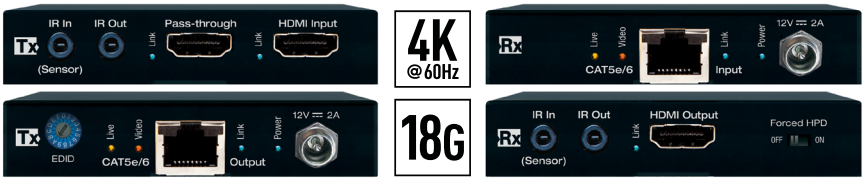
KD-EX18G

4K with HDR HDMI Extender Tx + Rx Kit.
Extends 4K 18G to 35m (115ft), 1080p to 50m (164ft).
4K to 1080p Down Convert, HDMI Pass Thru, Power over CAT, 2 Way IR, Handshake Control, Forced HPD

Operating Instructions



Key digital®

The Experts in Digital Video Technology and Solutions™

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Always follow the instructions provided in this Operating Manual.

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-EX18G is a UHDoTP HDMI extender Tx + Rx set with 4K/UHD resolution and bandwidth support up to 18Gbps and HDCP2.2 compliancy. KD-EX18G extends video resolutions up to 4096x2160 at 60hz with 4:4:4 chroma sub-sampling over a single CAT5e/6 cable up to 115ft (35m). 1080p signals are extended up to 164ft (50m). In addition to HDMI video and audio signals, KD-EX18G carries IR for controlling remotely located equipment. KD-EX18G features 4K to 1080p down convert, EDID handshake control, and hot plug detection integration tools, as well as an HDMI pass-thru port for connecting to AV Surround Receivers or local monitors.

Key Features

- **UHDoTP via Single CAT5e/6 UTP/STP Extension**: With fully automatic adjustment of feedback, equalization, and amplification depending on cabling length
- **4K Resolution Support**: 4096x2160 or 3840x2160 24/25/30/60hz at 4:4:4 (signals up to 18Gbps bandwidth)
- **Visually Lossless Compression**: 18G enabling technology applied to all video formats exceeding 10.2Gbps to accommodate UHDoTP transmission channel
- **4K to 1080p Down Convert**: Optional resolution conversion applied at UHDoTP output provides added integration options in retrofit installations as well as added distance performance
- **10G Pass-thru**: Mode enables uncompressed 10.2Gbps signal extension
- **Flexible Power over CAT (PoC)**: Only one power connection needed. Tx may power Rx, or Rx may power Tx.
- **Low Profile**: Slim chassis design
- **Signal Extension**: For resolution and cable quality
  - **4K/UHD:** Up to 35m (115ft) using CAT5e/6
  - **1080p:** Up to 50m (164ft) maximum
- **HDR10 (High Dynamic Range)**: More life-like images through a greater range of luminance levels
- **HDCP 2.2**: Compliancy up to HDCP 2.2 and backward compliant
- **Deep Color Support**: Up to UHD/4K 30Hz 4:4:4/12 bits or 60Hz 4:4:4/8 bit
- **EDID Control**: Internal library with 15 EDID handshakes including 4K with HDR in addition to native EDID data from Output/Display device connected to Rx
- **Hot Plug Detection Control**: Enables integrator to choose if active signal voltage is forced to connected display/output device
- **Full Buffer System™**: Manages TMDS re-clocking / signal re-generation, HDCP authentication with source & display, EDID handshake control, and Hot Plug Detection control
- **IR Sensor**: Sensor powering via +5V on IR In ports collects line-of-sight IR from remote(s) without external IR connecting block
- **Up/Down IR**: Two channels of IR enable control to/from devices or control systems connected to Tx and Rx units
- **HDMI Pass-Through**: Enables connection to local monitor or AV Receiver.
- **Surround Audio Support**: On HDMI pass-thru and UHDoTP outputs:
  - **HDMI Pass-Thru:** Supports Dolby®, Dolby® TrueHD, DTS™ and DTS-HD™ (formats up to 7.1)
  - **UHDoTP Output:** Supports Dolby®, DTS™ (formats up to 5.1/6.1)

Included Accessories

- 1x 12V/2A, 24W DC Power Supply (Screw-In Type). SKU: KD-PS12V2ASC
- 4x Mounting Brackets
- 1x IR Emitter, 1x IR Sensor

Quick Setup Guide

CONNECT:

Begin with the Tx and Rx units and all input/output devices turned off with power cables removed.

