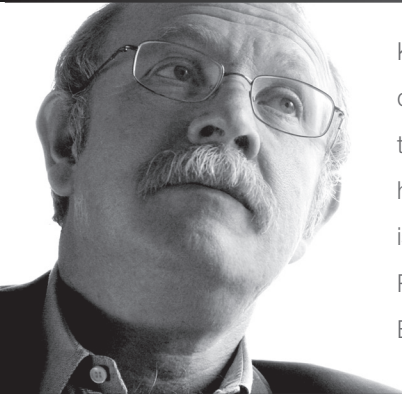


KD-4x4CSA KD-8x8CSA

4/8 Inputs to 4/8 Outputs HDMI Matrix Switchers with Audio De-embedding of Analog L/R Balanced/Unbalanced & Digital Coaxial Audio, supports Ultra HD/4K & HDCP 2.2

Operating Instructions



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.



KD-4x4CSA



KD-8x8CSA

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About KD-4x4CSA/KD-8x8CSA

Key Digital's KD-4x4CSA/KD-8x8CSA switchers are designed and engineered to offer the best in quality, performance, and reliability, while providing a cost-effective HDMI switching solution. The KD-4x4CSA/KD-8x8CSA HDMI matrix switchers are capable of switching 4/8 independent Inputs/ Sources to 4/8 independent Outputs/Zones and feature de-embedding of HDMI audio for external distribution. KD-4x4CSA/KD-8x8CSA support all SD, HD, VESA and Ultra HD/4K video standards, including UHD/4K, 1080p/60, 1920x1200, 3D, and HDCP 2.2.

Key Features

- › **HDMI Matrix Switching:** 4/8 HDMI sources to 4/8 HDMI outputs
- › **HDCP Licensing:** Fully licensed and compatible with HDCP 2.2
- › **Resolution Support:** Supports all SD, HD, and VESA (VGA, SVGA, XGA, WXGA, SXGA, UXGA).
- › **Ultra HD/4K Support:** 4096x2160 or 3840x2160 30Hz at 4:4:4 and 60Hz at 4:2:0
- › **HDR (High Dynamic Range):** More life-like images through a greater range of luminance levels
- › **Deep Color Support:** Up to UHD/4K 30Hz 4:2:2/12 bits or 60Hz 4:2:0/8 bit
- › **Audio De-Embedder:** Audio from the selected HDMI input is de-embedded through the Coax digital (PCM) or Analog L/R Balanced/Unbalanced
- › **3D Ready:** Capability to pass 3D stereoscopic signal formats
- › **Full Buffer System™:** Manages TMDS re-clocking / signal re-generation, HDCP authentication to source & display, and EDID Control handshake
- › **EDID:** Internal library with 15 default EDID configurations for input, in addition to native EDID data for any Output/Display
- › **TMDS re-clocking:** Support for long HDMI connectivity using Key Digital® HDMI cables
- › **Lossless Compressed Digital Audio:** Dolby® TrueHD, Dolby® Digital Plus, DTS-HD Master Audio™, and Dolby Atmos
- › **Control:** Front panel buttons/LEDs, Serial IR, Optical IR, RS-232 Control, and TCP/IP Control
- › **Control System Support:** Key Digital app ready. Compass Control ready. Fully controllable by all IR, RS-232, and TCP/IP supported control systems via open API.

