

KD-Pro8x8D

8x8 HDBaseT/HDMI/POH Matrix Switcher, Integrated Audio, DSP/De-embedding of Analog L/R Balanced/ Unbalanced, Digital Coaxial Audio, ARC (Includes 8 Rx Extenders- 6 Short & 2 Long Range)

Operating Instructions



x2

KD-X88LGRx



x6

KD-X88SHRx

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Introduction

Key Digital® KD-Pro8x8D is a UHD/4K, HDCP 2.2, and ARC supporting digital video matrix with audio de-embedding on analog and digital audio connectors. Video outputs feature simultaneously active HDMI and HDBaseT ports for simplistic single-wire integration with displays throughout the distributed video system. Six short range (model KD-X88SHRx) and two long range extenders (model KD-X88LGRx) deliver UHD/4K video up to 125 ft. and 300 ft. respectively and are powered at the matrix switch. IR and RS-232 control routing adds up to 34 control ports to third-party control systems.

Always follow the instructions provided in this Operating Manual.

Key Features

- › **Ultra HD/4K:** Supports signals up to 4096x2160 60Hz [4:2:0] 8bit or 4096x2160 30Hz [4:4:4] 8bit
- › **Bandwidth:** 10.2Gbps supports UHD/4K resolutions with HDR via EDID handshaking
- › **HDR (High Dynamic Range):** More life-like images through a greater range of luminance levels
- › **HDCP 2.2 and HDMI Licensing:** Fully licensed and compatible with HDCP 2.2 and HDMI latest technologies
- › **Simultaneously Active:** 8 HDBaseT (CAT5e/6 RJ45) and 8 HDMI outputs with fully automatic CAT5e/6 cable equalization. Supports up to 16 displays (8 mirrored)
- › **HDBaseT Rx Included:** 8 total Rx extenders integrate with built-in HDBaseT Tx output ports
 - › Six (6) Standard Range KD-X88SHRx
 - › Two (2) Long Range KD-X88LGRx
- › **Signal Extension:**
 - › KD-X88SHRx:
 - › Up to 200 feet @ 1080p/60, 1080p/24, 1080i, 720p
 - › Up to 125 feet @ 4K/Ultra HD
 - › KD-X88LGRx:
 - › Up to 500 feet @ 1080p/60, 1080p/24, 1080i, 720p
 - › Up to 300 feet @ 4K/Ultra HD
- › **Audio Return Channel:** Audio may be returned from display to respective audio output
- › **Audio De-Embedding:** Audio from the selected HDMI input may be de-embedded through the Coax digital (PCM) and analog L/R balanced/unbalanced output
- › **Audio DSP:** Variable level settings for volume, muting, 3-band EQ, balance, and lip-sync delay per output
- › **Full Buffer™ Technology:** Full buffering of HDCP and EDID, for the fastest possible switching and viewing of any source/input to any display/output, regardless of multiple output viewing relation
- › **EDID Control:** Internal library with 15 default EDID configurations for each input, in addition to native EDID data for any Output/Display
- › **TMDS Re-clocking:** Support for long HDBaseT and HDMI runs and many layers of connectivity.
- › **Voltage Control:** Two dedicated 3-pin relays and any control I/O ports may be used as a voltage trigger
- › **Lossless Compressed Digital Audio:** Dolby® TrueHD, Dolby® Digital Plus, Dolby® Atmos and DTS-HD Master Audio™
- › **Deep Color Support:** Up to 12 bits/color
- › **Control Routing:** Enables bi-directional IR/RS-232 control signal extension adding 36 ports to control system
- › **Control Integration:** TCP/IP, RS-232, and USB with full bi-directional operation, front panel push buttons and LEDs, front/rear optical IR, serial IR,
- › **Control System Support:** Key Digital® App ready, Compass Control® Pro ready, KD-Wizard® ready. Fully controllable by all IR, RS-232, and TCP/IP supported control systems via open API: AMX®, Crestron®, Control4®, KNX®, RTI®, Savant®, URC®, Leviton® etc.
- › **Key Digital® App Ready:** Scan & detect population for pre-built GUI and TCP/IP control via Key Digital® App

Accessories

- › 6 standard range receiver extenders, model KD-X88SHRx
- › 2 long range receiver extenders, model KD-X88LGRx
- › 2 external power supplies +12V/6.6A (80W) for powering of matrix and POH Rx units, model
- › IR Remote control, model KD-REMOTEHM88
- › 6 ft. USB A to Micro USB data cable
- › 8 IR emitters
- › Rack mount ears

Rack Mounting

- › Secure the included rack ears to each side of KD-Pro8x8D with the supplied hardware, then fasten the unit to the rack rails with appropriate machine screw.

About KD-X88SHRx and KD-X88LGRx HDBaseT receive extenders

- › Extends HDMI video + audio, and control (IR and RS-232) via a single CAT5e/6 UTP or STP cable
- › Powered at the matrix. No local power connections needed.
- › **KD-X88SHRx:**
 - » Up to 200 feet @ 1080p/60, 1080p/24, 1080i, 720p
 - » Up to 125 feet @ 4K/Ultra HD
- › **KD-X88LGRx:**
 - » Up to 500 feet @ 1080p/60, 1080p/24, 1080i, 720p
 - » Up to 300 feet @ 4K/Ultra HD
- › Installation best practices:
 - » Use the shortest possible HDMI cable when connecting KD-X88SHRx / KD-X88LGRx to a display. HDMI cables \leq 9ft recommended for optimum performance.
 - » Ensure the CAT5e/6 cable runs directly from the switcher to the KD-X88SHRx / KD-X88LGRx.
 - » Do not use patch panels, punch downs, keystones, couplers, wall plates, etc.
 - » Use shielded twisted pair (STP) cabling with shielded RJ45 connectors for optimum performance and distances.

Connections, Buttons and LEDs

HDMI & HDBaseT



- HDMI Inputs (8): Located on the left side of the back panel. The inputs have a blue LED that illuminates when a source is connected and synced
- HDMI & HDBaseT Outputs (8 each): Located in the middle of the back panel. The HDMI and HDBaseT outputs each have a blue LED that illuminates when an output device is connected and synced
 - » **HDBaseT outputs 1 and 5** integrate natively with long range extenders, model KD-XLGRx
 - » **HDBaseT outputs 2, 3, 4, 6, 7, 8** integrate natively with short range extenders, model KD-XSHRx

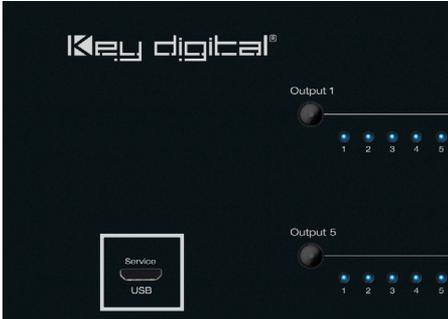
Audio De-Embed Outputs



- Each Output features audio de-embedding on (1) Analog L/R balanced/unbalanced 6-Pin terminal and (1) Digital audio on RCA
- The audio de-embed ports provide audio output of the selected HDMI input for the respective output (default) or returned audio (ARC) from the connected display if enabled. See [Audio Return Channel \(ARC\)](#) section for more information
- The analog audio de-embed ports feature an assortment of DSP controls including Volume, Muting, 3-band EQ, and Lip-sync delay. The digital audio outputs feature muting control only.
- There are no down/up conversion capabilities. For example, in order to achieve 2ch analog audio output, the selected HDMI input source audio format must be 2ch.
- Pin assignment for Analog Audio outputs:
 - » Left + is Pin 1; Left Ground is Pin 2; Left - is Pin 3
 - » Right + is Pin 4; Right Ground is Pin 5; Right - is Pin 6

| Audio Input Signal Format | Audio L/R Output | Digital Audio Output |
|---------------------------|------------------|----------------------|
| 2CH PCM | Pass-through | Pass-through |
| Multi-Channel PCM | MUTE | MUTE |
| DOLBY/DTS | MUTE | Pass-through |
| HD Audio | MUTE | MUTE |

