



# TV to VGA Converter/Line Doubler

With Audio and Output VGA Switch



**CUSTOMER  
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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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 libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

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

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# 1. Introduction

## 1.1 General

The Model AC135A converts an NTSC or PAL video signal to VGA for display on PC monitors, projectors, or HDTV (in 480p or 600p modes). The converter doubles the frame rate by turning the interlaced TV signal into a "progressive scan" (non-interlaced) signal suitable for high resolution display devices.

The AC135A 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 AC135A provides a separate VGA and audio input from a PC that can be switched to the output. This makes the AC135A a 4 multi-standard input to 1 VGA output device.

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

Selection of the input channel for display is made by a simple one-button operation. The audio selection follows the selected input channel (switched on or off), or can be mixed continuously to the output.

The unit features non-volatile memory to store the selected channel and performance characteristics.

The AC135A'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.

The Model AC135A 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
- Full screen 24-bit true color broadcast-quality video
- Eliminates interlace flicker from video presentations
- Significantly improves appearance of projected video images
- Reduces visible line structure on large video images
- VGA input for full screen TV or PC Video display
- RS-232 control input port
- No software required
- 4 Stereo audio inputs
- User programmable brightness and contrast for TV input
- Low cost, high reliability
- Packaged in portable EMI shielded enclosure
- VGA input resolutions to 1600 x 1200



Figure 1.1



## 2. Installation

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

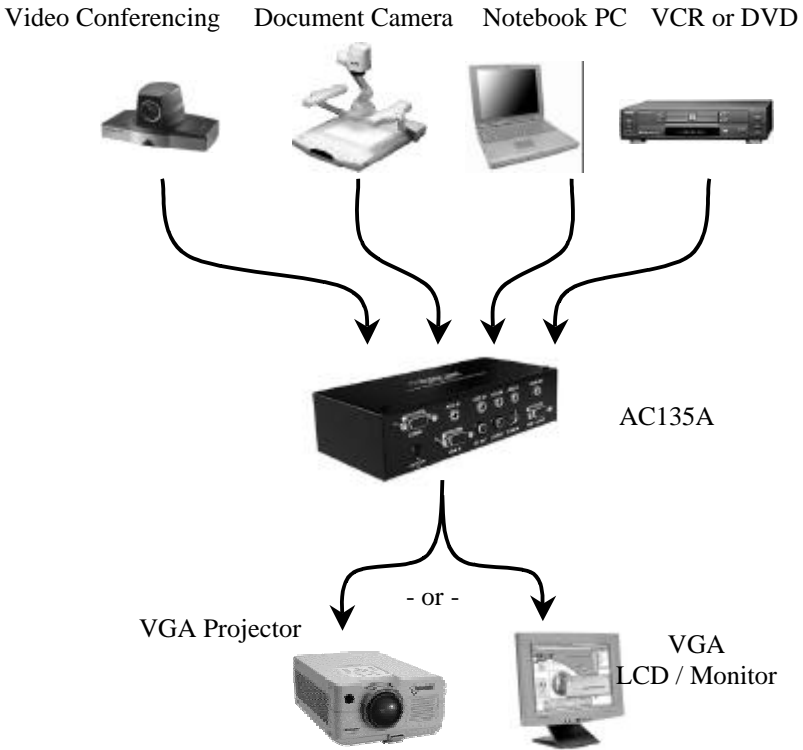


Figure 2.1

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	

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 connector has standard Pin-out. The VGA output connector is also standard with the exception that the left and right audio output are available on two normally undedicated pins (see table 2.1). These audio outputs are available in addition to the separate standard audio output connector on the box, and are normally used in special applications only.**

High-Density 15-pin VGA Output Connector	
PIN	Function
1	Red
2	Green
3	Blue
4	Right Audio
5	Left Audio
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)

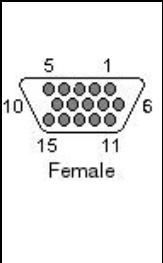


Table 2.1

### 3. Operation

Upon plugging in the power, the unit performs a self-test and selects the video input that was previously selected. To select a different signal, simply press the push-button on the front of the unit and it will "walk" the selection to the next inputs (see figure 3.1). You can cycle through all inputs and select one in this manner.

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

Front panel LED's indicate the current selection.



Figure 2.2

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.

Some VCR's (particularly lower cost ones with no time-base correction), may not output accurate and clean video signal timing (especially in FF, REV, or PAUSE modes); however, the AC135A

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) on the input signal from the VCR. DVD players and video cameras do not exhibit this characteristic, as their signal timing is always very accurate.

The audio selection switch to the output normally follows the video input signal. However, you can mix any or all of the audio input signals to the output (contact factory for details). An example of this can be a situation in which a line-level microphone feed is connected to one of the audio inputs and you don't want it to ever be switched off, so when you switch the input between a PC and a DVD, the MIC. input is always mixed in with the output.

