BLACK BOX®

Multi-Format AV Scaler with DisplayPort

Scales analog video, S-Video, component video, VGA, DVI, HDMI, and DisplayPort video input signals into VGA or HDMI output signals.

Supports resolutions of 480i/p, 720p, and 1080i/p.

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, PA 15055-1018
Web site: www.blackbox.com • E-mail: info@blackbox.com

Trademarks Used in this Manual

Federal Communications Commission and Industry Canada Radio Frequency Interference Statements

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.

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.

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 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 connectado 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 fisica 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 lineas de energia.
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 objectos liquidos 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: Objectos 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

1. Save the carton and packing materials whether or not the unit arrives in good condition. If you ever need to ship the unit, use the original factory packing.
2. Read all documentation before operating your equipment. Retain all documentation for future reference.
3. Follow all instructions printed on the unit chassis for proper operation.
4. Do not spill water or other liquids into or on the unit, or operate the unit 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. Route the power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords, plugs, convenience receptacles, and the points where they exit from the appliance.
7. Always operate the unit with the AC ground wire connected to the electrical system ground. Be careful not to defeat the grounding of a piece of equipment.
8. Voltage must be the same as that printed on the rear of the unit. Damage caused by connection to improper AC voltage is not covered by warranty.
9. Power off and disconnect the unit from the voltage before connecting any equipment.
10. Do not leave the unit on unstable surfaces.
11. Do not use the unit near stoves, heat registers, radiators, or other heat-producing devices.
12. Do not block the fan intake or exhaust ports. Do not operate the equipment on a surface or in an environment that 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 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 the equipment to reach full output.
15. When you are not using the unit, unplug the power cord of the equipment from the outlet.
16. Refer servicing to qualified service personnel when:

    A. The power supply cord or the plug is damaged.

    B. Liquid has been spilled into the equipment.

    C. The equipment has fallen.

    D. The equipment has been exposed to rain.

    E. The equipment does not appear to operate normally, or exhibits a change in performance.

    F. The equipment has been dropped, or the enclosure damaged.

Important Safety Instructions

To ensure the best from this product, read this manual carefully. Keep it for future reference.

To reduce the risk of electric shock, do not remove the cover from the unit.

There are 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 connection 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.

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

Table of Contents

1. Specifications

Technical Specifications

Advanced Video Processing	High-quality video and graphics scaling up and down Frame rate conversion
Approvals	CE, FCC, RoHS (2002/95/EC)
Audio Input Signal	Digital Audio (PCM), Stereo Audio
Audio Output Signal	1x S/PDIF Digital Audio, 1x Analog Audio RH/LH, 1x HDMI Audio
Chassis Material	Metal
Control	IR remote control, RS-232, front panel push buttons
Dimensions	11.96"H x 5.90"W x 1.73"D (30.4 x 15 cm x 1.1 cm)
HDCP Support	Automatic scanning of input/output status
HDMI Cable Distance	Max. 15 meters (49 feet), depending on cable quality
HDMI Compliance	HDMI 1.4a receiver and transmitter
Infrared Frequency	38 KHz
Input Resolution	DVI/ HDMI/ Display Port, compliant with HDCP 2.0
Intelligent Color Adjustment	Discrete RGB, color adjustment, hue, saturation sharpness, contrast, brightness, four preset color modes
IR Extend Distance	300 meters (984 feet) line cable via IR extender
Output Resolution	Up to 1080p-60, 1920x1200
Power Supply	Input: 100–240 VAC, 50/60 Hz Output: 12 VDC, 2 A
Rackmount	19-inch panel type (1U-44L)
Scaler Type	7 in/2 out HDMI Video Scaler
Source Status	Automatic scanning of input/output status
System Control	Box ID for easy independent control through IR, RS-232, and five selectable profiles settings for difference display. Ethernet control module with RJ-45 connector. ASCII control protocol over RS-232 and Ethernet.
Temperature	32–100° F (0–32° C)
Video Input Signal	(1) Composite/(1) S-Video/(1) Component (1) VGA/(1) DVI/(1) HDMI/(1) DP
Video Output Signal	(1) VGA, (1) HDMI
Video Wall	Magnify, scroll, pan through all inputs Video wall function: Image split, cropping, and assign display location Pixel based overlap adjustment in all edges, up to 15x15 matrix displays Up to 2560 x 1600 input resolution via display port
Weight	Shipping weight: 3.42 lb. (2.05 kg)

Input Resolution Support						
		Input				
Resolution		Component	VGA	DVI	HDMI	DisplayPort
640 x 350 @ 85 Hz	480p/480i	√		√	√	√
640 x 400 @ 85 Hz	576p/576i			√	√	√
640 x 480 @ 60 Hz	720p	√	√	√	√	√
640 x 480 @ 72 Hz	VGA			√	√	√
640 x 480 @ 75 Hz	VGA		√	√	√	√
720 x 400 @ 70 Hz	DOS		√	√	√	√
720 x 400 @ 85 Hz	1080p/1080i	√	√	√	√	√
800 x 600 @ 56 Hz	SVGA			√	√	√
800 x 600 @ 60 Hz	SVGA		√	√	√	√
800 x 600 @ 72 Hz	SVGA		√	√	√	√
800 x 600 @ 75 Hz	SVGA		√	√	√	√
832 x 624 @ 75 Hz	SVGA		√	√	√	√
848 x 480 @ 59 Hz	WVGA		√	√	√	√
848 x 480 @ 60 Hz	WVGA		√	√	√	√
852 x 480 @ 60 Hz	480p		√			
1024 x 768 @ 60 Hz	XGA		√	√	√	√
1024 x 768 @ 70 Hz	XGA			√	√	√
1024 x 768 @ 75 Hz	XGA		√	√	√	√
1152 x 864 @ 75 Hz	XGA+		√	√	√	√
1280 x 720 @ 48 Hz	HD 720		√			
1280 x 720 @ 50 Hz	HD 720		√	√	√	√
1280 x 720 @ 60 Hz	WXGA		√	√	√	√
1280 x 768 @ 75 Hz	WXGA		√	√	√	√
1280 x 768 @ 60 Hz	WXGA		√		√	√
1280 x 800 @ 60 Hz	WXGA		√		√	√
1280 x 800 @ 75 Hz	WXGA		√		√	√
1280 x 960 @ 60 Hz	SXGA		√		√	√
1280 x 1024 @ 60 Hz	SXGA		√	√	√	√
1280 x 1024 @ 75 Hz	SXGA		√	√	√	√
1360 x 768 @ 60 Hz	SXGA		√	√	√	√
1360 x 768 @ 75 Hz	SXGA		√			
1366 x 768 @ 60 Hz	WXGA		√			
1400 x 788 @ 60 Hz	WXGA+		√			
1400 x 1050 @ 60 Hz	SXGA+		√	√	√	√
1400 x 1050 @ 75 Hz	SXGA+		√	√	√	√
1400 x 1050 @ 60 Hz	SXGA+		√		√	√
1440 x 900 @ 60 Hz	WXGA+		√		√	√
1440 x 900 @ 75 Hz	WXGA+				√	√
1440 x 1050 @ 60 Hz	SXGA+		√	√	√	√
1600 x 1200 @ 60 Hz	UXGA		√	√	√	√

NOTE: A detailed resolution timing list is included in the Appendix.

Input Resolution Support (Continued)						
		Input				
Resolution		Component	VGA	DVI	HDMI	DisplayPort
1600 x 1200 @ 65 Hz	UXGA					√
1600 x 1200 @ 70 Hz	UXGA		√			
1600 x 1200 @ 75 Hz	UXGA					√
1680 x 1050 @ 60 Hz	WSXGA+		√	√	√	√
1792 x 1344 @ 60 Hz			√			
1856 x 1392 @ 60 Hz			√			
1920 x 1200 @ 60 Hz	WUXGA			√	√	√
1920 x 1200 @ 60 Hz	WUXGA		√			
1920 x 1440 @ 60 Hz	WUXGA		√			
1920 x 1440 @ 75 Hz	WUXGA		√			
720 x 480p @ 59 Hz	DVD "NTSC"			√	√	
720 x 480p @ 59 Hz	DVD "NTSC"			√	√	√
720 x 576p @ 50 Hz	DVD "PAL"			√	√	√
720 x 576p @ 50 Hz	DVD "PAL"			√	√	√
1280 x 720p @ 50 Hz	HDTV 720p		√	√	√	√
1280 x 720p @ 60 Hz	HDTV 720p			√	√	√
1280 x 720p @ 100 Hz	HDTV 720p			√	√	√
1280 x 720p @ 120 Hz	HDTV 720p			√	√	√
1920 x 1080p @ 24 Hz	1080p HD				√	√
1920 x 1080p @ 30 Hz	1080i HD				√	√
1920 x 1080p @ 50 Hz	1080p HD				√	√
1920 x 1080p @ 60 Hz	1080p HD		√	√	√	√
1920 x 1080p @ 24 Hz	Full HD 1080p					√
2048 x 1280 @ 60 Hz			√			
2560 x 1600	WQXGA					√

NOTE: A detailed resolution timing list is included in the Appendix.

Output Resolution Support			
		Output	
Front Panel Buttons	Resolution	VGA	HDMI
OTHERS	720 x 480	√	√
	800 x 600	√	√
	1280 x 800	√	√
	1280 x 1024	√	√
	1360 x 768	√	√
	1400 x 1050	√	√
	1600 x 1200	√	√
XGA	1920 x 1200	√	√
WXGA	1024 x 768	√	√
720p	1280 x 720	√	√
1080p	1920 x 1080	√	√

NOTE: When you press the front panel button "OTHERS," the scaler will automatically apply the resolution 1360 x 768. Continue pressing "OTHERS" to cycle through the following four resolutions:

1360 x 768 —> 1280 x 1024 —> 1600 x 1200 —> 1920 x 1200

NOTE: To select 720 x 480, 800 x 600, or 1280 x 800, open the OSD menu and go to "Image Properties" to adjust the settings in output mode.

2. Overview

2.1 Introduction

The AVSC-7DA-HDMI is a video graphics scaler that accepts seven types of signals: analog video, S-Video, component video, VGA, DVI, HDMI, and DisplayPort signals. It scales the input signals into either VGA or HDMI signals, supporting higher full HD resolutions of 480i/p, 720p, and 1080i/p. The scaler is designed to solve problems of compatibility between source devices and monitors. Use it to deliver one single image on a TV wall. In addition to the front panel buttons and the IR remote control, users may control the scaler using a PC through the RS-232 serial port or Ethernet port.

