

KD-MSW8x4Pro 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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521 East 3rd Street, Mount Vernon, NY 10553

Phone: 914.667.9700 Fax: 914.668.8666

Web: www.keydigital.com

KD-MSW8x4Pro

HDTV Matrix Switcher

8 Inputs to 4 Outputs HDTV Matrix Switcher with Volume Control

OPERATING INSTRUCTIONS



These Operating Instructions apply to the entire
Key Digital® Fat Boy Series line of HDTV Matrix Switchers:

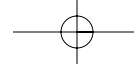
KD-MSW8x4Pro	8x4 HDTV Matrix Switcher (single base unit)
KD-MSW8x4Pro - 8x8	8x8 HDTV Matrix Switcher (2 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x12	8x12 HDTV Matrix Switcher (3 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x16	8x16 HDTV Matrix Switcher (4 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x20	8x20 HDTV Matrix Switcher (5 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x24	8x24 HDTV Matrix Switcher (6 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x28	8x28 HDTV Matrix Switcher (7 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x32	8x32 HDTV Matrix Switcher (8 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x36	8x36 HDTV Matrix Switcher (9 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x40	8x40 HDTV Matrix Switcher (10 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro - 8x44	8x44 HDTV Matrix Switcher (11 base units of 8x4 and Cable Kit)

The KD-MSW8x4Pro by Key Digital® is a part of Fat Boy family of switchers. With 8 Inputs and 4 Outputs, the full matrix non-blocking switcher and distribution amplifier allows each one of the 4 outputs to be seamlessly connected to any one of the 8 available inputs. The KD-MSW8x4Pro offers the factory installed expansion capability to up to 44 outputs and professional Fade-to-Black and Audio/Video Muting features. It directly supports component (YPbPr) and RGBHV video formats, as well as S-Video and Composite video formats (with appropriate cable adapters). Concurrently with the video, it switches and distributes both PCM coaxial digital audio and analog stereo audio (analog stereo audio is not available when RGBHV configuration is used). The KD-MSW8x4Pro features volume control functionality for analog stereo audio L/R channels. With analog video bandwidth of up to 300 MHz, the KD-MSW8x4Pro handles all standard HD and SD video resolutions (at 50 and 60 Hz) including 1080p/60, with no degradation in video quality. The KD-MSW8x4Pro is simple to operate and control via front panel buttons. The LEDs offer selection monitoring. The switcher is offered with IR remote control, wired IR and RS-232 control port compatible with all industry standard control systems. **Only operate the KD-MSW8x4Pro HDTV Matrix Switcher Series with the Key Digital® external Power Supply provided with your unit.**



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CAUTION!



Fat Boy Series KD-MSW8x4Pro HDTV Matrix Switcher

8 Inputs to 4 Outputs HDTV Matrix Switcher and Fat Boy Expansion

CAUTION: YOUR BASE KD-MSW8x4Pro HDTV MATRIX SWITCHER (AND EACH FAT BOY SERIES EXPANSION UNIT) COMES WITH ITS OWN EXTERNAL POWER SUPPLY THAT MUST BE ATTACHED TO EACH UNIT.

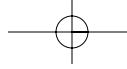
No other Power Supply Adapter can be used with any KD-MSW8x4Pro unit! Using a Power Supply other than the one(s) provided by Key Digital with your unit(s) VOIDS THE ENTIRE PRODUCT WARRANTY, may cause damage to your unit and associated equipment, and is a potential safety hazard.



**You MUST use the Power Supply
that came with your unit:**

+ 6V DC @ 5 Amps, 110-240 VAC, 50-60 Hz





KD-MSW8x4Pro Operating Instructions

KD-MSW8x4Pro Operating Instructions

Safety Instructions – Please be sure to follow these instructions for safe operation of your unit

1. Read these instructions.
 2. Keep these instructions.
 3. Heed all warnings.
 4. Follow all instructions.
 5. Do not use this apparatus near water.
 6. Clean only with dry cloth.
 7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
 8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
 10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
 11. Only use attachments/accessories specified by the manufacturer.
 12. Unplug this apparatus during lightning storms or when unused for long periods of time.
 13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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Introduction

The KD-MSW8x4Pro HDTV Matrix Switcher provides the next generation in professional Video/Audio switching technology. Perfect for both the board room and home entertainment applications, this versatile component is the ideal complement to your video and audio equipment, making possible the interface and transparent switching of up to eight (8) separate HDTV source signals simultaneously, to as many as four (4) independent video displays. In addition, the KD-MSW8x4Pro HDTV Matrix Switcher can also switch PCM digital coaxial and/or left and right stereo. The AV interface is via the BNC type connector array, consisting of eight sets of independent video/audio inputs and four sets of independent video/audio outputs, each supporting video formats up to and including 1080P/60.



Typical source components you may need to switch with your KD-MSW8x4Pro HDTV Matrix Switcher can include the following:

- DVD Players
 - Electronic game boxes
 - Cable TV, satellite and terrestrial DTV set-top receivers
 - Digital Video Recorders
 - D-VHS, S-VHS and VHS VCR's



