

# Phantom Series™

## HDMI®/DVI Switchers

# Operating Instructions



The Experts in Digital Video Technology and Solutions™

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. We provide total video system solutions because we know and help drive the technology, the industry, the business, and all the latest up-and-coming standards. But most of all, we know exactly what you need for your unique application - the right solution.



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KD-HDSW2X1



KD-HDSW3X1



KD-HDSW4X1



Key Digital® Phantom Series™ HDMI/DVI switchers are designed and engineered to offer the best in quality, performance, and reliability while providing a cost effective HDMI/DVI switching solution. The KD-HDSW2X1, KD-HDSW3X1, KD-HDSW4X1 HDMI switchers provide multiple input to one output switching and maintain crystal-clear, pristine picture and sound quality. Phantom Series™ HDMI switchers are a transparent solution for all digital video/audio switching applications and support all HD and SD video standards, including 1080p/60. In addition, the KD-HDSW line has complete support for the latest 3D technology. KD-HDSW switchers feature iAS™ Intelligent Auto Sense signal detection and switching, pushbutton control, IR, RS-232, status-monitoring LEDs, and support for HDMI CEC. KD-HDSW Phantom Series™ switchers support multiple unit expandability, and are individually addressable.

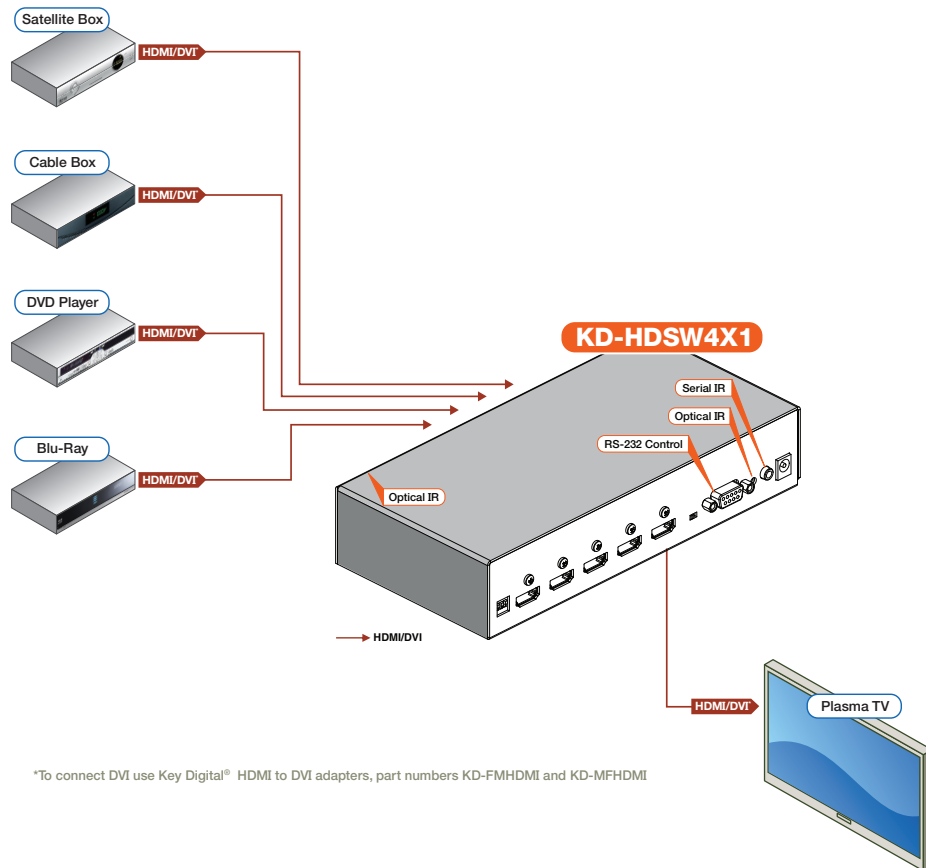


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## Quick Setup Guide

- > **Step 1:** Find a safe and convenient location to mount or place your KD-HDSW unit
- > **Step 2:** Begin with the KD-HDSW unit and all input/output devices turned off with power cables removed
- > **Step 3:** Connect your HDMI or DVI-D source devices to the input ports of your KD-HDSW unit
- > **Step 4:** Connect your HDMI or DVI-D display to the output port of your KD-HDSW unit
- > **Step 5:** Connect the desired IR or RS-232 control inputs to your KD-HDSW unit
- > **Step 6:** Be sure the Operation Mode Switch is set to the "Normal" position
- > **Step 7:** Connect power to the KD-HDSW unit
- > **Step 8:** Power on input/output devices



Note: No signal conversion is done on the KD-HDSW2X1; KD-HDSW3X1; KD-HDSW4X1.  
If input signal is HDMI output signal will be HDMI. If input signal is DVI output signal will be DVI.

