KD-4x4CSX

4 Inputs to 4 Outputs HDMI via Dual CAT5e/6 Matrix Switcher. Includes (4) KD-CATHD100Rx Extenders.

Setup Guide

Key digital®

The Experts in Digital Video Technology and Solutions™

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

Table of Contents

About KD-4x4CSX

Description

› KD-4x4CSX is an HDMI Matrix switcher capable of switching 4 independent Inputs/Sources to 4 independent Outputs/Zones. There are both HDMI and CAT5e/6 Outputs (over 2 CAT5e/6 cables) and are available simultaneously. Built-in fully matrixed Serial IR routing is also available to control your displays remotely.

Key Features

› Simultaneous availability of HDMI and CAT5e/6 outputs
› Full switching of 2 independent matrixes: HDMI Audio/Video, one-directional IR Tx to Rx
› Internal EDID Library features 12 default EDID configurations, in addition to native EDID data for any Output/Display
› Supports all SD, HD, and VESA (VGA, SVGA, XGA, WXGA, SXGA, UXGA) resolutions up to 1080p (60Hz & 50Hz)

  » **SD & HD:** 480i, 480p, 720p, 1080i, 1080p

  » **VESA / VGA (RGBHV):** From 640x480p up to 1920x1200p

› Advanced HDMI® Features: **3D Ready**
› Full support for 12-bit Deep Color and HDCP
› Supports lossless compressed digital audio:

  » Dolby® TrueHD, Dolby® Digital Plus and DTS™-HD Master Audio

Key Benefits

› Transmits 1080p up to 140 ft. 1080i and all lesser resolutions up to 280 ft. when used with included KD-CATHD100Rx Receiver Extenders
› LED Link Lights indicate connectivity between KD-4x4CSX and each input & output device
› Serial IR, Optical IR, Front Panel & RS-232 control
› Supports major control systems such as Compass Control®, AMX®, Control4®, Crestron®, RTI®, Universal®
› Rack Mountable (1U) with included rack ears

Accessories

› (4) KD-CATHD100Rx CAT5e/6 Receiver Extenders;

  » (4) 5V 1A DC Power Supplies;

  » (4pr) Brackets

› (1) External 12 Volt 5 Amp power supply (110V-240V 50/60Hz)
› (1) IR Remote control
› (1pr) Rack mounting ears for KD-4X4CSX
› (4) IR Emitters (for use with Extenders)
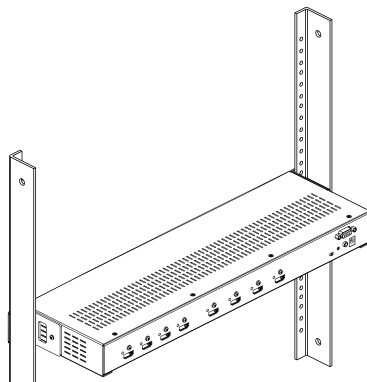
Mounting:

› Rack mount: Secure the rack ears to each side of the KD-4x4CSX with the supplied hardware. Then, fasten the unit to the rack rails with the included machine screws.

Connections, Buttons and LEDs

Rear Panel Connections:

All connections to the KD-4x4CSX are found on the rear panel of the unit. Refer to the illustrations below for port assignments while making connections.
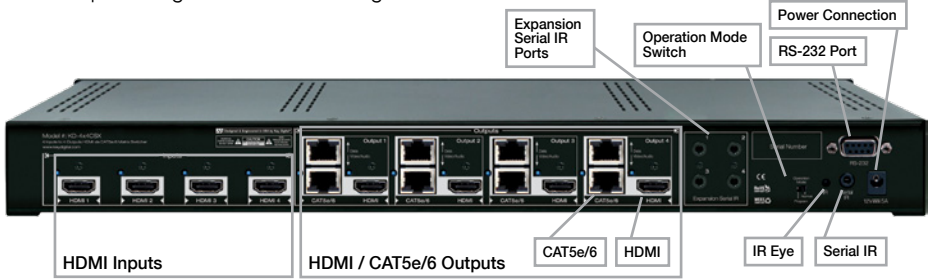
Connections

› **HDMI Inputs:** The 4 HDMI Inputs are located on the left side of the back panel. The Inputs have a blue LED that will illuminate when a source is connected and synced.