Key Features

- Pristine, crystal-clear switching of ALL your HD and SD analog sources, even 1080p, out to 300 MHz:
 - ⇒ Component Video (YPbPr) or RGBHV Video
 - ⇒ Digital PCM or analog stereo audio
 - ⇒ BNC connectors
 - ⇒ Output video format = Input video format
 - Left and right analog stereo Audio Volume Control feature provided for YPbPr mode (RGBHV video mode does not support analog audio, only digital PCM).
 - Switch like a pro in the Studio:
 - ⇒ All-new “Fade-to-Black” and “Video Muting” features eliminate video “glitches” on your display when you switch your source
 - Easy to control and operate, you can switch:
 - ⇒ Manually, using the front panel pushbuttons and LED indicators
 - ⇒ Remotely, using the supplied IR remote control
 - ⇒ Using the RS-232 control
 - Instant verification of your switching status, via the convenient front-panel LED's
 - So versatile, you can even switch S-Video and Composite Video signals (with the appropriate adapter) from VCR's, digital video recorders and satellite set-top receivers
 - Massively expandable, the outputs of the 8x4Pro can be incremented in steps of 4, providing an unheard-of matrix switching capability all the way up to 8x44
 - ⇒ Purchase multiple units in kits from Key Digital® to meet your expansion needs, from 8x4, to 8x8, to 8x12, ... to 8x44

Massively Expandable

These Operating Instructions apply to the entire Key Digital® Fat Boy Series line of HDTV Matrix Switchers:

KD-MSW8x4Pro	8 x 4 HDTV Matrix Switcher (single base unit)
KD-MSW8x4Pro-8 x 8	8 x 8 HDTV Matrix Switcher (2 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x12	8x12 HDTV Matrix Switcher (3 base units of 8x4 and Cable Kit)
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KD-MSW8x4Pro-8x44	8x44 HDTV Matrix Switcher (11 base units of 8x4 and Cable Kit)

Technology

As for all Key Digital® products, it's our custom technology that allows us to deliver the highest standard of picture quality, like:



LHBC Linear High Bandwidth Circuit



Surface Mount Technology



Multi-Layer Board Technology

GETTING STARTED

The KD-MSW8x4Pro HDTV Matrix Switcher is capable of switching eight (8) sets of three-wire component (YPbPr) video and/or five-wire component (RGBHV) video, as well as analog/digital audio to any or all of the four outputs (typically your displays or projectors). If your source device has a VGA output connector, you will need a VGA-to-BNC breakout cable. The KD-MSW8x4Pro HDTV Matrix Switcher is also capable of switching S-Video and composite video signals (with the appropriate cable adapter) from VCR's, digital video recorders and satellite set-top receivers. The default video signal format for the KD-MSW8x4Pro HDTV Matrix Switcher is three-wire Component Video (YPbPr).

Note: Since the KD-MSW8x4Pro Matrix Switcher does NOT perform video processing, the output video format is the same as the input video format. This means that the video resolution is not changed and also that if you input one form of video, for example Component Video, the output will be in exactly the same format.

Open the carton and you will find the following contents:

1. One KD-MSW8x4Pro HDTV Matrix Switcher unit¹
2. One +6V DC external Power Supply adapter module²
3. IR Remote Control with batteries included
4. RS-232 cable³ (not provided with the base KD-MSW8x4Pro unit stand-alone)
5. Operating Instructions Manual
6. Warranty Card



CAUTION: If you have purchased an expanded configuration of the Fat Boy series HDTV Matrix Switcher line beyond the base 8x4Pro Matrix Switcher, the multiple base units will come pre-connected from the factory with a special cable kit that has been tested for your configuration. You are advised NOT to disconnect or reconfigure any of these cables.

¹ These Operating Instructions apply to the entire Fat Boy Series line of massively expandable KD-MSW8x4Pro HDTV Matrix Switchers. The number of units in your package is listed on the table at the front of these Operating Instructions for the particular configuration you have purchased. If you have purchased a configuration beyond the base 8x4 Matrix Switcher, a Cable Kit has already been installed and tested, and you will also find the RS-232 cable that connects to multiple units.

² No other power supply adapter can be used with the KD-MSW8x4Pro unit; you must use the Power Supply provided! Using a power supply other than the one provided by Key Digital with your unit VOIDS THE WARRANTY, may cause damage to your unit(s) and associated equipment, and is a potential safety hazard.

³ The RS-232 cable is ONLY PROVIDED FOR FAT BOY EXPANSION. If you have purchased the base KD-MSW8x4Pro HDTV Matrix Switcher, the RS-232 cable is NOT provided.

Setting up your KD-MSW8x4Pro HDTV Matrix Switcher for operation:

Your KD-MSW8x4Pro HDTV Matrix Switcher is easy to configure and operate. In this section, you will first connect all of your A/V Input and Output devices to your KD-MSW8x4Pro Matrix Switcher unit.

Connecting A/V Equipment

Connecting A/V equipment to the KD-MSW8x4Pro HDTV Matrix Switcher is straightforward and accomplished easily via the ergonomic rear panel connector array.



CAUTION: When unpacking the unit, make all hookups and connections before plugging in the Power Adapter provided with your unit. Do NOT apply power to the unit until all Video and Audio connections have been made to your KD-MSW8x4Pro unit(s) from the "Source" devices to the Display(s) and/or Audio system(s). 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.

The KD-MSW8x4Pro HDTV Matrix Switcher is equipped with professional-grade BNC female connectors. These connectors offer a better match to video cables than do the smaller RCA connectors, as well as providing a positive bayonet lock when installed. Because not all consumer equipment marketed uses BNC connector interfaces, it may be necessary to employ RCA-to-BNC or VGA-to-BNC adapter plugs and/or cable assemblies to interface these various devices to your high-quality Matrix Switcher.

The video signal format must be considered when making connections to the KD-MSW8x4Pro HDTV Matrix Switcher. Simply match the A/V device's output (be it YPbPr "Component" or RGBHV "VGA" video) to a similar video signal output configuration on the KD-MSW8x4Pro HDTV Matrix Switcher. In the event that these superior quality output formats are not available on the device in question, then S-Video and/or composite video may also be interfaced with the KD-MSW8x4Pro HDTV Matrix Switcher with the use of the appropriate adapters.

