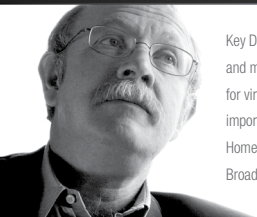HDMI
HIGH-DEFINITION MULTIMEDIA INTERFACE

KD-FIX418A

4K/18G HDMI Fixer with L/R & PCM Audio De-Embed Output

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.
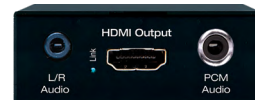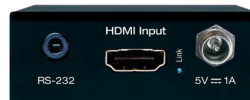
Key digital®

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About KD-FIX418A

Key Digital® KD-FIX418A is a 4K/18G HDMI connectivity repair and audio de-embedding solution which serves as an HDMI extension coupler, EDID handshake manager, and 18G to 10G down-converter when activating its various settings. Analog and digital audio de-embedding on 3.5mm stereo & PCM RCA connectors allow for integration of sources with no external audio connections into distributed audio systems, audio DSPs, amplifiers, or sound bars. KD-FIX418A supports all SD, HD, VESA and Ultra HD/4K video standards with HDR header information included in a variety of 4K EDID handshakes. Additionally KD-FIX418A can be controlled via RS-232 for implementing troubleshooting tools and collecting valuable troubleshooting connection data.

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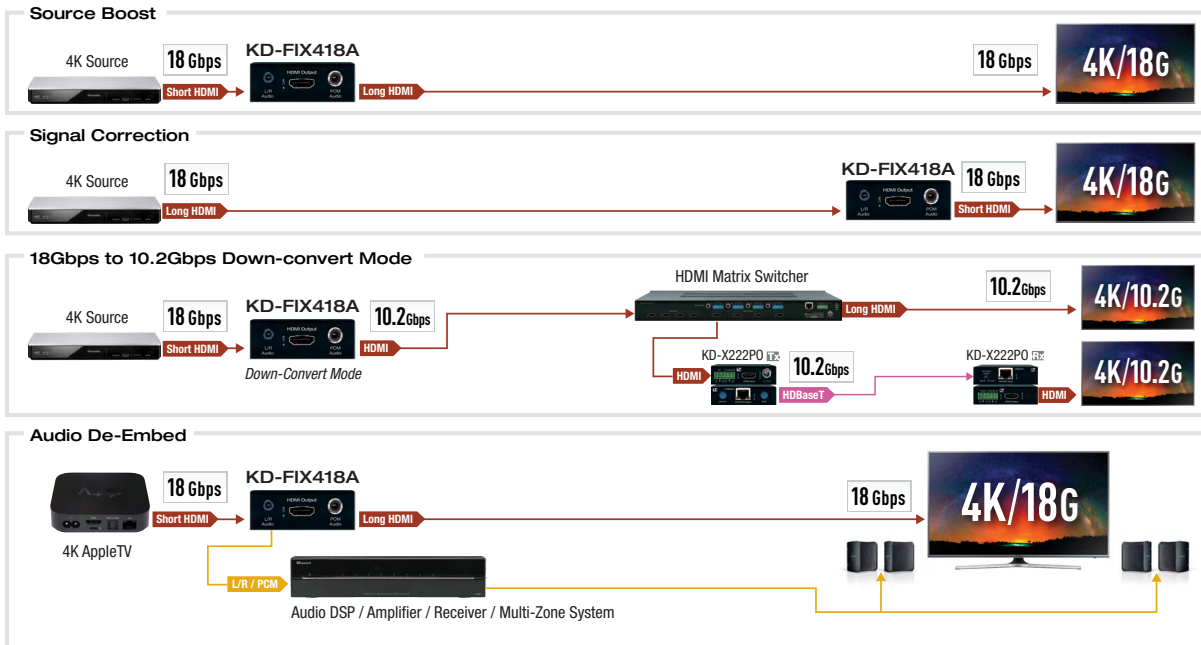
Key Features

> **HDMI Correction:** Resolves common HDMI integration obstacles related to Hot Plug Detection, EDID handshaking, HDCP authentication, and bandwidth

> **Audio De-embedding:** HDMI input audio is de-embedded on an analog 3.5mm stereo and digital PCM connector.