› **HDMI and CAT5e/6 Outputs:** The 4 HDMI and 4 dual-CAT outputs are located in the center of the back panel. The outputs have a blue LED that will illuminate when a display/balun is connected and synced.

› The HDMI and CAT5e/6 Outputs are both active simultaneously.

› There are 4 **Serial IR Inputs** located on the right side of the back panel. These are standard 3.5mm mono jacks. Connect these to any control system for routing IR over the CAT5e/6 outputs.

› The **RS-232, Serial IR, Optical IR Sensor, Operation Mode Switch and Power connections** are located on the right side of the back panel. The Operation Mode switch is only used to update the unit's firmware, which is done using the DB9/RS-232 port. The firmware version, as well as all RS-232 commands, is available through the RS-232 command 'H'. A detailed list of RS-232 commands is available later in this guide.

› If newer firmware is made available, complete updating instructions will be included with it. Check the Key Digital website for any firmware updates.

Front Panel Buttons and LEDs:
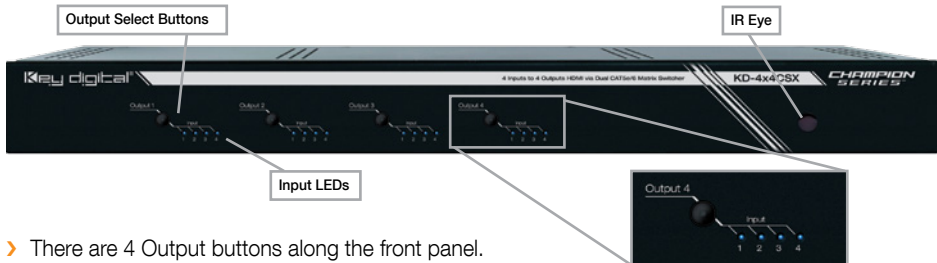
- › There are 4 Output buttons along the front panel.
- › Each press of an Output button cycles through each of the 4 Inputs.
- › A blue LED will indicate which Input has been selected for each Output.
- › There is also an Optical IR window located on the right side of the front panel for IR remote signals.

KD-CATHD100Rx Baluns

If you will be utilizing the KD-CATHD100Rx Baluns (included), please follow this procedure:

- › 2 CAT5e/6 UTP or STP cables need to be used.
- › Be careful to connect the "Video/Audio" jacks to each other and the "Data" jacks to each other. Do not cross these connections.
- › Use 6' or shorter HDMI cables on both ends.
- › Ensure that the 2 cables are run directly from the switcher to the Baluns.
- › Do not use patch panels, punch downs or wall plates.
- › Each Balun is supplied with a power supply.
  - › **Key Digital recommends the use of CAT5e/6 STP cable with shielded RJ45 connectors for optimum performance and distances from your Balun.**

### Transmitting IR signals with KD-CATHD100Rx Baluns

KD-4x4CSX can consolidate incoming IR signals to control display/output devices when integrated with KD-CATHD100Rx.

The IR Signal flows only in one direction; from Input (Matrix) to Output (Balun). It cannot be used to route IR signals from Output (Balun) to Input (Matrix).

The default signal path for Expansion Serial IR Input 1 is RJ45 Output 1 and continues respectively through Input/Output 4. However, the Input/Output relationship can be changed via RS-232.

When connecting the IR Emitter to the device you wish to control, make sure to find the IR receiver area on your particular device first. Experiment with locations and test the functionality before permanently fixing it.

