

## 2x1 Compact VGA Switch

Model AC505A



with  
Push-button Switch Cord and Serial Control Port

March 2006

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### 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

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UMA1032, Rev 1.2



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### FEDERAL COMMUNICATIONS COMMISSION

#### RADIO FREQUENCY INTERFERENCE STATEMENT

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 designed 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 intended 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 or her 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.*

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

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

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# 1. Introduction

## 1.1 General

The Model AC505A is a versatile, compact, high performance, solid-state, 2 input x 1 output, VGA video switch that can operate at resolutions of up to 1600x1200.

The unit allows one monitor to be switched between two video sources. The device is housed in a small RFI shielded enclosure and is supplied with an universal power supply, a push-button remote switch control cable, and a Serial (RS-232) control cable for connecting to a PC or other serial control device.

The switch terminates both video input signals and buffers the output in order to protect signal integrity. The Model AC505A can drive video cables to 150 feet or more (depending on cable quality and resolution setting). The input and output connectors are all HD15 Female (standard VGA style).

## 1.2 Features

- ❑ Allows one monitor to be switched between two sources
- ❑ Can be controlled manually, via Serial port, or from TTL level (or contact closure)
- ❑ Select input 1, input 2, or blank the output
- ❑ Auto mode automatically scans and selects the input with active video (Inputs can also be prioritized)
- ❑ Infinite switching cycle life
- ❑ Can drive long cables
- ❑ Terminates both video input signals and buffers the output to protect signal integrity
- ❑ Includes pushbutton and serial cables for control

## 2. Installation

Your package should include two control cables, a power supply, and the Video Switch unit itself. Please take inventory of all items received and ensure that you have the above items.

Connect INPUT 1 and INPUT 2 of the switch to your video sources such as computer or notebook PC. You will require a cable for each connection. It is highly recommended that you use multi-coaxial high-resolution VGA cables for this purpose. The cables would generally be male-to-male. Black Box can provide cables from 3 feet to 100 feet or more; please contact us for ordering information.

Connect the display device such as a monitor (or a video projector) to the output of the Switch.

Set the dip switches according to the mode of operation that best suites your application.

Connect the supplied AC power adapter to the Splitter, and plug-in the push-button switch cord.

Please refer to figure 2.1 for installation block diagram.

### Important Notice

*Always use the unit with the provided power supply. Do Not Substitute other DC Power Source. If you would like to use a different power supply source, contact Black Box first to confirm compatibility.*

## Plug-and-Play

*DDC (Direct Data Channel) is a standard by which a compatible monitor sends its identification and other parameters to a PnP operating system such as Windows XP etc. The AC505A does not switch the PNP signal lines to the PC. This means that, in some instances, you may have to select a new monitor or video settings on your PC. Also notice that most Notebook PC's have a special function key to activate the external video output connector*

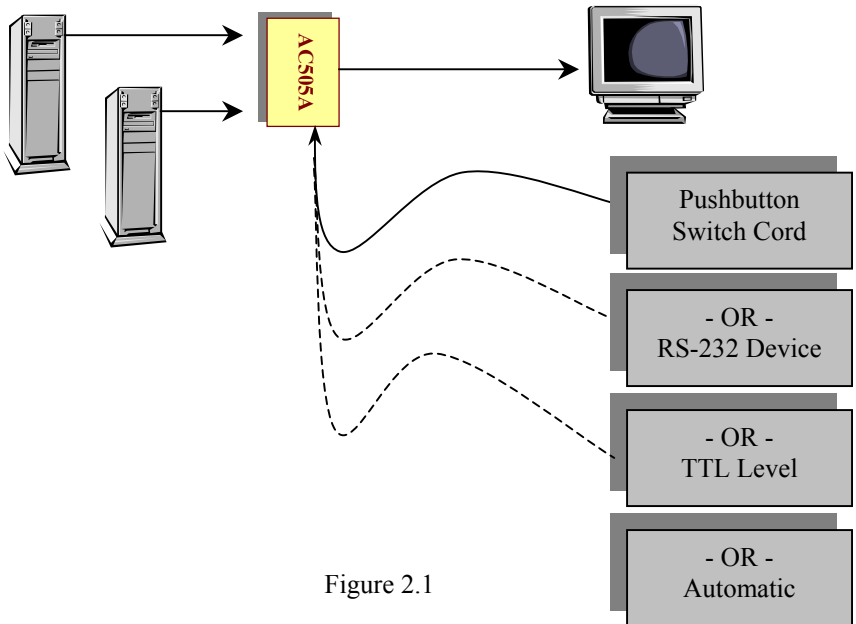


Figure 2.1

## 3. Configuration & Operation

### 3.1 Dip Switch Settings

The Model AC505A provides a convenient dip switch for setting the desired mode of operation. It is recommended to set the jumper prior to applying power to the unit, however the device does monitor the dip switch settings when on and changes mode of operation as needed.