2.2 Features

- Compliant with HDMI 1.4, DVI 2.0, and HDCP 2.0.
- Input support: Analog: analog video, S-Video, composite video, VGA;
  Digital: DVI, HDMI, and DisplayPort
- Output support: VGA and HDMI 1080p with deep color 36-bit
- Output audio support: S/PDIF, stereo audio
- Supports a wide range of HD resolutions ranging from XGA to WUXGA 1920 x 1200 to HDTV/DTV resolutions 480i/480p, 576i/576p, 720p, 1080i, and 1080p.
- Compatible with all HDMI source devices, PC monitors, plasma HD displays, HDTVs, and audio receivers/amplifiers.
- Supports intelligent color adjustment (discrete RGB color adjustment, hue, saturation, sharpness, contrast, brightness, and preset color modes).
- Rackmountable: 19-inch ear rackmount.
- Various user interface control, including front-panel push buttons, IR wireless remote control, third-party RS-232 controller (via simple ASCII), and Ethernet with built-in Web browser.
- Supports IR extender with maximum extend distance reaching 300 meters.
- Supports TV wall function, allowing the image to be divided on multiple displays/monitors.
- Includes 12-VDC power supply, universal-type switch, 100–240 VAC, 50/60 Hz.

2.3 What's Included

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

- Main console unit
- IR remote controller
- 19" ear mount bracket
- IR extender receiver
- CD-ROM containing this user manual in PDF format and IP changing software
- RS-232 cable
- 12-VDC, 2-A power supply, universal-type switch, 50/60 Hz, 100–240 VAC

2.4 Hardware Description

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

Figures 2-2 through 2-4 show the back panel of the scaler. Tables 2-2 through 2-4 describe its components.

2.4.1 Front Panel

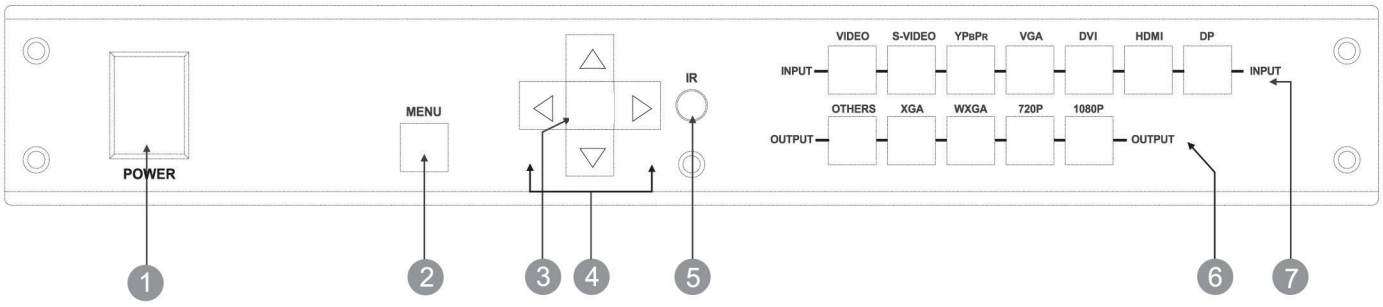


Figure 2-1. Front panel of the scaler.

Table 2-1. Front panel components.

Number in Figure 2-1	Component	Description
1	Power switch	The power switch turns the unit on and off. The LED lights blue to indicate that the switch is ON and receiving power. The scaler will remember the last setting during a power cycle. When turned ON again, it will automatically apply the setting last used.
2	Menu	Press menu to open the on-screen display (OSD) interface. Press again to exit the menu. For guidance on the OSD options, refer to Chapter 7, OSD Instructions.
3	Enter	Press enter to confirm your entries.
4	Arrow keys	Use the arrow keys to move between the OSD options. Press the up key to enter the upper layer and the down key to enter the next layer. Press the left and right keys to select options in the same layer or change the value of a parameter.
5	IR sensor	The IR sensor receives IR commands from the supplied remote controller or a third-party IR emitter.
6	Output select buttons	Select the desired resolution supported by your display devices. Press "OTHERS" for resolutions other than XGA, WXGA, 720p, and 1080p. The button will light blue to indicate it is selected. Advanced resolution adjustment is an OSD option.
7	Input select buttons	Select from one of the seven buttons the video signal to scale. The button will light blue to indicate it is selected.

2.4.2 Back Panel

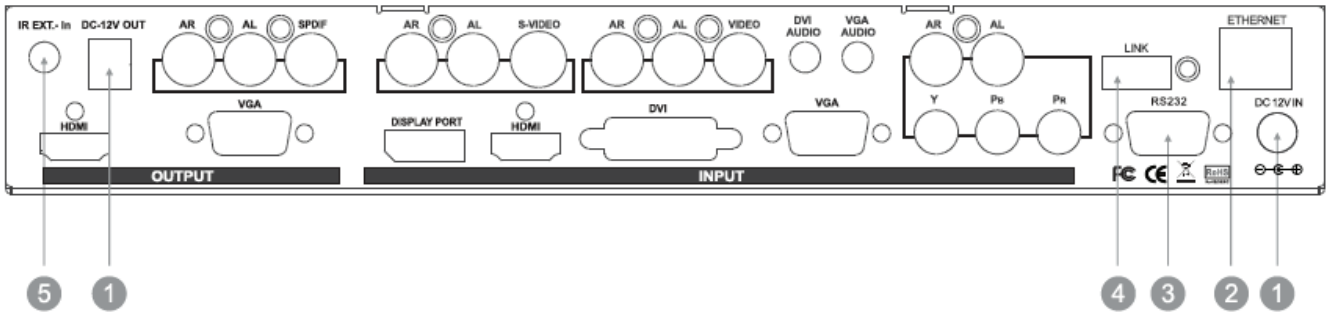
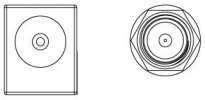
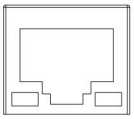
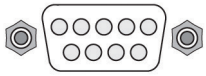
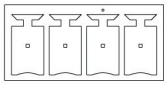


Figure 2-2. Back panel of the scaler.

Table 2-2. Back panel components.				
Number in Figure 2-2	Component	Description	Picture	Specifications
1	DC power inlet/outlet	The scaler has a DC power plug-pack input connector. Make sure the plug-pack used is of an approved type and is the correct current, voltage output, and connector polarity: 12-VDC, 2-A power supply.		Power jack: DC jack: Inner OD = 2.1 mm Outside OD = 5.5 mm Power input: 12 VDC, 2 A
2	Ethernet connection	Connect a CAT5 cable to the Ethernet port to control the scaler from a computer.		8P8C/RJ-45 connector
3	RS-232 connection	Connect a serial cable to the RS-232 port to control the scaler from a computer.		DB9 female connector
4	Link	Connect the link port for firmware updates.		Terminal block connector
5	IR extender control	Supports remote control via IR extender. Maximum extend distance reaches about 1000 feet (300 meters).		IR extender jack: Female jack: Inner OD = 3.5 mm

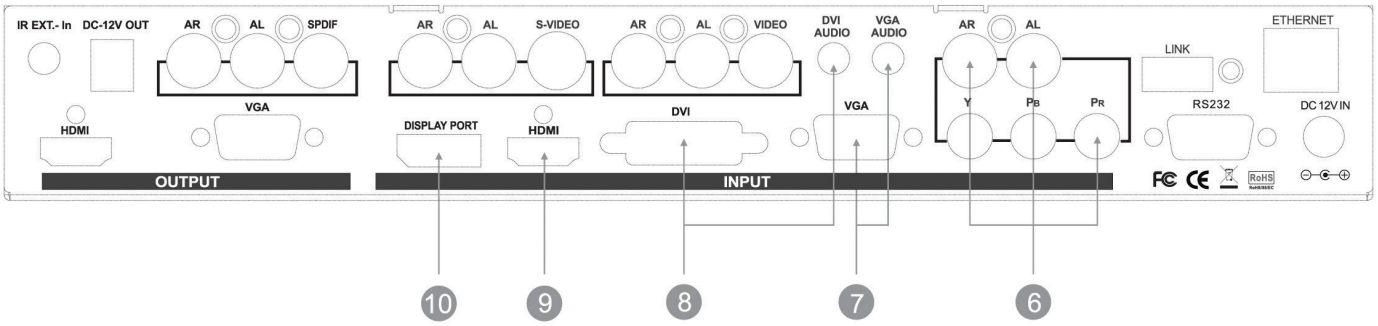
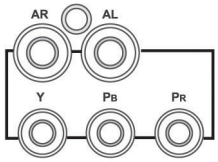
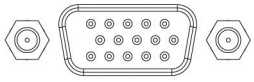
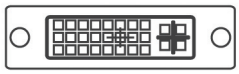
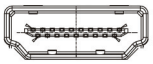
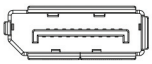


Figure 2-3. Back panel of the scaler.

Table 2-3. Back panel components (continued).				
Number in Figure 2-3	Component	Description	Picture	Specifications
6	YPbPr + AR/AL audio input	Connect a component video signal directly to the female RCA connector, which supports component video (YPbPr) to HDTV display devices. Connect the output port of your source audio device to the AR/AL inputs.		Component video via (3) RCA female connectors Stereo audio via (2) RCA female connectors
7	VGA + VGA audio input	Connect a VGA (RGBHV) signal to the HD15 female connector. Connect the output port of your source device to the audio input.		VGA video jack: Female HD15 connector
8	DVI + DVI audio input	Connect a DVI signal to the digital video connector. Connect the output port of your source audio device to the audio input.		Female DVI connector
9	HDMI input	Connect an HDMI direct digital video/ audio signal link to the HDMI connector, which supports HDMI digital video/audio and DVI digital video sources.		HDMI female jack
10	DisplayPort input	Connect a DisplayPort signal to the DP port, which supports digital video and audio.		Display port digital video and audio connector.

