



## 8 x 8 VGA Matrix Switch with Audio

Switch (8) source devices with VGA plus audio and IR to (8) displays with VGA plus audio.

Use for high-definition LCD television or plasma display applications.



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Support  
Information**

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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 B 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.

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## Instrucciones de Seguridad (Normas Oficiales Mexicanas Electrical Safety Statement)

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 a 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 debe 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.

### Safety Information

*NOTE: THIS SAFETY INFORMATION IS OF A GENERAL NATURE AND MAY BE SUPERSEDED BY INSTRUCTIONS CONTAINED WITHIN THIS MANUAL.*

1. Save the carton and packing material even if the equipment has arrived in good condition. If you ever need to ship the unit, use only the original factory packing.
2. Read all documentation before operating your equipment. Retain all documentation for future reference.
3. Follow all instructions printed on unit chassis for proper operation.
4. Do not spill water or other liquids into or on the unit, or operate the unit while standing in liquid.
5. Make sure power outlets conform to the power requirements listed on the back of the unit.
6. Do not use the unit if the electrical power cord is frayed or broken. The power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where they exit.
7. Always operate the unit with the AC ground wire connected to the electrical system ground. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated.
8. Voltage must be correct and the same as that printed on the rear of the unit. Damage caused by connection to improper AC voltage is not covered by any warranty.
9. Power down and disconnect the unit from mains voltage before making connections.
10. Never hold a power switch in the "ON" position.
11. Do not use the unit near stoves, heat registers, radiators, or other heat-producing devices.
12. Do not block fan intake or exhaust ports. Do not operate equipment on a surface or in an environment which may impede the normal flow of air around the unit, such as a bed, rug, carpet, or completely enclosed rack. If the unit is used in an extremely dusty or smoky environment, the unit should be periodically "blown free" of foreign matter.
13. Do not remove the cover. Removing the cover will expose you to potentially dangerous voltages. There are no user-serviceable parts inside.
14. Do not drive the inputs with a signal level greater than that required to drive equipment to full output.
15. The power cord of equipment should be unplugged from the outlet when left unused for a long period of time.
16. Service information equipment should be serviced by qualified service personnel when:
  - A. The power supply cord or the plug has been damaged.
  - B. Objects have fallen, or liquid has been spilled into the equipment.
  - C. The equipment has been exposed to rain.
  - D. The equipment does not appear to operate normally or exhibits a marked change in performance.
  - E. The equipment has been dropped, or the enclosure damaged.

# Important Safety Instructions

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## IMPORTANT SAFETY INSTRUCTIONS

To get the best from this product, please read this manual carefully. Keep it in a safe place for future reference.

To reduce the risk of electric shock, do not remove the cover from the unit. No user-serviceable parts inside. Refer servicing to qualified personnel.

To reduce the risk of fire, do not expose the unit to rain, water, or excessive moisture.

Do not force switched or external connections.

When moving the unit, disconnect the serial port connections first then the power cable and finally the interconnecting cables to other devices.

Do not attempt to clean the unit with chemical solvents or aerosol cleaners, as this may damage the unit. Use a clean, dry cloth.

Installation of this unit should be in a cool, dry place, away from sources of excessive heat, vibration, dust, moisture, and cold.

*WARNING: To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle, or other outlet unless the blades can be fully inserted to prevent blade exposure. To prevent electric shock, match wide blade of plug to wide slot, fully insert.*

*CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK), NO USER-SERVICEABLE PARTS INSIDE, REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.*

*WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.*

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# Chapter 1: Specifications

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## 1. Specifications

**Color** — Black

**Material** — Steel

**MTBF**— 50,000 hours

**Safety Approvals** — CE, FCC, RoHS, WEEE, UL®

**User Controls** — (16) push buttons for source selection;  
(6) function buttons

**Connectors** — Input: (8) VGA, (8) 3.5-mm audio;  
Output: (8) VGA, (8) 3.5-mm audio;  
(1) 1.5-mm IR extension port;  
(1) DB9 serial port;  
(1) 2.5-mm barrel jack for power