Accessories

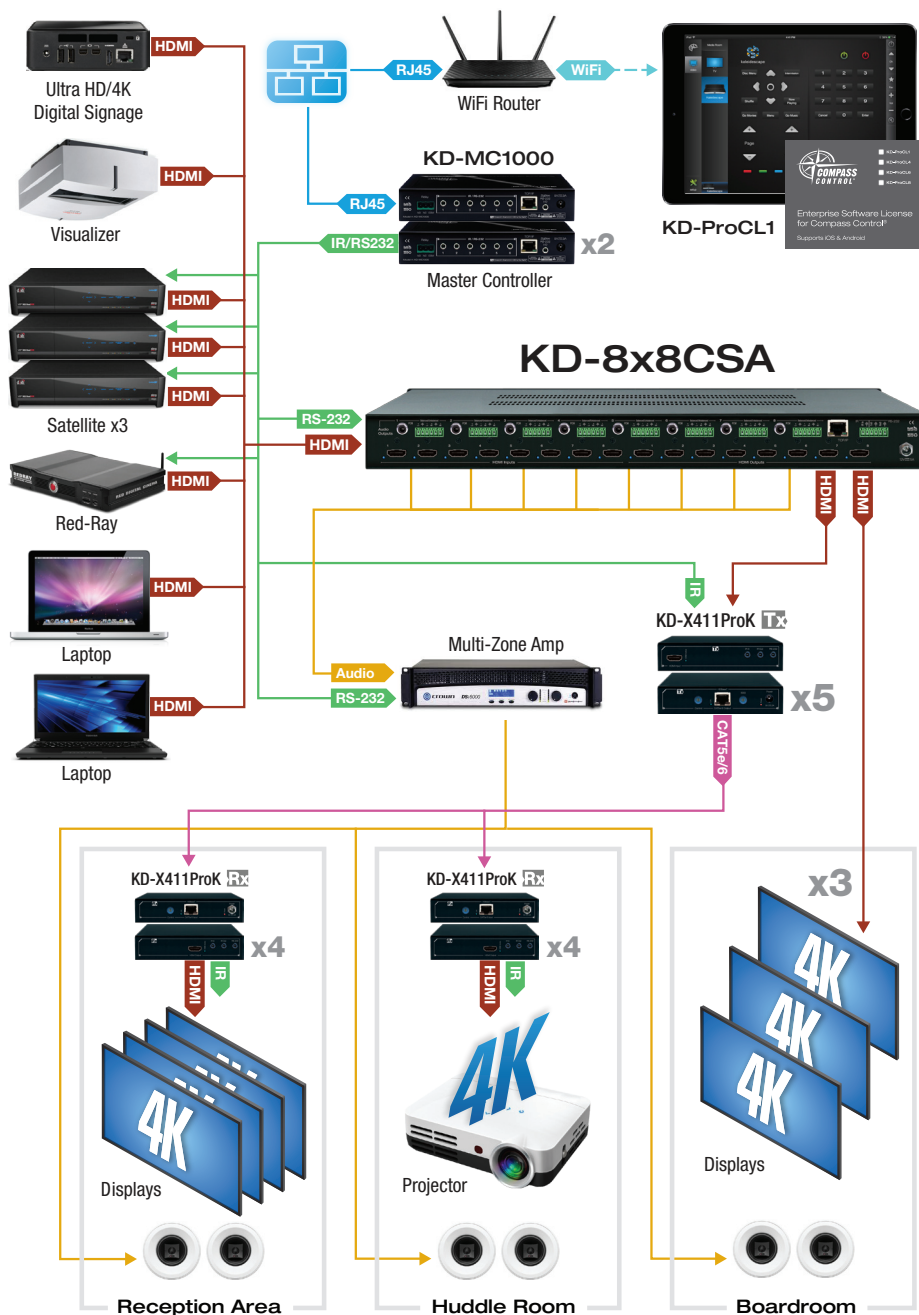
- › Power Supply:
 - » KD-4x4CSA - KD-PS12V2A 12V/2A DC Power Jack, Screw In Type
 - » KD-8x8CSA - KD-PS12V5A 12V/5A DC Power Jack, Screw-In Type
- › Rack Ears
- › Remote Control
- › 5/9 6-Pin Terminal Blocks

Rack Mounting:

- › Secure the rack ears to each side of the KD-4x4CSA/KD-8x8CSA with the supplied hardware and then fasten the unit to the rack rails with the included machine screws.

Always follow the instructions provided in this Operating Manual.
Please check the Key Digital Website for the most up-to-date Manual.