> **18G Down-Convert:** Incoming 18Gbps bandwidth HDMI signals may be down-converted for integration with existing 10.2Gbps systems/infrastructure

> **Ultra HD/4K:** Supports up to 4096x2160 or 3840x2160 24/25/30/60hz at 4:4:4 (signals up to 18Gbps bandwidth)

> **HDCP Licensing:** Fully licensed and compatible with HDCP 2.2

> **HDR10 and Dolby Vision:** More life-like images through a greater range of luminance levels

> **Resolution Support:** Supports all SD, HD, and VESA (VGA, SVGA, XGA, WXGA, SXGA, UXGA) up to 4096x2160p.

> **Deep Color Support:** Up to UHD/4K 30Hz 4:4:4/12 bits or 60Hz 4:4:4/8 bit

> **Full Buffer System™:** Manages TMDS re-clocking / signal re-generation, HDCP authentication to source & display, Hot Plug management, and EDID control handshake

> **EDID Management:** Internal library with 15 internal EDID handshakes including 4K with HDR in addition to native EDID data copied from the output/display

> **Lossless Compressed Digital Audio:** Dolby® TrueHD, Dolby® Digital Plus, DTS-HD Master Audio™, and Dolby Atmos

> **ARC Pass-thru:** From connected ARC supported display to connected ARC supported HDMI source

> **CEC Pass-thru:** From connected display to selected HDMI source

> **Control:** RS-232 control and connectivity status

Included Accessories

> Power Supply: KD-PS5V1ASC 5V/1A (5W) DC power jack, screw-in type

> Mounting: 2x L-bracket

Usage Modes

Source Boost

4K Source | **18** Gbps | **KD-FIX418A** | **18** Gbps | 4K/18G

Short HDMI | HDMI Output | L/R Audio | PCM Audio | Long HDMI

Signal Correction

4K Source | **18** Gbps | | **KD-FIX418A** | **18** Gbps | 4K/18G

Long HDMI | HDMI Output | L/R Audio | PCM Audio | Short HDMI

18Gbps to 10.2Gbps Down-convert Mode

4K Source | **18** Gbps | **KD-FIX418A** | **10.2**Gbps | HDMI Matrix Switcher | **10.2**Gbps | 4K/10.2G

Short HDMI | HDMI | *Down-Convert Mode* | Long HDMI

KD-X222PO | **10.2**Gbps | KD-X222PO | 4K/10.2G

HDMI | HDBaseT | HDMI

Audio De-Embed

4K AppleTV | **18** Gbps | **KD-FIX418A** | **18** Gbps | 4K/18G

Short HDMI | HDMI Output | L/R Audio | PCM Audio | Long HDMI

L/R / PCM

Audio DSP / Amplifier / Receiver / Multi-Zone System

*Maximum one active/directional HDMI cable may be used for 18Gbps signals

Quick Setup Guide

CONNECT:

1. Begin with the KD-FIX418A unit, input and output devices turned off with power removed
2. Connect your HDMI sources to KD-FIX418A's input port
3. Connect your HDMI display to KD-FIX418A's output port
4. Connect analog and/or digital audio outputs to amplifier, DSP, AV receiver, or sound bar
5. Screw-in the power supply to KD-FIX418A, then, plug-in to power outlet
6. Power on input and output devices

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-FIX418A 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.

Connections, LEDs, Slide Switches, and Rotaries

VIDEO INPUTS AND OUTPUTS:

HDMI Input:

› The HDMI input is located on the short end beside the power.
› Blue LED near the HDMI connector illuminates solid to indicate an active HDMI signal is incoming.

HDMI Output:

› The HDMI output is located on the short end beside the RCA PCM
› Blue LED near the HDMI connectors illuminates solid when Hot Plug Detection (HPD) is received from the display/output device and there is an active incoming HDMI signal.
› The LED will blink steadily when there is no HPD from the display but an active HDMI signal is incoming.

