

HDMI Matrix Switches

Switch multiple HDMI sources to multiple displays in any combination.



**Customer
Support
Information**

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax
724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence,
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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM)
Electrical Safety Statement
INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

Bandwidth: 6.75 Gbps (single-link)

Resolutions Supported: PC: Up to 1920 x 1200;
HDTV: 480i, 576i, 480p, 576p, 720p, 1080i, 1080p

CE Approval: Yes

RoHS: Yes

Connectors: AVSW-HDMI4X4: Input: (4) HDMI F;
Output: (4) HDMI F;
Control/command port: (1) DB9 F (RS-232);
AVSW-HDMI2X4: Input: (2) HDMI F;
Output: (4) HDMI F;
Control/command port: (1) DB9 F (RS-232);
AVSW-HDMI4X2: Input: (4) HDMI F;
Output: (2) HDMI F;
Control/command port: (1) DB9 F (RS-232);
AVSW-HDMI2X2: Input: (2) HDMI F;
Output: (2) HDMI F;
Control/command port: (1) DB9 F (RS-232)

Power: Input: 12 VDC

Size: 1.75"H (1U) x 17.3"W x 8.5"D (4.3 x 43.9 x 22 cm)

Weight: 7.5 lb. (3.4 kg)

NOTE: When connecting outputs to both displays and AV receivers, the audio output will only be stereo because of the limitations of the display. In addition, the switch will determine the resolution of all connected displays and output the resolution of the lowest display. For example: If you have both a 1080p LCD and a 720p LCD connected, the output to both will be 720p.

2. Overview

2.1 Introduction

HDMI Matrix Switches from Black Box support sharp, highly defined video in HD resolutions of up to 1080p—with a bandwidth of 6.75 Gbps.

Any input can be routed to any output, or the same input can be routed to all outputs or any combination, eliminating the need to manually move various cables to display HDMI video from different sources on different screens. An input source LED tells you at a glance each output you've selected.

The switch sets up in seconds and is easy to use. Control using front-panel buttons, the included IR remote controller, or an RS-232 connection linked to a Crestron®, AMX®, Control4® system, or any third-party computerized software/hardware control system. The switch even comes with an RS-232 serial cable for quick setup.

The switch also has an IR signal extension port (and includes an IR extender receiver). Once plugged in, the receiver enables you to use the IR remote controller to switch ports on the unit from another room—up to 984 feet (300 m) away.

Four models are available:

- AVSW-HDMI4X4: (4) HDMI inputs, (4) HDMI outputs
- AVSW-HDMI2X4: (2) HDMI inputs, (4) HDMI outputs
- AVSW-HDMI4X2: (4) HDMI inputs, (2) HDMI outputs
- AVSW-HDMI2X2: (2) HDMI inputs, (2) HDMI outputs

2.2 Features

- HDMI 1.3 and HDCP compliant.
- Works with all HDMI sources and displays—plus it's 3D capable.
- Signal boosters on ports amplify HDMI signals up to 60 feet (18.2 m).
- Supports the latest HDMI audio formats, including Dolby® TrueHD and DTS-HD.
- Carries the high-speed digital video signaling of TMDS formats for the delivery of 12-bit Deep Color.
- Ideal for corporate theaters, conference rooms, classroom and training facilities, and video broadcasting applications.

- Rackmountable 1U-high unit with mounting ears.
- Switch audio and video of two or four sources to two or four displays in any combination.
- Control from the front panel, with the included IR remote controller, or from an RS-232 console.
- Supports resolutions up to 1080p.

2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- Matrix switch
- 12-VDC power supply adapter
- IR extender kit
- IR remote controller
- Rackmount kit
- Control software
- RS-232 serial cable
- This user's manual

2.4 Hardware Description

2.4.1 Front Panel

Figure 2-1 shows the front panel of the converter. Table 2-1 describes its components.

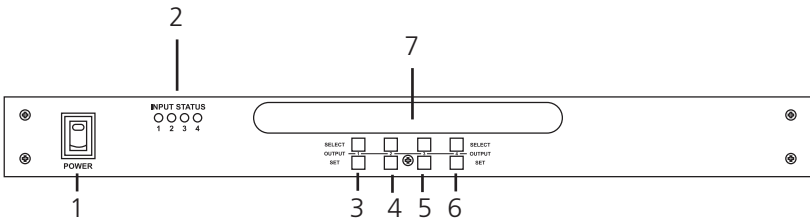


Figure 2-1. Front panel.

Table 2-1. Front panel components.