Application Example



Quick Setup Guide

- › Step 1: Find a safe and convenient location to mount or place KD-4x4CSA/KD-8x8CSA unit
- › Step 2: Begin with the KD-4x4CSA/KD-8x8CSA unit and all input/output devices turned off with power cables removed
- › Step 3: Connect your HDMI sources to the input ports of KD-4x4CSA/KD-8x8CSA unit
- › Step 4: Connect your HDMI displays to the output ports of KD-4x4CSA/KD-8x8CSA unit
- › Step 5: **Before connecting power supply to power outlet, screw-in the power supply to the KD-4x4CSA/KD-8x8CSA unit**
- › Step 6: After all connections are made, plug-in power supply to power outlet
- › Step 7: Power on input/output devices
- › Step 8: Operate the KD-4x4CSA/KD-8x8CSA switcher via front panel buttons, Serial IR, Optical IR, RS-232, and TCP/IP Control.

Installation and Operation

Before permanently securing the unit for final installation, test for proper operation of the unit and cables in your system. It is recommended that you leave enough ventilation space to provide sufficient airflow and cooling.

Push Button Control

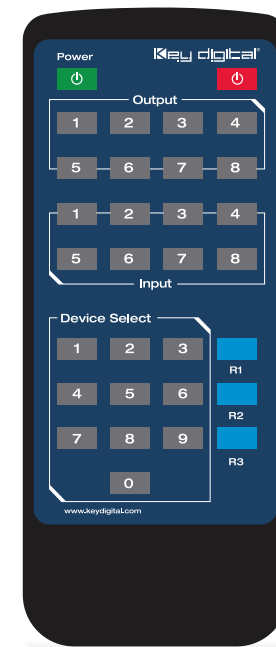
The KD-4x4CSA/KD-8x8CSA unit may be controlled via the push buttons on the front of the unit. Choose which output to change and then select the desired input by pressing the corresponding "Input Select" button. The front LED indicators (1, 2, 3, 4/5, 6, 7, 8) correspond to the input that has been selected for each output.

IR Remote Control

The KD-4x4CSA/KD-8x8CSA may also be operated using the IR Remote provided with the unit (The remote is powered by a CR2025 Battery). The KD-4x4CSA/KD-8x8CSA switcher features an IR sensor on the front of the unit for reception of signals.

IR Emitter Control

The IR Sensor on the front panel may also accept signals from a Compass Control Master Controller or from a 3rd party control system. When using a Master Controller or 3rd party control system, the IR Emitter must be mounted over the IR Sensor on the front of the KD-4x4CSA/KD-8x8CSA unit. The other end of the cable is connected to the Multi-function I/O port on the Master Controller or the IR Extender/IR Connecting Block of the 3rd party control system.



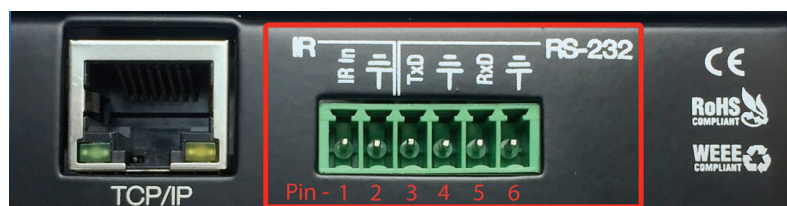
Serial IR, RS-232, and TCP/IP Control

The KD-4x4CSA/KD-8x8CSA features a 6-Pin Terminal Block for IR and RS-232 Control. Signals may be received from these connections as well as the Ethernet Jack for TCP/IP Control. Serial commands may be found in the “Communications Protocol” section.

For Serial IR, connect a mono cable to the Multi-function I/O port on the Master Controller or the IR Extender/IR Connecting Block of the 3rd party control system. The other end would then connect to Pins 1 and 2 on the 6-Pin Terminal Block. IR In is Pin 1; Ground is Pin 2.

For Serial RS-232, connect a stereo cable to the Multi-function I/O port on the Compass Control Master Controller or the RS-232 port of the 3rd party control system. The other end would then connect to Pins 3,4,5,6 on the 6-Pin Terminal Block. Tx Data is Pin 3; Rx Data is Pin 5; Ground is Pin 4 and/or Pin 6. Either ground pin may be used for RS-232.