Application Example
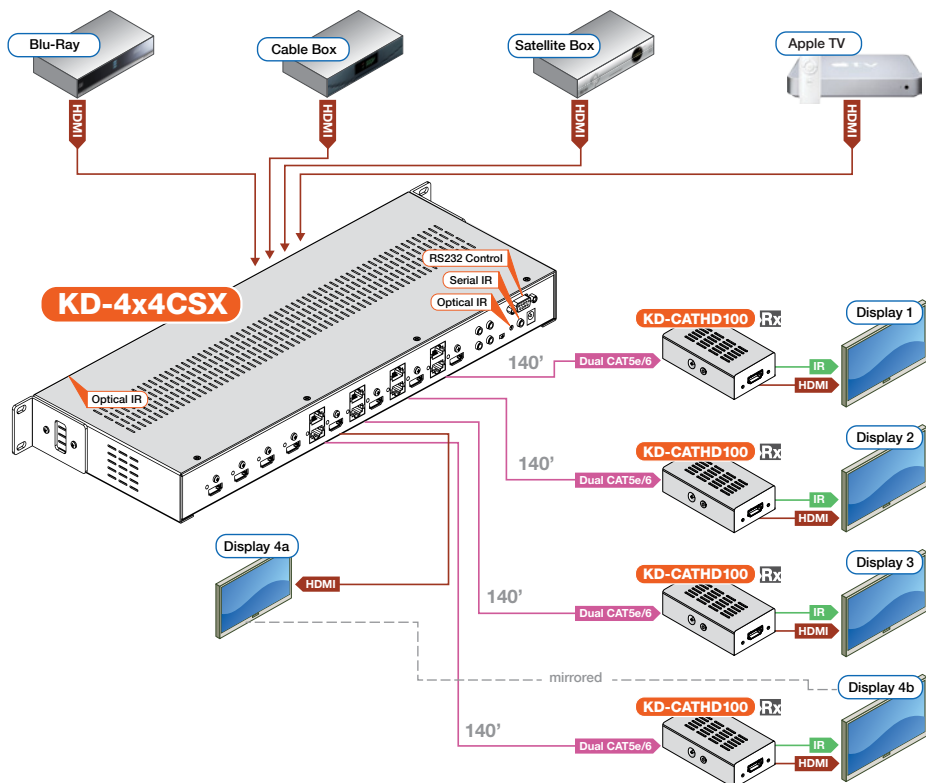
Quick Setup Guide:

1. Begin with the KD-4x4CSX and all input/output devices turned off and power cables removed.

2. Connect HDMI sources to the appropriate input ports on the KD-4x4CSX.

3. Connect either or both HDMI and CAT5e/6 outputs. You will require 2x CAT5e/6 UTP or STP cables for each Balun connected

4. Connect power to the KD-4x4CSX and all other input and output devices and turn them on.

5. Operate the KD-4x4CSX switcher via front panel buttons, IR Remote, Serial IR or RS-232 control.

Operation:

After performing the setup above, the unit is ready for operation.

There are several options for controlling the unit. Commands can be issued via IR remote control, RS-232 or by using the front panel buttons. Note that the advanced commands are available only via the RS-232 protocol.

Settings

The KD-4x4CSX features a library of 12 internal EDID (Extended Display Identification Data) files, in addition to allowing any Input source to receive a copy of the EDID information of any selected Output connected via HDMI. The default EDID setting is "04" – 1080p 2ch Digital Audio. Changing to EDID settings may be necessary when connecting to or from an AV Receiver, or for passing 3D content derived from a Cable or Satellite source if the default EDID has problems. They can also speed up the switching process with cable or satellite sources.

The possible EDID settings can range from '01' to '12'. ('04' is the default).

01	1080i, 2CH Audio	07	3D, 1080p 2CH Audio
02	1080i, DOLBY/DTS 5.1	08	3D, DOLBY/DTS 5.1
03	1080i, HD Audio	09	3D, HD Audio
04	1080p, 2CH Audio	10	1280x1024 DVI
05	1080p, DOLBY/DTS 5.1	11	1920x1080 DVI
06	1080p, HD Audio	12	1920x1200 DVI

When selecting an EDID from the library (settings 01-12), your source device will see the KD-4x4CSX EDID choice instead of the display's EDID, overriding the display's own EDID information. If your display is not capable of accepting the video resolution or audio type selected, you may not see a picture or hear sound. In this case please choose another more compatible EDID, or use the default EDID.

EDID settings can only be changed through the RS-232 command protocol. See the RS-232 command section below for a list of EDID commands available.

Remote Control

You may control the KD-4x4CSX switching commands by using the supplied IR Remote control. There are 2 groups of controls, one group for each Output. Each Input can be selected by pressing the Input numbers 1-4.