Unit Control Ports



› MAIN Control Port

- › 6-Pin Terminal Block for IR and RS-232
- › RS-232 and TCP/IP commands may be found in the [RS-232 & TCP/IP Commands](#) section
- › Pin out:
 - › Pin 1 = IR Signal
 - › Pin 2 = IR Ground
 - › Pin 3 = RS-232 Tx Data
 - › Pin 4 = RS-232 Ground
 - › Pin 5 = RS-232Rx Data
 - › Pin 6 = Ground (optional)

› TCP/IP Control Port

- › Connect an Ethernet cable from the KD-Pro8x8D to a network router or connect a straight-through cable directly from a PC
- › Default IP address is 192.168.1.239, with default port 23

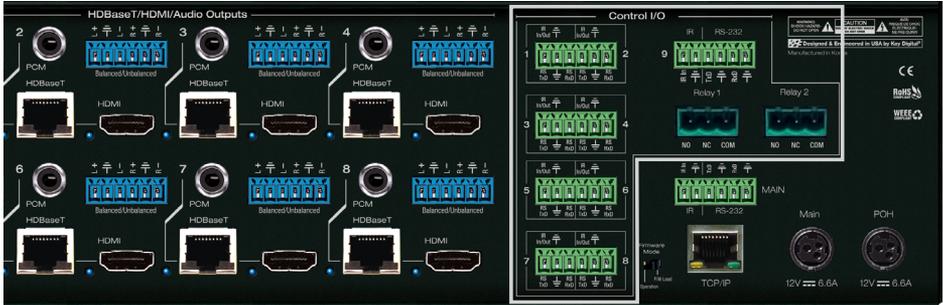
› Firmware Mode Switch

- › Should remain in Operation setting unless instructed by Key Digital technical support
- › If changing position of switch, do so only with matrix unit not powered
- › Not every firmware update requires the switch to be set to the F/W Load position
- › If set to F/W Load, all front LEDs will be illuminated, indicating that unit is in bootloader mode and awaiting a firmware load.

› Micro USB (front panel)

- › Typically used for unit configuration, control, and firmware updates
- › It is most commonly used with KD-Wizard® software downloaded at www.keydigital.com

Control I/O Ports



- > **8 multifunction I/O ports that can be used as IR, bi-directional RS-232 or voltage trigger**
 - » Pin out:
 - » Pin 1 = RS-232 Tx/D / IR Signal
 - » Pin 2 = Ground
 - » Pin 3 = RS-232 Rx/D / IR No Connect
- > **1 dedicated IR and RS-232 port**
 - » Used as primary IR/RS-232 input source for Control Routing
 - » RS-232 and TCP/IP commands may be found in the [RS-232 & TCP/IP Commands](#) section
 - » Pin out:
 - » Pin 1 = IR Signal
 - » Pin 2 = IR Ground
 - » Pin 3 = RS-232 Tx Data
 - » Pin 4 = RS-232 Ground
 - » Pin 5 = RS-232 Rx Data
 - » Pin 6 = Ground (optional)
- > **2 Relay ports**
 - » Electrically operated switch with 250VAC/12A (2500W) Resistive switching capacity
 - » COM-NC (normally closed) is connected when relay is activate
 - » COM-NO (normally open) is connected when relay is inactive

Buttons and LEDs



> 8 output buttons on the front panel

- » Pressing an output button will select the next HDMI input
- » A blue LED indicates selected input for each output
- > **Video output MUTE** is indicated by the outermost (1, 2, 7, 8) LEDs illuminated, while the inner LEDs (3, 4, 5, 6) are **NOT** illuminated
- > **Video output OFF** is indicated when the innermost (3, 4, 5, 6) LEDs are illuminated, while the outermost (1, 2, 7, 8) are **NOT** illuminated
- > **Factory default reset** is achieved by simultaneously holding the input select buttons 1&4 for 10 seconds
 - » The matrix reboots after reset. The LEDs will ramp until reboot has completed

KD-X88SHRx and KD-X88LGRx LED Indicator Lights



KD-X88LGRx



KD-X88SHRx

> **Power: Green**

- » Solid illumination during power ON state, as provided by POH power supply at matrix switch