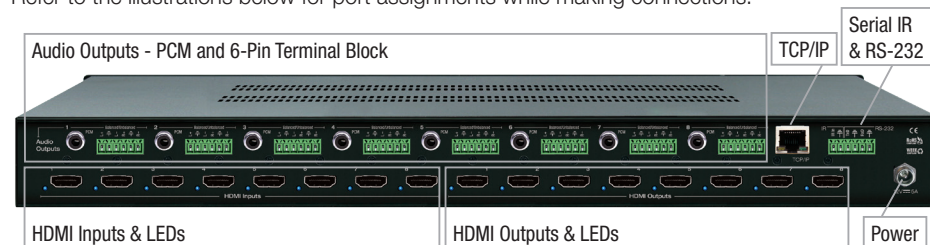
For TCP/IP control, connect an Ethernet cable from the KD-4x4CSA/KD-8x8CSA to a network router or connect a crossover cable from the KD-4x4CSA/KD-8x8CSA directly to a PC.



Connections, Buttons and LEDs

Rear Panel Connections:

All connections to the KD-4x4CSA/KD-8x8CSA are found on the rear panel of the units. Refer to the illustrations below for port assignments while making connections.



HDMI Inputs:

- » The HDMI Inputs are located on the bottom left side of the back panel. The Inputs have a blue LED that will illuminate solid during active link (voltage + data link)

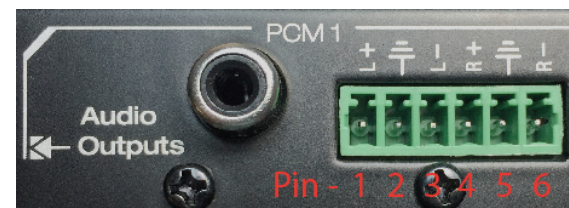
HDMI Outputs:

- » The HDMI Outputs are located on the bottom right side of the back panel. The Outputs have a blue LED that will illuminate solid during active link (voltage + data link)

Ethernet Jack, Serial IR, RS-232, and Power Block:

- » Located on the right side of the back panel.

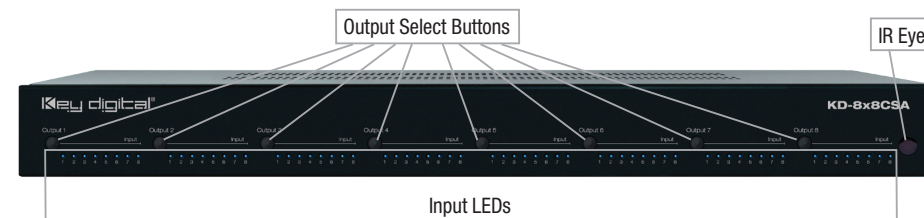
Audio Outputs



- » Each Output Channel has 1 Analog L/R Balanced/Unbalanced connection: 6-Pin Terminal Block which provides de-embedded 2ch Balanced Analog Audio Output from selected HDMI input source
- » The Pin assignment for the audio is as follows:
 - » Left + is Pin 1; Left - is Pin 3; Left Ground is Pin 2.
 - » Right + is Pin 4; Right - is Pin 6; Right Ground is Pin 5.
- » Each Output Channel has 1 Digital Audio Output: RCA Jack which provides de-embedded Digital Audio Output from selected HDMI input
- » There are no volume or tone control features, only muting control of the external audio outputs via RS232 and TCP/IP
- » There are no DSP features. Audio must be configured in the source. For example, in order to achieve 2ch analog audio output, the selected HDMI input source audio format must be 2ch.

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

Front Panel Operation



- » There are 4/8 Output buttons along the front panel.
- » Pressing an output button will select the next HDMI input.
- » A blue LED will indicate which Input has been selected for each Output.
- » Front button control can be disabled/enabled via serial control if desired.
- » The Optical IR window is located on the right side of the front panel receives IR remote control signals.