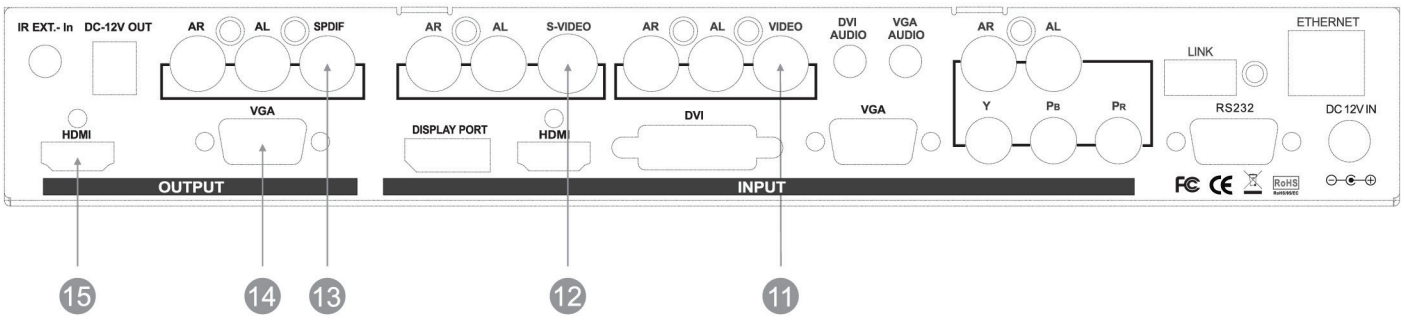
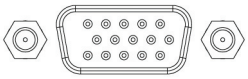
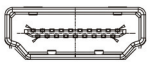


Figure 2-4. Back panel of the scaler.

Table 2-4. Back panel components (continued).				
Number in Figure 2-4	Component	Description	Picture	Specifications
11	Video + AR/AL audio input	Connect a composite video signal to the RCA connector. Connect the output port of your source audio device to the AR/AL inputs.		Female RCA connector Stereo audio (AR/AL) via (1) 3.5-mm earphone jack connector *NOTE: With (1) female phone jack for each channel.*
12	S-Video + AR/AL audio input	Connect an S-Video signal to the connector. Connect the output port of your source audio device to the AR/AL inputs.		Mini-DIN connector Stereo audio (AR/AL) via (1) 3.5-mm earphone jack connector *NOTE: With (1) female phone jack for each channel.*
13	SPDIF	Connect the digital audio output.		Female RCA connector.
14	VGA output	Connect a VGA (RGBHV) to the VGA connector.		VGA video jack: Female HD15 connector
15	HDMI output	Connect an HDMI direct digital video/ audio signal link to this female HDMI connector, which supports HDMI digital video/audio and DVI digital video sources.		HDMI digital video/audio connector HDMI female connector *NOTE: With proper adapters, the scaler can be used with DVI digital video signals and is HDCP compliant.*

2.5 Typical Application

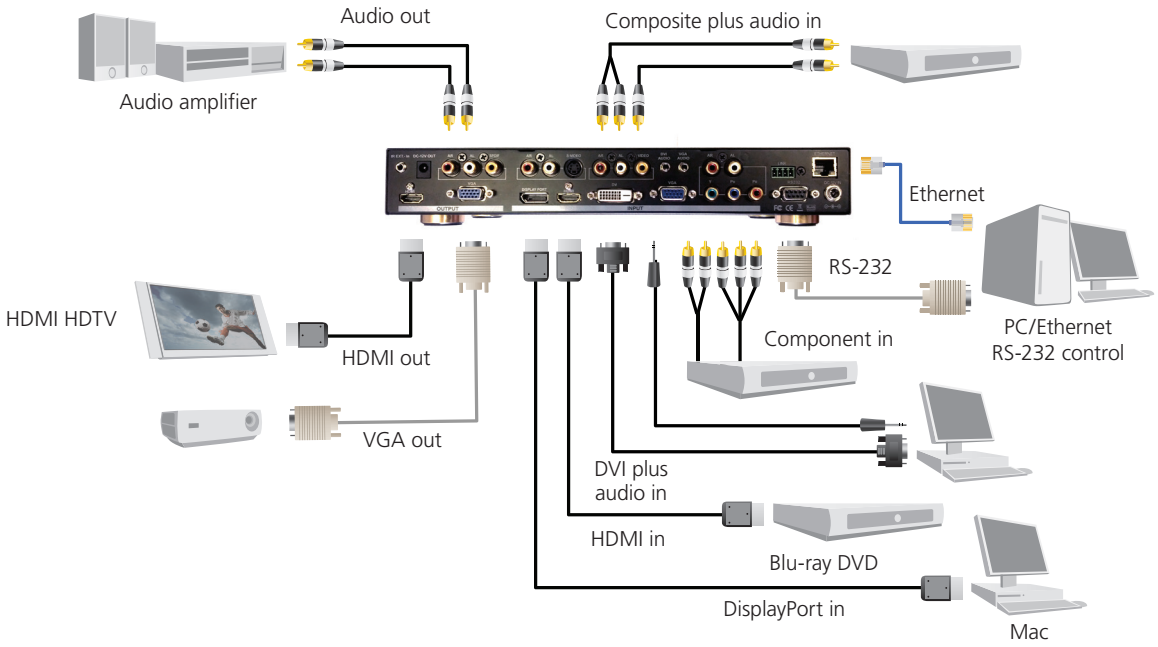


Figure 2-5. Multi-Format AV Scaler with DisplayPort.

3. IR Remote

3.1 Remote Control

Before connecting anything to the scaler, observe the following:

- Make sure the voltage supply matches the label on the supplied plug-pack (±10%).
- Make sure the power switch is off.
- Make sure that all system grounds are connected to a common point.
- Avoid powering the device within a system of multiple power sources that are separated by a large distance.
- Connect all audio/video source and display devices.
- Power on all source and display audio-visual devices.
- To yield video/audio to an output, select the input source by using the front panel input buttons, the supplied IR remote control, or through the RS-232 serial communication port.
- When powering on, the scaler will automatically apply the setting last used.

NOTE: For how to to use the on-screen display (OSD) options, go to Chapter 7, OSD Instructions, in this manual.

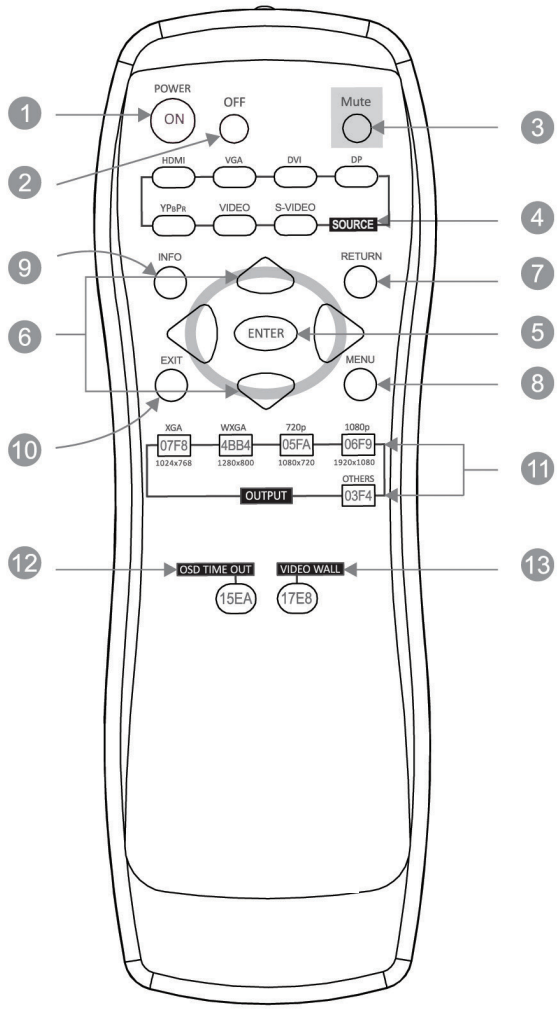


Figure 3-1. IR remote.

Table 3-1. IR remote control key.

Number in Figure 3-1	Description
1, 2	Power ON and OFF: Turn the scaler on or off.
3	Mute: Stop playing sounds.
4	Source (HDMI, VGA, DVI, DP, YPbPr, Video, S-Video): Select your input signal type.
5	Enter: Confirm your selection/enter the next layer of OSD options.
6	Arrow keys: Move up, down, left, or right between the OSD options. Use the left and right arrow keys to adjust the value of a parameter. Use the down key to enter the next layer of options and the up key to move back.
7	Return: Return to the upper layer of OSD options.
8	Menu: Open the OSD menu.
9	Info: Check the connection status of input/output/RS-232/Ethernet ports.
10	Exit: Leave the OSD menu.
11	Output (XGA, WXGA, 720p, 1080p, and others): Select the desired output resolution supported by your display device.
12	OSD timeout: Adjust the OSD menu display time.
13	Video wall: Open the video wall options.

3.2 IR Remote Custom and Data Codes (NEC Standard)

How to set up IR codes:

Custom Code: 20 DF

Power on: 20DF 5DA2
Power off: 20DF 5EA1
Mute: 20DF 02FD

HDMI: 20DF 1FE0
VGA: 20DF 0AF5
DVI: 20DF 50AF
DP: 20DF 59A6
YPbPr: 20DF 58A7
Video: 20DF 5AA5
S-Video: 20DF 5BA4

Return: 20DF 11EE
Menu: 20DF 19EA
Info: 20DF 1BE4
Exit: 20DF 5CA3

Enter: 20DF 51AE
Up: 20DF 44BB
Right: 20DF 48B7
Left: 20DF 1CE3
Down: 20DF 1DE2

XGA: 20DF 08F8
WXGA: 20DF 4BB4
720p: 20DF 05FA
1080p: 20DF 06F9
Others: 20DF 03FC

OSD timeout: 20DF 15EA
Video wall: 20DF 15EB

Example 1: Select input VGA and output HDMI.

The IR data code: 20DF 0AF5 20DF 07F8

Example 2: Open OSD—>move right—>move down to next layer—>enter to confirm selection.