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Always follow the instructions provided in this Operating Manual.

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## Introduction

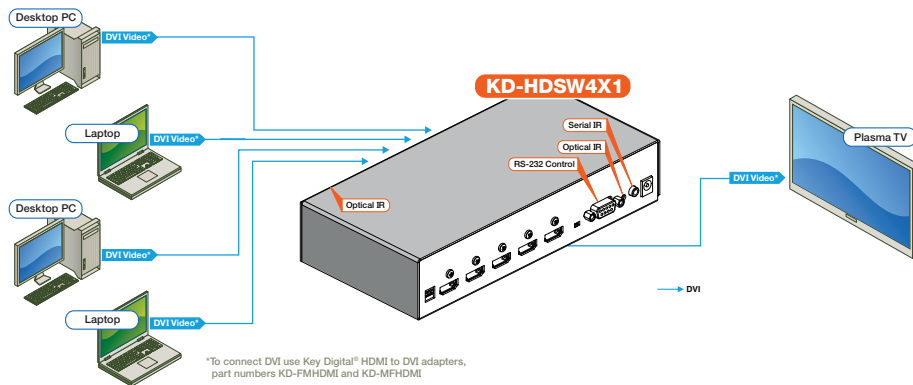
Thank you for purchasing a Key Digital Phantom Series™ KD-HDSW HDMI switcher. KD-HDSW switchers are designed to interface your HDMI or DVI-D source devices, such as DVD players, Satellite Boxes, Digital Video Recorders (DVR), Set Top Box, or PCs to your HDMI or DVI-D compatible display.

### About the KD-HDSW2X1; KD-HDSW3X1; KD-HDSW4X1

- › Digital switching of multiple (2, 3, or 4) HDMI inputs to one (1) HDMI output
- › 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 / DVI: From 640x480p up to 1920x1200p
- › EDID Control featuring 4 internal library settings or auto EDID selection of display
- › Supports signal rates up to 10.2 Gb per second
- › iAS™ Intelligent Auto Sensing of signal presence and switching to active input
- › Supports HDMI and DVI-D
- › Compliant with HDCP copyright protection
- › Compliant with all HDMI® versions
- › Supports CEC (Consumer Electronics Control)
- › Pushbutton, IR Sensor, and RS-232 control
- › Input and Output status indicated by LED
- › Compatible with all control systems
- › Firmware upgradable
- › Rack mountable

### DVI Applications for KD-HDSW2X1; KD-HDSW3X1; KD-HDSW4X1

KD-HDSW switchers can also be used with DVI-D sources and displays. For these applications, use DVI to HDMI (Key Digital model number KD-MFHDMI or KD-FMHDMI) adapters. Note that while HDMI supports both video and audio over an HDMI cable, DVI-D supports only video.



## Accessories

- › External 5 Volt 3 Amp power supply
- › IR Remote Control
- › Rack Ears
- › Operating Instructions
- › Warranty Card
- › IR Receiver with 3.5 mm Male Stereo Plug

## Installation and Operation

Before permanently securing the unit for final installation of cabling behind walls or ceilings, test for proper operation of the unit and the cables in your system. It is recommended that you leave enough ventilation space to provide sufficient airflow and cooling, especially if you are going to leave the unit powered at all times.

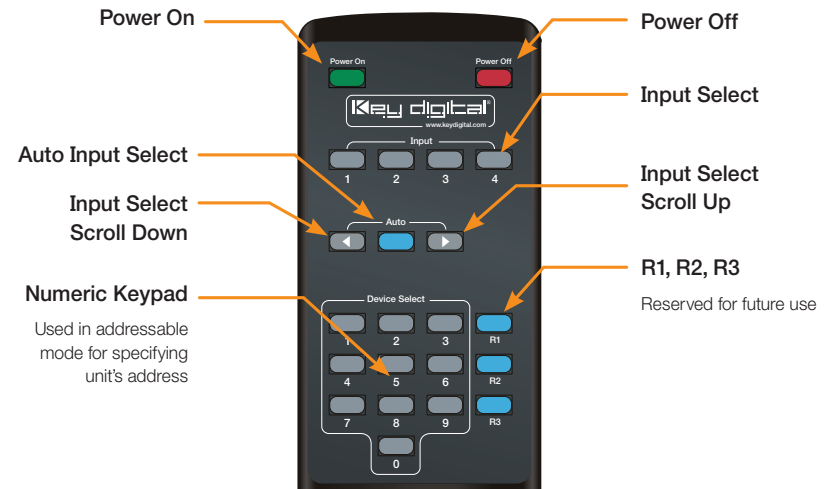
### Pushbutton Control

Your KD-HDSW unit may be controlled via the pushbutton on the front of the unit. Select your desired input by depressing the "Input Select" button. The front LED indicators (1, 2, 3, 4) correspond to the input that has been selected.