**Indicators** — (8) red LEDs for Input Status;  
(1) Text screen

**Temperature Tolerance** — Operating: +32 to +104° F (0 to +40° C);  
Storage: -4 to +104° F (-20 to +60° C)

**Humidity Tolerance** — Up to 80%

**Altitude**— 10,000 ft. (3048 m)

**Power** — Desktop power supply: Input: 100–240 VAC, 50 to 60 Hz, 45 VA over an IEC320 C14 connector;  
Output: 9 VDC, 1.5 A over a 2.5-mm barrel plug connector center positive  
Consumption: 3880 mA maximum

**Size** — 3.75"H x 17.5"W x 8"D (9.5 x 44.5 x 20.3 cm)

**Weight** — 6 lb. (2.7 kg)



## 2. Overview

### 2.1 Introduction

The 8 x 8 VGA Matrix Switch with Audio is a high-performance 8x8 matrix routing switch for VGA signals. It has (8) individual inputs and (8) individual outputs for VGA with audio. Because it is a matrix switch, any input may be routed to any output, or the same input may be routed to all outputs in any combination. It completely eliminates the need to constantly move VGA input and output cables. Use the switch for high-definition LCD television or plasma display applications. Control the switch via front-panel push buttons with LED readout or IR remote controller. The switch also has an RS-232 serial interface to link to a console for out-of-band management.

### 2.2 Features

- Supports (8) VGA plus audio inputs to (8) VGA plus audio outputs.
- Input signals include VGA (RGBHV) and stereo audio (AR/AL).
- Output signals include VGA and stereo audio to VGA monitor display.
- Supports video bandwidth of 325 MHz for each R, G, B signals path.
- Supports high-definition (HD) resolutions: XGA, SXGA, UXGA, WSXGA, WUXGA.
- Provides a serial interface for management.
- Compatible with all VGA video monitor devices, plasma displays, and projectors.
- Supports an RS-232 serial interface protocol commands list.
- Features user interface controls, including:
  - Manual control with front-panel button.
  - Remote control
  - RS-232 serial commands

### 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](mailto:info@blackbox.com).

- (1) 8 x 8 VGA Matrix Switch with Audio
- (1) 12-VDC, 2-A power supply with cord
- (1) DB9 male-female cable
- (1) IR extender receiver
- (1) IR remote control with batteries
- 19-inch rackmounting kit
- User manual

## 2.4 Hardware Description

Figure 2-1 shows the front panel of the switch, and Figure 2-2 shows the rear panel. Tables 2-1 and 2-2 describe the components.

### 2.4.1 Front Panel

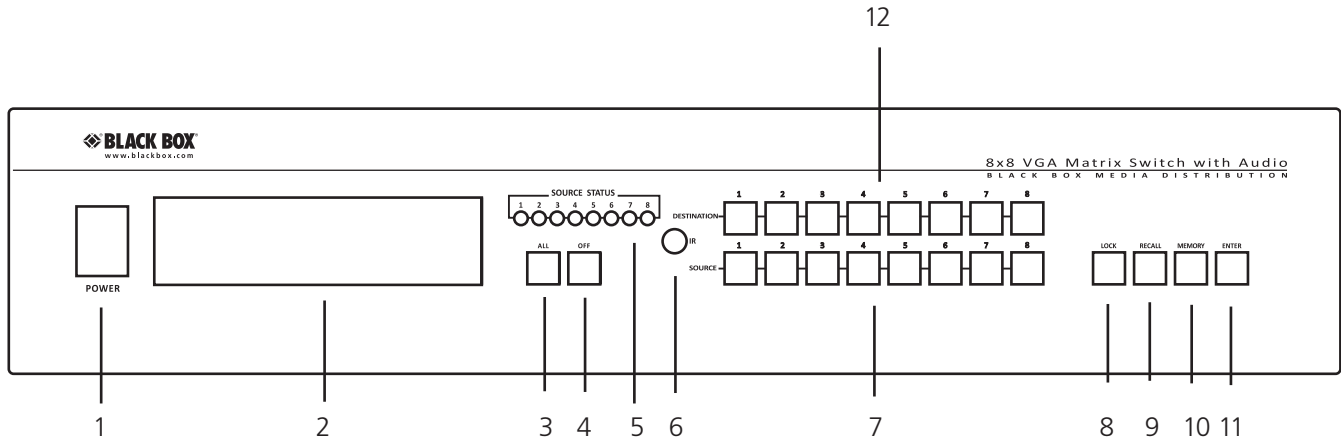


Figure 2-1. Front-panel diagram.