IR Extender:

You may want to use an IR extender, such as the KD-IRKIT300. Front and Rear panel sensors are available for use with the IR extender. A wired IR serial connector is also provided at the rear of the unit. Wired IR Extender KD-IRB3099 in the KD-IRKIT300 uses a 3.5mm male-to-male Mono cable. (Not Included with KD-4x4CSX)

KD-IRB3099 Wired IR Extender

3.5mm male-to-male mono cable

KD-IRCB204 Connecting Block

Back of the Unit
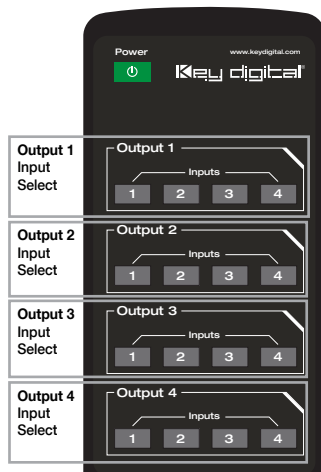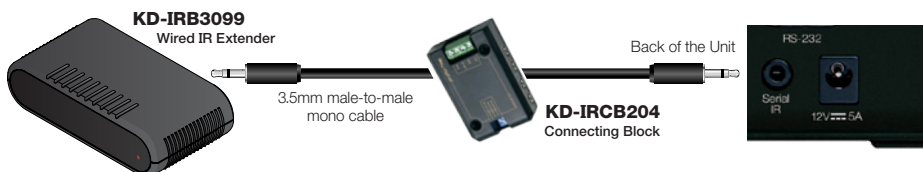
RS-232 Commands

The KD-4x4CSX provides access to all functions when used with an RS-232 control system.

The connection protocol is as follows:
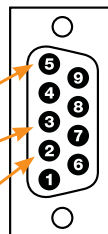
RS-232 cable pin out

- » Baud rate: 57,600
- » Data Bits: 8
- » Parity: None
- » Stop Bits: 1
- » Flow Control: None
- » Carriage Return: Required
- » Line Feed: Required

Pin 5 – Ground

Pin 3 – Receive

Pin 2 – Transmit

NOTE: All commands are case-insensitive. Spaces are shown for clarity; commands should not have any spaces. Every command below requires a carriage return at the end of the string for the command to be executed. If a new line character is received, a prompt should be sent back.

System Commands:

- › **H:**   **Help** - Help command. List of all RS-232 commands and Firmware version.
- › **STA:**   **Status Command** - Displays unit status for all internal variables such as Video Input, and EDID selected for each Input.
- › **PF:**   **Power Off** - Power Off command
- › **PN:**   **Power ON** - Power ON command

Commands:

Video Switch:

- » **'SP O xx SI yy'** To switch the desired Video Input to the desired Output:
- » xx = the Output number [01-04] -OR- [A] for 'All'
- » yy = the Input number [01-04] -OR- [U, D] for 'Up',' Down' respectively.
- » 'U/D' will increase/decrease the input number from its current position.
- » This command will switch Inputs to your desired Output.
- » _Example:_ To switch Output 1 to Input 3, issue the command; **'SPO01SI03'**
- » _Example:_ To incrementally switch the Input Up from its present number for Output 1, issue the command: **'SPO01SIU'**
- » _Example:_ To switch All Outputs to Input 3, issue the command: **'SPOASI03'**

IR Routing:

- » **'SPCIR xx yy'** To route Serial IR signals
- » xx = [01-04] -OR- [A] for 'All' – IR output destination via CAT5e/6
- » yy = [00-04] – IR input; yy = 00 is for special MASK Setting. If you set yy to 00, IR output will be OFF(disabled). If you set yy to others [01-04], IR output will be ON(enabled) and IR control signals will be routed to the specified output.
- » This command will route the selected Serial IR Input number [1-4] to the desired Output number over the CAT5e/6 connection.
- » Example: **'SPCIRA02'**: Will carry IR from IR Input port 2, to 'All' Outputs.
       'SPCIR0102': Will carry IR from IR Input port 2 to Output 1.
       'SPCIR0100': Will not carry IR to output 01 (output is OFF).

EDID Copy and Default EDID Library:

» **'SP C EDID xx H/C/D yy':** To Copy EDID to Input from Output via HDMI or CAT5e/6, or from a Default Library

» xx = Input numbers [01-04] –OR- [A] for 'All' Inputs

» H = EDID Copy from HDMI Output

» C = EDID Copy from CAT5e/6 Output

» D = Default EDID Library selection (see list below)

» yy = Output numbers [01-12] when 'H or C' variables are selected
–OR-
Default EDID library settings [01-08] when 'D' variable is selected.