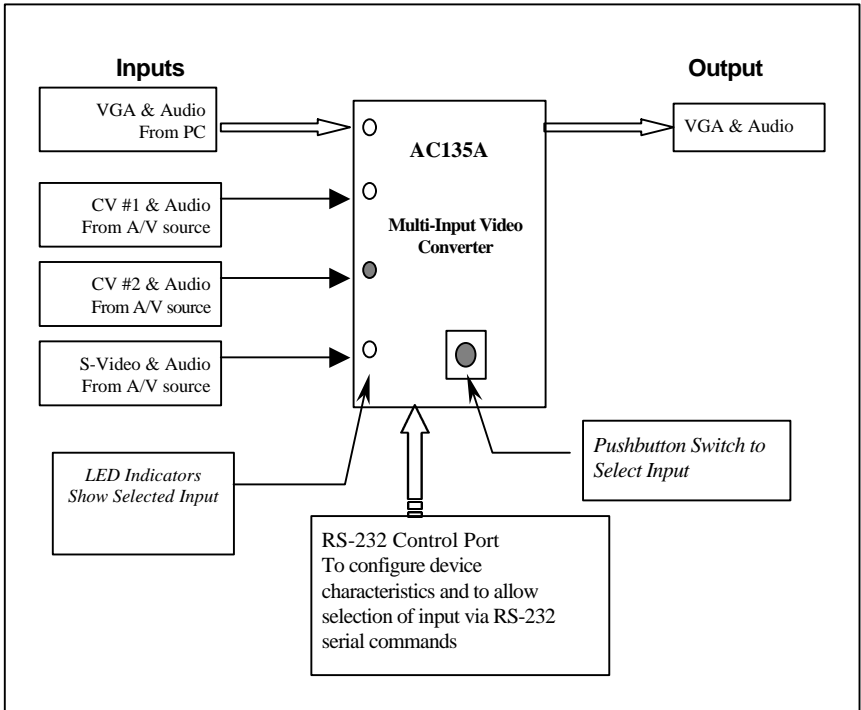


Figure 2.3

## 4. Configuration

### 4.1 RS-232 Control and configuration

The AC135A 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 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. 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 1200 baud, 8 bits, no parity, one stop bit. Set for ANSI emulation, ASCII with no Local Echo.

Upon power-up the AC135A restores its previous settings and lists the ASCII commands on the screen as shown below.

```
AC135A Rev 2.1  Black Box Corp
```

```
-----  
1 = Composite Vid #1  
2 = Composite Vid #2  
3 = S-Vid  
4 = VGA  
r = Read Register  
w = Write Register  
M = More Contrast  
L = Less Contrast  
-----
```

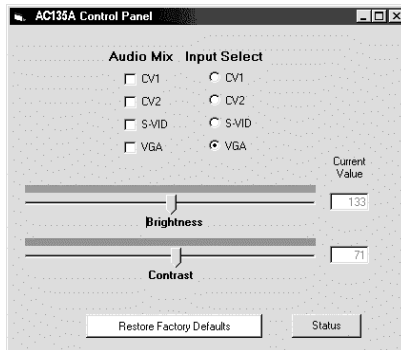
The commands for the PC are very simple. Numbers 1 through 4 select the 4 inputs. In addition two commands are used to write and read from internal registers and should only be used with caution since some registers are non-volatile and will not revert back even after power-down.

### To Configure Audio Channels to be mixed or switched:

1. Choose w for write
2. Put in an address of A001, A002, A003, or A004 for CV1, CV2, SVID, or VGA respectively
3. Put in a data value of 255, if you want that input to always mix in with the output, or put in 0, to make it switched.
4. Turn device off and then back on.

## 4.2 Control Panel Software for Windows

Optional Windows-based "Control Panel" software is available for the AC135A. 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.



## 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 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 converter relies on the AC power adapter that is supplied with it. The adapter generates a floating 6 or 7.5v DC output

### **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

<b>Compliance</b>	CE; FCC Part 15 Subpart B Class A, IC Class
<b>Standards</b>	VGA, SVGA, or XGA video. RGBHV
<b>Interfaces Supported</b>	Video: VGA, Composite, and S-Video, Audio: Stereo line-level analog Serial: RS-232, pinned according to TIA-574, DCE
<b>Video Types</b>	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)
<b>Bandwidth</b>	Video: DC to 200 MHz
<b>Video Level</b>	0.7 volts peak-to-peak, on RGB, TTL on H & V
<b>Connectors</b>	HD15 for VGA, RCA for CV, MD4 for S-VHS
<b>Temperature Tolerance</b>	Operating: 32 to 122°F (0 to 50°C); Storage: -40 to +185°F (-40 to +85°C)
<b>Enclosure</b>	Steel
<b>MTBF</b>	200,000 hours (calculated estimate)
<b>Power</b>	From utility-power (mains) outlet, through included external power adapters. Output Voltage: 6v DC to 7.5 v DC Center-Positive 750 ma, minimum
<b>Size</b>	6.9" W x 3.3" D x 1.8" H
<b>Weight</b>	1.2. lb box only; 2.7 lb shipping



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