Table 2-1. Front-panel components.

Number	Component	Description
1	Power switch	The power switch turns the unit on and off. The LED will light red to indicate that the switch is on and is receiving power.
2	LCD display	Displays which input port numbers are linked to which output ports.
3	ALL button	This function button is used to select all ports.
4	OFF button	This button turns output OFF (shows O on screen).
5	Input sources Status LED display	LEDs for inputs 1 to 8 light Red when a video source is present on that input.
6	IR sensor	The IR sensor receives IR commands from the supplied remote control.
7	Input sources Select buttons	Used to select which destination (output) is paired with each source (input).
8	Lock button	Press this button to lock/unlock switching.
9	Recall button	Used to recall a saved memory configuration.
10	Memory button	Used to save an input/output configuration.
11	Enter button	Press this button to finish other button functions.
12	Output destination Select buttons	Used to select which destination (output) is paired with each source (input).

2.4.2 Rear Panel

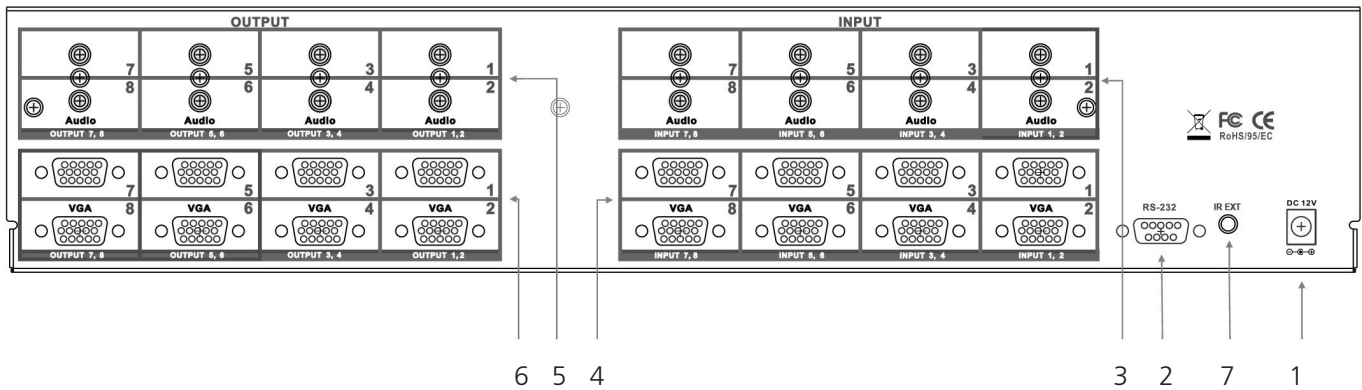

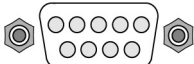






Figure 2-2. Rear panel.

Table 2-2. Rear-panel components.

Number	Component	Connector	Connector Description	Component Description
1	DC power inlet		Power jack: DC jack: inner OD 2.1-mm; outer OD 5.5-mm  Power input: 12 VDC, 5 A	The switch has a DC power plug input connector. Use the supplied power adapter.
2	RS-232 connection		Remote port: DB9 female connector	RS-232 control port enables serial control of the matrix switch from an external device.
3	Inputs 1–8 audio player sources		Stereo audio (AR, AL) via (1) 3.5-mm mini jack connector	Connect stereo audio signal input from Source 1–8.
4	Inputs — 1, 2, 3, 4, 5, 6, 7, 8 VGA source ports		VGA (RGBHV) via (1) HD15 male connector	Connect VGA (RGBHV) signal input from Source 1–8.
5	Outputs 1–8 audio player sources		Stereo audio (AR/AL) via (1) 3.5-mm mini jack connector	Connect stereo audio signal output to Audio Device 1–8.
6	Outputs — 1, 2, 3, 4, 5, 6, 7, 8 VGA RGBHV ports		VGA (RGBHV) via (1) HD15 male connector	Connect VGA (RGBHV) signal output to Display 1–8.
7	IR extender	See Figure 2-2	3.5-mm connector	Connect to IR extender.

# Chapter 3: Installation

## 3. Installation

### 3.1 Installation Diagram

Figure 3-1 shows a sample application using the 8 x 8 VGA Matrix Switch with Audio.