1. Connect your HDMI source to the input port of the Tx unit
2. Connect your HDMI display to the output port of the Rx unit
3. Connect a CAT5e/6 cable between Tx and Rx unit. Use 568-B termination.
4. Connect IR emitter from Tx or Rx unit to the IR receptor of the device you wish to control.
5. Mount IR Sensor in a location that can easily collect line of sight IR signals from remotes. Connect into the Tx or Rx unit's IR In port.
   - » If hard-wired, IR is needed couple IR Emitter from control system to IR sensor
6. **BEFORE** connecting power supply to power outlet, screw-in the power supply to the Tx or Rx unit
7. **AFTER** all connections are made, plug-in power supply to power outlet
8. Power on source and display

CONFIGURE:

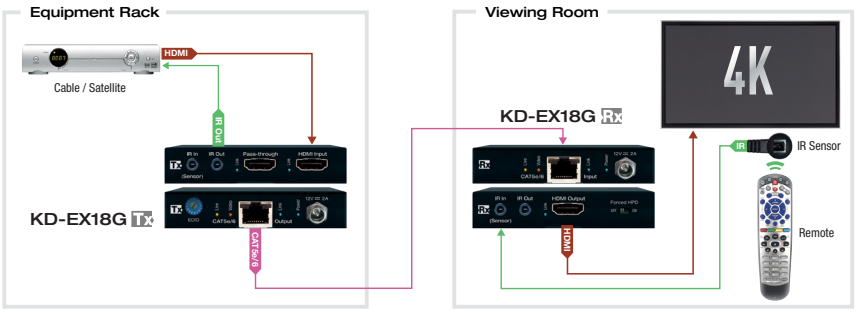
The default EDID handshake is 4Kx2K@60, 18G, HDR, 2ch audio (setting A) with 18G signal bypass. Use the EDID rotary to choose desired handshake to provide to connected source and the slide-switches to adjust 18G signal and hot plug detection handling.

Rack Mounting

In addition to mounting with the supplied L-Brackets, multiple KD-EX18G units 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.

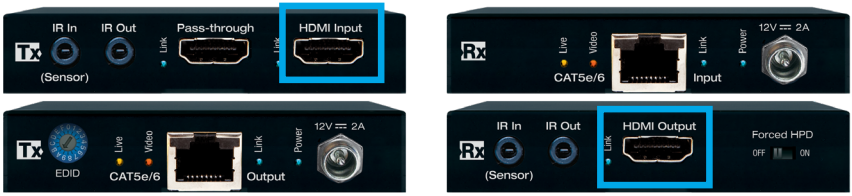
Application Example



Connections, Buttons, and LEDs

Before making any connections, power off your source and display devices.

HDMI Input & HDMI Output Connections

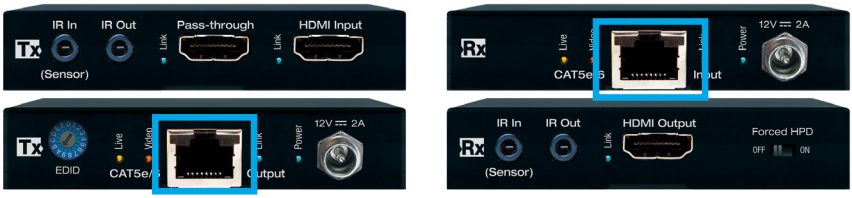


- **HDMI Input**: Using a short HDMI cable, connect your source device to the HDMI port labeled HDMI Input.
- **HDMI Output**: Using a short HDMI cable, connect your display device to the HDMI port labeled HDMI Output.
- For DVI-D/DVI-I sources or monitors, use appropriate adapters. For Display Port, use active converters.
  - 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 CEC pass thru
    - HDMI Input & Pass-thru ports support Dolby®, Dolby® TrueHD, DTS™ and DTS-HD™ formats up to 7.1ch

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

UHDoTP Output & UHDoTP Input Connections:



- Connect Tx unit's UHDoTP Output port to Rx unit's UHDoTP Input port using CAT5e/6 UTP or STP in 568-B termination.
  - UHD/4K: Up to 115ft (35m)
  - 1080p: Up to 164ft (50m)
  - Support Dolby®, DTS (5.1 formats max)
  - Use with third-party Tx or Rx extenders is not supported

