



BLACK BOX[®]
NETWORK SERVICES



June 2004
AC135A-R2

Video to VGA Converter/Switch

With Audio, RS-232 Control, and PC VGA input



**CUSTOMER
SUPPORT
INFORMATION**

Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mail order: **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

BLACK BOX and its logo  are registered trademarks of Black Box Corporation.

Apple and Macintosh are registered trademarks of Apple Computer, Inc.

IBM is a registered trademark of International Business Machines Corporation.

SGI is a registered trademark of Silicon Graphics, Inc.

Sun and Sun Microsystems are registered trademarks of Sun Microsystems, Inc. in the United States and other countries.

Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

**FEDERAL COMMUNICATIONS COMMISSION
AND CANADIAN DEPARTMENT OF COMMUNICATIONS
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 the Canadian Department of Communications.

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 le ministère des Communications du Canada.

EUROPEAN UNION DECLARATION OF CONFORMITY

This product complies with the requirements of the European EMC directive 89/336/EEC



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 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 librerías 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.

Contents

1. Introduction	page 6
1.1 General	page 6
1.2 Features	page 7
2. Installation	page 8
3. Operation	page 11
4. Configuration.....	page 13
4.1 RS-232 Control and Configuration	page 13
4.2 Control Panel Software for Windows.....	page 13
4.3 Serial Command Set.....	page 14
5. Troubleshooting.....	page 15
6. Specifications.....	page 16

1. Introduction

1.1 General

The Model AC135A-R2 converts an NTSC or PAL video signal to VGA for display on PC monitors, projectors, or other progressive scan displays. The converter de-interlaces and doubles the frame rate by turning the interlaced Video input signal into a "progressive scan" signal suitable for high-resolution display devices.

The AC135A-R2 provides multiple TV video inputs: two (2 ea.) RCA composite video and one (1 ea.) S-Video - all with their own corresponding stereo audio inputs.

Additionally, the unit provides a separate VGA and audio input from a PC that can be switched to the output. This makes the AC135A-R2 a 4-input to multi-standard switcher.

The user can select any of the inputs using individual push-button switches on the front panel. An RS232 serial port is available for external control and/or changing the internal configuration of the unit.

The unit has the ability to switch between the PC and TV inputs automatically. When in "Auto" mode, if no TV video signal is present, it selects the PC input and as soon as a TV input is detected, it switches to the TV input by itself. This feature makes the unit perfect for educational facilities where the presenter does not even have to worry about making selections on the AC135A-R2.

The AC135A-R2 also provides 4 Stereo audio inputs, one for each corresponding video input. The audio switching follows the selected video input channel. In addition, each audio input has its own adjustable volume setting making it perfect for balancing the output volume level regardless of the input selection.

The AC135A-R2's VGA output can drive VGA extension cables to 200 feet. It is recommended that when video extension cables are used, only high quality multi-coaxial VGA or RGBHV (such as Black Box EVNPS05-0050-MF) be used.

When enabled, OSD (On Screen Display) shows the selected TV input for a few seconds, or if the selected input does not have video, it continuously indicates the selected input. Screen Saver feature moves the OSD around the screen when no video input is detected. The OSD can be permanently disabled via the serial port.

The front panel can be locked out. This is a handy feature in many installations. For example if the system is in "Auto" mode, the installer may wish to also lock the front panel so that accidental hitting of the front panel switches does not take the system out of Auto mode.

The unit features a front panel switch for enhancing the TV video input prior to display on a VGA monitor. The enhancement is based on non-linear Gamma correction. to bring out the details in the dark areas without over driving the already bright regions of the image.

The Serial input gives the user or installer full control over all aspects of the device including: *Contrast, Brightness, Saturation, Hue, OSD, Front Panel Lock, Volume settings, Auto mode, TV format (NTSC/PAL), Enhancement factor, and more.*

The Model AC135A-R2 is housed in a compact shielded enclosure and includes a small power adapter and 6 ft video and audio cables for connection to the PC's VGA and sound outputs.

1.2 Features

- 3 NTSC/PAL and 1 PC input to one VGA output
- Eliminates interlace flicker from video presentations
- Includes line-doubler with motion compensations
- Video enhancement via Gamma factor correction
- VGA input for full screen TV or PC Video display
- RS-232 control input port
- Free Serial Control Software available for download
- 4 Stereo audio inputs
- User programmable brightness and contrast for TV input
- Packaged in portable EMI shielded enclosure
- VGA input resolutions to 1600 x 1200
- Individual volume controls for each audio input
- "Auto" mode for switching to active video
- Front panel and OSD enable/disable control

2. Installation

1. Connect one or more of the video and audio input signals to the input connectors on the AC135A-R2. Figure 2.1 shows a typical setup.