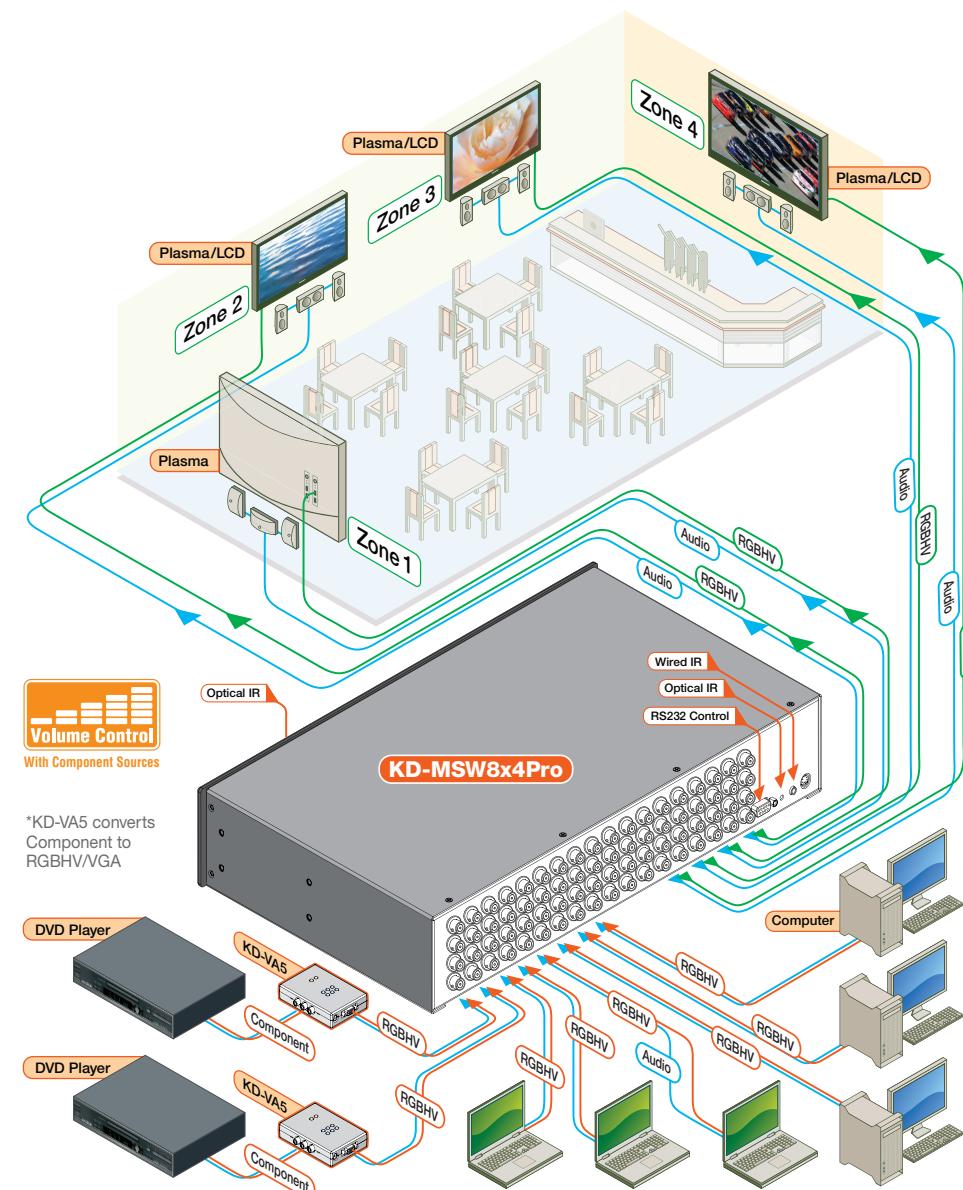
The same consideration applies to the audio interfaces. Both analog and digital output options are provided on the KD-MSW8x4Pro HDTV Matrix Switcher and may be employed appropriately as analog, when connecting directly to the audio inputs of a video monitor; or as digital, when connecting instead to an A/V receiver having coaxial digital (PCM) interfaces for decoding surround sound signals.



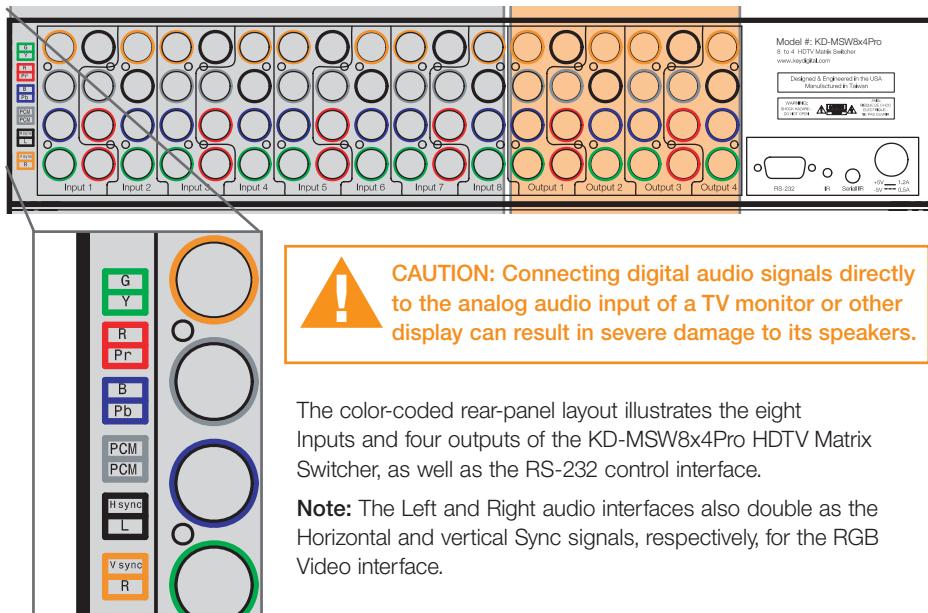
CAUTION: For proper operation of the high quality electrical circuits in your KD-MSW8x4Pro unit, do NOT "daisy chain" Inputs:

- Each Input of the MSW8x4 has its own 75 Ohm termination
- Do NOT feed a Source to multiple MSW8x4 Inputs without proper Distribution equipment

Typical Application Example for a base KD-MSW8x4Pro HDTV Matrix Switcher



Rear panel layout of the KD-MSW8x4Pro Matrix Switcher



High-quality Component Video (YPbPr) and "VGA" (RGBHV) Source Equipment

Some of your source equipment may have an analog video output that is called Component Video. Component Video is a three-wire video format, with the video signals typically labeled YPbPr. Another common analog video output format is RGB (like the "VGA" outputs on your computer), which typically has separate H&V sync signals. The KD-MSW8x4Pro HDTV Matrix Switcher is the perfect choice for switching Component Video and RGB Video source devices to your displays.

Example: Connecting a digital TV set-top receiver with Component Video three-wire YPbPr or "VGA" five-wire RGBHV video Outputs to the KD-MSW8x4Pro HDTV Matrix Switcher Inputs.

YPbPr Component Video

Connect the three-wire green, blue and red YPbPr cables from the set-top receiver of choice, to the green, blue and red color-coded connectors of any one of the eight input fields of the KD-MSW8x4Pro HDTV Matrix Switcher. Connect the white and red analog stereo audio cables from the set-top receiver to the white and orange connectors of the same input field of the KD-MSW8x4Pro HDTV Matrix Switcher. If a digital audio coaxial output is available on the set-top receiver, it can then connect to the gray-coded PCM connector on the KD-MSW8x4Pro HDTV Matrix Switcher.

Connect the green, blue and red connectors from Outputs 1, 2, 3 or 4 on the KD-MSW8x4Pro HDTV Matrix Switcher to the corresponding component video jacks on your TV or monitor. Connect the white and orange analog audio jacks from the same output to the corresponding white and red audio jacks on your TV or monitor. If digital audio is desired from the set-top receiver, connect a cable from the gray BNC connector in the same chosen output field to your AV receiver's coaxial digital audio input.



RGBHV

If the set-top receiver of choice employs RGBHV outputs, a 15-pin 'breakout' adapter cable will need to be used to implement the interface. In this instance connect the red, green and blue BNC connectors from this adapter cable to the red, green and blue connectors, again on any one of the eight input fields, of the KD-MSW8x4Pro HDTV Matrix Switcher. Connect the black and yellow wires from the breakout cable to the white and orange (analog audio input) connectors in the same input field of the KD-MSW8x4Pro HDTV Matrix Switcher.

Now connect the desired RGBHV video signal to your monitor or TV, by connecting the red, green, blue, white, and orange connectors of any one of the four output fields of the KD-MSW8x4Pro HDTV Matrix Switcher, directly to the red, green, blue, black, and yellow input connectors on your monitor or TV. These connectors may also be labeled R, G, B, H, and V. A second 15-pin breakout cable may be required for certain sets.

Note: It is not possible to use analog audio switching when in RGB mode, because the H&V sync signals required for the RGB format will occupy the port connectors typically used for the audio signals. This leaves the option, if desired, of connecting digital audio (PCM) from the set-top receiver to same input and output fields of the KD-MSW8x4Pro HDTV Matrix Switcher.

This same connection procedure described above applies to any other peripheral device that one may wish to interface with a desired display medium, including DVD players and game consoles.

Lower-quality S-Video (two-wire) or Composite Video (CVBS) Source Equipment

S-Video

A "breakout" adapter cable is required to connect a satellite receiver, DVR, or S-VHS VCR to the KD-MSW8x4Pro HDTV Matrix Switcher. This cable is equipped with an S-Video (DIN) plug at one end and a pair of BNC plugs at the other connected to white and yellow conductors. Connect the white (Y) conductor to the green BNC connector in the selected input field, and connect the yellow (C) conductor to either the blue or red BNC connector in the same input field. Connect the white and red analog stereo audio connectors of the set-top receiver of choice, to the white and orange connectors in the same input field on the KD-MSW8x4Pro HDTV Matrix Switcher.

Connect the green BNC connector in the selected output field to the white (Y) conductor of a second S-video to BNC adapter cable. Connect the blue or red connector to the yellow (C) conductor. Plug the other end of the adapter cable into the TV or monitor's S-video input. Connect the white and red analog stereo audio cable connectors to the white and orange connectors of the same KD-MSW8x4Pro HDTV Matrix Switcher output field. Connect the other end of the audio cable pair to the white and red analog audio input of your TV or monitor.

Composite Video (CVBS) Connection

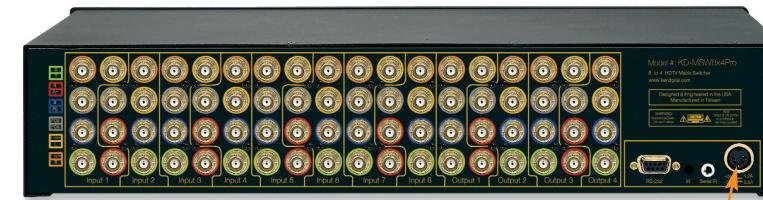
Connect the Composite Video connector (yellow) from your VCR or DVR to the green BNC connector in the selected KD-MSW8x4Pro HDTV Matrix Switcher input field. Connect another composite video cable from the green BNC connector in the selected output field to your TV or video monitor. Follow the instructions above for connecting analog audio.

