

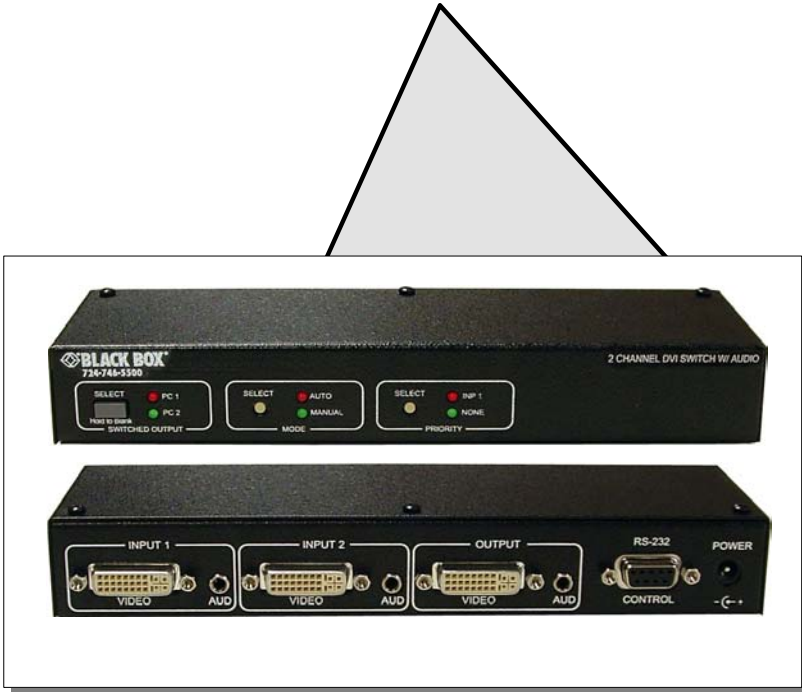


BLACK BOX[®]
NETWORK SERVICES



AC1032A-2A
Rev A

2-Port DVI Switch with Audio, Serial Control & Long Cable Equalization



**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

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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 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.

Contents

| | |
|---|----|
| 1.0 General | 6 |
| 2.0 Features..... | 7 |
| 3.0 Installation | 8 |
| 3.1 Required Cables..... | 8 |
| 3.2 Inputs & Outputs | 8 |
| 3.3 Connecting the AC1032A-2A | 8 |
| 3.4 Connection Diagram..... | 9 |
| 4.0 Operation | 10 |
| 4.1 Switched Output | 10 |
| 4.2 Modes of Operation..... | 10 |
| 4.3. Priority Selection in Auto Mode..... | 11 |
| 4.4 Long Cable Equalization | 11 |
| 4.5 RS-232 Control Port Usage | 11 |
| 4.6 To configure HyperTerminal..... | 12 |
| 4.7 Serial Port Control Codes | 13 |
| 5.0 Troubleshooting..... | 17 |
| 5.1 Calling Black Box | 17 |
| 5.2 Shipping and Packaging | 17 |
| 5.3 Problem Solving FAQ | 18 |
| 6. Specifications..... | 19 |

1.0 General

Thank you for purchasing Black Box AC1032A-2A 2-Port DVI Switch with Audio & Serial Control.

This unit provides both a video and audio output that can be switched between two video and audio sources. This allows routing of multiple DVI equipped devices (such as PC's) to a single DVI display (such as a plasma or LCD screen). The switcher supports single-link, DVI-D video signals at resolutions up to 1600x1200 and HDTV up to 1080i.

The AC1032A-2A unit provides all the A/V and control connections on the rear panel; the front panel has a push-button switch with corresponding LED indicator for the selection of video source. The front panel also features mode selection buttons to allow the unit to operate automatically (based on video sync signal detection).

This unit can be controlled by either manually using the front panel switch, automatically based on video detection, or remotely through an RS232 serial port.

The unit can be configured to operate in two different modes: Auto and Manual.

There is a priority selection that can be set for the 'Input 1' DVI connector. The switched output can be blanked and un-blanked either from the front panel button or from a command sent from a PC to the serial port.

The unit also has EEPROM (internal non-volatile flash memory) to store the last operating mode when power is off.