### IR Remote Control

The KD-HDSW can also be operated using the IR remote control provided with your unit. The KD-HDSW switcher features IR sensors on the front and rear of the unit for reception of the IR command signals.



### Serial IR & IR Emitter Control

- › The “Serial IR” port requires the use of a Male 3.5mm Mono cable (not included) with the IR command signal being carried on the “Tip” of the input inserted into the KD-HDSW unit. The location of the IR signal may vary by control system used. Please verify the location of the IR signal with your control system.



- › When using the IR Emitter / IR Extender (sold separately), the IR Emitter must be mounted over the IR Sensor on the KD-HDSW unit. It is recommended that the rear IR sensor of the KD-HDSW unit be utilized for these applications. One end of the cable is connected to the IR Receiver / Master Controller / IR Extender / IR Connecting Block, while the other end is mounted over the IR Sensor of the KD-HDSW unit.



### RS-232 Commands and Protocol

- › KD-HDSW units are compatible with all Control Systems, such as AMX®, Control4®, Crestron®, RTI®, Universal®
- › Connect your Control System's Master Controller to the KD-HDSW unit using the RS-232 port. Follow all instructions provided with your control system.
- › RS-232 Protocol:
  - › Baud Rate = 9600 bits per second
  - › Data Bits = 8
  - › Parity = None
  - › Stop Bits = 1
  - › Flow Control = None

#### RS-232 Command List:

RS-232 Command	Description	Comments
pwr_1	Power On	
pwr_0	Power Off	
sel_x	x = 1-4, 5, 6	1-4 = Input #, 5 = Up, 6 = Down
asl	Auto Select Enable/ Disable	
hep	Help	Full RS-232 command listing
sta	Status	“s1y” y = active input

sir_x_x_y	Addressing per Command	x x = desired two-digit address for command (01 – 99) y = Input Select, Up, Down (1-4, 5, 6)
gir	Address Setting Status	
dir_y	Delete Address Setting per Command	y = Input Select, Up, Down (1-4, 5, 6)

- › All RS-232 commands must be in lower case letters, require spaces where indicated above with ( \_ ), and require a carriage return to be sent.

### Multiple KD-HDSW Unit Configurations

Up to 99 individually addressable units can be installed. KD-HDSW switchers allow you to assign a two-digit address to each unit or each of the selectable inputs. This capability can be configured via IR or the RS-232 port.

#### › Addressing Buttons / Units via IR

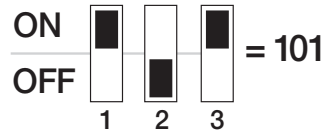
- › With power enabled on the unit, press the “Power On” button. The “Input Select” LED lights will begin to blink, indicating that the KD-HDSW unit is ready to receive the address information.
- › Press the first digit (0 – 9) of the two-digit address. Once this first digit has been received “Input Select 1” LED will blink.
- › Press the second digit (0 – 9) of the two-digit address. Once this second digit has been received “Input Select 1” and “Input Select 2” LED’s will blink.
- › Press the Input Select button (Input 1 – Input 4, Up or Down) that you wish to assign the two-digit address to. Once this is completed, all “Input Select” lights will become solid indicating that the Input Select button has now been re-addressed.
- › Repeat Steps 2 through 4 if you wish to assign an address to additional “Input Select” buttons or to your entire KD-HDSW unit.
- › Press “Power On” button to exit addressing mode when completed.

#### › Addressing Buttons / Units via RS-232

- › See “RS-232 Commands and Protocol” section for RS-232 Addressing Commands
- › To address an Input, use “sir\_x\_x\_y” command. To address an entire unit, repeat command for each Input, Up, and Down
- › For address settings, use “gir” RS-232 command to receive a list of address settings
- › To delete address settings, issue “dir\_y” RS-232 command

## EDID Control Settings

At times, your HDMI sources and display may not synchronize properly. This is when EDID\* control should be utilized. KD-HDSW switchers feature an internal library of default settings that modify KD-HDSW input port's EDID to ensure that your HDMI source's output is compatible with your display.



**NOTE: the DIP settings are 0 = down / off and 1 = up / on.** Please reset the unit by either unplugging and plugging the HDMI connections, or via a power cycle for the new settings to take effect.