The IR data code: 20DF 15EA 20DF 48B7 20DF 1DE2 20DF 51AE

4. IR Extender

4.1 IR Extender Connection

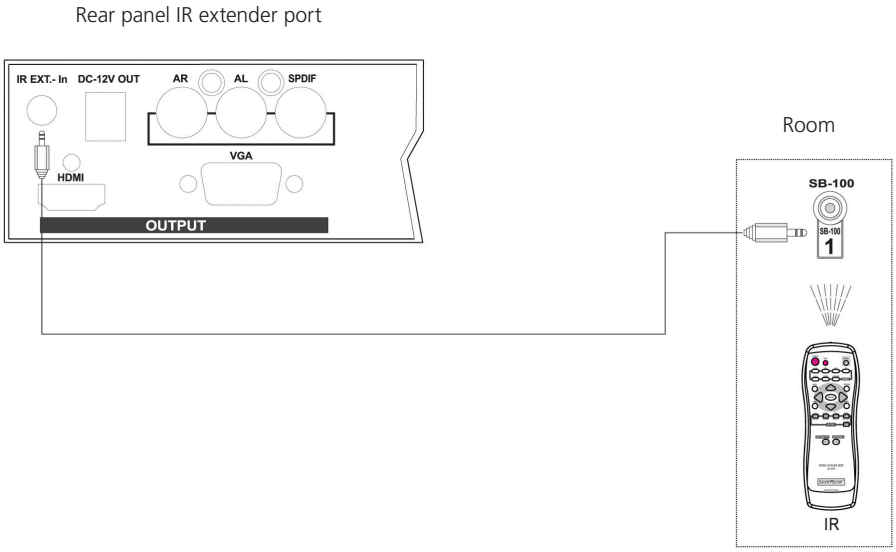


Figure 4-1. IR extender connection.

NOTE: When you plug the external IR extender into the scaler, the front panel IR receiver remains active.

4.2 IR Extender Package

How to Set Up the IR Extender Components

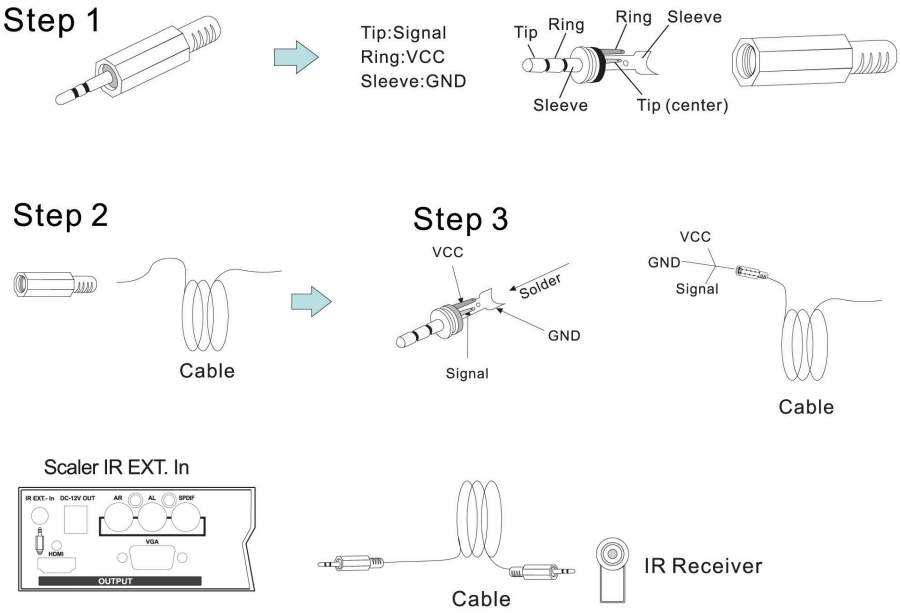


Figure 4-2. Setting up thte IR extender components.

5. Installation

Control Ports:

1. Front panel—function key press buttons.
2. IR remote—IR remote controller.
3. RS-232 interface—RS-232 interface system.
4. Ethernet—Ethernet interface system.

Inputs 1–7 Port Source Signals:

Component video, AV, DVI, HDMI, DisplayPort (5 input ports connected)

Outputs 1–2 Port Display Signals:

VGA, HDMI

NOTE: The Multi-Format AV Scaler with DisplayPort supports seven inputs and two outputs, control IR, and RS-232 interface system ports.

6. On-Screen Display (OSD)

6.1 OSD Options Overview

Table 6-1. OSD options.

Layer 1	Layer 2	Layer 3
Picture	Brightness	
	Contrast	
	Hue	
	Saturation	
	Sharpness	
Image Setup	Automatic	
	Manual	Clock/Phase/Save
	Horizontal Position	
	Vertical Position	
Image Properties	Color	Preset Mode/Custom
	Input Signal	DVI/HDMI/VGA/DisplayPort/Component/Composite/S-Video
	Scaling	Original AR/Full Screen
	Output Mode	720 x 480, 800 x 600, 1280 x 800, 1280 x 1024, 1360 x 768, 1400 x 1050, 1600 x 1200, 1024 x 768, 1280 x 768, 1280 x 720, 1920 x 1080
Video Wall	Zoom	Horizontal Zoom/Vertical Zoom
	Pan	Horizontal Pan/Vertical Pan
	Overlap	Left/Right/Top/Bottom (Edges)/Reset
Options	Information	
	Language	English
	Reset	Reset All/Reset Video Wall
	Accessibility	Button Repeat Rate (off, default, slow)/Menu Timeout/Logo Timeout
	Setting	Mute
		Box ID
		Profile
		Network (serial port, Ethernet)

6.2 Picture

Picture allows you to digitally adjust the brightness, contrast, hue, saturation, and sharpness of the images. An unlit icon suggests the function is not available. To enable it, the unit color must be set in custom mode. Go to the third icon in the first layer to change the setting in color: Image properties—>color—>custom—>save. Be sure to save your setting. Otherwise, the value will not be set.

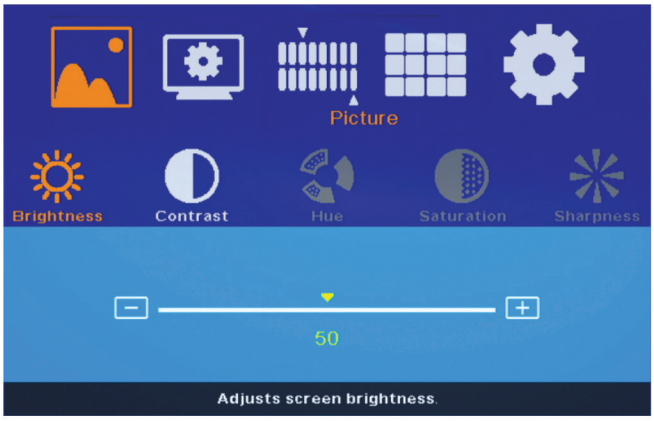


Figure 6-1. Picture icon.

- Layer one, the first icon from left.
- Choose the icon and use the down arrow key to open the next layer, which has five options: brightness, contrast, hue, saturation, and sharpness.
- The hue, saturation, and broadcast icons light only when AV, S-Video, or component video signals are present on the scaler.

Table 6-2. Picture options.

Icon	Description
	Brightness: Use arrow key right and left to adjust the value.
	Contrast: Use arrow key right and left to adjust the value.
	Hue: Use arrow key right and left to adjust the value. Adjustable only when the unit receives valid AV, S-Video, or component video signals.
	Saturation: Use arrow key right and left to adjust the value. Adjustable only when the unit receives valid AV, S-Video, or component video signals.
	Sharpness: Use arrow key right and left to adjust the value. Adjustable only when the unit receives valid AV, S-Video, or component video signals.

6.3 Image Setup

To enable the image setup, a valid VGA signal must be present on the scaler. An illuminated icon indicates the presence of a VGA signal.

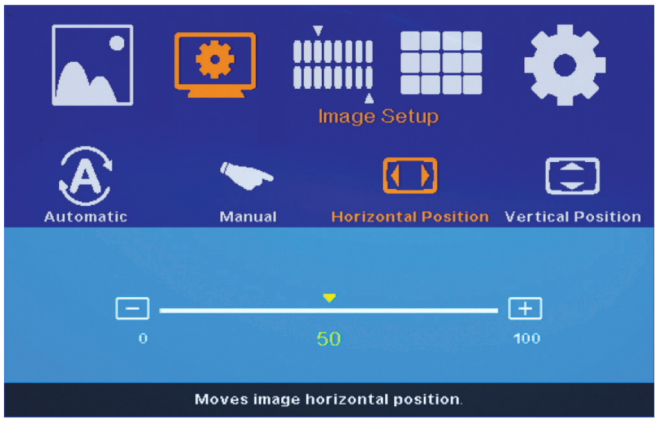


Figure 6-2. Image setup icon.

- First layer, the second icon from the left.
- Choose the icon and use the down arrow key to open the second layer, which has four options: automatic, manual, horizontal position, and vertical position.

Table 6-3. Image setup.

Icon	Description
	Automatic: AVSC-7DA-HDMI reads the input signal and automatically sets the optimal value for the output.
	Manual: Clock/Phase /Save
	Horizontal Position Move the image to the right or left.
	Vertical Position Move the image up or down.

6.4 Image Properties

Image properties allow you to change color, select input signal, adjust scaling, and change output resolution. Under the output mode, you can select resolutions not listed on the front panel button.

Figure 6-3. Image properties icon.

- Layer one, the third icon from left.
- Choose the icon and use the down arrow key to open up the second layer, which has four options: color, input signal, scaling, and output mode.
- Setting the color in custom mode can enable the Picture function (layer one, the first icon from left).

Table 6-4. Image properties.

Icon	Description
	**Color** Preset Mode: Standard, RGB, warm, cold Custom: Red, Green, Blue, Save
	**Input Signal** DVI, HDMI, VGA, DisplayPort, Component, Composite Video, S-Video
	**Scaling** Original AR, full screen
	**Output Mode** Select one desired output resolution from the following 11 choices: Others, 720 x 480, 800 x 600, 1280 x 800, 1280 x 1024, 1360 x 768, 1400 x 1050, 1600 x 1200, 1920 x 1200 XGA: 1024 x 768 WXGA: 1280 x s 720p: 1280 x 720 1080p: 1920 x 1080 When you press the front panel button "Others," the scaler will automatically apply the resolution 1360 x 768. Users may continue pressing "Others" to cycle through the following four resolutions: 1360 x 768 —> 1280 x 1024 —> 1600 x 1200 —> 1920 x 1200

6.5 Video Wall

The AVSW-7DA-HDMI scaler can send divided images on multiple display devices and build a video wall of, for example, 1x2, 2x2, or 10x10. A video wall of 15x15 is the maximum size the scaler can generate.

NOTE: An AVSW-7DA-HDMI is required for each output. Users may arrange the position and adjust the size of each image block under the TV WALL function.