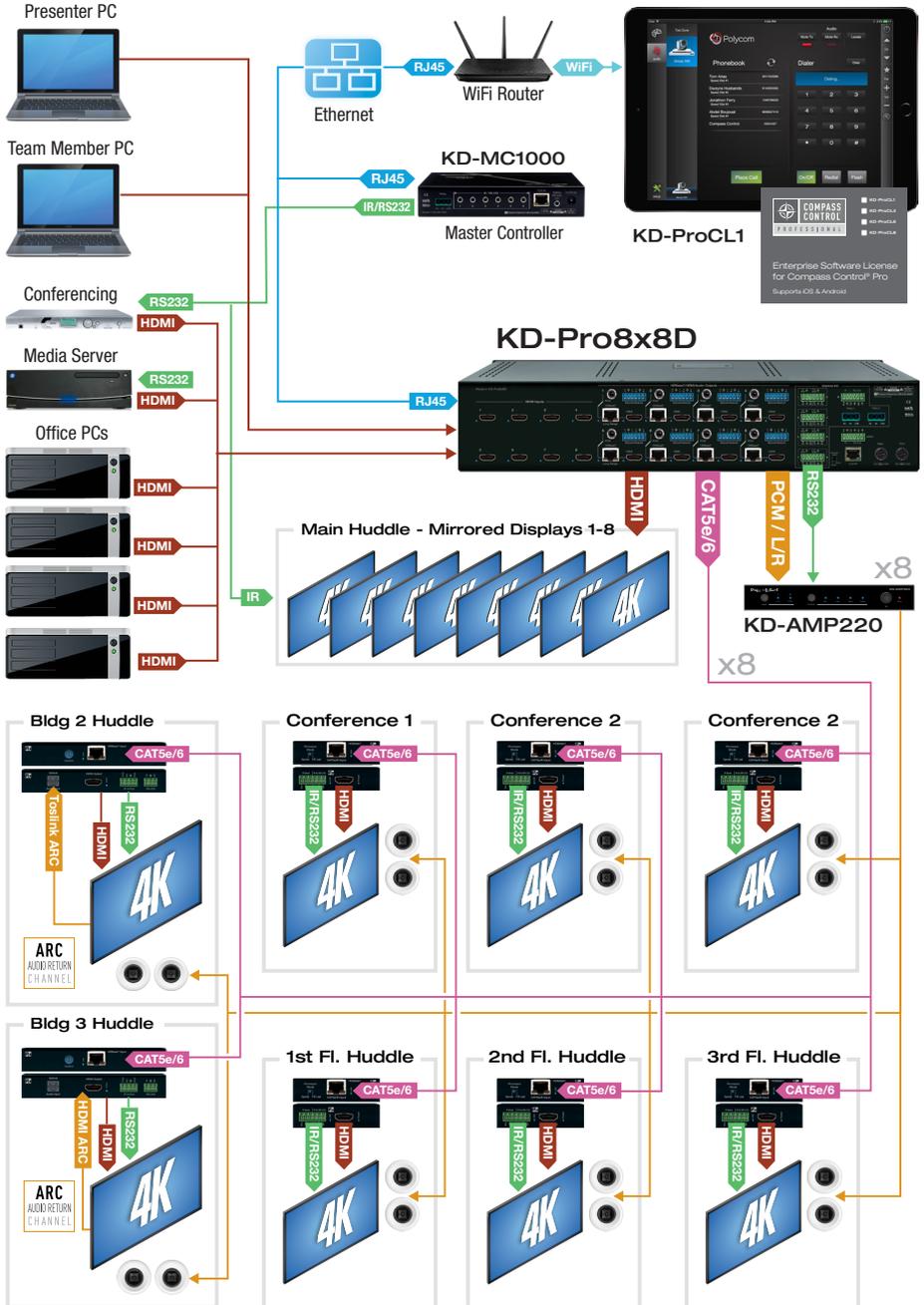
> **HDMI Active: Blue**

- » Solid illumination from active Hot Plug Detection voltage with connected display/output device

> **HDBaseT Link: Blue**

- » Solid illumination from active HDBaseT link with matrix switch

Application Example



Quick Setup Guide

1. Begin with the KD-Pro8x8D and all input/output devices turned off and power cables removed
2. Connect HDMI sources to the desired input ports on the KD-Pro8x8D
3. Connect HDBaseT outputs to the Rx extenders via CAT5e/6 cables
4. Connect HDMI output of Rx extenders to the output devices (display, projector, AV Receiver, etc)
5. Connect HDMI outputs to the appropriate output device (output signals mirror HDBaseT outputs)
6. Connect both power supplies (one for matrix and one for the POH Rx extenders) to the KD-Pro8x8D and all other input and output devices and power them on
7. Operate the KD-Pro8x8D switcher via front panel buttons, IR Remote, Serial IR or RS-232 control. See [Setting and Adjustments via Remote](#) section for quick adjustments during initial installation
8. If TCP/IP control is desired, set the IP address using appropriate Key Digital software from www.keydigital.com. Note that many advanced commands are available only via TCP/IP and RS-232 protocol

Settings and Adjustments via Remote

Many initial installation steps may be configured using the factory remote control. Other advanced settings may be configured using USB and software downloaded from www.keydigital.com

Matrix Switching Command via IR

IR Button Sequence = Video Mode, X, Y

- » X = Output # [1-8]
- » Y = Input # [1-8]

EDID Handshaking 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 each HDMI source. The integrator may select from the following EDID file options:

- » **Default EDID Library:** The EDID handshake is relayed to the source from the matrix switcher’s default EDID table (see table below)
 - » **Copy from connected HDMI or CAT5e/6 (HDBaseT) output:** The EDID file of a selected output device is copied to the software of the matrix switcher and relayed to the source. This is sometimes necessary if working with very new or very old displays.
- » EDID Setup Command via IR
- » XX = Input # [01-08]
 - » YY = Output # [01-08]
 - » ZZ = Default EDID Table File [01-15]

Default EDID Table

| | |
|----|--|
| 01 | HDMI Video 1080i@60, Audio 2CH PCM |
| 02 | HDMI Video 1080i@60, Audio PCM,DTS/DOLBY 5.1 |
| 03 | HDMI Video 1080i@60, Audio PCM,DTS/DOLBY/HD 7.1 |
| 04 | HDMI Video 1080p@60, Audio 2CH PCM |
| 05 | HDMI Video 1080p@60, Audio PCM,DTS/DOLBY 5.1 |
| 06 | HDMI Video 1080p@60, Audio PCM,DTS/DOLBY/HD 7.1 |
| 07 | HDMI Video 4Kx2K@24/30, Audio 2CH PCM |
| 08 | HDMI Video 4Kx2K@24/30, Audio PCM,DTS/DOLBY 5.1 |
| 09 | HDMI Video 4Kx2K@24/30, Audio PCM,DTS/DOLBY/HD 7.1 |
| 10 | HDMI Video 4Kx2K@50/60(4:2:0), Audio 2CH PCM |
| 11 | HDMI Video 4Kx2K@50/60(4:2:0), Audio DTS/DOLBY 5.1 |
| 12 | HDMI Video 4Kx2K@50/60(4:2:0), Audio HD 7.1 |
| 13 | DVI Video Max. 1280x720@60, No Audio |
| 14 | DVI Video Max. 1920x1080@60, No Audio |
| 15 | DVI Video Max. 3840x2160@60, No Audio |

- › Write EDID from Default EDID File ZZ to Input XX
 - › IR Button Sequence = R2, XX, Treble, ZZ
- › Write EDID from Default EDID File ZZ to All Inputs
 - › IR Button Sequence = R2, Treble, ZZ
- › Write EDID from Output YY to Input XX
 - › IR Button Sequence = R2, XX, Bass, YY
- › Write EDID from Output YY to All Inputs
 - › IR Button Sequence = R2, Bass, YY

Forced Hot Plug Detection

Hot Plug Detection (HPD) may be forced on the matrix switcher's output in order to provide connected output devices with necessary voltage to inform the device that a partner (ie video source) is connected and active. If the Forced HPD is set to OFF, HPD signals from the matrix output to the display device will pass as normal. In cases of many layers of connectivity, HPD may be lost leading to no signal at the display. In those cases, fix Forced HPD to ON.

- › Force Hot Plug Detection Voltage on Output XX
 - › IR Button Sequence = R1, XX, Audio Mode, R4, Restore
- › Bypass (default setting) Hot Plug Detection Voltage on Output XX
 - › IR Button Sequence = R1, XX, Audio Mode, R4, Mute

Volume and Muting Control

- › Set Output XX to Audio Volume YY [00-99]
 - » IR Button Sequence = R1, XX, Volume, YY
- › Set Output XX Audio Volume Up
 - » IR Button Sequence = R1, XX, Volume, UP
- › Set Output XX Audio Volume Down
 - » IR Button Sequence = R1, XX, Volume, Down
- › Set Output XX Audio Mute Enable
 - » IR Button Sequence = R1, XX, Mute
- › Set Output XX Audio Mute Disable
 - » IR Button Sequence = R1, XX, Restore
- › Set Output XX Audio Delay to YY [00-99]
 - » IR Button Sequence = R1, XX, Lip Sync, YY
- › Set Output XX Audio Delay Up
 - » IR Button Sequence = R1, XX, Lip Sync, Up
- › Set Output XX Audio Delay Down
 - » IR Button Sequence = R1, XX, Lip Sync, Down
- › Set Output XX Audio Return Channel On
 - » IR Button Sequence = R1, XX, Audio Mode, R2, Restore
- › Set Output XX Audio Return Channel Off
 - » IR Button Sequence = R1, XX, Audio Mode, R2, Mute

IP Configuration via IR

Default IP address is 192.168.1.239, with default port 23

- › Set Unit Static IP Address to xxx.xxx.xxx.xxx
 - » IR Button Sequence = R3, Bass, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X
- › Set Unit Default Gateway/Router IP Address to xxx.xxx.xxx.xxx
 - » IR Button Sequence = R3, Treble, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X



Audio Return Channel (ARC)

KD-Pro8x8D supports Audio Return Channel. When enabled, audio from the connected display is returned to the matrix and output on KD-Pro8x8D's audio de-embed ports.