IR In & Out Connections:

- IR Control ports are simultaneous and bi-directional
  - Tx Unit IR In corresponds with Rx unit IR Out. Tx Unit IR Out corresponds with Rx unit IR In.
  - Rx Unit IR In corresponds with Tx unit IR Out. Rx Unit IR Out corresponds with Tx unit IR In.
- Only the provided IR Sensor and IR Emitter should be used. Third-party sensors or emitters may not be compatible and/or may result in damage

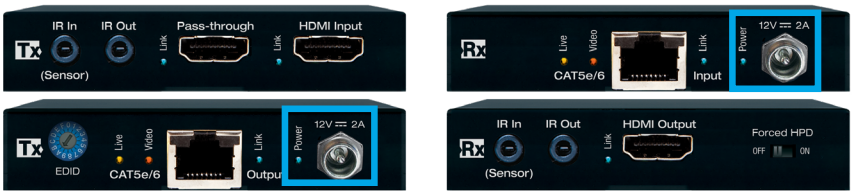
IR In & Sensor:

- Connect sensor directly into the Tx or Rx unit's IR In port to collect line-of-sight signals from device remotes.
  - No external IR distribution block or power supply is needed
- Receives signals from a 90° angle at up to 30 ft. away.
  - Maximum supported IR burst frequency is 55kHz.
- IR In Pinout (3.5mm Stereo):
  - Tip: IR Signal
  - Ring: 5V Power for powering IR Sensor
  - Sleeve: Ground
- IR In port does not support hard-wired control from control system / IR connection block.
  - IR from a control processor or IR connection block should be achieved by coupling IR Emitter and IR sensor

IR Out & Emitter:

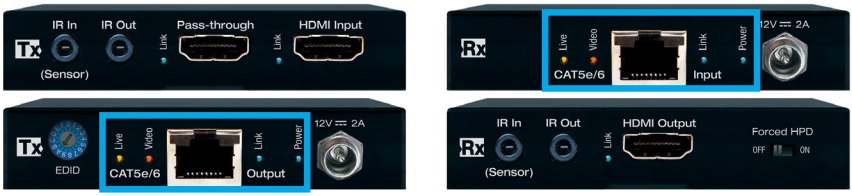
- IR Out driving power: 5V with 32mA minimum current
- IR Out Pinout (3.5mm Mono)
  - Tip: IR Signal
  - Sleeve: Ground
- IR Emitter Wiring:
  - Dashed/Marked wire: IR Signal
  - Solid/No Marking: Ground

Power Connection:



- 12V/2A (24W) power supply
- Only one power connection needed. May be connected at Tx or Rx unit
- Flexible Power over CAT (PoC). Tx may power Rx, or Rx may power Tx.
- Not compatible with third-party PoC devices

LED Indicator Lights:



- **Power:**
  - Color: **Blue**
  - Solid illumination during power on state, as provided by healthy connection with power supply and healthy PoC extension.
  - Steady blink if unit has is has a power short
- **Live**:
  - Color: **Yellow**
  - Steady blink from healthy unit CPU state
- **UHDoTP Link**:
  - Color: **Blue**
  - Solid illumination from healthy UHDoTP link between Tx and Rx units
- **Video**:
  - Color: **Orange**
  - Illumination with active TMDS (video + audio) signal
  - Off with no TMDS (video + audio) signal

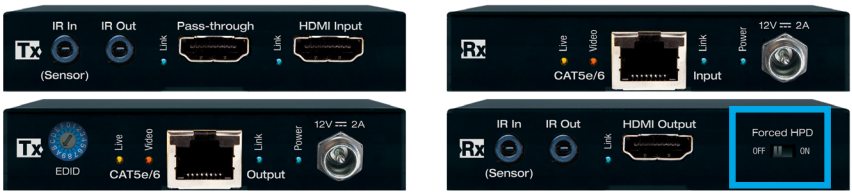
› **HDMI Link**:
- » Color: **Blue**
- » Tx Unit: Solid illumination from active signal from connected source
- » Rx Unit: Solid illumination from active Hot Plug Detection voltage with connected display/output device