Figure 2.1

2. The following table summarizes the available inputs:

Connector Name	Connector Type	Signal Type	Comments
VGA IN	HD15, Female	VGA, SVGA, XGA	From any PC, MAC, or Notebook. A 6 ft high-resolution VGA cable is supplied with unit
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	One 6 ft m/m input cable is provided for connection to a PC sound output
CV IN 1	RCA, Female	Composite NTSC or PAL	From any video source
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	
CV IN 2	RCA, Female	Composite NTSC or PAL	From any video source
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	
S-VID IN	MiniDin 4, Female	Y/C (S-Video, S-VHS)	
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	



Figure 2.2

The output connectors are a HD15-F (VGA), and a 3.5mm (1/8") Mini-Stereo audio. Plug your VGA monitor and speakers (must be powered) to these connectors.

3. Plug the supplied AC adapter to the Power input connector. Use the supplied adapter or a 100% equivalent only.

NOTE

Do not connect a supply with an output voltage of greater than 7.5 V DC to the unit. The power connector is center-positive.

NOTE

The VGA input and out connectors have standard pin-outs as shown below

High-Density 15-pin VGA Output Connector	
PIN	Function
1	Red
2	Green
3	Blue
4	Not Used
5	Gnd
6	Red Return (Gnd)
7	Green Return (Gnd)
8	Blue Return (Gnd)
9	Key (Not Used)
10	Gnd
11	Gnd
12	SDA (plug-n-play)
13	Horizontal Sync
14	Vertical Sync
15	SCL (plug-n-play)

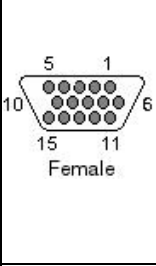


Table 2.1

3. Operation

Upon plugging in the power, the unit performs a self-test and selects the video input that was previously selected. If the unit was in “Auto” mode prior to shut down, then it will come up in auto mode. To select an input, simply press the push-button on the front of the unit corresponding to that input. Corresponding LED indicates the selected input.

Alternatively, the AC135A-R2 can be controlled by the serial RS232 port from any computer or RS-232 device (see details in following section).



If the VGA input is selected, then the unit buffers the signal and passes it to the output without modification. If the input is from one of the 3 NTSC or PAL channels, the unit automatically converts the signal to VGA. Line doubling and image processing via digital filtering do the conversion. The output signal preserves the entire information contained in the TV input signal, and also improves the way it appears on the screen by line doubling (de-interlaced). The output resolution during conversion is 640x480 for NTSC Systems and 768x576 for PAL. Almost all VGA monitors and LCD's today should automatically size the image to perfectly fit the screen.

The Enhancement switch on the front panel applies the level of gamma correction previously defined via the Serial control. Default level is 1.

The audio selection follows the video input signal. If the “line-level” volume of the input is different between your sources, for example if

the DVD player has louder output than the VCR, you can balance (equalize) the volume settings using the serial input control so that when you switch from one input to another the output volume level stays the same.

Special Front Panel Operations

- ❑ To enter the “Auto” mode from the front panel press the left two switches (VGA and CV1) simultaneously for 1 second. In auto mode if there are no TV inputs, the unit selects the PC input. As soon as it detects a valid TV input on any of the video inputs, the AC135A-R2 switches to the TV input. (The TV inputs have priority over the VGA input from the PC; there is no priority structure among TV inputs as soon as a valid TV signal is found on CV1, CV2, or S-Video, the unit selects it and stays on it as long as the video signal is present.
- ❑ To reset the system to factory default settings, press the left and right switches (VGA and S-Video) simultaneously for 3 seconds. The system will reset to factory settings. This capability is available even if the front panel has been locked.

4. Configuration

4.1 RS-232 Control and configuration

The AC135A-R2 is ready and fully operational right out of the box and no customer configuration is normally needed.

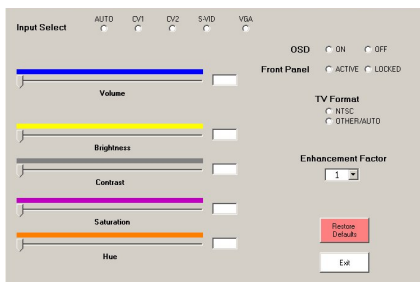
However, the RS-232 port provided on the box can be used not only to make input channel selection, but to adjust a few of the internal settings of the AC135A-R2 such as default contrast, brightness, and audio switching/mixing parameters.

You can use any ASCII terminal emulation software (such as Windows Hyper Terminal), or contact Black Box to obtain a Windows-based control and setup program for the AC135A-R2. You would need a straight through DB9 Male-to-Female cable for connection to a PC.