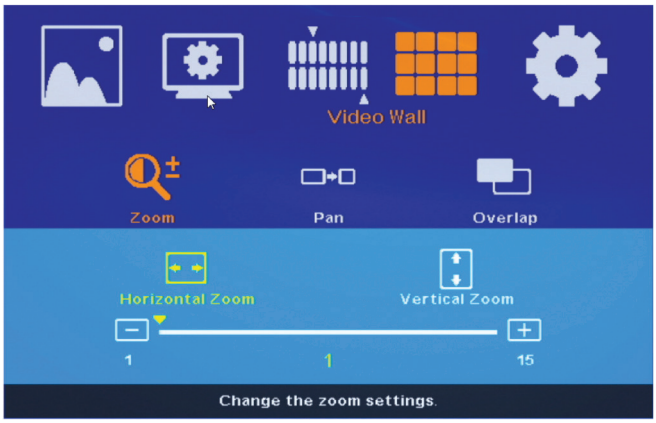
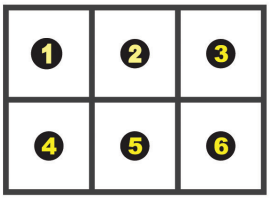


Figure 6-4. Video Wall icon.

- Layer one, the third icon from the left.
- Choose the TV wall icon, use the down arrow key to open the next layer, which has three options: zoom, pan, and overlap.

Table 6-5. Video wall.

Parameter	Description
Zoom	Use right/left key to adjust the value of the parameter. Horizontal zoom: enlarge the image on the left and right ends. Vertical zoom: enlarge the image upwardly and downwardly.
Pan	Arrange the relative position of the image in the TV wall: assign the number of displays horizontally and vertically connected. Then, assign numbers to indicate relative position. Two examples of TV walls are shown below.
	3x2 TV wall (Horiztonal: 3; Vertical: 2) Display No. 4 should be assigned: Horizontal Zoom = 1 Vertical Zoom = 2 Display No. 5 should be assigned: Horizontal Zoom = 2 Vertical Zoom = 2
Overlap	Align the overlapping images for visual continuum. Move the image up, down, or to left, right by adjusting the parameters of the top edge, bottom edge, left edge, and right edge. To return to the original setting, press "Reset."

6.6 Options

Options allows you to check the connection status, change menu language, return to factory defaults, save settings, and make adjustments to the OSD menu settings.

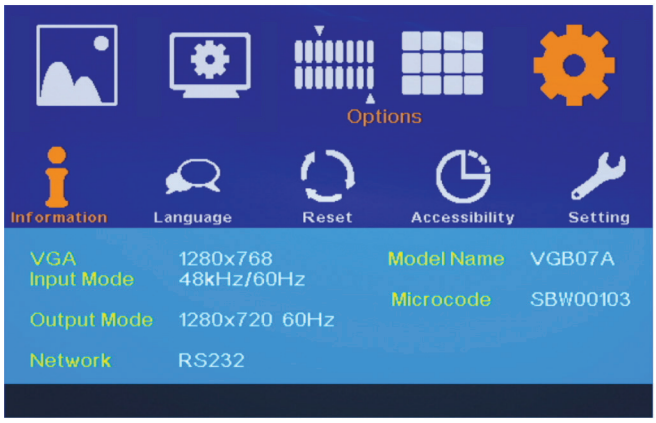


Figure 6-7. Options icon.

- Layer one: the fifth icon from the left.
- Press the down arrow key to open up the second layer, which has five options: information, language, reset, accessibility, and setting.

Table 6-6. Options.

Parameter	Description
Information	Check the connection status of the input/output ports, the model name, the connection status of RS-232/Ethernet ports, and the firmware version.
Language	Change the OSD language to English, Simplified Chinese, or Traditional Chinese.
Reset	Return to the factory default setting. Reset all: Reset all options. Reset video wall: Reset all the options relating to video wall function only.
Accessibility	Button repeat rate: Adjust the unit response time when the Menu button is pressed. Off: Press the "Menu" button, and the menu shows up/disappears once. Default: Return to the factory default setting. Slow: Press the "Menu" button and hold it on for longer than a few seconds, and the unit will take more time than the default to respond. Menu timeout: Adjust the length of time the OSD menu stays on screen. On: The OSD menu will disappear after a period of time. You can lengthen or shorten the display time. Off: Stop the OSD menu from disappearing automatically. When the function is turned off, the OSD menu will not disappear until you press the "Menu" button again. Logo timeout: Adjust the length of time the logo stays on screen when the unit is turned on.
Setting	Mute: Stop playing sounds. Box ID: Check the ID of the unit. Profile: Save and reload the settings. The unit can memorize a total of five different settings. Network: Serial port, Ethernet.

7. RS-232 Protocol Commands

7.1 AVSC-7DA-HDMI RS-232 Protocol and Commands

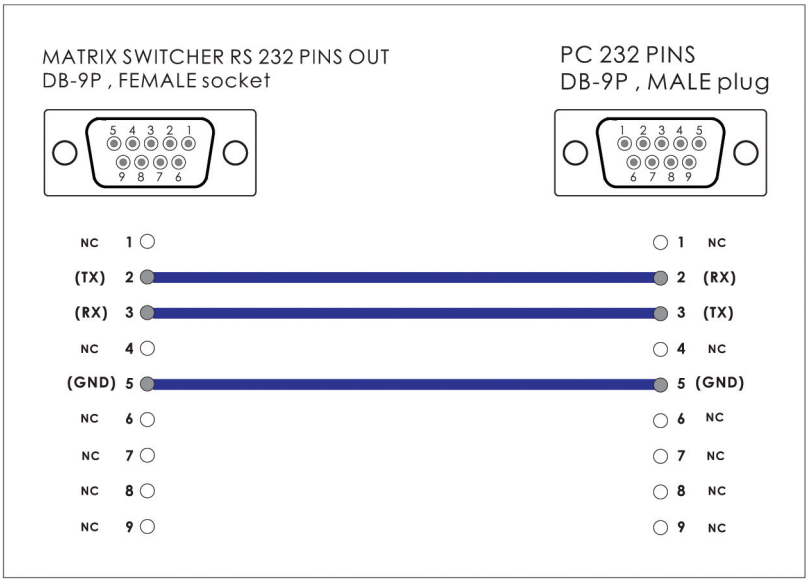


Figure 7-1. RS-232 cable pin lines.

1. Transmission rate: 9600 bps
2. Data format: 8 data bits, no parity, 1 start bit, and 1 stop bit
3. Flow control: None

Also known as 9600, n, 8, 1.

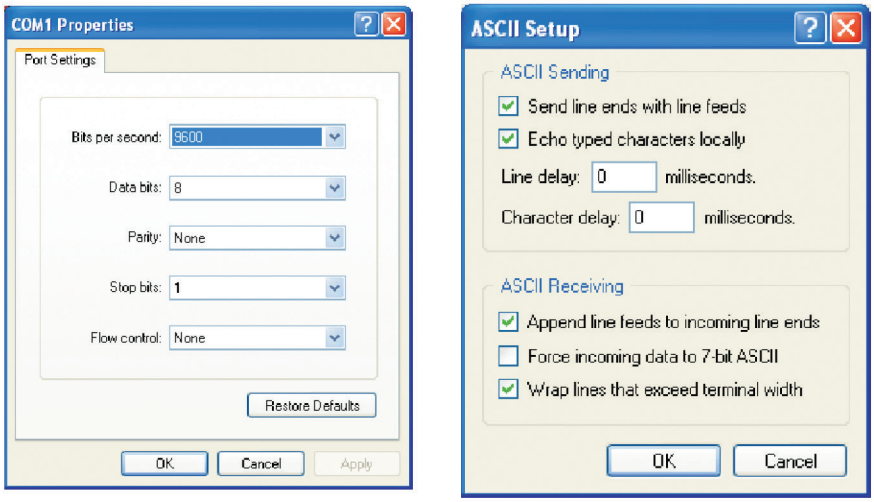


Figure 7-2. COM1 properties and ASCII setup screens.

7.2 Ethernet TCP Setup Guide

The Ethernet (TCP) port allows control of the unit via a computer by redirecting serial commands (COM port) to the unit's IP address.

To connect to the unit:

1. Set your PC within the same subnet of the unit (default address 192.168.0.3; default netmask 255.255.255.0).
2. Open up a telnet connection to the unit's IP address with port 5000.
3. Send commands as you would with serial.

To change the network settings of the unit:

1. Set your PC within the same Class C subnet of the unit.

a. For example, if the unit's default IP address is 192.168.0.3, the PC's IP address could be 192.168.0.5.

b. Set your PC's netmask to 255.255.255.0.

2. Run the software included on the CD that came with the unit.
3. Click the search button and select your unit when it is found.
4. Change the unit's network setting as desired and submit.

To change your computer's network settings:

1. Set up your computer in the same network of the unit.
2. Go to "Start" and click on "Control Panel."
3. Double-click on "Network Connections."
4. Click on "Properties."
5. Click to select "Internet protocol (TCP/IP)" and click "Properties."

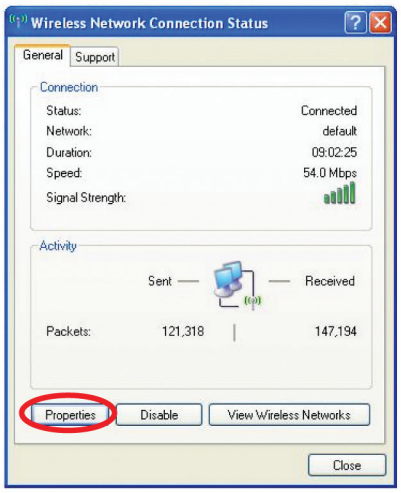


Figure 7-3. Properties selected.

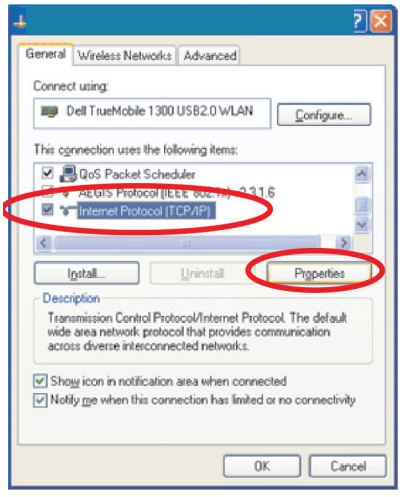


Figure 7-4. Internet protocol selected.

7.3 Data String Format

The data string contains four elements.

[Command] [ ] [Data] [;]

The format is:

1. Command

2. Space

3. Data

4. ;

There is a single space after the command and before the data string. The data string must conclude with a semicolon ";" (without the quotation marks). All text is full ASCII code and is not case-sensitive. LINK is the same as Link. You can use either capital letters or lower-case letters and get the same result.