Number	Component	Description
1	Power switch and LED indicator	Press this button to power the switch on or off.
2	LEDs 1–4	Provides input port status
3	Input selector A	Press the HDMI OUT A button repeatedly to switch to your desired source, and the LED will light to indicate which input source is selected and routed to HDMI A display.
4	Input selector B	Press the HDMI OUT B button repeatedly to switch to your desired source, and the LED will light to indicate which input source is selected and routed to HDMI B display.
5	Input selector C	Press the HDMI OUT C button repeatedly to switch to your desired source, and the LED will light to indicate which input source is selected and routed to HDMI C display.
6	Input selector D	Press the HDMI OUT D button repeatedly to switch to your desired source, and the LED will light to indicate which input source is selected and routed to HDMI D display.
7	Status LEDs	(4) seven-segment LEDs to show current output status.

NOTE: AVSW-HDMI4X2 and AVSW-HMDI2X2 switches only have (2) seven-segment LEDs.

2.4.2 Back Panel

Figure 2-2 shows the back panel of the converter. Table 2-2 describes its components.

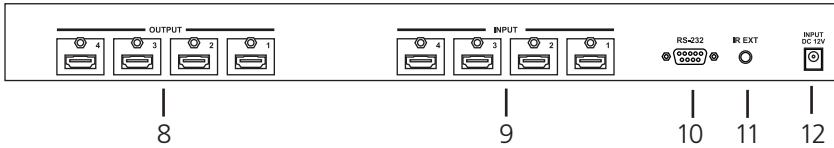


Figure 2-2. Back panel.

Table 2-2. Back-panel components.

Number	Component	Description
8	(4) HDMI connectors	HDMI outputs: Connect each of these output ports to the HDMI input of an HDMI display. <i>NOTE: AVSW-HDMI4X2 and AVSW-HDMI2X2 switches only have (2) HDMI outputs.</i>
9	(4) HDMI connectors	HDMI inputs: Connect each of these input ports to your source equipment such as a DVD player or set-top box. <i>NOTE: AVSW-HDMI2X4 and AVSW-HDMI2X2 switches only have (2) HDMI inputs.</i>
10	DB9 connector	RS-232 communication port: links to console port on PC for management.
11	IR in socket	Plug the IR extender sensor (optional) into the socket for IR extension control.
12	Barrel connector	Plug the 12-VDC power supply in here and connect the adapter to an AC wall outlet.

Chapter 3: Remote Control Functions

3. Remote Control Functions

Figures 3-1 through 3-4 show the remote controls. Table 3-1 describes their components.

Table 3-1. Remote Control Components.

Number	Component	Description
1	Input Select for HDMI OUT A	Press 1, 2, 3, or 4 to select the desired input source for HDMI OUT A
2	Input Select for HDMI OUT B	Press 1, 2, 3, or 4 to select the desired input source for HDMI OUT B
3	Input Select for HDMI OUT C	Press 1, 2, 3, or 4 to select the desired input source for HDMI OUT C
4	Input Select for HDMI OUT D	Press 1, 2, 3, or 4 to select the desired input source for HDMI OUT D
5	Power	Turn remote control ON/OFF

Figures 3-1 through 3-4 show the overlay on the remote control overlay for each of the four available Matrix Switches.

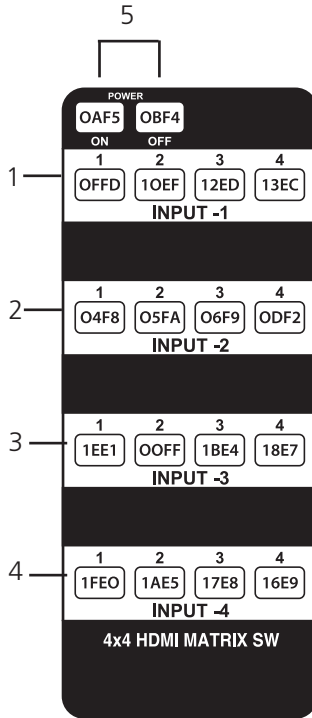


Figure 3-1. 4 x 4 HDMI Matrix Switch remote control overlay.

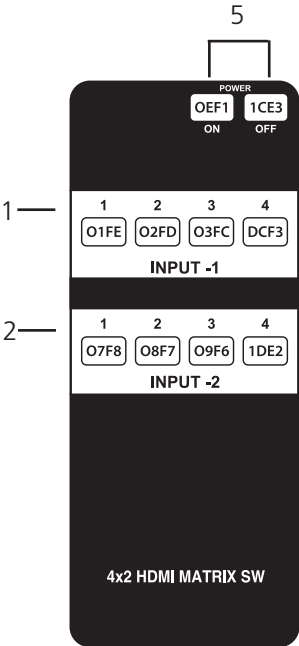


Figure 3-2. 4 x 2 HDMI Matrix Switch remote control overlay.