For example, when using Windows Hyper-Terminal, do the following: Use Comm. port 1 or 2 of the PC. Configure for 4800 baud, 8 bits, no parity, one stop bit. Set for ANSI emulation, ASCII with no Local Echo.

4.2 Control Panel Software for Windows

Optional Windows-based "Control Panel" software is available for the AC135A-R2. The software includes options for changing the default brightness, contrast, audio switching/mixing setup, selecting input channels, getting a status report, and restoring factory default settings. If you are interested, please contact the Black Box ftp site or Tech Support to obtain a copy. You would need a straight-through DB9 Male-to-Female cable for connection to a PC.



4.3 Serial Command Set

Configure port for: 4800 Baud, 8-bits, no parity, 1 stop bit

Command	Description
D1[enter]	Restore Defaults
I0[enter]	Auto Scan
Ix[enter]	Select Input (x=1:CV1, 2: CV2, 3:S-Vid, 4:VGA)
Bx[enter]	Brightness set & Save (0 < x < 255)
^Bx[enter]	Brightness set (0 < x < 255)
Cx[enter]	Contrast set & Save (0 < x < 127)
^Cx[enter]	Contrast set (0 < x < 127)
Vx[enter]	Volume set & Save for current input selection (0 < x < 255)
^Vx[enter]	Volume set (0 < x < 255)
Sx[enter]	Saturation set (0 < x < 127)
^Sx[enter]	Saturation set (0 < x < 127)
Hx[enter]	Hue set (0 < x < 255)
^Hx[enter]	Hue set (0 < x < 255)
Ox[enter]	OSD Control (x=0:Off, 1:On)
Fx[enter]	Front Panel Control (x=0:Off or Disabled, 1:On or active)
Gx[enter]	Gamma Enhancement Level (x=1:1.3, 2:1.5, 3:1.8)
Nx[enter]	NTSC (x=1:Configure Specifically for NTSC, 0:Other or Auto)
Rx [enter]	Read Bus (follow instructions) ** FOR ADVANCED USE ONLY **
Wx [enter]	Write Bus (follow instructions) ** FOR ADVANCED USE ONLY **

5. Troubleshooting

If your monitor goes blank periodically ...

Some VCR's (particularly lower cost ones with no time-base correction), output jittery and unstable video signal timing (especially in FF or PAUSE modes); however, the AC135A-R2 performs the conversion to VGA regardless. Some VGA monitors or LCD's may not be able to handle the instability in refresh rate and may lose the image lock periodically. If this occurs, the solution is to: use a different VCR with time base correction (TBC), change the monitor to a different brand/model, or use a time-base corrector (or sync stabilizer).

If you want to substitute power supplies ...

The universal power supply that comes with the AC135A-R2 generates 6v DC output. Do not apply a DC voltage higher than 7.5 V to the unit.

Calling Black Box

If you determine that your converter is malfunctioning, do not attempt to repair the unit. Contact Black Box Tech. Support at 724-746-5500.

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;
- The components involved in the problem—that is, what type of cable, makes and models of computers and monitors, etc.

Shipping and Packaging

If you need to transport or ship your converter:

- Package it carefully. We recommend that you use the original container.
- Before you ship the unit back to Black Box for repair or return, contact us to get a Return Authorization (RA) number.

6. Specifications

Compliance	CE; FCC Part 15 Subpart B Class A, IC Class
Standards	VGA, SVGA, or XGA video. RGBHV
Interfaces Supported	Video: VGA, Composite, and S-Video, Audio: Stereo line-level analog Serial: RS-232, pinned according to TIA-574, DCE
Video Types	VGA Input: to 1600 x 1200 up to 100 Hz TV Inputs: NTSC or PAL (auto detect) VGA Output: Same as VGA input, or 640x480 / 800x600 for conversion (NTSC / PAL respectively)
Bandwidth	Video: DC to 250 MHz
Video Level	0.7 volts peak-to-peak, on RGB, TTL on H & V
Connectors	HD15 for VGA, RCA for CV, MD4 for S-VHS
Temperature Tolerance	Operating: 32 to 122°F (0 to 50°C); Storage: -40 to +185°F (-40 to +85°C)
Enclosure	Steel
MTBF	90,000 hours (calculated estimate)
Power	From utility-power (mains) outlet, through included external power adapters. Output Voltage: 6v DC to 7.5 v DC Center-Positive 750 ma, minimum
Size	6.9" W x 3.3" D x 1.8" H
Weight	1.2. lb box only; 2.7 lb shipping



© Copyright 2004. Black Box Corporation. All rights reserved.

1000 Park Drive

Lawrence, PA 15055-1018

724-746-5500

Fax 724-746-0746