The Link command must be sent first. This establishes a communications link between an external controller (or computer) and the device you wish to control. When you have an established link, communication via the IR port is disabled. The front panel remains operational.

The format is:

LINK 01; This will establish the link.

Your commands:

LINK 00; This will terminate the link.

Devices that are firmware version x.x or higher will return a status.
Status is command dependent.
For example: Response: [SKU] [ ] [Status] [;]|
The status is a two-digit numerical code.
Specific details are discussed later in this document.

NOTE: If at any time the AVSC-7DA-HDMI receives an invalid command, a response of "AVSC-7DA-HDMI 01" will be returned.

7.4 Commands

NOTE: Not all commands are supported on all devices.

Table 8-1. Commands.

Item	Command	Description
1	Key	Set OSD key
2	Power	Set/check the power status.
3	Mute	Set/check the mute status.
4	Source	Set/check the source status.
5	Resolution	Set/check the resolution status.
6	Brightness	Set/check the brightness status from the OSD.
7	Contrast	Set/check the contrast status from the OSD.
8	Hue	Set/check the hue from the OSD.
9	Saturation	Set/check the saturation status from the OSD.
10	Sharpness	Set/check the sharpness status from the OSD.
11	Auto	Set/check the auto adjustment status from the OSD.
12	H-Zoom	Set/check the H-zoom status from the OSD.
13	V-Zoom	Set/check the V-zoom status from the OSD.
14	H-Pan	Set/check the H-pan status.
15	V-Pan	Set/check the V-pan status.
16	Overlap–L	Set/check the overlap-L status from the OSD.
17	Overlap-R	Set/check the overlap-R status from the OSD.
18	Overlap-T	Set/check the overlap-T status from the OSD.
19	Overlap-B	Set/check the overlap-B status from the OSD.
20	Language	Set/check the language status from the OSD.
21	Reset	Set/check the reset status from the OSD.
22	Button	Set/check the button status from the OSD.
23	Timeout	Set/check the timeout status from the OSD.

1. Key			
Function	Command	Response	Description
Set Key	Key +000;	AVSC-7DA-HDMI 00;	Set Menu Key
	Key +001;	AVSC-7DA-HDMI 00;	Set Up Key
	Key +002;	AVSC-7DA-HDMI 00;	Set Down Key
	Key +003;	AVSC-7DA-HDMI 00;	Set Left Key
	Key +004;	AVSC-7DA-HDMI 00;	Set Right Key
	Key +005;	AVSC-7DA-HDMI 00;	Set Enter Key

2. Power			
Function	Command	Response	Description
Power OFF	Power +000;	AVSC-7DA-HDMI 00;	Power OFF
Power ON	Power +001;	AVSC-7DA-HDMI 00;	Power ON
Check the status of condition	Power ?;	Power +000;	Power OFF
		Power +001;	Power ON

3. Mute			
Function	Command	Response	Description
Mute OFF	Mute +000;	AVSC-7DA-HDMI 00;	Mute OFF
Mute ON	Mute +001;	AVSC-7DA-HDMI 00;	Mute ON
Check the Mute status	Mute ?;	Mute +000;	Mute OFF
		Mute +001;	Mute ON

4. Source			
Function	Command	Response	Description
Set Source	Source +000;	AVSC-7DA-HDMI 00;	Source set to VGA
	Source +001;	AVSC-7DA-HDMI 00;	Source set to DVI
	Source +002;	AVSC-7DA-HDMI 00;	Source set to HDMI
	Source +003;	AVSC-7DA-HDMI 00;	Source set to DP
	Source +004;	AVSC-7DA-HDMI 00;	Source set to YPbPr
	Source +005;	AVSC-7DA-HDMI 00;	Source set to video
	Source +006;	AVSC-7DA-HDMI 00;	Source set to S-Video

Function	Command	Response	Description
Check Source	Source ?;	Source +000;	Source set to DVI
		Source +001;	Source set to HDMI
		Source +002;	Source set to VGA
		Source +003;	Source set to DP
		Source +004;	Source set to YPbPr
		Source +005;	Source set to video
		Source +006;	Source set to S-Video

5. Resolution			
Function	Command	Response	Description
Set Resolution	Resolution +000;	AVSC-7DA-HDMI 00;	Set resolution to 720 x 480, 60 Hz
	Resolution +001;	AVSC-7DA-HDMI 00;	Set resolution to 1280 x 720, 60 Hz
	Resolution +002;	AVSC-7DA-HDMI 00;	Set resolution to 1920 x 1080, 60 Hz
	Resolution +003;	AVSC-7DA-HDMI 00;	Set resolution to 800 x 600, 60 Hz
	Resolution +004;	AVSC-7DA-HDMI 00;	Set resolution to 1024 x 768, 60 Hz
	Resolution +005;	AVSC-7DA-HDMI 00;	Set resolution to 1280 x 800, 60 Hz
	Resolution +006;	AVSC-7DA-HDMI 00;	Set resolution to 1280 x 1024, 60 Hz
	Resolution +007;	AVSC-7DA-HDMI 00;	Set resolution to 1360 x 768, 60 Hz
	Resolution +008;	AVSC-7DA-HDMI 00;	Set resolution to 1400 x 1050, 60 Hz
	Resolution +009;	AVSC-7DA-HDMI 00;	Set resolution to 1600 x 1200, 60 Hz
	Resolution +010;	AVSC-7DA-HDMI 00;	Set resolution to 1920 x 1200, 60 Hz

Function	Command	Response	Description
Check Resolution	Resolution ?;	Resolution +000;	Resolution is 720 x 480, 60 Hz
		Resolution +001;	Resolution is 1280 x 720, 60 Hz
		Resolution +002;	Resolution is 1920 x 1080, 60 Hz
		Resolution +003;	Resolution is 800 x 600, 60 Hz
		Resolution +004;	Resolution is 1024 x 768, 60 Hz
		Resolution +005;	Resolution is 1280 x 800, 60 Hz
		Resolution +006;	Resolution is 1280 x 1024, 60 Hz
		Resolution +007;	Resolution is 1360 x 768, 60 Hz
		Resolution +008;	Resolution is 1400 x 1050, 60 Hz
		Resolution +009;	Resolution is 1600 x 1200, 60 Hz
		Resolution +010;	Resolution is 1920 x 1200, 60 Hz

6. Brightness		
Function	Command	Variables
Set Brightness	BRIGHTNESS XXXX;	AVSC-xxxx = Brightness number +000–+100

Command Example	Response	Description
BRIGHTNESS +015;	AVSC-7DA-HDMI 00;	Set Brightness to 15.

Function	Command	Response	Description
Check Brightness	BRIGHTNESS ?;	BRIGHTNESS +001;	Brightness setting is 1.
		BRIGHTNESS +015;	Brightness setting is 15.

7. Contrast		
Function	Command	Variables
Set Contrast	CONTRAST XXXX;	AVSC-xxxx = Contrast number +000–+100

Command Example	Response	Description
CONTRAST +015;	AVSC-7DA-HDMI 00;	Set Contrast to 15.

Function	Command	Response	Description
Check Contrast	CONTRAST ?;	CONTRAST +001;	Contrast setting is 1.
		CONTRAST +015;	Contrast setting is 15.

8. Hue		
Function	Command	Variables
Set Hue	HUE XXXX;	AVSC-xxxx = Hue number +000–+100

Command Example	Response	Description
HUE +015;	AVSC-7DA-HDMI 00;	Set Hue to 15.

Function	Command	Response	Description
Check Hue	HUE ?;	HUE +001;	Hue setting is 1.
		HUE +015;	Hue setting is 15.

9. Saturation		
Function	Command	Variables
Set Saturation	SATURATION XXXX;	AVSC-xxxx = Saturation number +000–+100

Command Example	Response	Description
SATURATION +015;	AVSC-7DA-HDMI 00;	Set Saturation to 15.

Function	Command	Response	Description
Check Saturation	SATURATION ?;	SATURATION +001;	Saturation setting is 1.
		SATURATION +015;	Saturation setting is 15.

10. Sharpness		
Function	Command	Variables
Set Sharpness	SHARPNESS XXXX;	AVSC-xxxx = Sharpness number +000–+100

Command Example	Response	Description
SHARPNESS +015;	AVSC-7DA-HDMI 00;	Set Sharpness to 15.

Function	Command	Response	Description
Check Sharpness	SHARPNESS ?;	SHARPNESS +001;	Sharpness setting is 1.
		SHARPNESS +015;	Sharpness setting is 15.

11. Auto			
Function	Command	Response	Description
Set Auto	Auto +001;	AVSC-7DA-HDMI 00;	Set VGA auto adjustment.

12. H-Zoom		
Function	Command	Variables
Set H-zoom	H-ZOOM XXXX;	xxxx = H zoom number +000 – +009

Command Example	Response	Description
H-ZOOM +001;	AVSC-7DA-HDMI 00;	Set H-Zoom to 1.

Function	Command	Response	Description
Check H-zoom	H-ZOOM?;	H-ZOOM +001;	H-zoom setting is 1.

13. V-Zoom		
Function	Command	Variables
Set V-zoom	V-ZOOM XXXX;	xxxx = V zoom number +000 – +009

Command Example	Response	Description
V-ZOOM +001;	AVSC-7DA-HDMI 00;	Set V-Zoom to 1.

Function	Command	Response	Description
Check V-zoom	V-ZOOM?;	V-ZOOM +001;	V-zoom setting is 1.

14. H-Pan		
Function	Command	Variables
Set H-Pan	H-PAN XXXX;	xxxx = H-Pan number +000 – +009

Command Example	Response	Description
H-PAN +001;	AVSC-7DA-HDMI 00;	Set H-Pan to 1.

Function	Command	Response	Description
Check H-Pan	H-PAN?;	H-PAN +001;	H-Pan setting is 1.

15. V-Pan		
Function	Command	Variables
Set V-Pan	V-PAN XXXX;	xxxx = V-Pan number +000 – +009

Command Example	Response	Description
V-PAN +001;	AVSC-7DA-HDMI 00;	Set V-Pan to 1.

Function	Command	Response	Description
Check V-Pan	V-PAN?;	V-PAN +001;	V-Pan setting is 1.

16. Overlap—L		
Function	Command	Variables
Set Overlap Left Edge	OVERLAP-L XXXX;	xxxx = Overlap-L number +-600– +600

Command Example	Response	Description
OVERLAP-L+050;	AVSC-7DA-HDMI 00;	Set Overlap-L to +50.