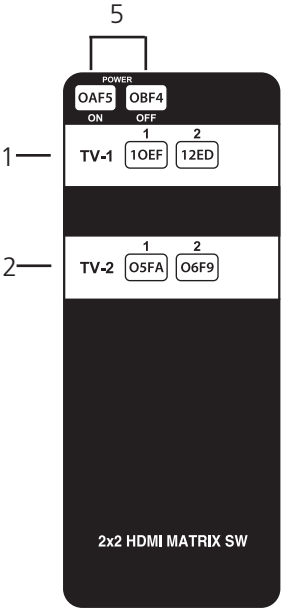


Figure 3-3. 2 x 2 HDMI Matrix Switch remote control overlay.

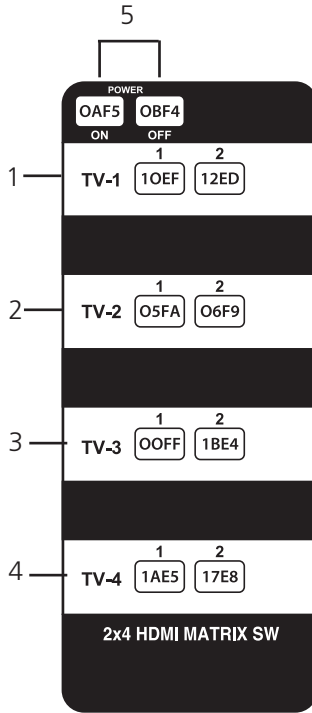


Figure 3-4. 2 x 4 HDMI Matrix Switch remote control overlay.

4. RS-232 Serial Interface

4.1 Pin Definitions

Table 4-1. RS-232 pin definitions.

AVSW-HDMI Switch		Remote Control Console	
Pin	Definition	Pin	Definition
1	Not connected	1	Not connected
2	Tx	2	Rx
3	Rx	3	Tx
4	Not connected	4	Not connected
5	GND	5	GND
6	Not connected	6	Not connected
7	Not connected	7	Not connected
8	Not connected	8	Not connected
9	Not connected	9	Not connected

4.2 RS-232 Serial Control Port

You can control the HDMI Matrix Switches via the RS-232 serial control port for interfacing to a PC. The serial communication parameters are: 9600 baud, 8 bits, no parity, and one stop bit. This is often referred to as 9600 8N1.

When the switch recognizes a complete command, it will perform the requested action—no delimiter character is required. The unit does not send out a message when a value is changed from the front panel or via IR control. If you need to control the unit via the front panel in addition to the RS-232 control, you should regularly poll the unit status to ensure that the control system accurately reflects the current settings or similar third-party control system.

5. RS-232 Serial Commands


To switch inputs to outputs:

SBIO200Y (where X is the output number [1-4] and Y is the input number [1-4]).

Unit will respond with:

SBUD0XOY (where X is the output number [1-4] and Y is the input number [1-4]).

Example: Send input 2 to output 3:

SBIO2003: Send 

SBUD0203: Recvd 

5.1 Standby Mode

NOTES: Turning the unit's System Power Off over RS-232 will turn off the LED display, leaving only the Power Switch LED on. The video and audio outputs will also mute.

While the unit is turned off by RS-232, it will continue to accept and act upon switching commands. For example, if the unit is in the off mode (via RS-232) and you send a command to switch an input to an output, that route will complete and the video and audio will now appear on that channel only.

The front panel LED for that particular output will also show the input selected (for that single output channel only). The remaining LEDs will stay off and video and audio outputs muted.

The unit will still return status and change messages in response to commands sent while in Power Off state.

A hard reset command (SBALLRST) will return the unit to normal operation and also unlock the front panel.

5.2 Power Off Mode

SBSYSMOF: Put system into Standby (soft power off).

SBSYSMON: Bring the unit out of Standby (soft power on).

Unit will respond with:

SBALOFAX: Unit is in standby.

SBALONAK: Unit is no longer in standby.

Example: Put unit in standby (soft power).

SBSYSMOF: Send

SVBALOFAK: Rcvd

5.3 Front Panel Lock

NOTE: Hard resetting the unit will unlock the front panel controls.

SBSYSMLK: When the front panel is locked, you can only make changes by RS-232.

SBSYSMUL : Front panel unlock.

Unit will respond with:

SBSYSLOK: Front panel has been locked.

SBYSULK: Front panel has been unlocked.