ARC is useful in applications where an internet-enabled display is streaming content. ARC is a means for the audio to still reach the distributed audio system or AV Receiver.

ARC must be enabled via IR, RS-232, or TCP/IP. After enabling ARC, the output's digital and analog audio connection will provide the audio returned from the display/output.

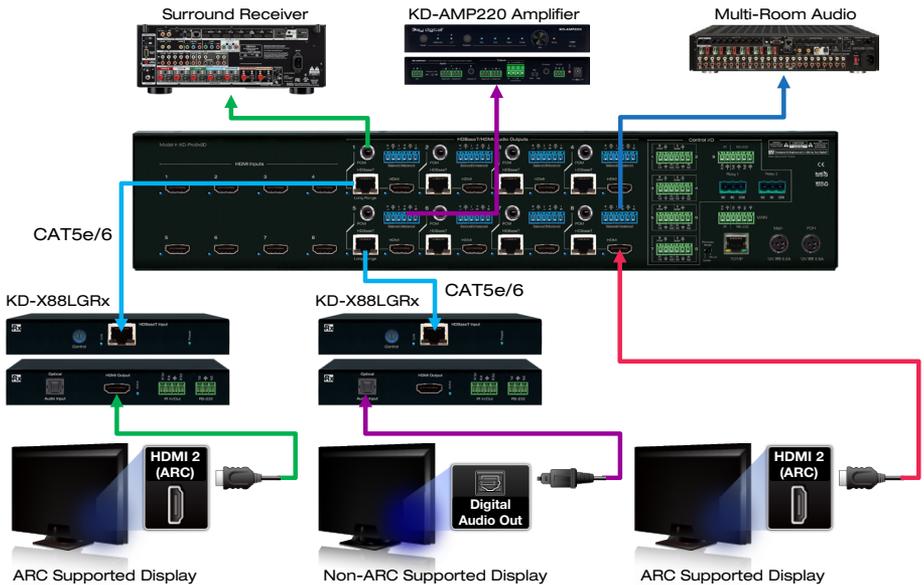
ARC Support via HDBaseT (Outputs 1 and 5 only)

- » Supported by KD-X88LGRx only (not KD-X88SHRx)
- » KD-X88LGRx supports ARC on two connectors:
 - » HDMI connection from an ARC supported display
 - » Toslink optical external audio output of the display

ARC Support via HDMI (All outputs)

- » Ensure that display and HDMI cable support ARC

Example of ARC usage and supported connectivity



IR & RS-232 Control Routing Ports and Uses

KD-Pro8x8D can pass-thru or route control signals just like it can HDMI signals.

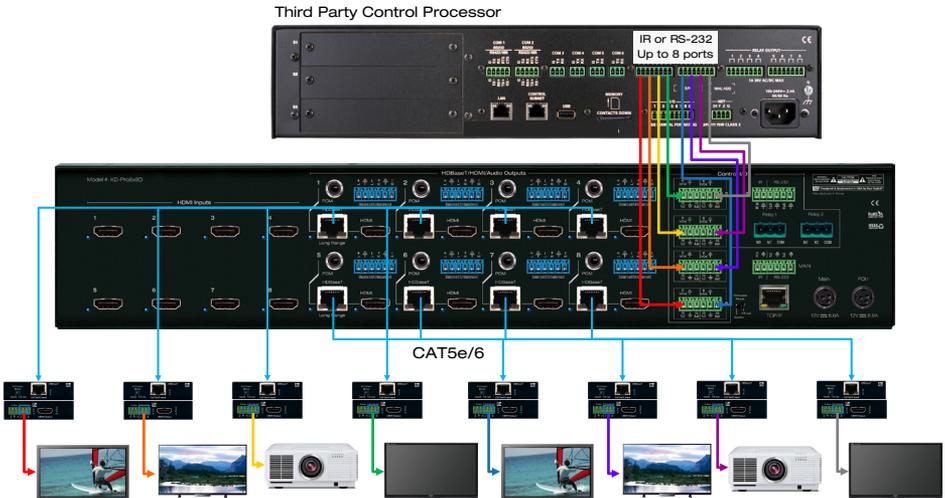
Control Connections and Signals

- 8x HDBaseT Rx
- 9x Control I/O on matrix
 - » Port 9 is recommend as the primary IR/RS-232 input source for control routing
- 8x HDMI Inputs
 - » Use Key Digital's KD-IQJUMP12FM (sold separately) jumper cable as the control breakout port
 - » See KD-IQJump12FM product page for more information: <http://www.keydigital.com/items.asp?ItemCode=KDIQJUMP12FM&Company=KEY>
- 8x HDMI Outputs
 - » Use Key Digital's KD-IQJUMP12FM (sold separately) jumper cable as the control breakout port

Default setting (control pass-thru)

- A simple pass-thru of an IR or RS-232 signal from Control I/O ports 1-8 to HDBaseT outputs 1-8 is the default control signal flow.

Example of control pass-thru

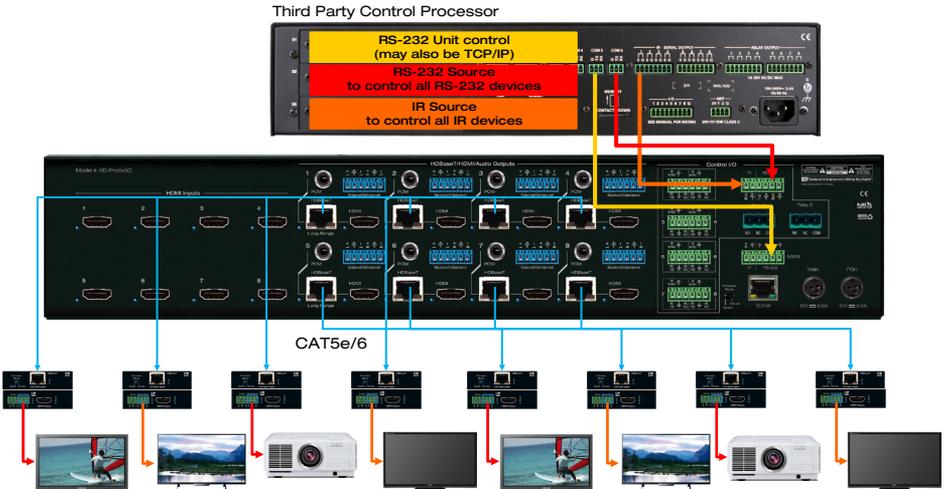


Advanced Configuration (control routing)