Applying power to your unit



CAUTION: No other power supply adapter can be used with the KD-MSW8x4Pro unit(s); you must use the Power Supply provided. Using a power supply other than the one provided by Key Digital with your unit **VOIDS THE WARRANTY**, may cause damage to your unit and associated equipment, and is a potential safety hazard.

Now that the installation is completed, it is recommended to double check all connections before connecting the external power supply. Once every connection has been verified, plug the connector of the Power Supply into the power input jack of the KD-MSW8x4Pro.



Carefully insert the Power Supply adapter plug, here

Next, plug the external Power Supply provided with your unit into an appropriate* wall outlet.

*Power Requirements

- Each unit draws 0.9A,100-240 VAC
 - External power supply provided:
 - + 6V DC @ 5 Amps, 110-240 VAC, 50-60 Hz



You MUST use the Power Supply that came with your unit

+ 6V DC @ 5 Amps, 110-240 VAC, 50-60 Hz



For added safety and protection it is always recommended to use a good quality surge protector.

Always test all connections and final operation first, before sealing cables behind walls or completing difficult wire routings. Use a reliable “Source” to test your connections (like a DVD player) before routing or hiding any wires behind walls or ceilings.

BASIC OPERATION

A "Matrix Switcher" allows you to select any input device, and have it available on the output (typically a display) of your selection. For example, not only can you select your DVD player as the source of video for your enjoyment from your total array of source devices like Set Top Boxes and DVR's, but you can also direct the DVD player to appear on your HDTV or any particular display you have connected to the output of your Matrix Switcher, while you monitor other sources on other displays under your command.

An “8x4” Matrix Switcher:

Video Source#	Display A	Display B	Display C	Display D
1	→			
2				
3	→			
4				
5	→			
6				
7	→			
8				

All input/output combinations are configurable via the front panel pushbuttons and clearly displayed by LED indicators for each of the output fields. Switching can be accomplished conveniently in any of three ways:

- Manually, using the front panel pushbuttons and LED indicators
 - Remotely, using the supplied IR remote control
 - Using the RS-232 control

Manual configuration of A/V Inputs and Outputs

Manual routing of video and audio signals from the available inputs to selected outputs is easily implemented on the KD-MSW8x4Pro HDTV Matrix Switcher using the front panel pushbuttons, and visually verifiable via the LED indicator array for each of the four output fields.

The front panel of the KD-MSW8x4Pro HDTV Matrix Switcher provides the user with a visual representation of the four output fields. Each of these four segments consists of a large push button and an array of eight LED indicators. Each of these appropriately numbered LED indicators corresponds to one of the eight available inputs.

Once the input source devices and the output displays have been connected to the KD-MSW8x4Pro HDTV Matrix Switcher they can easily be configured into desired combination using these simple pushbuttons.

To switch an A/V device input to the intended one of the four outputs requires depressing the pushbutton corresponding to the chosen output field, as necessary, until the LED indicator corresponding to the chosen input is lit. The video and audio sources connected to that input are automatically switched to the selected output. The KD-MSW8x4Pro HDTV Matrix Switcher can simultaneously route a single input to all of the four outputs by simply repeating the same procedure for each of the four output fields.

Fade-to-Black and Video Mute pro-features

Two new features have been added to this generation of Key Digital® switchers, called “Fade-to-Black” and “Video Mute.” Both of these features let you switch like a pro, like in a live studio.

The **Fade-to-Black feature** allows for switching between input/output combinations without the usual visual signal noise that traditionally accompanies switching between video signals. The video image momentarily goes to black as the KD-MSW8x4Pro HDTV Matrix Switcher selects between inputs for the chosen output.

An additional related feature, available on the KD-MSW8x4Pro HDTV Switcher, is the **Video Mute**, which enables the user to mute the video signal (the display goes to black) at the chosen output.

IR REMOTE CONTROL

The KD-MSW8x4Pro HDTV Matrix Switcher can be operated remotely using the supplied infrared (IR) remote control. As many as fifteen individual KD-MSW8x4Pro HDTV Switchers can be addressed by the same remote control using the few simple functions designed into the system.



Summary of Remote Control Sequences for various functions.

Please, refer to "Addressing desired Output/Input" section for basic switching keystroke sequences