» This command will either copy the EDID information from a selected Output to a specific Input (or All Inputs), or, write EDID information from an internal library of default EDID settings to a specific Input (or All Inputs).

» _Example:_ To copy the EDID information from HDMI Output 2 to Input 4, issue the command: **'SPCEDID04H02'**

» _Example:_ To copy the EDID information from CAT5 Output 2 to All Inputs, issue the command: **'SPCEDIDAC02'**

» _Example:_ To write the EDID information from the built-in default EDID library using default EDID 1 to Input 2, issue the command; **'SPCEDID02D01'**

» **The possible EDID settings can range from '01' to '12'. ('04' is the default).**

01	1080i, 2CH Audio	07	3D, 1080p 2CH Audio
02	1080i, DOLBY/DTS 5.1	08	3D, DOLBY/DTS 5.1
03	1080i, HD Audio	09	3D, HD Audio
04	1080p, 2CH Audio	10	1280x1024 DVI
05	1080p, DOLBY/DTS 5.1	11	1920x1080 DVI
06	1080p, HD Audio	12	1920x1200 DVI

Front Panel Buttons Enabled/Disabled:

» **'SP C FB E/D'**

» Where 'E' will Enable the front panel buttons and 'D' will Disable the front panel buttons.

» _Example:_ To Disable the front panel buttons, issue the command; **'SPCFBD'**

Reset to Factory Defaults:

» **'SP C DF xx'**

» xx = [01-12] and is the default EDID library loaded during a factory reset.

» This command will return the unit to its factory default settings including a user chosen default EDID setting. (See above for a list of possible default EDID library settings available)

» _Example:_ To reset the unit to factory default with an EDID setting of 1080i 2CH Audio, issue the command; **'SPCDF01'**

» _Example:_ To reset the unit to factory default with an EDID setting of 3D 1080p 2CH Audio, issue the command; **'SPCDF07'**

Specifications

Technical:

- » **Input (Each):** 1 HDMI; 1 wired IR on 3.5 mm stereo jack connector per slot
- » **Output (Each):** 1 HDMI; 2 CAT5e/6 on RJ45 connectors;
- » **Bandwidth:** TMDS bandwidth 10.2 Gb/s
- » **Control:** Front panel push buttons and LEDs; IR sensor front/rear; RS-232 Tx/Rx lines with full bi-directional operation
- » **Video/Audio Matrix Switching:** Full matrix switching for HDMI Video matrix
- » **Wired IR Control Matrix:** Each input/output section wired IR and unit wired IR can be switched into matrix in uni-directional operation to any of the inputs/outputs
- » **EQ adjustment:** Precise auto-adjustment, distance measurement on Rx Balun or CAT5e/6 Input.
- » **Link and Range:** 1080p/60, 1920x1200 max. up to 140 ft.
      1080i/60, 720p, 1080p/24 up to 280 ft.
- » **Deep Color Support:** Digital video formats in Deep Color Mode at up to 10 bits/color
- » **HDMI® and HDCP Licensing:** Fully licensed and compatible with all HDMI and HDCP technologies
- » **EDID Control:** Each input EDID is either a choice of any of the active zone displays connected via HDMI or CAT5e/6 to the outputs or form internal library of 12 default EDID's
- » **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 Bi-directional Transparency from Display to Source
- » **Wired IR:** modulated IR signal input, 0-5V TTL or -10to +10V.
- » **Power:** External Power Supply. 12V/5A

General:

- » **Regulation:** CE, RoHS, WEEE
- » **Rack Mount:** 1U, Full Rack Width (rack ears included)
- » **Enclosure:** Black Metal
- » **KD-4x4CSX Product Dimensions:** 17.13" x 6.63" x 1.71"
- » **KD-CATHD100Rx Product Dimensions:** 3.25" x 1.875" x .875"
- » **KD-4x4CSX Product Weight:** 4.05 lb.
- » **KD-CATHD100Rx Product Weight:** .25 lb
- » **Shipping Dimensions:** 19.88" x 11.25" x 6.3"
- » **Shipping Weight:** 10 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

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

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 limited three-year parts and labor warranty.

Installation Notes

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

Key digital®