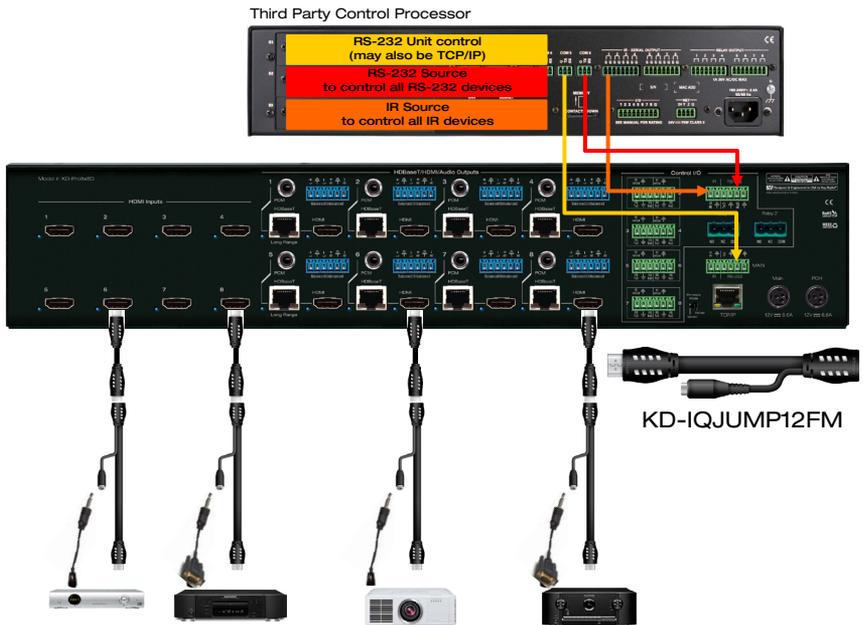
- The path and control signal type can be manipulated by using the desired RS-232 or TCP/IP command
- A single IR and RS-232 connection source can be input and routed discreetly to desired destinations, adding up to 34 control ports to third-party control systems

- Each IR and RS-232 port is bi-directional, allowing for control signal flow from the matrix (source) to the zone (destination) or from the zone to the matrix.
- When connecting the IR Emitter to the device you wish to control make sure to find the IR receiver area on the device.

Example of control routing for control of devices connected via HDBaseT Rx units



Example of control routing for control of devices connected via HDMI using KD-IQJump12FM



Control Routing Commands

- › Control routes may be established via RS-232 and TCP/IP
- › Point-to-point routing will disconnect any existing destination(s) for source yy
- › Point-to-many routing will add destination(s) for source xx without disconnecting other destinations

Point-to-Point IR Control Routing:

- › To configure the path of IR control signals from an Control I/O Port to an HDBaseT output, use the command **SPOC xx IRR 1 S yy**
 - › xx=IR destination, yy=IR source
- › To configure the path of IR control signals from an Control I/O Port to an HDMI output, use the command **SPOH xx IRR 1 S yy**
 - › xx=IR destination, yy=IR source
- › To configure the path of IR control signals from an Control I/O Port to an HDMI input, use the command **SPI xx IRR 1 S yy**
 - › xx=IR destination, yy=IR source

Point-to-Point RS-232 Control Routing:

- › To configure the path of RS-232 control signals from an Control I/O Port to an HDBaseT output, use the command **SPOC xx RSS 1 S yy**
 - › xx=RS-232 destination, yy=RS-232 source
- › To configure the path of RS-232 control signals from an Control I/O Port to an HDMI output, use the command **SPOH xx RSS 1 S yy**
 - › xx= RS-232 destination, yy= RS-232 source
- › To configure the path of RS-232 control signals from an Control I/O Port to an HDMI input, use the command **SPI xx RSS 1 S yy**
 - › xx= RS-232 destination, yy= RS-232 source

Point-to-Many IR Control Routing

- › To configure the path of IR control signals from an Control I/O Port to multiple HDBaseT outputs, use the command **SPOC xx IR 1 S yy**
 - › xx=IR destination, yy=IR source
 - › Send additional **SPOC xx IR 1 S yy** commands for each additional destination
- › To configure the path of IR control signals from an Control I/O Port to multiple HDMI outputs, use the command **SPOH xx IR 1 S yy**
 - › xx=IR destination, yy=IR source
 - › Send additional **SPOH xx IR 1 S yy** commands for each additional destination
- › To configure the path of IR control signals from an Control I/O Port to multiple HDMI inputs, use the command **SPI xx IR 1 S yy**
 - › xx=IR destination, yy=IR source.
 - › Send additional **SPI xx IR 1 S yy** commands for each additional destination

Point-to-Many RS-232 Control Routing

- To configure the path of RS-232 control signals from an Control I/O Port to multiple HDBaseT outputs, use the command **SPOC xx RS 1 S yy**
 - » xx=RS-232 destination, yy=RS-232 source
 - » Send additional **SPOC xx RS 1 S yy** commands for each additional destination
- To configure the path of RS-232 control signals from an Control I/O Port to multiple HDMI outputs, use the command **SPOH xx RS 1 S yy**
 - » xx= RS-232 destination, yy= RS-232 source
 - » Send additional **SPOH xx RS 1 S yy** commands for each additional destination
- To configure the path of RS-232 control signals from an Control I/O Port to multiple HDMI inputs use the command **SPI xx RS 1 S yy**
 - » xx= RS-232 destination, yy= RS-232 source
 - » Send additional **SPI xx RS 1 S yy** commands for each additional destination

IR Remote Command List

IR Control is possible using remote model KD-REMOTEHM88 (included). Use the numerical keypad for XX, YY, and Z values below. Advanced unit setup should be completed in the KD Wizard software found on www.keydigital.com



All unit setup should be completed in the KD Wizard software found on www.keydigital.com

| Command | Sequence |
|---|--------------------------------------|
| Output Video Setup | |
| Set Output XX to Video Input YY | R1, X, X, Video Mode, Y, Y |
| Set Output XX Video Input Up | R1, X, X, Video Mode, UP |
| Set Output XX Video Input Down | R1, X, X, Video Mode, DOWN |
| Set All Outputs to Video Input XX | R1, Video Mode, Y, Y |
| Set All Outputs to Video Input Up | R1, Video Mode, UP |
| Set All Outputs to Video Input Down | R1, Video Mode, DOWN |
| Set All Outputs to Pass Through | R1, Video Mode, Audio Mode |
| Set Output XX Video Mute Enabled/Disabled | R1, XX, Video Mode, Mute/Restore |
| Set Output XX ON/OFF | R1, XX, Video Mode, R2, Restore/Mute |
| Set Output XX Debug Mode ON/OFF | R1, XX, Video Mode, R3, Restore/Mute |
| Set All Outputs Video Mute Enabled/Disabled | R1, Video Mode, Restore/Mute |
| Set All Outputs ON/OFF | R1, Video Mode, R2, Restore/Mute |
| Set All Outputs Debug Mode ON/OFF | R1, Video Mode, R3, Restore/Mute |

| Audio Output Setup | |
|--|--|
| Set Output XX Audio Volume to YY, YY=[00-99] | R1, XX, Volume, YY |
| Set Output XX Audio Volume Up | R1, XX, Volume, UP |
| Set Output XX Audio Volume Down | R1, XX, Volume, DOWN |
| Set Output XX Audio Balance to YY, YY=[00-40],U,D | R1, XX, Balance, YY/UP/DOWN |
| Set Output XX Audio Bass Freq. to YY, YY=[00-24],U,D | R1, XX, Bass, YY |
| Set Output XX Audio Middle Freq. to YY, YY=[00-24],U,D | R1, XX, Middle, YY |
| Set Output XX Audio Treble Freq. to YY, YY=[00-24],U,D | R1, XX, Treble, YY/UP/DOWN |
| Set Output XX Audio Delay to YY, YY=[00-99],U,D | R1, XX, LipSync, YY |
| Set Output XX Audio Mute Enabled/Disabled | R1, XX, Mute/Restore |
| Network Setup | |
| Set Host IP Address to xxx.xxx.xxx.xxx | R3, Bass, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X |
| Set Net Mask to xxx.xxx.xxx.xxx | R3, Middle, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X |
| Set Router IP Address (Default Gateway) to xxx.xxx.xxx.xxx | R3, Treble, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X, Video Mode, X, X, X |
| Set TCP/IP Port to zzzz | R3, Volume, X, X, X, X |
| Apply New Network Config | R3, All Restore |
| Set LAN Port1 by Y [1=1G-BaseT, 2=100BaseT, 3=Auto] | R3, 1, Audio Mode, X |
| Set LAN Port2 by Y [1=1G-BaseT, 2=100BaseT, 3=Auto] | R3, 2, Audio Mode, X |
| Set Group ID xxxx for Multicast, [0000=Unicast] | R4, Video Mode, X, X, X, X |
| Set Front Panel Button E/D (E=Enable,D=Disable) | R4, R2, Mute (Disable)/Restore (Enable) |
| Set RS232 Baud Rate to z bps [0=115200, 1=57600, 2=38400, 3=19200, 4=9600] | R4, R2, Bass, Z |
| Reset Unit to Factory Default | R4, R3, R2, R1, All Restore |

RS-232 and TCP/IP Commands

KD-Pro8x8D allows control over serial interface for bi-directional communication.