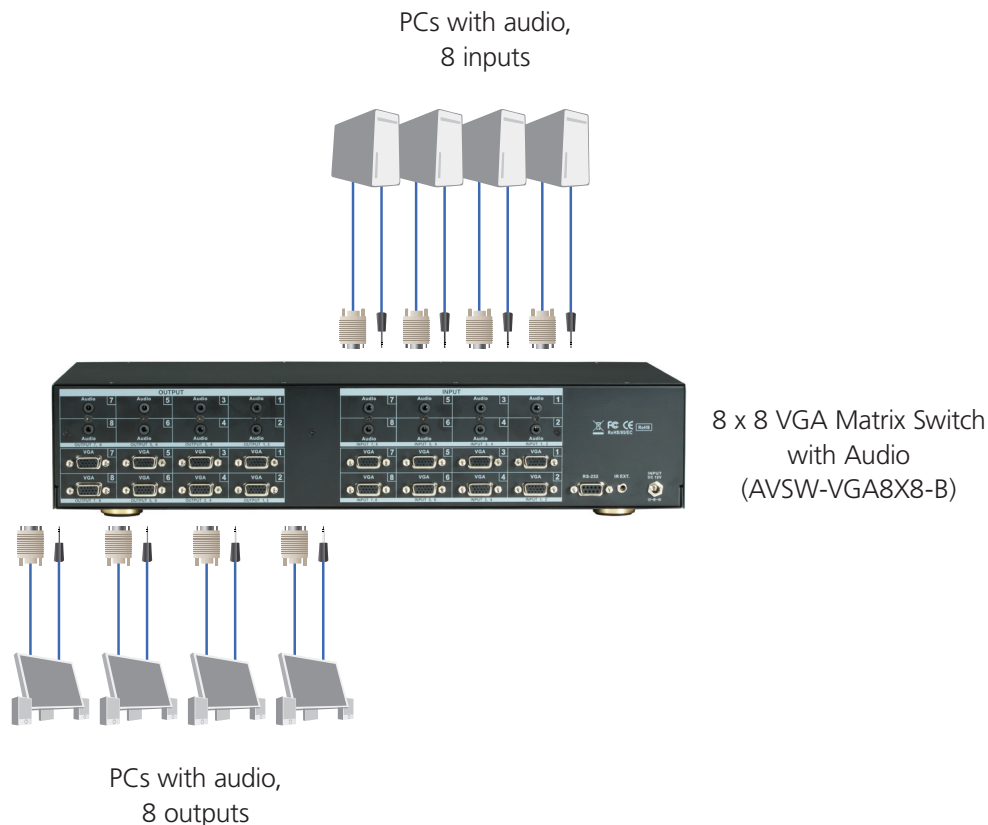


Figure 3-1. Typical application using the 8 x 8 VGA Matrix Switch with Audio.

Before making any connections to the switch, observe the following:

- Make sure that the voltage supply matches the label on the supplied plug ( $\pm 10\%$ ).
- Make sure that the power switch is OFF.
- Make sure that all system grounds are connected to a common point.
- Avoid powering equipment with a system from multiple power sources that may be separated by large distances.
- Connect all audio and video sources and destination equipment.
- Power on all source and destination audio-visual sources.
- For each destination output, select the appropriate input source by using the front-panel Input 1–8 select buttons, the supplied IR remote control, or through the RS-232 serial communications port.
- On power-up, the switch will return to its last used setting before it was powered down.

3.2 Remote Control

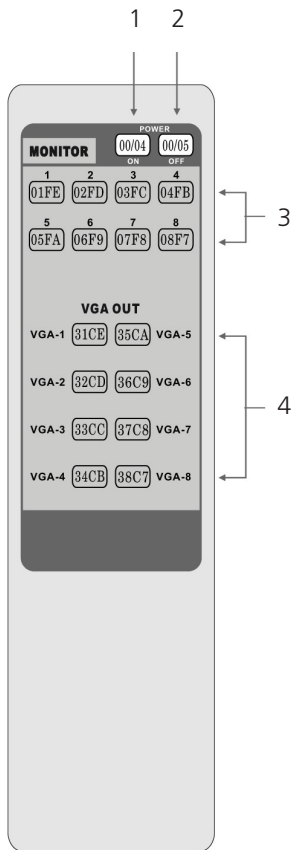


Table 3-1. IR remote control key.