Function	Command	Response	Description
Check Overlap-L	OVERLAP-L?;	OVERLAP-L +050;	Overlap-L setting is +50.

17. Overlap—R		
Function	Command	Variables
Set Overlap Right Edge	OVERLAP-R XXXX;	xxxx = Overlap-R number +-600– +600

Command Example	Response	Description
OVERLAP-R +050;	AVSC-7DA-HDMI 00;	Set Overlap-R to +50.

Function	Command	Response	Description
Check Overlap-R	OVERLAP-R?;	OVERLAP-R +050;	Overlap-R setting is +50.

18. Overlap—T		
Function	Command	Variables
Set Overlap Top Edge	OVERLAP-T XXXX;	xxxx = Overlap-T number +-600– +600

Command Example	Response	Description
OVERLAP-T +050;	AVSC-7DA-HDMI 00;	Set Overlap-R to +50.

Function	Command	Response	Description
Check Overlap-T	OVERLAP-T?;	OVERLAP-T +050;	Overlap-T setting is +50.

19. Overlap—B		
Function	Command	Variables
Set Overlap Bottom Edge	OVERLAP-B XXXX;	xxxx = Overlap-B number +-600– +600

Command Example	Response	Description
OVERLAP-B +050;	AVSC-7DA-HDMI 00;	Set Overlap-B to +50.

Function	Command	Response	Description
Check Overlap-B	OVERLAP-B?;	OVERLAP-B +050;	Overlap-B setting is +50.

20. Language			
Function	Command	Response	Description
Set Language	LANGUAGE +000;	AVSC-7DA-HDMI 00;	Set language to English.
	LANGUAGE +001;	AVSC-7DA-HDMI 00;	Set language to simplified Chinese.
	LANGUAGE +002;	AVSC-7DA-HDMI 00;	Set language to traditional Chinese.

Function	Command	Response	Description
Check Language	Language ?;	LANGUAGE +000;	Language is English.
		LANGUAGE +001;	Language is simplified Chinese.
		LANGUAGE +002;	Language is traditional Chinese.

21. Reset			
Function	Command	Response	Description
Set Reset	RESET +001;	AVSC-7DA-HDMI 00;	Reset all settings.
	RESET +002;	AVSC-7DA-HDMI 00;	Reset video wall settings.

22. Button			
Function	Command	Response	Description
Set button	BUTTON +000;	AVSC-7DA-HDMI 00;	Set button to repeat rate off.
	BUTTON +001;	AVSC-7DA-HDMI 00;	Set button to repeat rate default.
	BUTTON +002;	AVSC-7DA-HDMI 00;	Set button to repeat rate slow.

Function	Command	Response	Description
Check button	Button?;	BUTTON +000;	Button is repeat rate off.
		BUTTON +001;	Button is repeat rate default.
		BUTTON +002;	Button is repeat rate slow.

23. Timeout		
Function	**Command**	**Variables**
Set TimeOut	TIMEOUT XXXX;	xxxx = Timeout number +000 – +060
Command Example	**Response**	**Description**
TIMEOUT +015;	AVSC-7DA-HDMI 00;	Set timeout to 15 seconds.

Function	**Command**	**Response**	**Description**
Check Timeout	TIMEOUT?;	TIMEOUT +001;	Timeout setting is 1 second.
		TIMEOUT +015;	Timeout setting is 15 seconds.

Appendix A. Video Timing Lists

Table A-1. Video Timing List (HDMI).

Resolution	H. Freq. (kHz)	V. Freq. (Hz)	Pixel Clock (MHz)	H. Total Pixel	H. Display Pixel	H. Front Porch	H. Sync. Width	H. Sync. Pol.	V. Total Lines	V. Display Lines	V. Front Porch	V. Sync. Width	V. Sync. Pol.
640 x 480 @60 Hz	31.484	59.97	25.1875	800	640	16	96	N	525	480	10	2	N
640 x 480 @72 Hz	37.861	72.809	31.5	832	640	24	40	N	520	480	9	3	N
640 x 480 @75 Hz	37.5	75	31.5	840	640	16	64	N	500	480	1	3	N
720 x 400 @70 Hz	31.458	70.063	28.3125	900	720	16	108	N	449	400	13	2	P
800 x 600 @56 Hz	35.156	56.25	36	1024	800	24	72	P	625	600	1	2	P
800 x 600 @60 Hz	37.879	60.317	40	1056	800	40	128	P	628	600	1	4	P
800 x 600 @72 Hz	48.077	72.188	50	1040	800	56	120	P	666	600	37	6	P
800 x 600 @75 Hz	46.875	75	49.5	1056	800	16	80	P	625	600	1	3	P
848 x 480 @59 Hz	29.83	59.659	31.5	1056	848	23	80	N	500	480	3	5	P
848 x 480 @60 Hz	31.02	60	33,75	1088	848	16	112	P	517	480	6	8	P
1024 x 768 @60 Hz	48.363	60.004	65	1344	1024	24	135	N	806	768	3	6	N
1024 x 768 @70 Hz	56.476	70.069	75	1328	1024	24	136	N	806	768	3	6	N
1024 x 768 @75 Hz	60.023	75.029	78.75	1312	1024	16	96	P	800	768	1	3	P
1152 x 864 @75 Hz	67.5	75	108	1600	1152	64	128	P	900	864	1	3	P
1280 x 720 @48 Hz	35.539	47.961	58	1632	1280	48	128	N	741	720	1	3	P
1280 x 720 @50 Hz	39.618	49.822	60.25	1632	1280	48	128	N	741	720	1	3	P
1280 x 720 @60 Hz	44.621	59.814	74.25	1664	1280	56	136	N	746	720	1	3	P
1280 x 768 @60 Hz	47.396	59.995	68.25	1440	1280	48	32	P	790	768	3	7	N
1280 x 768 @60 Hz	47.776	59.87	79.5	1664	1280	64	128	N	798	768	3	7	P
1280 x 768 @75 Hz	60.289	74.893	102.25	1696	1280	80	128	N	805	768	3	7	P
1280 x 800 @60 Hz	49.702	59.81	83.5	1680	1280	72	128	N	831	800	3	6	P
1280 x 700 @75 Hz	62.795	74.934	106.5	1696	1280	80	128	n	838	800	3	6	P
1280 x 960 @60 Hz	60	60	108	1800	1280	96	112	P	1000	960	1	3	P
1280 x 1024 @60 Hz	63.981	60.02	108	1688	1280	48	112	P	1066	1024	1	3	P
1280 x 1024 @75 Hz	79.976	72.025	135	1688	1280	16	144	P	1066	1024	1	3	P
1360 x 768 @60 Hz	47.712	60.015	85.5	1792	1360	64	112	P	795	768	3	6	P
1360 x 768 @60 Hz	48	60	72	1500	1366	13	56	P	800	768	1	3	P
1400 x 1050 @60 Hz	64.744	59.948	101	1560	1400	48	32	P	1080	1050	3	4	N
1400 x 1050 @60 Hz	65.317	59.978	121.75	1864	1400	88	144	N	1089	1050	3	4	P
1400 x 1050 @75 Hz	82.278	74.867	156	1896	1400	104	144	N	1099	1050	3	4	P
1440 x 900 @60 Hz	55.935	59.887	106.5	1904	1440	80	152	N	934	900	3	6	P
1440 x 900 @75 Hz	70.506	74.847	136.5	1936	1440	96	152	N	942	900	3	6	P
1440 x 1050 @60 Hz	65.234	59.903	125.25	1829	1440	88	152	N	1089	1050	3	10	N
1600 x 1200 @60 Hz	75	60	162	2160	1600	64	192	P	1250	1200	1	3	P
1680 X 1050 @60 Hz	65.402	60.057	146.5	2240	1680	104	176	N	1089	1020	2	6	P
1920 x 1200 @60 Hz	74.038	59.95	154	2080	1920	48	32	P	1235	1200	3	6	N
720 x 480p @59 Hz	31.469	59.94	27	858	720	16	62	N	525	480	9	6	N
720 x 480p @59 Hz	31.469	59.94	27	858	720	16	62	N	525	480	9	6	N
720 x 576p @50 Hz	31.25	50	27	864	720	12	64	N	625	576	5	5	N
720 x 576p @50 Hz	31.25	50	27	864	720	12	64	N	625	576	5	5	N
1280 x 720p @50 Hz	37.5	50	74.25	1980	1280	440	40	P	750	720	5	5	P

Table A-1 (Continued). Video Timing List (HDMI).

Resolution	H. Freq. (kHz)	V. Freq. (Hz)	Pixel Clock (MHz)	H. Total Pixel	H. Display Pixel	H. Front Porch	H. Sync. Width	H. Sync. Pol.	V. Total Lines	V. Display Lines	V. Front Porch	V. Sync. Width	V. Sync. Pol.
1280 x 720p @60 Hz	45	60	74.25	1650	1280	110	40	P	750	720	5	5	P
1280 x 720p @100 Hz	75	100	148.5	1980	1280	440	40	P	750	720	5	5	P
1280 x 720p @120 Hz	90	120	148.5	1650	1280	110	40	P	750	720	5	5	P
1920 x 108p @24 Hz	27	24	74.25	2750	1920	638	44	P	1125	1080	4	5	P
1920 x 108p @30 Hz	33.75	30	74.25	2200	1920	88	44	P	1125	1080	4	5	P
1920 x 108p @50 Hz	56.25	50	148.5	2640	1920	528	44	P	1125	1080	4	5	P
1920 x 108p @60 Hz	67.5	60	148.5	2200	1920	88	44	P	1125	1080	4	5	P

Table A-2. Video Timing List (VGA).