Button Sequence	Function		
"Output 1"	"Up"	Output 1 volume increase	
"Output 1"	"Down"	Output 1 volume decrease	
"Output 2"	"Up"	Output 2 volume increase	
"Output 2"	"Down"	Output 2 volume decrease	
"Output 3"	"Up"	Output 3 volume increase	
"Output 3"	"Down"	Output 3 volume decrease	
"Output 4"	"Up"	Output 4 volume increase	
"Output 4"	"Down"	Output 4 volume decrease	
"Output 1"	"U1"	Output 1 Audio Mute	
"Output 1"	"U2"	Output 1 Audio Restore (unmute)	
"Output 1"	"U3"	Output 1 Audio Volume Reset (to mid position)	
"Output 2"	"U1"	Output 2 Audio Mute	
"Output 2"	"U2"	Output 2 Audio Restore (unmute)	
"Output 2"	"U3"	Output 2 Audio Volume Reset (to mid position)	
"Output 3"	"U1"	Output 3 Audio Mute	
"Output 3"	"U2"	Output 3 Audio Restore (unmute)	
"Output 3"	"U3"	Output 3 Audio Volume Reset (to mid position)	
"Output 4"	"U1"	Output 4 Audio Mute	
"Output 4"	"U2"	Output 4 Audio Restore (unmute)	
"Output 4"	"U3"	Output 4 Audio Volume Reset (to mid position)	
"R1"	"Output 1"	"Up"	Output 1 Video and Audio Mute
"R1"	"Output 1"	"Down"	Output 1 Video and Audio Restore (unmute)
"R1"	"Output 2"	"Up"	Output 2 Video and Audio Mute
"R1"	"Output 2"	"Down"	Output 2 Video and Audio Restore (unmute)
"R1"	"Output 3"	"Up"	Output 3 Video and Audio Mute
"R1"	"Output 3"	"Down"	Output 3 Video and Audio Restore (unmute)
"R1"	"Output 4"	"Up"	Output 4 Video and Audio Mute
"R1"	"Output 4"	"Down"	Output 4 Video and Audio Restore (unmute)
"R1"	"U4"	"Up"	All Outputs Video and Audio Mute
"R1"	"U4"	"Down"	All Outputs Video and Audio Restore (unmute)
"R1"	"7"		All video outputs set to RGBHV
"R1"	"8"		All video outputs set to YPrPb
"R1"	"9"		Front buttons disabled
"R1"	"0"		Front buttons enabled
"R2"	Output 1~4, 1~8		I/O switching in IR Remote Lockout Mode enabled
"R3"	hold until front panel LEDs stop flashing		IR Remote Lockout toggle. Executed once to enable, twice to disable.
Output 1~4, 1~8			Switch output [1~4] to input [1~8]

FAT BOY EXPANSION OF THE BASE KD-MSW8x4Pro

The Application Example provided earlier serves to illustrate the versatility of the KD-MSW8x4Pro HDTV Matrix Switcher, as the ideal interface device for virtually all user video and audio equipment input and output configuration needs. Additionally the KD-MSW8x4Pro HDTV Matrix Switcher is expandable to as many as 44 configurable outputs, allowing for even greater input/output flexibility for the given eight input fields. The expansion feature is factory installed and shipped to the consumer as a pre-wired combination of two or more KD-MSW8x4Pro HDTV Matrix Switchers.



CAUTION: If you have purchased an expanded configuration of the Fat Boy Series HDTV Matrix Switcher line beyond the base 8x4Pro Matrix Switcher, the multiple base units will come pre-connected from the factory with a special cable kit that has been tested for your configuration. You are advised NOT to disconnect or reconfigure any of these cables.

The KD-MSW8x4Pro HDTV Matrix Switcher is available in the following expansion packages, configured to provide input/output combinations ranging from 8x8 up to 8x44 (eight inputs x forty-four outputs).

The entire Key Digital Fat Boy Series line of HDTV Matrix Switchers

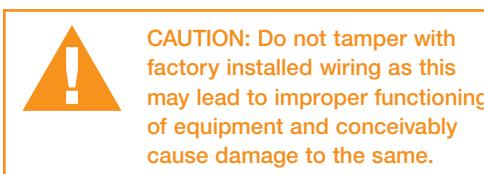
KD-MSW8x4Pro	8 x 4 HDTV Matrix Switcher (single base unit)
KD-MSW8x4Pro-8 x 8	8 x 8 HDTV Matrix Switcher (2 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x12	8x12 HDTV Matrix Switcher (3 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x16	8x16 HDTV Matrix Switcher (4 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x20	8x20 HDTV Matrix Switcher (5 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x24	8x24 HDTV Matrix Switcher (6 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x28	8x28 HDTV Matrix Switcher (7 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x32	8x32 HDTV Matrix Switcher (8 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x36	8x36 HDTV Matrix Switcher (9 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x40	8x40 HDTV Matrix Switcher (10 base units of 8x4 and Cable Kit)
KD-MSW8x4Pro-8x44	8x44 HDTV Matrix Switcher (11 base units of 8x4 and Cable Kit)

Fat Boy Expansion: Theory of Operation

The Fat Boy KD-MSW8x4Pro HDTV Matrix Switcher series is expandable to as many as 44 configurable outputs, allowing for even greater input/output flexibility for the given eight input arrays. This expansion feature is factory installed and shipped to the consumer as a pre-wired and pre-tested combination of from two up to eleven KD-MSW8x4Pro HDTV Matrix Switchers. The expansion packages are comprised of multiple KD-MSW8x4Pro units ganged together.

In the expansion configurations, the individual connectors of each input array, on each unit, are connected to all other corresponding input array connectors on all of the other units (up to eleven units for the massive KD-MSW8x4Pro – 8x44 HDTV Matrix Switcher configuration) of a given expanded package. Each of the eight combined input fields is then supplied with a single input array (R, G, B, PCM Audio, Left Audio and Right Audio). The resulting output arrays (eight, or twelve, or sixteen, ... up to 44), depending on the expansion package chosen, are configurable in the same way as those of a single switcher. The stand-alone or combined package KD-MSW8x4Pro HDTV Matrix Switcher is addressable in the same manner as described prior, using either the supplied IR Remote Controller or via the RS-232 control port.

Using the same application example illustrated previously, the user will note that the input video and audio sources remain the same. The signals for each of the inputs shown are supplied to each of the additional units of a given expanded package via the parallel connection array described earlier. The output array available (up to 44 with 11 base KD-MSW8x4Pro units) now offers you additional interfaces for display devices and/or surround sound systems.