Number in Figure 3-2	Description
1	Switch Power ON
2	Switch Power OFF
3	Source: 1–8 input source selection: Press Input 1–8 sources with selection button
4	Destination: 1–8 output selection: Press the destination button to select the output display channel.

Figure 3-2. Remote control.

Table 3-2. 1–8 monitor inputs selection.

Number in Figure 3-2	Input number	Description
1, 2	—	Switch power ON or OFF
3	1	Switch (8) VGA sources to #1 monitor display
3	2	Switch (8) VGA sources to #2 monitor display
3	3	Switch (8) VGA sources to #3 monitor display
3	4	Switch (8) VGA sources to #4 monitor display
3	5	Switch (8) VGA sources to #5 monitor display
3	6	Switch (8) VGA sources to #6 monitor display
3	7	Switch (8) VGA sources to #7 monitor display
3	8	Switch (8) VGA sources to #8 monitor display

Table 3-3. Outputs 1–8 VGA sources outputs setup.

Number in Figure 3-2	Output number	Description
4	VGA-1	VGA signal source device #1
4	VGA-2	VGA signal source device #2
4	VGA-3	VGA signal source device #3
4	VGA-4	VGA signal source device #4
4	VGA-5	VGA signal source device #5
4	VGA-6	VGA signal source device #6
4	VGA-7	VGA signal source device #7
4	VGA-8	VGA signal source device #8

## 3.3 How to Set Up IR Codes

POWER ON: 00FF 04FB

POWER OFF: 00FF 05FA

Table 3-4. How to set up IR codes for monitor input #1/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #1	Output #1	01FE 31CE
Input #1	Output #2	01FE 32CD
Input #1	Output #3	01FE 33CC
Input #1	Output #4	01FE 34CB
Input #1	Output #5	01FE 35CA
Input #1	Output #6	01FE 36C9
Input #1	Output #7	01FE 37C8
Input #1	Output #8	01FE 38C7

Table 3-5. How to set up IR codes for monitor input #2/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #2	Output #1	02FD 31CE
Input #2	Output #2	02FD 32CD
Input #2	Output #3	02FD 33CC
Input #2	Output #4	02FD 34CB
Input #2	Output #5	02FD 35CA
Input #2	Output #6	02FD 36C9
Input #2	Output #7	02FD 37C8
Input #2	Output #8	02FD 38C7

Table 3-6. How to set up IR codes for monitor input #3/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #3	Output #1	03FC 31CE
Input #3	Output #2	03FC 32CD
Input #3	Output #3	03FC 33CC
Input #3	Output #4	03FC 34CB
Input #3	Output #5	03FC 35CA
Input #3	Output #6	03FC 36C9
Input #3	Output #7	03FC 37C8
Input #3	Output #8	03FC 38C7

Table 3-7. How to set up IR codes for monitor input #4/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #4	Output #1	04FB 31CE
Input #4	Output #2	04FB 32CD
Input #4	Output #3	04FB 33CC
Input #4	Output #4	04FB 34CB
Input #4	Output #5	04FB 35CA
Input #4	Output #6	04FB 36C9
Input #4	Output #7	04FB 37C8
Input #4	Output #8	04FB 38C7

Table 3-8. How to set up IR codes for monitor input #5/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #5	Output #1	05FA 31CE
Input #5	Output #2	05FA 32CD
Input #5	Output #3	05FA 33CC
Input #5	Output #4	05FA 34CB
Input #5	Output #5	05FA 35CA
Input #5	Output #6	05FA 36C9
Input #5	Output #7	05FA 37C8
Input #5	Output #8	05FA 38C7

Table 3-9. How to set up IR codes for monitor input #6/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #6	Output #1	06F9 31CE
Input #6	Output #2	06F9 32CD
Input #6	Output #3	06F9 33CC
Input #6	Output #4	06F9 34CB
Input #6	Output #5	06F9 35CA
Input #6	Output #6	06F9 36C9
Input #6	Output #7	06F9 37C8
Input #6	Output #8	06F9 38C7

Table 3-10. How to set up IR codes for monitor input #7/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #7	Output #1	07F8 31CE
Input #7	Output #2	07F8 32CD
Input #7	Output #3	07F8 33CC
Input #7	Output #4	07F8 34CB
Input #7	Output #5	07F8 35CA
Input #7	Output #6	07F8 36C9
Input #7	Output #7	07F8 37C8
Input #7	Output #8	07F8 38C7

Table 3-11. How to set up IR codes for monitor input #8/VGA OUT.