HDMI Input/Output Port Specifications:

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

Supported standard 4K Video Formats:

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

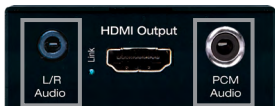**AUDIO OUTPUTS:**

Analog L/R Audio Output:

> 3.5mm stereo jack with de-embedded audio from the selected HDMI source
> Drives audio signals up to 1 VRMS with a sampling rate of 192KHz
> Automatically mutes if audio formatting is not PCM 2ch

PCM Digital Audio Output:

> RCA audio output with de-embedded audio from the selected HDMI source
> SPDIF IEC 60958 format
> Compatible with sampling rates up to 192KHz
> Supports multi-channel Dolby® and DTS™ surround formats up to 5.1
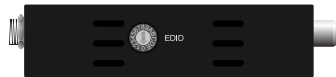> Automatically mutes if audio formatting is not PCM, Dolby®, or DTS™

For all audio de-embed outputs:

> There are no volume or tone control features
> There are no DSP features

Audio Input Signal Format	Audio L/R Output	Digital Audio Output
2ch PCM	Pass-Through	Pass-Though
Multi-Channel PCM	Front L&R Pass-through	MUTE
Dolby DTS	MUTE	Pass-Though
HD Audio	MUTE	MUTE

RS-232:

> 3.5mm tip, ring ,sleeve (stereo) connection
> Commands and feedback found in the RS-232 Commands section
> Communication typically done with third-party terminal software like TeraTerm or PuTTY
> Pin out:
>> Tip = RS-232 Tx Data
>> Ring = RS-232 Rx Data
>> Sleeve = RS-232 Ground

EDID Handshaking Rotary:

EDID authentication is provided from the KD-FIX418A to the connected input/source

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

Position	EDID Handshake Description	EDID Rotary
0	Copy EDID from HDMI Output	
1	1080i, 2CH AUDIO	
2	1080i, DOLBY/DTS 5.1	
3	1080i, HD AUDIO	
4	1080p, 2CH AUDIO	
5	1080p, DOLBY/DTS 5.1	Note: Default position is "**A**"
6	1080p, HD AUDIO	
7	4Kx2K@60, 10.2G, HDR, 2CH AUDIO	
8	4Kx2K@60, 10.2G, HDR, DOLBY/DTS 5.1	IMPORTANT: Please apply light pressure to the EDID rotary when making your selection.
9	4Kx2K@60, 10.2G, HDR, HD AUDIO	
A	4Kx2K@60, 18G, HDR, 2CH AUDIO	
B	4Kx2K@60, 18G, HDR, DOLBY/DTS 5.1	
C	4Kx2K@60, 18G, HDR, HD AUDIO	
D	1280x720p@60 DVI (no audio)	
E	1920x1080p@60 DVI (no audio)	
F	4Kx2K@30, 10.2G, HDR, 2CH AUDIO	

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 source not detecting a display/sync device and not outputting a signal. A display device may also not detect a connected source in cases of failed hot plug detection.

> **When ON**, Hot Plug Detection voltage is fixed ON to the connected source, informing it that it always has a live sync/display to receive its signal

> Standard HPD behavior (bypass) when set to OFF position

18G → 10G Conversion:

> **When ON,** KD-FIX418A will apply color space conversion of the 18G signal's chroma sub-sampling. The incoming 4:4:4 content will be output of KD-FIX418A at 4:2:0 lessening the overall TMDS bandwidth from 18G to 10.2G max

> **When ON,** the above described color space adjustment will only apply if the incoming signal is greater than 10.2G

> **When OFF,** the incoming signal is passed through without any color space conversion regardless of the signal's bandwidth

RS-232 Commands

KD-FIX418A allows control over serial interface for bi-directional communication.

Use a TRS cable for RS-232 communication.