EDID Rotary

- » EDID authentication is provided from the Tx unit to the connected input/source device.
- » 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 each source may behave differently.
- » Adjustments may be necessary to help achieve desired video and audio formatting and may speed up sync time.
- » The default EDID setting is position 7, 4K@60fps, 18G, 2ch audio

Position	EDID Handshake Description	EDID Rotary
0	Copy EDID from Rx Display/Output	 Note: Default position is "**7**"
1	1080i, 2CH AUDIO	
2	1080i, DOLBY/DTS 5.1	
3	1080i, HD AUDIO	
4	4Kx2K@60, 10.2G, HDR10, 2CH AUDIO	
5	4Kx2K@60, 10.2G, HDR10, DOLBY/DTS 5.1	
6	4Kx2K@60, 10.2G, HDR10, HD AUDIO	
7	**4Kx2K@60, 18G, HDR10, 2CH AUDIO**	
8	4Kx2K@60, 18G, HDR10, DOLBY/DTS 5.1	
9	4Kx2K@60, 18G, HDR10, HD AUDIO	
A	1280x720p@60 DVI (no audio)	
B	1920x1080p@60 DVI (no audio)	
C	4Kx2K@60, 18G, 2CH AUDIO ➔ 1080p Downconvert at Rx	**IMPORTANT: Please apply light pressure to the EDID rotary when making your selection.**
D	4Kx2K@60, 18G, DOLBY/DTS 5.1 ➔ 1080p Downconvert at Rx	
E	4Kx2K@60, 18G, HD AUDIO ➔ 1080p Downconvert at Rx	
F	Copy EDID from HDMI Pass-through	

Forced HPD Troubleshooting Tool:



In cases of many layers of connectivity or non-standard devices in-line, hot plug detection (HPD) may be lost or drop below standard levels, leading to the video display not detecting a connected source and resulting in no image.

- If set to ON, Hot Plug Detection (HPD) voltage is forced at the HDMI connection of the Rx unit. The connected display will be fed a constant voltage to inform the device that a partner is always connected and active.
- If set to OFF, Hot Plug Detection (HPD) voltage is passed-thru from connected source to the display

Specifications

Technical:

- Inputs Tx (Each): 1 HDMI, 1 IR
- Outputs Tx (Each): 1 UHDoTP, 1 IR
- Inputs Rx (Each): 1 UHDoTP, 1 IR
- Outputs Rx (Each): 1 HDMI, 1 IR
- Bandwidth: TMDS bandwidth 18Gbps
- Deep Color Support: Digital video formats in Deep Color Mode up to 12 bits per color
- DDC Communication: EDID and HDCP Bi-directional buffering from Display to Source
- HDMI Connector: Type A, 19 Pin Female
- RJ45 Connector: Shielded Link Connector, UHDoTP
- IR In & Out Connectors (Each): 3.5mm
- Power: (1) 12V/2A, 24W DC Power Supply (Screw-In Type). 100-240VAC, 50-60Hz. Interchangeable transformer plug with screw-in connector. SKU: KD-PS12V2ASC

General:

- Regulation: CE, RoHS, WEEE, EAC
- Enclosure: Black Metal
- Product (Each): 4.1” x 2.8” x 0.875”, Weight: 0.75 lbs

Accessories:

- 4x Mounting Brackets, 1x IR Emitter, 1x IR Sensor, 1x Power Supply

⚠ 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.Heed all warnings.
2. Do not use this device near water. Clean only with dry cloth.
3. Install in accordance with the manufacturer's instructions.
4. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
5. Only use attachments/accessories specified by the manufacturer.
6. 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 or 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 or 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

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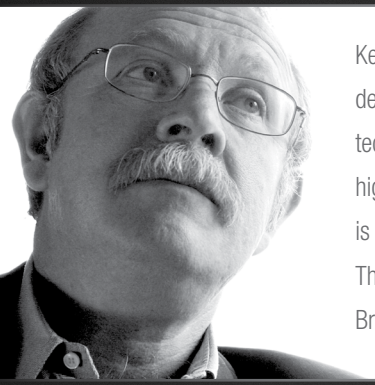

Key Digital®, led by digital video pioneer Mike Tsinberg, develops and manufactures high quality, cutting-edge technology solutions for virtually all applications where high-end video and control are important. Key Digital® is at the forefront of the video industry for Home Theater Retailers, Custom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

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