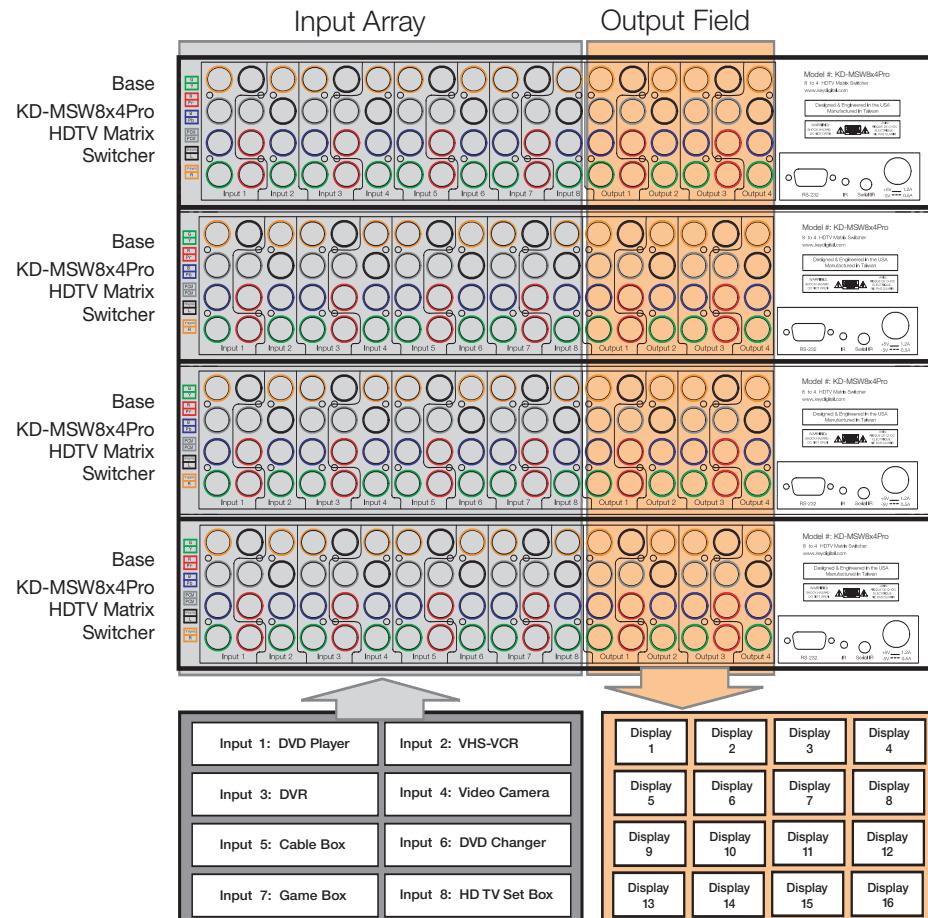


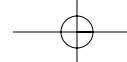
The combined units provide the user with a virtually unlimited output capability (up to 44). As illustrated previously in this manual, up to eight individual inputs are available for an array of source devices, ranging from VCR's to DVD players and HDTV Set Top boxes.

The following Expansion Application Example is that of an expanded KD-MSW8x4Pro HDTV Matrix Switcher Package (8x16). The four 8x4 interconnected switcher units provide, for the eight segment input field (shown in gray), additional interfacing with an expanded array of sixteen (16) individual outputs (shown in red). The necessary wiring is factory installed and the expanded switcher package shipped to the consumer ready for connection to the video and audio equipment of choice.

**Typical Fat Boy KD-MSW8x4Pro Expansion Application Example
for a KD-MSW8x4Pro-8x16:**

Four (4) KD-MSW8x4Pro base units configured from the factory to provide 8x1 HDTV Matrix Switching





RS-232 PROTOCOL AND COMMANDS

The KD-MSW8x4Pro HDTV Switcher can also be remotely controlled via its RS-232 port by systems such as Crestron, AMX, ELAN, and Control4, utilizing industry standard commands

PROTOCOL:

- 4800 Baud rate
- 8 data bits
- 1 Stop bit
- No parity



For the base KD-MSW8x4Pro HDTV Matrix Switcher, you must supply your own RS-232 cable and insert carefully in the back of the unit.

For the Fat Boy expansions, your units come pre-configured from the factory with their own RS-232 cable for you to use to connect to your PC or Control System..

RS-232 Connector type: DB-9 Female

Pin 2 = Tx, Pin 3 = Rx, Pin 5 = Gnd, Pin 4 = Pin 6, Pin 8 = Pin 7

Note: the pinout is with respect to the switcher, not the external controller

The commands list for the KD-MSW8x4Pro HDTV Switcher is as follows:

Minimum timing interval between successive RS-232 commands is 0.2 sec. Note: Exception is input switching commands. For input switching commands the minimum timing interval between successive RS-232 commands is determined by the Fade-to-Black period set via RS-232. The minimum period here is the greater of the two: 0.2 sec or Fade-to-Black interval. Please see Fade-to-Back Interval Set for more information.

Note 1: all commands are case insensitive (see Note 2 for exception).

Note 2: cc = 2-digit address [01~15] when unit's address not equal to 16
cc = 'CC' (uppercase) when units address is set to 16.

1. I/O Switching Set: 'ccxy'

x = output select [1~4]

y = input select [1~8]

cc = the 2-digit unit address [01~15] or 'CC'

The expected system response format is:

'UUy₁y₂y₃y₄kk', where:

y₁ is the input selected for output 1, the range is [1~8]

y₂ is the input selected for output 2, the range is [1~8]

y₃ is the input selected for output 3, the range is [1~8]

y₄ is the input selected for output 4, the range is [1~8]

kk is the unit address (2 digits), the range is [01~16]

Example:

To select input 3 for output 1 of unit at address 09, issue the following RS-232 sequence:
'0913'

2. Unit Address Set: 'ccAkk'

cc = the current 2-digit unit address [01~15] or 'CC'

kk = the new 2-digit unit address [01~16]. 16 is used for stand-alone configuration.