› Notes:

- › Front LEDs will scroll during boot up
- › Video OFF setting for an output is represented by a steady blinking of the selected input indicator LED for the respective output

Settings and Adjustments

The KD-4x4CSA/KD-8x8CSA unit may be configured using the provided IR Remote. Such settings and adjustments include unit address, matrix switching, and EDID settings. Factory Reset may be completed by using the push buttons.

Addressing Mode

Units may be addressed when used in a multi-unit system. The Key Digital IR Remote is required to change the address of the KD-4x4CSA/KD-8x8CSA unit. Please press the following sequence on the Key Digital IR Remote to change the address.

R3 » R1 » R2 » X » X

- › **X** = Numeric Keypad Button from the IR Remote (Device Select)
- › Default address is 00 – Single unit mode.
- › All addresses must be two digits long
- › All LED lights will blink once to confirm the address has been set.
- › Once a unit has been addressed, the two digit address must precede all IR command sequences

Matrix Switching

The Key Digital IR Remote is required to change the selected input to an output of the KD-4x4CSA/KD-8x8CSA unit. Please press the following sequence on the Key Digital IR Remote to switch the input of an output.

B » A

- › **B** = Numeric Output Button 1 through 8 from the IR Remote (Output)
- › **A** = Numeric Input Button 1 through 8 from the IR Remote (Input)

EDID Control

EDID (Extended Display Identification Data) is a data structure provided by a digital display to describe its capabilities to a video source. This data is also known as a “handshake” and typically includes manufacturer, serial number, product type, resolutions supported by the display, display size, pixel mapping data, etc.

Key Digital EDID Control allows the integrator to choose the handshake that will be provided to source devices of the system. The EDID handshake is relayed to the source from the Champion Series switch, or from the first connected display (default setting). This handshake will always be the EDID information that the source device receives.

The Key Digital IR Remote is required to change the EDID of a specific input. Please press the following sequence on the Key Digital IR Remote to change the source EDID settings:

R2 » R1 » R3 » A » X » X

- › **X** = Numeric Keypad Button from the IR Remote (Device Select)
- › **A** = Numeric Input Button 1 through 8 from the IR Remote (Input)
- › All LED lights will blink once to confirm the EDID mode has been set.

The EDID may also be copied from a specified Output to a specific Input. Please press the following sequence on the Key Digital IR Remote to change the EDID settings:

R2 » R1 » R3 » A » B

- › **A** = Numeric Input Button 1 through 8 from the IR Remote (Input)
- › **B** = Numeric Output Button 1 through 8 from the IR Remote (Output)
- › All LED lights will blink once to confirm the EDID mode has been set.

The possible EDID settings can range from ‘00’ to ‘15’. (‘04’ is the default).

00	Copy EDID from HDMI Output	08	4Kx2K@30, Dolby/DTS 5.1 Audio
01	1080i@60, 2Ch PCM Audio	09	4Kx2K@30, HD Audio
02	1080i@60, Dolby/DTS 5.1 Audio	10	4Kx2K@60, 2Ch PCM Audio
03	1080i@60, HD Audio	11	4Kx2K@60, Dolby/DTS 5.1 Audio
04	1080p@60, 2Ch Audio (Default)	12	4Kx2K@60, HD PCM Audio
05	1080p@60, Dolby/DTS 5.1 Audio	13	1280x720p@60 DVI
06	1080p@60, HD PCM Audio	14	1920x1080p@60 DVI
07	4Kx2K@30, 2Ch Audio	15	3840x2160p@60 DVI

Resetting to Factory Default

To reset your KD-4x4CSA unit to factory default, please follow these steps:

- › Press and hold the Output 1 button and the Output 4 button on the front panel for 10 seconds.

To reset your KD-8x8CSA unit to factory default, please follow these steps:

- › Press and hold the Output 1 button and the Output 8 button on the front panel for 10 seconds.