Use pins 3, 4, 5 for RS-232 communication.

In addition to RS-232, the serial interface may also be accessed using a TCP/IP connection

- » **Default IP address is 192.168.1.239, with default port 23**

Connection Protocol:

- » Baud Rate = 57,600 bits per second
- » Data Bits = 8
- » Stop Bits = 1
- » Parity = None
- » Flow Control = None
- » Carriage Return: Required

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

Response from Help command – Returns entire API in readable format:

KD-Pro8x8D> H

```
-----
--                               Key Digital Systems  HELP                               --
-----
--          KD-Pro8x8D                               F/W Version : 1.07          --
-- System Address : 00                               --
--
-- Azz          : All Commands may have Prefix System Address zz=[01-99] --
-- H            : Help                               --
-- PHO          : Help for Output Setup Commands    --
-- PHE          : Help for EDID Setup Commands      --
-- PHC          : Help for Control I/O Setup Commands --
-- PHT          : Help for Status Commands          --
-- PF           : Power Off                          --
-- PN           : Power ON                          --
--
-- SPC A xx     : Set System Address, xx = [00-99] (00=Single) --
-- SPC UM x     : Set System User Mode, x = [0-1] --
-- SPC FB E/D/T : Front Panel Buttons Enabled/Disabled/Toggle --
-- SPC BIRS z   : IR Source for HD8x8, z = [1-2] (1-Wired,2-Sensor) --
-- SPC RSB z    : Set RS232 Baud Rate to z bps, z=[0-4] --
--              [0:57600, 1:38400, 2:19200, 3:9600, 4:4800] --
-- SPC FAN z    : Set FAN Speed z [0:OFF, 1-8:SPEED LEVEL, 9:AUTO] --
-- SPC DISP z   : Set Front Display(LED) z [0:OFF, 1:ON, 2:AUTO] --
-- SPC TIME hh:mm:ss : Set Time by hh=[00~23], mm=[00~59], ss=[00~59] --
-- SPC PWRST hh:mm : Set Power Reset Time by hh=[00~23], mm=[00~59] --
-- SPCDF        : Factory Default without EDID change --
-- SPCDF zz     : Factory Default, zz=[01-15] (DEFAULT EDID 01-15) --
--
```

```

-- System Control Setup Commands: --
-- Network Setup, xxx = [000-255], zzzz = [0001-4999] --
-- SPC ETIPA xxx.xxx.xxx.xxx : Set Host IP Address to xxx.xxx.xxx.xxx --
-- SPC ETIPM xxx.xxx.xxx.xxx : Set Net Mask to xxx.xxx.xxx.xxx --
-- SPC ETIPR xxx.xxx.xxx.xxx : Set Route IP Address to xxx.xxx.xxx.xxx --
-- SPC ETIPP zzzz : Set TCP/IP Port to zzzz --
-- SPC IPRST ON/OFF : Set IP Auto Reset ON/OFF --
--
-- Video I/O Setup Commands: xx = [01-08,A], yy = [01-08] (A=All) --
-- SPI xx ON/OFF : Set Input ON/OFF --
-- SPO xx VM E/D/T : Set Output xx Video Mute Enabled/Disabled/Toggle --
-- SPO xx ON/OFF : Set Output ON/OFF --
-- SPO xx SI yy : Set Output xx to Video Input yy --
-- SPOSI aabbccddeeffgghh : Set Output 01-08 to Video Input aa~hh --
-- SPO A PT : Set All Input/Output Video to Pass-Through --
-- SPO xx H FM A/D/H : Set HDMI Output xx to Video Format by --
-- Auto/Forced DVI/BYPASS --
-- SPC ARC XX ON/OFF : Set ARC of HDMI Output xx to ON/OFF --
--
-- Audio Output DSP Setup Command ( xx=[01~08,A] A=All ) --
-- SPO xx AV yy : Set Output xx Audio Volume to yy=[00-99],U,D --
-- SPO xx AB yy : Set Output xx Audio Balance to yy=[00-40],U,D --
-- SPO xx AL yy : Set Output xx Audio Bass to yy=[00-24],U,D --
-- SPO xx AM yy : Set Output xx Audio Middle to yy=[00-24],U,D --
-- SPO xx AH yy : Set Output xx Audio Treble to yy, yy=[00-24],U,D --
-- SPO xx AD yy : Set Output xx Audio Delay to yy=[00-99],U,D --
-- SPO xx A E/D : Set Output xx Audio Mute Enabled/Disabled --
--
-- Control I/O Setup Commands: xx = [01-09,A], yy = [01-09] (A=All) --
-- z = [1-6], 1 = External I/O, 2 = HDMI Input, 3= HDMI Output --
-- 4 = CAT5e/6 Output, 9 = IR MIX from All CAT5e/6 Outputs --
-- SPC IRMX ON/OFF : Set IR Mix Mode ON/OFF --
-- SPI xx IR z S yy : Set from yy of z to HDMI Input(IR) xx --
-- SPI xx IRR z S yy : Route from yy of z to HDMI Input(IR) xx --
-- SPI xx RS z S yy : Set from yy of z to HDMI Input(RS232) xx --
-- SPI xx RSS z S yy : Route from yy of z to HDMI Input(RS232) xx --
-- SPOH xx IR z S yy : Set from yy of z to HDMI Output(IR) xx --
-- SPOH xx IRR z S yy : Route from yy of z to HDMI Output(IR) xx --
-- SPOH xx RS z S yy : Set from yy of z to HDMI Output(RS232) xx --
-- SPOH xx RSS z S yy : Route from yy of z to HDMI Output(RS232) xx --
-- SPOC xx IR z S yy : Set from yy of z to CAT5e/6 Output(IR) xx --
-- SPOC xx IRR z S yy : Route from yy of z to CAT5e/6 Output(IR) xx --
-- SPOC xx RS z S yy : Set from yy of z to CAT5e/6 Output(RS232) xx --
-- SPOC xx RSS z S yy : Route from yy of z to CAT5e/6 Output(RS232) xx --
-- SPE xx IR z S yy : Set from yy of z to Expansion I/O(IR) xx --
-- SPE xx IRR z S yy : Route from yy of z to Expansion I/O(IR) xx --
-- SPE xx RS z S yy : Set from yy of z to Expansion I/O(RS232) xx --
-- SPE xx RSS z S yy : Route from yy of z to Expansion I/O(RS232) xx --
--
-- SPI xx TRO y : Set HDMI Input(TRIGGER) xx to y [0=LOW, 1=HIGH] --
-- SPOH xx TRO y : Set HDMI Output(TRIGGER) xx to y [0=LOW, 1=HIGH] --
-- SPOC xx TRO y : Set CAT5e/6 Output(TRIGGER) xx to y [0=LOW, 1=HIGH] --
-- SPE xx TRO y : Set Expansion I/O(TRIGGER) xx to y [0=LOW, 1=HIGH] --
-- SPE RL z ON/OFF : Set Relay z=[1,2] ON/OFF --
--