Resolution	H. Freq. (kHz)	V. Freq. (Hz)	Pixel Clock (MHz)	H. Total Pixel	H. Display Pixel	H. Front Porch	H. Sync. Width	H. Sync. Pol	V. Total Lines	V. Display Lines	V. Front Porch	V. Sync. Width	V. Sync. Pol
640 x 480 @60 Hz	31.563	60.119	25.1875	800	640	16	96	N	525	480	10	2	N
640 x 480 @72 Hz	37.861	72.809	31,5	832	640	24	40	N	520	480	9	3	N
640 x 480 @75 Hz	37.5	75	31.5	840	640	16	64	N	500	480	1	3	N
720 x 400 @70 Hz	31.528	70.218	28.3125	900	720	16	108	N	449	400	12	2	P
800 x 600 @56 Hz	35.156	56.25	36	1024	800	24	72	N	625	600	1	2	P
800 x 600 @60 Hz	37.879	60.317	40	1056	800	40	128	N	628	600	1	4	P
800 x 600 @72 Hz	48.077	72.188	50	1040	800	56	120	N	666	600	37	6	P
800 x 600 @75 Hz	46.875	75	49.5	1056	800	16	80	P	625	600	1	3	P
848 x 480 @59 Hz	29.83	59.659	31.5	1056	848	24	80	N	500	480	3	5	P
848 x 480 @60 Hz	31.02	60	33.75	1088	848	16	112	P	517	480	6	8	P
1024 x 768 @60 Hz	48.363	60.004	65	1344	1024	24	136	N	806	768	3	6	N
1024 x 768 @70 Hz	56.476	70.069	75	1328	1024	24	136	N	806	768	3	6	N
1024 x 768 @75 Hz	60.023	75.029	78.75	1312	1024	16	96	N	800	768	1	3	P
1152 x 864 @75 Hz	67.5	75	108	1600	1152	64	128	P	900	864	1	3	P
1280 x 720 @48 Hz	35.539	47.961	58	1632	1280	48	128	N	741	720	1	3	P
1280 x 768 @60 Hz	47.396	59.995	68.25	1440	1280	48	32	P	790	768	3	7	N
1280 x 768 @60 Hz	47.776	59.87	79,5	1664	1280	64	128	N	798	768	3	7	P
1280 x 768 @75 Hz	60.289	74.893	102.25	1696	1280	80	128	N	805	768	3	7	P
1280 x 800 @60 Hz	49.792	59,81	83,5	1680	1280	72	128	N	831	800	3	6	P
1280 x 800 @75 Hz	62.795	74.934	106.5	1696	1280	80	128	N	838	800	3	6	P
1280 x 960 @60 Hz	60	69	108	1800	1280	96	112	P	1000	960	1	3	P
1280 x 1024 @60 Hz	63.981	60.02	108	1688	1280	48	112	P	1966	1024	1	3	P
1280 x 1024 @75 Hz	79.976	75.025	135	1688	1280	16	144	P	1066	1024	1	3	P
1360 x 768 @60 Hz	47.712	60.015	85.5	1792	1360	64	112	P	795	768	3	6	P
1400 x 1050 @60 Hz	64.744	59.948	101	1560	1400	48	32	P	1080	1050	3	3	N
1400 x 1050 @60 Hz	65.317	59..978	121.75	1864	1400	88	144	N	1089	1050	3	4	P
1400 x 1050 @75 Hz	82.278	74.867	156	1896	1400	104	144	N	1099	1050	3	4	P
1440 x 900 @60 Hz	55.935	59.887	106.5	1904	1440	80	152	N	934	900	3	6	P
1440 x 1050 @60 Hz	65.234	59.903	125.25	1920	1440	88	152	N	1989	1050	3	10	N
1600 x 1200 @60 Hz	75	60	162	2160	1600	64	192	P	1250	1200	1	3	P
1680 x 1050 @60 Hz	65.179	59.852	146	2240	1680	104	176	N	1089	1050	3	6	P
1920 x 1200 @60 Hz	74.038	59.95	154	2080	1920	48	32	P	1235	1200	3	6	N

Table A-3. Video Timing List (DisplayPort).

Resolution	H. Freq. (kHz)	V. Freq. (Hz)	Pixel Clock (MHz)	H. Total Pixel	H. Display Pixel	H. Front Porch	H. Sync. Width	H. Sync. Pol.	V. Total Lines	V. Display Lines	V. Front Porch	V. Sync. Width	V. Sync. Pol.
640 x 480 @60 Hz	31.56	60.12	25.1875	800	640	16	96	N	525	480	10	2	N
640 x 480 @72 Hz	37.86	72.81	31.5	832	640	24	40	N	529	480	9	3	N
640 x 480 @75 Hz	37.5	75	31.5	840	640	16	64	N	500	480	1	3	N
720 x 400 @70 Hz	31.46	70.06	28.3125	900	729	16	108	N	449	400	13	2	P
800 x 600 @56 Hz	35.16	56.25	36	1024	800	24	72	P	625	600	1	2	P
800 x 600 @60 Hz	37.88	60.32	40	1056	800	40	128	P	628	600	1	4	P
800 x 600 @72 Hz	48.08	72.19	50	1040	800	56	120	P	666	600	37	6	P
800 x 600 @75 Hz	46.88	75	49.5	1056	800	16	80	P	625	600	1	3	P
848 x 480 @59 Hz	29.83	59.66	31.5	1056	848	24	80	P	500	480	3	5	P
848 x 480 @60 Hz	31.02	60	33.75	1088	848	16	112	P	517	480	6	8	P
1024 x 768 @60 Hz	48.36	60	65	1344	1024	24	136	N	806	768	3	6	N
1024 x 768 @70 Hz	56.48	70.07	75	1328	1024	24	136	N	806	768	3	6	N
1024 x 768 @75 Hz	60.02	75.03	78.75	1312	1024	16	96	P	800	768	1	3	P
1152 x 864 @75 Hz	67.5	75	108	1600	1152	64	128	P	900	864	1	3	P
1280 x 720 @48 Hz	35.54	47.96	58	1632	1280	48	128	N	741	720	1	3	P
1280 x 720 @50 Hz	36.92	49.82	60.25	1632	1280	48	128	N	741	720	1	3	P
1280 x 720 @60 Hz	44.62	59.81	74.25	1664	1280	56	136	N	746	720	1	3	P
1280 x 768 @60 Hz	47.4	59.99	68.25	1440	1280	48	32	P	790	768	3	7	N
1280 x 768 @60 Hz	47.78	59.87	79.5	1664	1280	64	128	N	798	768	3	7	P
1280 x 768 @75 Hz	60.29	74.89	102.25	1696	1280	80	128	N	805	768	3	7	P
1280 x 800 @60 Hz	49.7	59.81	83.5	1680	1280	72	128	N	831	800	3	6	P
1280 x 960 @60 Hz	60	60	108	1800	1280	96	112	P	1000	960	1	3	P
1280 x 1024 @60 Hz	63.98	60.02	108	1688	1280	48	112	P	1066	1024	1	3	P
1280 x 1024 @75 Hz	79.98	75.02	135	1688	1280	16	144	P	1066	1024	1	3	P
1360 x 768 @60 Hz	47.71	60.02	85.5	1792	1360	64	112	P	795	768	3	6	P
1366 x 768 @60 Hz	48	60	72	1500	1366	14	56	P	800	768	1	3	P
1400 x 1050 @60 Hz	64.74	59.95	101	1560	1400	48	32	P	1080	1050	1	4	N
1400 x 1050 @60 Hz	65.32	59.98	121.75	1864	1400	88	144	N	1089	1050	3	4	P
1400 x 1050 @75 Hz	82.28	74.87	156	1896	1400	104	144	N	1099	1050	3	4	P
1440 x 900 @60 Hz	55.93	59.89	106.5	1904	1440	80	152	N	934	900	3	6	P
1440 x 900 @75 Hz	70.51	74.85	136.5	1936	1440	85	152	N	942	900	3	6	P
1440 x 1050 @60 Hz	65.23	59.9	125.25	1920	1440	88	152	N	1089	1050	3	10	N
1600 x 1200 @60 Hz	75	60	162	2160	1600	64	192	P	1250	1200	1	3	P
1600 x 1200 @65 Hz	81.25	65	175.5	2160	1600	64	192	P	1250	1200	1	3	P
1600 x 1200 @70 Hz	87.5	70	189	2160	1600	64	192	P	1250	1200	1	3	P
1600 x 1200 @75 Hz	93.52	74.81	292	2160	1600	64	192	P	1250	1200	1	3	P
1680 x 1050 @60 Hz	65.18	59.85	146	2240	1680	104	176	N	1089	1050	3	6	P
1920 x 1200 @60 Hz	74.04	59.95	154	2080	1920	48	32	P	1235	1200	3	6	N
1920 x 1200 @60 Hz	74.46	59.81	193	2592	1920	136	200	N	1245	1200	3	6	P
2560 x 1600 @60 Hz	98.53	59.86	268	2720	2560	48	32	P	1646	1600	3	6	N
720 x 480p @59 Hz	31.47	59.94	27	858	720	16	62	N	525	480	9	6	N

Table A-3 (Continued). Video Timing List (DisplayPort).													
Resolution	H. Freq. (kHz)	V. Freq. (Hz)	Pixel Clock (MHz)	H. Total Pixel	H. Display Pixel	H. Front Porch	H. Sync. Width	H. Sync. Pol.	V. Total Lines	V. Display Lines	V. Front Porch	V. Sync. Width	V. Sync. Pol.
720 x 480p @59 Hz	31.47	59.94	27	858	720	16	62	N	525	480	9	6	N
720 x 576p @50 Hz	31.25	50	27	864	720	12	64	N	625	576	5	5	N
720 x 576p @50 Hz	31.25	50	27	864	720	12	64	N	625	576	5	5	N
1280 x 720p @50 Hz	37.5	50	74.25	1980	1280	440	40	P	750	720	5	5	P
1280 x 720p @60 Hz	45	60	74.25	1650	1280	110	40	P	750	720	5	5	P
1280 x 720p @100 Hz	75	100	148.5	1980	1280	440	40	P	750	720	5	5	P
1280 x 720p @120 Hz	90	120	148.5	1650	1280	110	40	P	750	720	5	5	P
1920 x 108i @50 Hz	28.13	5	74.25	2640	1920	528	44	P	1125	1080	2	5	P
1920 x 108p @24 Hz	27	24	74.25	2750	1920	638	44	P	1125	1080	4	5	P
1920 x 108p @30 Hz	33.75	30	74.25	2200	1920	88	44	P	1125	1080	4	5	P
1920 x 108p @50 Hz	56.25	50	148.5	2640	1920	528	44	P	1125	1080	4	5	P
1920 x 108p @60 Hz	67.5	60	148.5	2200	1920	88	44	P	1125	1080	4	5	N

Appendix B. Troubleshooting

B.1 Contacting Black Box

If you determine that your Multi-Format AV Scaler with DisplayPort 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.

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.

B.2 Shipping and Packaging

If you need to transport or ship your Multi-Format AV Scaler with DisplayPort:

- 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.

Great tech support is just 60 seconds away at 724-746-5500 or blackbox.com.

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AVSC-7DA-HDMI, version 1