Example:

To change the address of stand-alone unit to 12, issue the following RS-232 sequence:
'CCA12' or 'CcA12'

To change the unit at address 12 to a stand-alone configuration, issue the following RS-232 sequence: '12A16' or '12a16'

To change the address from 12 to 05, issue the following RS-232 sequence:
'12A05' or '12a05'

3. AV Muting Set:

'ccMx' : AV Muting Enable

'ccNx' : AV Muting Disable

x = output select [1~4]

cc = the 2-digit unit address [01~15] or 'CC'

Example:

To mute output 2 audio and video of a stand-alone unit, issue the following RS-232 sequence:
'CCm2' or 'CCM2'

To disable muting of output 4 of the unit at address 5, issue the following RS-232 sequence:
'05n4' or '05N4'

4. Fade-to-Black Interval Set: 'cclx'

x = Fade-to-Black Interval setting in the range [0~9]

cc = the 2-digit unit address [01~15] or 'CC'

Fade-to-Black interval is the time period the selected video/audio output is muted during the input changing process

x	Fade to Black interval (msec)
0	0
1	40
2	80
3	160
4	240
5	320
6	480
7	640
8	800
9	1200

Example:

To set Fade to Black interval to 0 for a stand-alone unit, issue the following RS-232 sequence:
'CCl0' or 'CCl0'

To set Fade to Black interval to 9 for a unit at address 15, issue the following RS-232 sequence:
'15l9' or '15l9'

5. Video Type Set:

'ccOR' : RGBHV mode
 'ccOC' : Component mode (factory default)
 cc = the 2-digit unit address [01~15] or 'CC'

Example:

To set video type to RGBHV for a stand-alone unit, issue the following RS-232 sequence:
 'CCOR' or 'CCor' or 'CCoR' or 'CCOr'

To set video type to Component for a unit at address 01, issue the following RS-232 sequence:
 '01OC' or '01oc' or '01oC' or '01Oc'

6. IR Control Set:

'L': Disable IR/Wired IR Remote Control functionality
 'U': Enable IR/Wired IR Remote Control functionality
 This command is not addressable.

Example:

To disable the IR control of a unit issue the following RS-232 command: 'L' or 'l'

To enable the IR control of a unit, issue the following RS-232 command: 'U' or 'u'

7. Front Panel Control Set:

'D': Disable front panel pushbutton controls
 'E': Enable front panel pushbutton controls
 This command is not addressable.

Example:

To disable the pushbuttons of a unit, issue the following RS-232 command: 'D' or 'd'

To enable the pushbuttons of a unit, issue the following RS-232 command: 'E' or 'e'

8. Distribution Amplifier Mode Set:

'Zn', where n is input select [1~8]
 'Z0' - restore the previous input/output configuration

This command switches all outputs to a selected input.

Note: For Fat Boy Series expansion, ALL outputs follow the selected input

Example:

To switch all outputs of ALL units, irrespectively of address, to input 6,
 issue the following RS-232 sequence: 'Z6'

To restore the previous I/O configuration of ALL units irrespectively of address,
 issue the following RS-232 sequence: 'Z0'

9. Power Control:

S : Power OFF
 Q : Power ON

Note: This command is not addressable.

Example:

To turn the power ON issue the following RS-232 command: 'q' or 'Q'

To turn the power OFF issue the following RS-232 command: 's' or 'S'

10. Volume Level Set:

'ccVxzz'
 x = output select [1~4]
 zz = 2-digit volume select [00~30]
 cc = the 2-digit unit address [01~15] or 'CC'

Note: Audio volume control is supported in Component mode only. See Video Type Set..

zz	Volume (dB)	zz	Volume (dB)	zz	Volume (dB)
00	mute	10	-10	20	+10
01	-28	11	-8	21	+12
02	-26	12	-6	22	+14
03	-24	13	-4	23	+16
04	-22	14	-2	24	+18
05	-20	15	0 (default)	25	+20
06	-18	16	+2	26	+22
07	-16	17	+4	27	+24
08	-14	18	+6	28	+26
09	-12	19	+8	29	+28
				30	+30

Example:

To set the volume of output 2 of the unit at address 10 to value of -12 dB, issue the following RS-232 sequence: '10V209' or '10v209'

11. Factory Default Reset: 'ccF0'

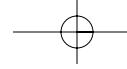
This command causes the unit to be reset to the factory default configuration.

Item	Default Value
Selected Input for every output	1
Distribution Amplifier Mode	Enabled (Input = 1)
Unit address	16 (stand-alone)
Fade-to-Black Interval	6
Volume	15
Output mode	Component
Front panel pushbuttons	Enabled
IR Control	Enabled

Example:

To reset the unit at address 02 to factory default configuration, issue the following RS-232 sequence: '02F0' or '02f0'

To reset the stand-alone unit to factory default configuration, issue the following RS-232 sequence: 'CCF0' or 'CCf0'



HOW TO CONTACT KEY DIGITAL®

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- Should your product require warranty service, please contact Key Digital® to obtain a Returned Materials Authorization (RMA) number
 - Please contact us at either:
 - Phone: 1-914-667-9700 ext 215
 - E-mail: rma@keydigital.com

Technical Support

- For technical questions about using our products, please contact us at either
 - Phone: **1-914-667-9700 ext 301, ext 216**
 - E-mail: **tech@keydigital.com**

Customer Support

- For customer support questions about using our products, please contact us at either
 - Phone: **1-914-667-9700 ext 223**
 - E-mail: **customersupport@keydigital.com**

WARRANTY

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.