```

```

-- EDID Setup, xx = [01-08,A], yy = [01-08], zz = [01-12] --
-- SPC EDID xx C yy : Copy EDID from Output CAT5e/6 yy to Input xx --
-- 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 --
--   DEFAULT EDID 02 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY --
--   DEFAULT EDID 03 : HDMI Video 1080i@60, Audio PCM,DTS/DOLBY/HD --
--   DEFAULT EDID 04 : HDMI Video 1080p@60/3D, Audio 2CH PCM --
--   DEFAULT EDID 05 : HDMI Video 1080p@60/3D, Audio PCM,DTS/DOLBY --
--   DEFAULT EDID 06 : HDMI Video 1080p@60/3D, Audio PCM,DTS/DOLBY/HD --
--   DEFAULT EDID 07 : HDMI Video 4Kx2K@24/30, Audio 2CH PCM Audio --
--   DEFAULT EDID 08 : HDMI Video 4Kx2K@24/30, Audio PCM,DTS/DOLBY --
--   DEFAULT EDID 09 : HDMI Video 4Kx2K@24/30, Audio PCM,DTS/DOLBY/HD --
--   DEFAULT EDID 10 : HDMI Video 4Kx2K@50/60(4:2:0), Audio 2CH PCM --
--   DEFAULT EDID 11 : HDMI Video 4Kx2K@50/60(4:2:0), Audio DTS/DOLBY --
--   DEFAULT EDID 12 : HDMI Video 4Kx2K@50/60(4:2:0), Audio HD Audio --
--   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 --
--
-- Status Commands: xx = [01-08,A], A = ALL --
-- STA : Show Global System Status --
-- STPC : Show Control System Setup Status --
-- STPExx : Show Expansion I/O xx Status --
-- STPIxx : Show Video Input xx Status --
-- STPOxx : Show Video Output xx Status --
-- STMA : Show Global System Status by Micro-Code --
-- STMC : Show Control System Setup Status by Micro-Code --
-- STMExx : Show Expansion I/O xx Status by Micro-Code --
-- STMIxx : Show Video Input xx Status by Micro-Code --
-- STMOxx : Show Video Output xx Status by Micro-Code --
-----

```

Status Command (STA) – Returns unit and system status in readable format:

KD-Pro8x8D> STA

```

-----
--           Key Digital Systems : KD-Pro8x8D           Status           --
-----
--   Unit Name : UN000001                               F/W Version : 1.00 --
--   System Address : 00,           Time : 00:00:59 --
--   Power : ON ,           Reset Time : 00:00 --
--   RS232 : Baud Rate=57600bps, Data=8bit, Parity=None, Stop=1bit --
--   Command Mode : Normal , IR Route Mode = 00 --
--   Front Panel Button : Enabled --
--   Front Display LED Mode : ON --
--   Control IR Source : SENSOR , IR MIX Mode = OFF --
--   Matrix Switcher Temperature : 10 C, Fan Speed : AUTO(8) --
--
--   Network Setting(Telnet Server) Status --
--   MAC Address = 60:89:B1:14:00:4E --
--   Host IP Address = 192.168.001.239 , LINK = OFF --
--   Net Mask = 255.255.255.000 --
--   Router IP Address = 192.168.001.001 , PING = FAIL --
--   TCP Port = 0023 , IP Auto Reset = ON --
--
-----

```

```

-- External I/O Status
-- 01: I/O TYPE = IR , SRC = None
-- 02: I/O TYPE = IR , SRC = None
-- 03: I/O TYPE = IR , SRC = None
-- 04: I/O TYPE = IR , SRC = None
-- 05: I/O TYPE = IR , SRC = None
-- 06: I/O TYPE = IR , SRC = None
-- 07: I/O TYPE = IR , SRC = None
-- 08: I/O TYPE = IR , SRC = None
-- 09: IR SRC = None , RS232 SRC = None
-- Relay1 = OFF, Relay2 = OFF
--
-- Video Input Status
-- 01: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 02: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 03: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 04: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 05: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 06: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 07: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
-- 08: EDID = DEFAULT07, Link = OFF, HDCP = NONE , Video = DVI (ON )
-- Control I/O TYPE = IR , SRC = None
--
-- Video Output Status
-----
-- 01: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = None
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = External I/O[01] , PWR = ON
-----
-- 02: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = None
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = External I/O[02] , PWR = ON
-----
-- 03: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = None
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = External I/O[03] , PWR = ON
-----
-- 04: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = None
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD
-- Control I/O TYPE = IR , SRC = External I/O[04] , PWR = ON
-----

```

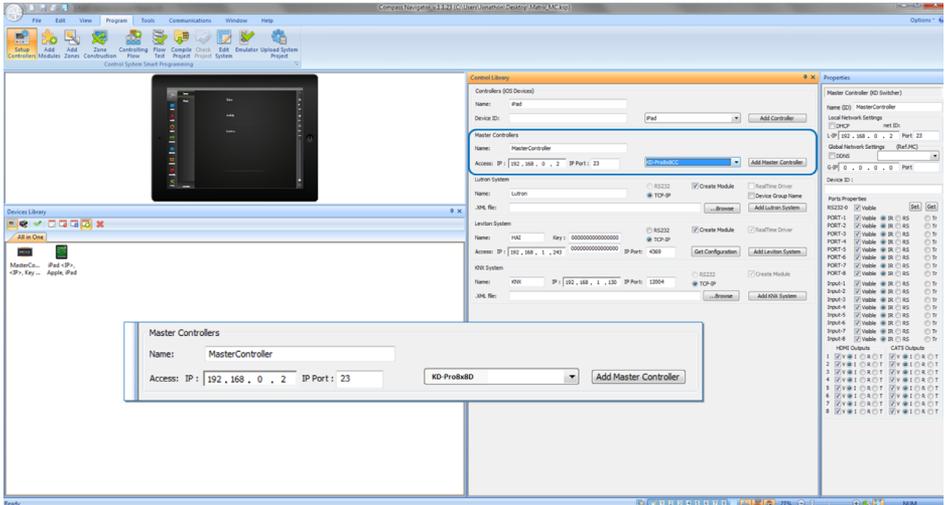
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-- 05: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON --
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = None --
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = External I/O[05] , PWR = ON --
-----
-- 06: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON --
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = None --
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = External I/O[06] , PWR = ON --
-----
-- 07: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON --
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = None --
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = External I/O[07] , PWR = ON --
-----
-- 08: Input = 01, Mode = AUTO(DVI ,DVI ), VM = UNMUTED, Output = ON --
-- HDMI= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = None --
-- CAT5= NONE , HPD = OFF, Link = OFF, HDCP = NONE , DDC = GOOD --
-- Control I/O TYPE = IR , SRC = External I/O[08] , PWR = ON --
-----
--
-- Audio Output Status
-- 01 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 02 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 03 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 04 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 05 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 06 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 07 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-- 08 : IN=HDMI, V=99, B=20, L=12, M=12, T=12, LP=00, Mute=OFF --
-----

