode is only disabled via IR or RS-232. It is not disabled via manual source switching/selection.

RS-232 Commands & Protocol

KD-S4x1X-3 allow control over serial interface for bi-directional communication.

Use the included 3.5mm TRS to Micro USB cable to control from your control system or BrightSign player.

Connection Protocol:

- › Baud Rate = 57,600 bits per second
- › Data Bits = 8, Stop Bits = 1
- › Parity = Non, Flow Control = None
- › Carriage Return: Required at end of string

Notes:

- › Commands are not case-sensitive
- › Spaces are shown for clarity; commands should NOT have any spaces
- › After a new command is received, a prompt should be sent back

KD-S4x1X-3 Help Command (H). Returns entire API in readable format:

```
KD-S4x1X-3> H
-----
--                               Key Digital Systems HELP                               --
-----
-- KD-S4x1X-3                               F/W Version : 1.01                       --
--
-- H           : Help
-- STA        : Show Global System Status
--
-- Video Output Setup Commands: yy = [01-04,U,D]
-- SPO SI yy   : Set Output to Video Input yy
-- SPO01 SI yy : Set Output to Video Input yy
--
-- System Control Setup Commands:
-- SPC AS x    : Set Auto Sensing Mode x = [0=OFF,1=ON] --
-- SPC FB E/D  : Enable/Disable Front Input Select Button
--
-----
```

KD-S4x1X-3 Status Command (STA). Returns unit status and settings in readable format:

```
KD-S4x1X-3> STA
-----
--                               Key Digital Systems STATUS                               --
-----
-- KD-S4x1X-3                               F/W Version : 1.01                       --
--
-- Front Input Select Button : Enabled
-- Auto Sensing Mode       : OFF
--
-- Video Input 01 : EDID = DEFAULT A, LINK = ON
-- Video Input 02 : EDID = DEFAULT A, LINK = OFF
-- Video Input 03 : EDID = DEFAULT A, LINK = ON
-- Video Input 04 : EDID = DEFAULT A, LINK = OFF
--
-- Video Output   : Input = 01, LINK = ON , HPD = OFF
--
-----
```

Specifications

Technical:

- › Input (Each): HDMI Connector, Type A, 19 Pin Female
- › Output: HDMI Connector, Type A, 19 Pin Female
- › Bandwidth: TMDS bandwidth 18 Gbps
- › DDC Signal (Data): Input DDC Signal - 5 Volts p-p (TTL)
- › HDMI Video/Audio Signal: Input Video Signal - 1.2 Volts p-p
- › Power Supply: SK01T-0500100Z 5V/1A DC power jack, screw-in type

General:

- › Regulation: CE, RoHS, WEEE
- › Enclosure: Black Metal
- › Product:
 - » 7.7 x 3.5 x 0.8" (197 x 90 x 20mm), 0.9 lb
- › Packaging:
 - » 9.4 x 5.6 x 3.1" (240 x 144 x 80mm), 1.3 lb

Important Product Warnings:

1. Connect all cables before providing power to the unit.
2. Test for proper operation before securing unit behind walls or in hard to access spaces.
3. If installing the unit into wall or mounting bracket into sheet-rock, provide proper screw support with bolts or sheet-rock anchors.

Safety Instructions:

Please be sure to follow these instructions for safe operation of your unit.

1. Read and follow all instructions.
2. Heed all warnings.
3. Do not use this device near water.
4. Clean only with dry cloth.
5. Install in accordance with the manufacturer's instructions.
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
7. Only use attachments/accessories specified by the manufacturer.
8. Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way including:
 - » Damage to the power supply or power plug
 - » Exposure to rain or moisture

Power Supply Use:

You **MUST** use the Power Supply **PROVIDED** with your unit or you **VOID** the Key Digital® Warranty and risk damage to your unit and associated equipment.

Contacting Key Digital®

Technical Support

For technical questions about using Key Digital® products, please contact us at:

- › Phone: 914-667-9700
- › E-mail: tech@keydigital.com

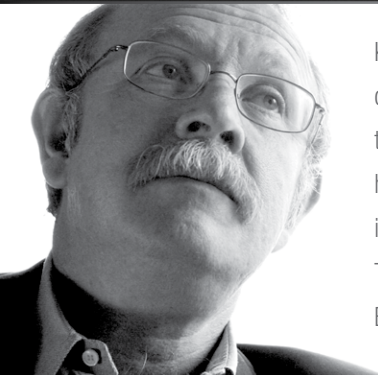
Repairs and Warranty Service

Should your product require warranty service or repair, please obtain a Key Digital® Return Material Authorization (RMA) number by contacting us at:

- › Phone: 914-667-9700
- › E-mail: rma@keydigital.com

Warranty Information

All Key Digital® products are built to high manufacturing standards and should provide years of trouble-free operation. They are backed by a Key Digital Limited 3 Year Product Warranty Policy. <http://www.keydigital.com/warranty.htm>



Key Digital®, led by digital video pioneer Mike Tsinberg, develops and manufactures high quality, cutting-edge technology solutions for virtually all applications where high-end video and control are important. Key Digital® is at the forefront of the video industry for Home Theater Retailers, Custom Installers, System Integrators, Broadcasters, Manufacturers, and Consumers.

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