Notes:

- › All LED lights will blink once to confirm that the unit has been reset.
- › Switch is defaulted back to Input 1 to Output 1, Input 2 to Output 2... Input 8 to Output 8
- › All HDMI Outputs are on
- › Address Mode will reset to 00
- › Each input EDID will be set to EDID preset 04.
- › All Analog and Digital Audio outputs are enabled

Communication Protocol

The KD-4x4CSA/KD-8x8CSA allows control over serial interface for bi-directional communication. In addition to RS-232, the serial interface may also be accessed using a TCP/IP connection (**Default IP address is 192.168.0.239 with default port 23**).

> Connection Protocol:

- » Baud Rate = 57600 bits per second
- » Data Bits = 8
- » Stop Bits = 1
- » Parity = None
- » Flow Control = None
- » Carriage Return: Required
- » Line Feed: Required

> Notes:

- » Commands are not case-sensitive.
- » Spaces are shown for clarity; commands should NOT have any spaces.
- » Carriage return and line feed is required at the end of each string.
- » If a new command is received, a prompt should be sent back.

Help Command (H). Returns entire API in readable format

KD-4x4CSA> H

```
-----
--                               Key Digital Systems HELP                               --
-----
-- KD-4x4CSA                      System Address = 00                      F/W Version : 1.02  --
--
-- Azz      : All Commands may have Prefix System Address zz=[01-99]  --
-- H        : Help                                                    --
-- PF       : Power Off                                              --
-- PN       : Power ON                                              --
-- STA      : Show Global System Status                               --
--
-- Video Output Setup Commands:                                       --
-- ( xx = [01-04,A], yy = [01-04,U/D], A=All, U=Up, D=Down )       --
-- SPO xx SI yy : Set Output xx to Video Input yy                    --
-- SPO xx ON/OFF : Set Output xx ON/OFF                               --
-- SPO xx DBG ON/OFF : Set Output xx Debug Mode ON/OFF              --
-- SPO xx HFM A/D/H : Set Output xx to Video Format by               --
--                               Auto(A)/Forced DVI(D)/Bypass(H)       --
--
-- EDID Setup, xx = [01-04,A], yy = [01-04], zz = [01-15] (A=All)  --
-- SPC EDID xx H yy : Copy EDID from Output yy to Input xx          --
-- SPC EDID xx D zz : Copy EDID from Default EDID zz to Input xx    --
--   DEFAULT EDID 01 : HDMI Video 1080i@60, Audio 2CH PCM Audio     --
--   DEFAULT EDID 02 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY     --
--   DEFAULT EDID 03 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY/H  --
--   DEFAULT EDID 04 : HDMI Video 1080p@60, Audio 2CH PCM Audio     --
--   DEFAULT EDID 05 : HDMI Video 1080p@60, Audio PCM,DTS/DOLBY     --
--   DEFAULT EDID 06 : HDMI Video 1080p@60, Audio PCM,DTS/DOLBY/H  --
--   DEFAULT EDID 07 : HDMI Video 4Kx2K@30/3D, Audio 2CH PCM Audio  --
--   DEFAULT EDID 08 : HDMI Video 4Kx2K@30/3D, Audio PCM,DTS/DOLBY  --
--   DEFAULT EDID 09 : HDMI Video 4Kx2K@30/3D, Audio PCM,DTS/DOLBY  --
--   DEFAULT EDID 08 : HDMI Video 4Kx2K@30/3D, Audio PCM,DTS/DOLBY  --
--   DEFAULT EDID 10 : HDMI Video 4Kx2K@60/3D, Audio 2CH PCM Audio  --
--   DEFAULT EDID 11 : HDMI Video 4Kx2K@60/3D, Audio PCM,DTS/DOLBY  --
--   DEFAULT EDID 12 : HDMI Video 4Kx2K@60/3D, Audio PCM,DTS/DOLBY/H  --
--   DEFAULT EDID 13 : DVI Video Max. 1280x720@60, No Audio        --
--   DEFAULT EDID 14 : DVI Video Max. 1920x1080@60, No Audio       --
--   DEFAULT EDID 15 : DVI Video Max. 3840x2160@60, No Audio       --
-----
```

```
-----
--                               Key Digital Systems STATUS                               --
-----
-- KD-4x4CSA                      System Address = 00                      F/W Version : 1.02  --
--
-- Power : ON                                                         --
-- RS232 : Baud Rate=57600bps, Data=8bit, Parity=None, Stop=1bit    --
-- Front Panel Button : Enabled                                       --
--
-- Network Setting(Telnet Server) Status                             --
-- MAC Address = 18:98:66:E9:7C:B1                                     --
-- Host IP Address = 192.168.000.239                                  --
-- Net Mask = 255.255.255.000                                         --
-- Router IP Address = 192.168.000.001                                 --
-- TCP Port = 0023                                                    --
--
-- Video Input 01 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 02 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 03 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 04 : EDID = DEFAULT 04, LINK = OFF                   --
--
-- Video Output 01 : IN = 01, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 02 : IN = 02, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 03 : IN = 03, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 04 : IN = 04, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
--
-- Audio Output 01 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 02 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 03 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 04 : Analog = Enabled, Digital = Enabled            --
-----
```