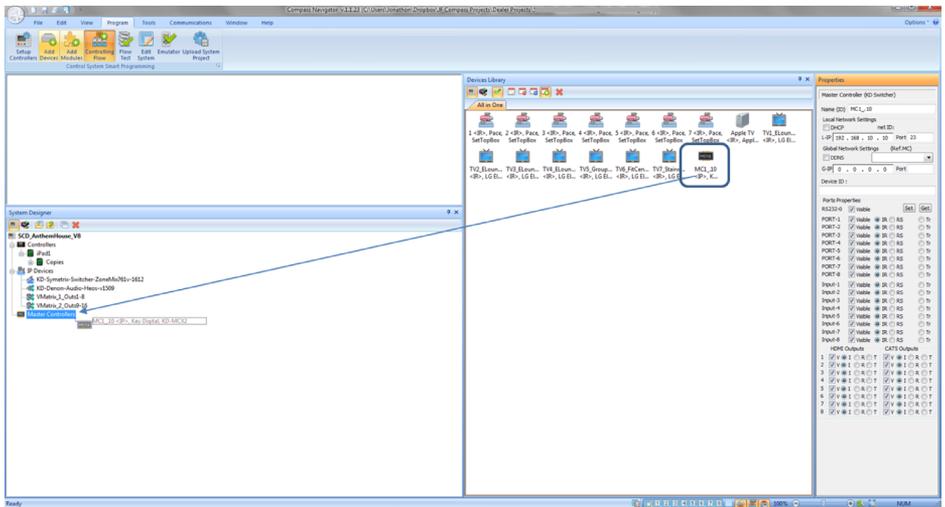
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Using KD-Pro8x8D in a Compass Control® Pro project

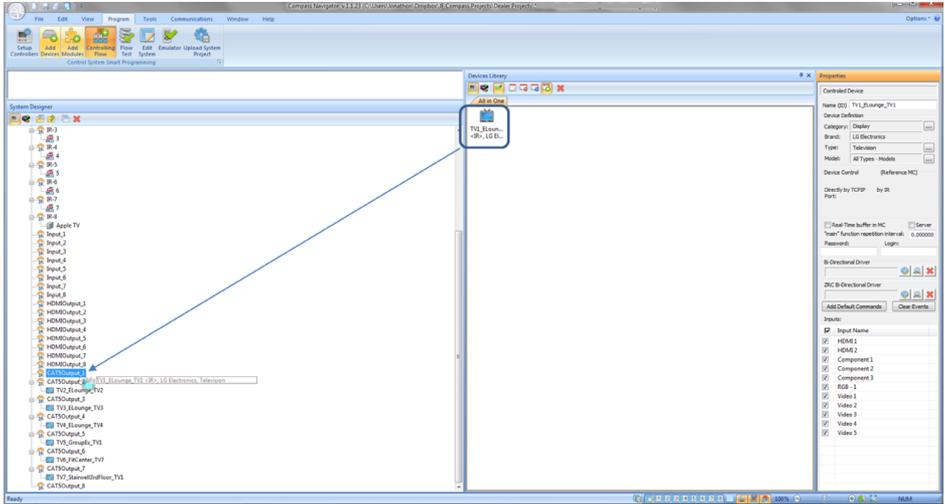
1. Choose your all-in-one matrix + MC in the **Setup Controllers** step. Add IP address, which must match IP address configured to matrix



2. In the **Controlling Flow** step, drag the MC from the **Devices Library** to the **Master Controllers** bullpen

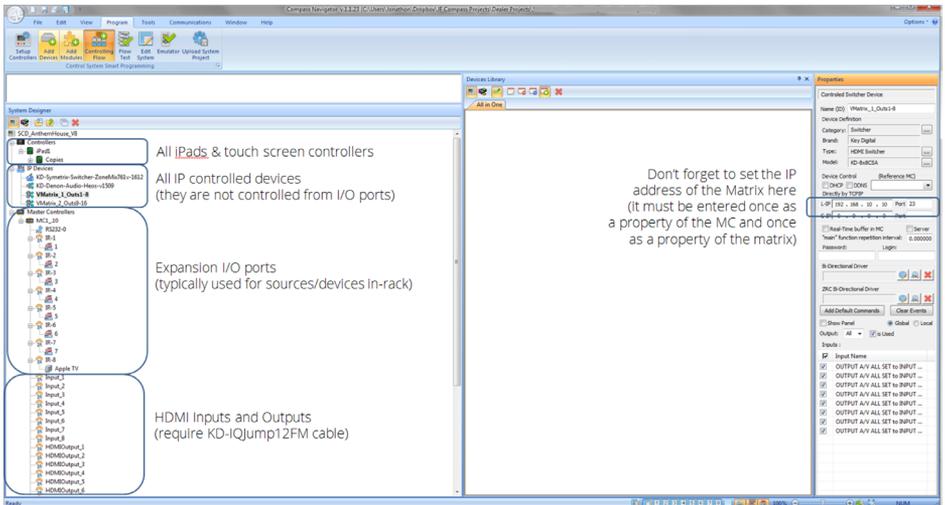


3. Drag desired devices from **Devices Library** to available MC ports. Displays connected via HDBaseT Rx are typically dragged to the ports labelled **CAT5Output_1-8**



4. Source and other in-rack equipment are typically controlled on the Expansion I/O Ports of the matrix MC. If you need to adjust from IR to RS-232, you may right-click a port to adjust.

Controlling Flow Work layout and port descriptions



Specifications

Technical:

- » Input (Each): 1 HDMI Connector, Type A, 19 Pin Female
- » Output (Each): 1 HDMI Connector, Type A, 19 Pin Female; 1 HDBaseT, CAT5e/6 on RJ45 connector; 6-Pin Terminal Block for Analog L/R Output; RCA Jack for Digital Audio Output [follows SPDIF format (IEC 60958)]
- » Control I/O (Each): 6-Pin Terminal Block configured as IR or RS-232 with variable voltage levels from +0.1V to +12V or as or Voltage Trigger fixed to +5V
- » Relay (Each): Configurable to NO (active), or NC (inactive) with 12A / 250VAC resistive switching capacity
- » TCP/IP (1): Supports 10/100BaseT up to 100Mbps
- » Video Bandwidth: TMDS bandwidth 10.2 Gbps
- » 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 Bi-directional buffering to Display and Source
- » Wired IR: modulated IR signal input, 0-5V TTL or -10to +10V.
- » Power:
 - » Matrix: +12V/6.6A (80W)
 - » HDBaseT: +12V/6.6A (80W)

General:

- » Regulation: CE, RoHS, WEEE
- » Enclosure: Black metal
- » Rack Mount: 2U, full rack-width (rack ears included)
- » Accessories: Rack Ears
- » Product: 17.3" x 6.6" x 3.46" ; Weight: 6.5 lbs
- » Packaging: 18.8" x 10.7" x 9.5"; Weight: 16 lbs



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

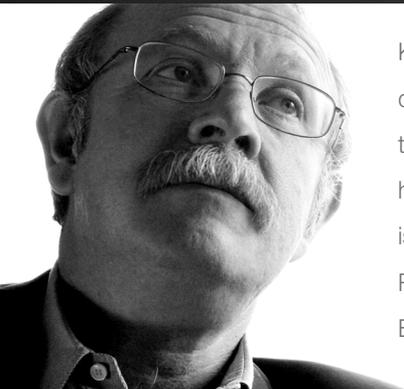
Please email any comments/questions about the manual to:

- › E-mail: customersupport@keydigital.com

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.