Example: Lock front panel buttons

SBSYSMLK: Send

SBSYSLOK: Recd

5.4 Unit Reset

SBALLRST: Reset every output to input 1.

Unit will respond with:

SBRSTACK: Unit has reset each output to input 1.

Example: Reset all outputs to input 1.

SBALLRST: Send

SBRSTACK: Recd

6. Typical Application

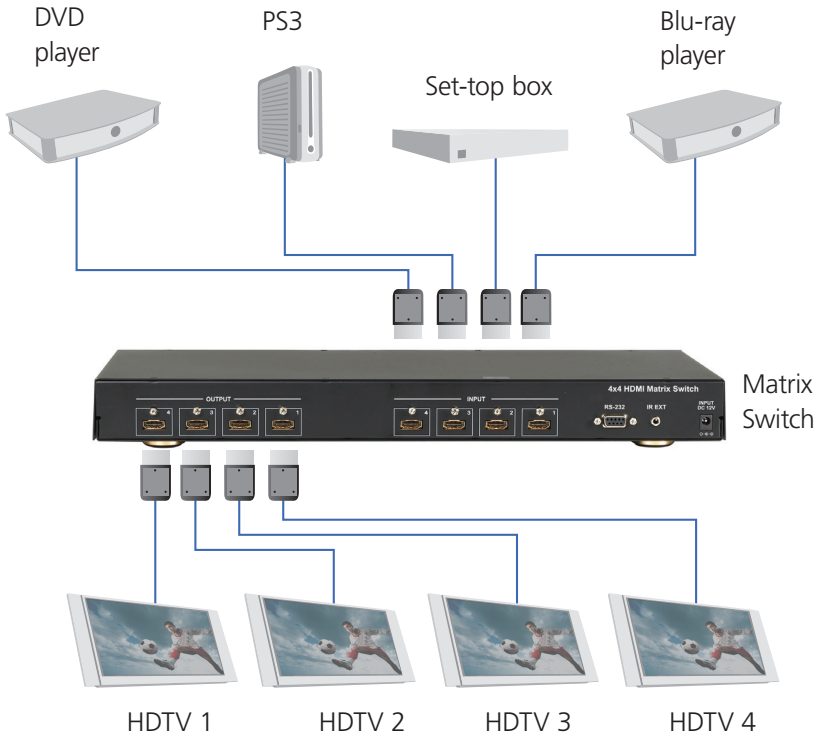


Figure 6-1. Example application.

Chapter 7: Safety Information

7. Safety Information

7.1 Safeguards

To reduce the risk of electric shock, do not expose this product to rain or moisture. If the wall plug does not fit into your local power socket, hire an electrician to replace your obsolete socket.

Do not modify the wall plug. Doing so will void the warranty and safety features.

Install this equipment near the socket outlet. The device should be easily accessible in case you need to disconnect it.

7.2 Precautions

FCC regulations state that any unauthorized changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Operate this product using only the included external power supply. Use of other power supplies could impair performance, damage the product, or cause fires.

If an electrostatic discharge occurs, this device may automatically turn off. If this happens, unplug the device, and plug it back in.

Protect and route power cords so they will not be stepped on or pinched by anything placed on or against them. Be especially careful of plug-ins or cord exit points from this product.

Avoid excessive humidity, sudden temperature changes, or temperature extremes.

Keep this product away from wet locations such as bathtubs, sinks, laundries, wet basements, and swimming pools.

Use only accessories recommended by Black Box to avoid fire, shock, or other hazards.

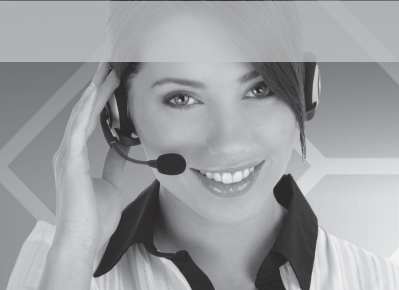
Unplug the product before cleaning. Use a damp cloth for cleaning. Do not use cleaning fluid or aerosols, which could enter the unit and cause damage, fire, or electrical shock. Some substances may also mar the finish of the product.

Never open or remove unit panels or make any adjustments not described in this manual. Attempting to do so could expose you to dangerous electrical shock or other hazards. It may also cause damage to your matrix switch. Opening the product will void the warranty.

Do not attempt to service the unit. Instead disconnect it and contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

Black Box Tech Support: FREE! Live. 24/7.

Tech support the
way it should be.



Great tech support is just 30 seconds away at
724-746-5500 or blackbox.com.



About Black Box

Black Box Network Services is your source for more than 118,000 networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

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