Pin Out:

- » Tip = RS-232 Tx Data
- » Ring = RS-232 Rx Data
- » Sleeve = RS-232 Ground

Connection Protocol:

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

Notes:

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

Status Command (STA). Returns unit status and settings in readable format:

```
KD-FIX418A> STA
------------------------------------------------------------------------
--             Key Digital Systems STATUS              --
------------------------------------------------------------------------
-- KD-FIX418A      System Address = 00      F/W Version : 1.00  --
--                                                             --
-- RS232 : Baud Rate=57600bps, Data=8bit, Parity=None, Stop=1bit  --
--                                                             --
-- Video Input  : EDID = DEFAULT 00,  LINK = ON               --
-- Video Output : Output = ON , LINK = ON , DBG = OFF          --
-- Audio Output : Analog = Enabled, Digital = Enabled          --
------------------------------------------------------------------------
```

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

```
KD-FIX418A> H
------------------------------------------------------------------------
--             Key Digital Systems HELP                --
------------------------------------------------------------------------
-- KD-FIX418A       System Address = 00      F/W Version : 1.00  --
--                                                             --
-- Azz   : All Commands may have Prefix System Address zz=[01-99] --
-- H     : Help                                               --
-- STA   : Show Global System Status                          --
--                                                             --
-- Video Output Setup Commands:                               --
-- SPO ON/OFF   : Set Output 01 ON/OFF                        --
-- SPO DBG ON/OFF : Set Debug Mode ON/OFF                     --
--                                                             --
-- Audio Output Setup Commands: [E=Enable, D=Disable]         --
-- SPO AA E/D : Enable/Disable External Analog Audio Output   --
-- SPO DA E/D : Enable/Disable External Digital Audio Output  --
--                                                             --
-- System Address Setup Command: xx = [00-99], 00 = Single    --
-- SPC Axx  : Set System Address to xx                        --
--                                                             --
-- System Control Setup Commands:                             --
-- SPC RSB z  : Set RS232 Baud Rate to z bps, z=[0-4]         --
--        [0:57600, 1:38400, 2:19200, 3:9600, 4:4800]         --
-- SPC DF   : Reset to Factory Defaults                       --
------------------------------------------------------------------------
```

Specifications

Technical:

> HDMI Input (Each): HDMI Connector, Type A, 19 Pin Female
> HDMI Output: HDMI Connector, Type A, 19 Pin Female
> HDMI Bandwidth: TMDS bandwidth 18Gbps
> DDC Signal (Data): Input DDC Signal - 5 Volts p-p (TTL)
> HDMI Video/Audio Signal: Input Video Signal - 1.2 Volts p-p
> 3.5mm Stereo Audio Output: Line level audio on TRS connector. Drives 1 VRMS line audio output with a sampling rate of 48kHz
> Analog Audio Max Output Level: 4dBu on 150kΩ, DC coupling
> Digital PCM Audio Output: RCA female for digital audio following SPDIF format (IEC 60958). Supports sampling rate up to 192KHz
> PCM Max Output Level: 1Vpp on 75Ω, DC coupling
> Audio Bandwidth: 20Hz to 20kHz @ 0dBu
> TND + Noise: 0.33% @0dBu @ 1kHz
> PCM Max Input Level: 1Vpp on 75Ω, AC coupling
> Power Supply: KD-PS5V1ASC, 5V/1A, 100-240VAC, 50-60Hz, Interchangeable head, screw-in connector

General

> Regulation: CE, RoHS, WEEE, EAC
> Enclosure: Black metal
> Power Supply: USB to micro USB cable (power adapter not included)
> Product: 2.17" x 3.085" x 0.68", Weight: 4 oz
> Packaging: 2.5" x 3.5" x 1", Weight: 6 oz

⚠ 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®

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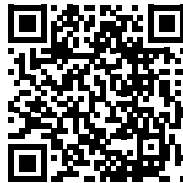
> Phone: 914-667-9700
> E-mail: rma@keydigital.com

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

Visit product page for most recent version
of the manual, firmware, control drivers
and all additional downloads.