Status command (STA). Returns current state and settings of the unit:

KD-4x4CSA> STA

```
-----
--                               Key Digital Systems STATUS                               --
-----
-- KD-4x4CSA                      System Address = 00                      F/W Version : 1.02  --
--
-- Power : ON                                                         --
-- RS232 : Baud Rate=57600bps, Data=8bit, Parity=None, Stop=1bit    --
-- Front Panel Button : Enabled                                       --
--
-- Network Setting(Telnet Server) Status                             --
-- MAC Address = 18:98:66:E9:7C:B1                                     --
-- Host IP Address = 192.168.000.239                                  --
-- Net Mask = 255.255.255.000                                         --
-- Router IP Address = 192.168.000.001                                 --
-- TCP Port = 0023                                                    --
--
-- Video Input 01 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 02 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 03 : EDID = DEFAULT 04, LINK = OFF                   --
-- Video Input 04 : EDID = DEFAULT 04, LINK = OFF                   --
--
-- Video Output 01 : IN = 01, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 02 : IN = 02, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 03 : IN = 03, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
-- Video Output 04 : IN = 04, OUT = ON , LINK = OFF, DBG = OFF, AUTO --
--
-- Audio Output 01 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 02 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 03 : Analog = Enabled, Digital = Enabled            --
-- Audio Output 04 : Analog = Enabled, Digital = Enabled            --
-----
```

Specifications

Technical:

- › Input (Each): 1 HDMI Connector, Type A, 19 Pin Female
- › Output (Each): 1 HDMI Connector, Type A, 19 Pin Female; 6-Pin Terminal Block for Analog L/R Output; RCA Jack for Digital Audio Output [follows SPDIF format (IEC 60958)]
- › Bandwidth: TMDS bandwidth 10.2 Gb/s
- › Link: Single Link
- › DDC Signal (Data): Input DDC Signal - 5 Volts p-p (TTL)
- › HDMI Video/Audio Signal: Input Video Signal - 1.2 Volts p-p
- › DDC Communication: EDID and HDCP buffering between source and display
- › Wired IR: modulated IR signal input, 0-5V TTL or -10to +10V, 3.5mm mono female connector with signal on tip
- › Power: External Power Supply – (KD-4x4CSA) 12V/2A, (KD-8x8CSA) 12V/5A

General:

- › Regulation: CE, RoHS, WEEE
- › Rack Mount: 1U, Full Rack Width (rack ears included)
- › Enclosure: Black Metal
- › Product Dimensions: 17.25" x 7.5" x 1.75"
- › Shipping Dimensions: 21.25" x 13" x 3.5"
- › Product Weight: 6.5 lb.
- › Shipping Weight: 8 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.

How to Contact Key Digital®

System Design Group (SDG)

For system design questions please contact us at:

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

Customer Support

For customer support questions please contact us at:

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

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

Feedback

Please email any comments/questions about the manual to:

- › E-mail: customersupport@keydigital.com