Monitor IN	VGA OUT	IR code
Input #8	Output #1	08F7 31CE
Input #8	Output #2	08F7 32CD
Input #8	Output #3	08F7 33CC
Input #8	Output #4	08F7 34CB
Input #8	Output #5	08F7 35CA
Input #8	Output #6	08F7 36C9
Input #8	Output #7	08F7 37C8
Input #8	Output #8	08F7 38C7

### 3.4 Installing the Switch

1. Study the panel drawings and become familiar with the signal input-output, power requirements, plus any controls present.
2. Before using the switch, make sure that the device you want to connect to its inputs is functioning properly. Verify that the video and audio signals are present and are being displayed on a suitable device.
3. Connect the appropriate cables between the output of the device you want to distribute to the devices you want to input a signal to.
4. Connect the 12-VDC, 2-A power supply to the switch and then plug the attached cord into a functioning AC outlet.



### 4. Operation

#### 4.1 Operating the Unit

After you connect the switch as described in Chapter 3, make sure that the inputs are being fed appropriate signals and are not losing signals because of cable problems or problems with the source device. If the input signals to the switch are appropriate, switch the power ON. You should see and hear the signals on the devices you have connected to the various output connectors of the switch.

#### 4.2 Power and Connections

The switch is not disconnected from the AC power source as long as it is connected to the wall outlet. The OFF state for the unit is called Standby mode. In standby mode, the unit consumes a reduced quantity of power compared to normal operating modes. When not using the switch for a long period of time, make sure that the AC power cord is disconnected from the wall outlet.

The AC wall outlet should be installed near the unit and be easily accessible.

*CAUTION: Do not plug in or attempt to operate a damaged unit.*

# Chapter 5: RS-232 Serial Interface and Commands

## 5. RS-232 Serial Interface and Commands

For a complete list of commands, refer to the extended RS-232 Protocol Instruction Manual.

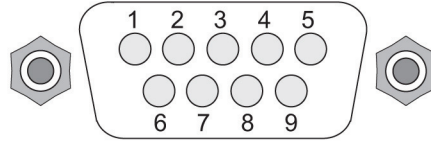


Figure 5-1. RS-232 DB9 connector.

Table 5-1. RS-232 serial interface pinouts.

Pin	RS-232	Defintion
1	—	Not used
2	TX	Transmitter
3	RX	Receiver
4	—	Not used
5	GND	Ground
6	—	Not used
7	—	Not used
8	—	Not used
9	—	Not used

You can control the switch via the RS-232 serial control port to interface to a PC or similar third-party control system.

The serial communication parameters are 9600 baud, 8 bit, no parity, and 1 stop bit. This is often referred to as 9600 8N1. When the unit recognizes a complete command, it will perform the requested action. There is no delimiter character required.

### 6. Troubleshooting

#### 6.1 Common Problems

Problem: You get a “no signal” with the switch outputs.

**Solutions:**

1. Make certain that the signal being fed to its inputs is acceptable. Disconnect the cables from the switch inputs and connect them directly to an appropriate monitoring device. If you do not see or hear a signal, the problem may be the signal source itself. Also check that the AC outlet you have used to power the switch is actually providing power. Check the wall switch, which often controls an AC outlet.
2. The second most common problem with this switch revolves around the cables. Inspect the cables for loose connectors or cable damage such as crushed cable or cables with cuts or nicks. Replace any cable with these problems. You must use the highest-quality cables if you want to achieve the best results. Poor-quality cables will provide poor-quality signals.

#### 6.2 Contacting Black Box

If you determine that your 8X8 VGA Matrix Switch is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500 or [info@blackbox.com](mailto:info@blackbox.com).

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

#### 6.3 Shipping and Packaging

If you need to transport or ship your 8X8 VGA Matrix Switch:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, make sure you include everything you received with it. Before you ship for return or repair, contact Black Box to get a Return Authorization (RA) number.

**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](http://blackbox.com).



### About Black Box

Black Box provides an extensive range of 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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AVSW-VGA8X8-B, version 2

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