Figure 3.1

**Normal (all switches off – levers up)**



This is the default mode setting for the switch. In this mode the unit is controlled from the push-button switch cord. The switch at the end of the cable is momentary and it has a built-in LED. The LED is used to indicate which input is selected. Solid on means Input 1, blinking means Input 2 (when blanking mode is enabled, LED off means blanked output). Every time you press the button the output switches from the current input to the other input. When blank mode is on, double clicking the button will blank the output screen.

**Auto**

If selected, causes the switch to select the input with active video automatically. The presence of video is determined by examining the V.Sync signal of the input connectors.

In Auto mode you don't need to have the pushbutton cord plugged in. However, if a push button cord is plugged-in, the button itself cannot be used for switching, but the LED either stays on or blinks to indicate which input is selected.

Additionally, it is possible to blank the output in auto mode using the push-button switch (see below)

**Auto Mode with Priority:** There are two modes of operation for the Auto-detection of video. In the default mode (with dip switches as shown above – TTL switch in off position) no priority is assigned to either input. Once the switch finds a video at one of the inputs it selects it and stops scanning until the currently selected input's video is absent, then the switch will start scanning again.

If the TTL dip switch is down (on) at the same time as Auto, then priority is given to input #1. This means that at any time video is present at input #1 the VS-2 will automatically select it, regardless of what is happening at input #2. For example if the Switch is showing an image from input #2 and you plug in a video signal to input #1, the switch will select #1 right away.

**Auto Mode with Blanking:** If the blanking dip switch is on (down) at the same time as Auto then double clicking the pushbutton will cause the output video to blank out. Click the button again to restore the output.

**Blank**

If enabled, then double clicking the pushbutton will cause the output to go blank. If dip switch is off, then the double click feature is not there and if the user presses the button in quick succession, all that the switch will do is to switch between the inputs quickly!

**TTL**

In this mode the selection of input is determined by an external contact closure or TTL signal. The customer should provide his or her own cable. The signal is to be asserted between the tip and ground of the 3.5mm mini-plug. A high (or open input) selects input #1 and a low (or short to ground) will select input #2. The center ring of the connector can be used to light an external LED for indication of the selected channel if desired. Simply tie the ring to the anode of the Led with the cathode tied to ground.

**RS-232**

This position is to allow the switch to be controlled via a Serial device. The same CTRL connector is used to attach the device to the serial port via a supplied cable. The unit operates at 1200 baud (adequate since only single ASCII characters are used to command the switching, and the lower baud rate eliminates cable length, shielding and noise issues). From the serial port you have full control over the operation of the switch (e.g. select input 1, input 2, blank the output, un-blank the output, or place the switch in and out of auto-mode).

### 3.2 More on Serial (RS-232) operation

Approximately one second after power-up, the AC505A will output a menu on the serial port. To view the menu you need an ASCII serial terminal or terminal emulator software. An example is Windows® Hyper-terminal® (generally found in Accessories\Communication folder).

#### Hyper-terminal Configuration

- ☐ Connect Direct to COM1 or COM2
- ☐ Configure for 1200 Baud, 8 bits, No Parity, 1 Stop bit, No flow control

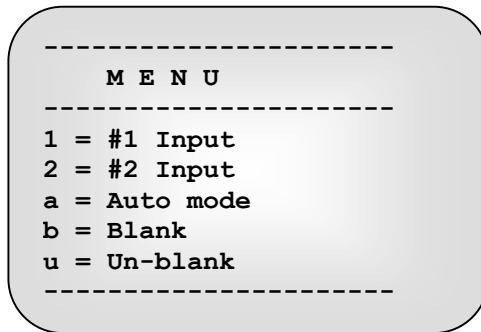


Figure 3.2

### 3.3 Serial Control Codes (1 byte commands)

#### Ascii 1 (or Hex31)

Selects input #1 (immediately and unconditionally). The device will respond with:

In #1 Selected

#### Ascii 2 (or Hex32)

Selects input #2 (immediately and unconditionally). The device will respond with:

In #2 Selected

#### Ascii a (or Hex61)

Enters Auto Mode. The device will respond with:

Auto Mode.