### Dip Switch Configurations:

Configuration	Description
000	Bypass (EDID Information of Display)
001	Video = 1080i, Audio = L/R Stereo
010	Video = 1080i, Audio = All Audio formats including HDMI 1.3a/b
011	Video = 1080p Audio =L/R Stereo
100	Video = <b>3D</b> 1080p, Audio = L/R Stereo
101	Video = <b>3D</b> 1080p, Audio = All Audio formats including HDMI 1.3a/b
All Others	Bypass (EDID Information of Display)

\*EDID (Extended display identification data) is a data structure provided by a display to describe its capabilities to a source device.

## Using iAS Intelligent Auto Sense™

**iAS INTELLIGENT AUTO SENSE™** iAS Intelligent Auto Sense™ will switch automatically when Hot Plug Detect signal becomes active on an input. iAS Intelligent Auto Sense™ can be enabled and disable via IR or RS-232 control. Please note that many common HDMI sources, such as a Cable or Satellite Box, will emit Hot Plug Detect signals when in stand-by mode and may prevent full functionality of iAS Intelligent Auto Sense™.

## Firmware Upgrades

From time-to-time, Key Digital provides updates for the firmware that operates and controls your KD-HDSW unit. These updates are optional, and you should only perform upgrades as provided and instructed by Key Digital. Periodically check out web site at [www.keydigital.com](http://www.keydigital.com) for the latest firmware updates for your unit.

### Firmware Upgrade Procedure

- Make sure you have the required equipment for upgrading your KD-HDSW device:
  - PC with a serial port capable of 57600 Baud Rate
  - Straight male-female DB9 serial cable no longer that 10 ft.  
*Note: Null modem cable is NOT supported.*
- Download desired firmware from [www.keydigital.com](http://www.keydigital.com). Unzip the firmware ZIP file to any directory on your PC.
- Make sure that no devices are using the Serial COM port on your PC.
- Disconnect Power from the KD-HDSW unit.
- Set the rear panel Operation switch to "Program".
- Connect an RS-232 cable to the serial port on your PC and the other end to the RS-232 port on the rear panel of the KD-HDSW unit.
- Double-click the "UartBootLoader.exe" file. The Key Digital BootLoader window will pop up.
- Reconnect Power to the KD-HDSW unit.
- Select the correct port used for your computer's RS-232 connection.
- Push "Open File" button and select firmware file (file extension .hex)
- Press "Start" button
- When the firmware had been updated, disconnect the power supply from your KD-HDSW unit. The power supply **MUST** be disconnected (either from the back of your unit or from the wall outlet) to have a complete power shutdown reset.
- Disconnect the RS-232 cable between the unit and your PC.
- With the power disconnected, set the rear-panel Operation switch to "Normal" mode.
- Reconnect the power supply to your KD-HDSW unit. The firmware upgrade is now complete and your KD-HDSW unit is now ready for operation.

## Mechanical / Technical Specifications

Inputs	4/3/2 HDMI Connectors
Outputs	1 HDMI Connector
Bandwidth	TMDS bandwidth 10.2 Gb/s
Compliance With HDMI® Standard	All HDMI Versions and HDCP.
Link	Single Link: 1080p/60, 12 bit color depth, 1920x1200 max.
Deep Color Support	Supports digital video formats in Deep Color Mode at up to 12 bits/color
Lossless Compressed Digital Audio	Supports lossless compressed digital audio (Dolby® TrueHD, Dolby® Digital Plus and DTS™-HD Master Audio)
DDC Signal (Data)	Input DDC Signal: 5 Volts p-p (TTL)
HDMI Video/Audio Signal	Input Video Signal: 1.2 Volts p-p
HDMI Connector	HDMI Connector: Type A, 19 Pin Female
I2C Communication	EDID and HDCP Bi-Directional Transparency from Display to Source
EDID Control	Active outputs connected via HDMI, or from internal library of default 4 EDID settings
Control	For RS-232 Db9 Female connector for Tx, Rx and ground. For IR two optical windows and wired 3.5 mm female mini-stereo connector. Push button and top LED's.
Switching	Switching of all Video and Audio simultaneous
Power Source	5 Volt DC @ 3 Amp, 100-240 VAC, 50-60 Hz
Dimensions	W=8.5", H=1.75", D=4"
Weight	2 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



**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](mailto: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](mailto: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](mailto:rma@keydigital.com)

### Feedback

Please email any comments/questions about the manual to:

- › E-mail: [customersupport@keydigital.com](mailto: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 two-year parts and labor warranty.