In auto mode the device automatically switches to the video input source that is active. "Active" means that video signal has sync signal, it does not mean that there is a non-static screen! If both inputs are active, then the AC505A stays on the currently selected video until the video signal ceases, then it will switch to the other channel if there is good video present there.

#### Ascii b (or Hex62)

Blanks the output. The device will respond with:

Blanked output

#### Switching Details

When switching from one input to another, the AC505A blanks the output, switches the input, waits 25 milliseconds, and un-blanks the output.

This is done in order to reduce or eliminate the undesired "flash of junk" on screen when the monitor is re-synchronizing from one input to the other. Most monitors take some additional time to synchronize to the new input and therefore the blanking time may be longer than 25 ms

When output is blanked, only the color intensities of the output are reduced to zero, the box still operates in normal fashion and sync signals are still routed to the output.

Ascii u (or Hex75)

Un-blanks the output. The device will respond with:

Unblanked output

## 4. Troubleshooting

### 1. Fuzzy, blurry, or ghosting image

Make sure that you are using the power supply adapter that came with the unit. The VGA cables must be of high quality multi-coaxial construction. If you are using long video cables in excess of 100 feet, the losses in the cable could be a contributing factor, in which case, first reduce the refresh rate to 60 HZ and if that is not enough, you may have to reduce the resolution of the incoming video signal.

### 2. The PC does not recognize a Plug-and-Play monitor

If the PC's Operating System is setup to detect a plug-and-play monitor (usually in Display Properties Advanced Settings), it may have trouble finding a monitor. If the PC does not produce an image due to this, disable the plug-and-play monitor detection in the PC's operating system Display Properties.

### 3. Substituting power supplies

The AC505A relies on the power adapter that it comes with. Do not substitute any other power supply or DC power source.

## **Contacting Black Box**

If you determine that your extender 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.

## **Shipping and Packaging**

If you need to transport or ship your extender:

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

## 5. Specifications

|                      |                                                                                                                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Video Types</b>   | VGA through UXGA, RGBHV                                                                                                                                                                                    |
| <b>Resolution</b>    | Up to 1600 x 1200 at up to 85 Hz                                                                                                                                                                           |
| <b>Bandwidth</b>     | DC to 250 MHz                                                                                                                                                                                              |
| <b>Max. Distance</b> | Up to 150 ft. (50 m)                                                                                                                                                                                       |
| <b>Connectors</b>    | HD15 female for input and both outputs; 3.5 mm Serial                                                                                                                                                      |
| <b>Interfaces</b>    | Standard Analog VGA; EIA/TIA RS-232 Serial                                                                                                                                                                 |
| <b>Compliance</b>    | CE; FCC Part 15 Subpart B Class A, IC Class                                                                                                                                                                |
| <b>Max. Altitude</b> | 10,000 ft. (3048 m)                                                                                                                                                                                        |
| <b>Temperature</b>   | Operating: 32 to 122°F (0 to 50°C);<br>Storage: -40 to +185°F (-40 to +85°C)                                                                                                                               |
| <b>Humidity</b>      | Up to 95% non-condensing                                                                                                                                                                                   |
| <b>Enclosure</b>     | Steel                                                                                                                                                                                                      |
| <b>MTBF</b>          | 90,000 hours (calculated estimate)                                                                                                                                                                         |
| <b>Power</b>         | From utility-power (mains) outlet, through included external universal power supply. Input Voltage: 100~240 vAC, 50~60 Hz. Output Voltage: 6v DC regulated Center-Positive. Power Consumption: 3 watts Max |
| <b>Size</b>          | 1.25" H x 2.75" W x 4.25" L (32 x 70 x 108 mm)                                                                                                                                                             |
| <b>Weight</b>        | 1.5 lbs. or 0.7 Kg (shipping)                                                                                                                                                                              |

# Notes





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