2.0 Features

- ✓ Clear and sharp images at resolutions up to 1600x1200 including HDTV up to 1080i
- ✓ Hot pluggable
- ✓ Supports the DDC2 standard for all input ports
- ✓ HDCP & HDMI 1.3 Compatible
- ✓ Allows one video with stereo audio to be switched between two video and audio sources
- ✓ Can be manually controlled by push-button switches, remotely by a RS232 communication port
- ✓ Provides an Auto mode to automatically select input source
- ✓ Auto Mode priority can be set for input #1 or no-priority
- ✓ Switched output can be blanked and un-blanked
- ✓ Video Cable Equalization available for long cabling
- ✓ Stores the last selection and mode in EEPROM
- ✓ Ships with universal (100~240 VAC) power supply
- ✓ Compact, Rugged, Reliable, and Economical
- ✓ Made in USA

3.0 Installation

3.1 Required Cables

The video input cables are generally DVI male to male (customer furnished). The Audio inputs are 3.5 mm mini-stereo (customer furnished). To connect to the unit to a Serial port (such as PC's COM1) you would need a Male/Female DB9 Serial Cable (customer furnished).

All of these items are available for purchase upon request.

3.2 Inputs & Outputs

The AC1032A-2A has 2 video and audio inputs labeled 'Input 1' and 'Input 2'. The unit has 1 video and audio output labeled 'Output'.

3.3 Connecting the AC1032A-2A

Connect your video and audio sources such as computer or notebook PC to 'Input 1' and 'Input 2'.

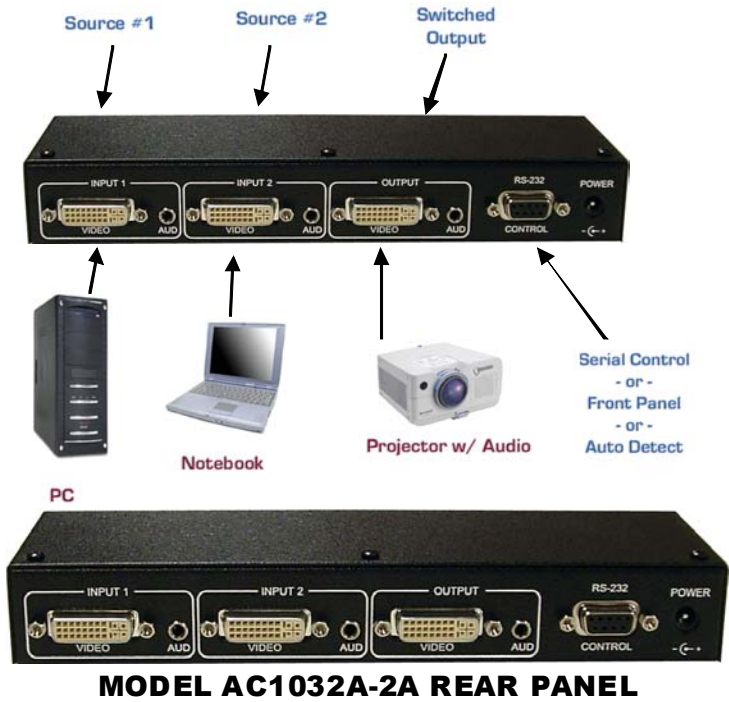
Connect the display device such as a monitor (or a video projector) to the switched video and audio outputs (SW Output).

Connect the included power supply to the AC1032A-2A.

Select the desired mode of operation including the priority for your video and audio output using the front panel switched buttons.

If preferred, the selection can also be done through RS-232 serial commands by connecting a DB9 RS-232 Serial cable to your PC and the AC1032A-2A.

3.4 Connection Diagram



4.0 Operation

4.1 Switched Output

The switched output SELECT button is used to select between video & audio input sources of PC 1 and PC 2. A solid-on LED is used to indicate which input is selected.

Holding down the switched output SELECT button for 3 seconds will blank the current selected input source (and mute the audio output). The LED for the current selected input will start blinking to indicate the blanking mode. Pressing the switched output SELECT button again will un-blank the output and un-mute the audio on the switched out rear connector.



MODEL AC1032A-2A FRONT PANEL

4.2 Modes of Operation

The unit can operate in either Auto or Manual mode by pressing the mode button.

In Auto mode, the AC1032A-2A will automatically select the input with active video and audio. The presence of video is determined by examining the V. Sync signal or optionally the +5 VDC signal from DVI input connectors. The front panel switched output SELECT button cannot be used to switch between 'Input 1' and 'Input 2' sources in this mode. However, the switched output SELECT button can be used to blank the output by holding it down for 3 seconds or to un-blank the output by pressing it once.

In Manual mode, the output of the AC1032A-2A will depend on the selection of the 'Switched Output' SELECT button.

4.3. Priority Selection in Auto Mode

The priority button is used to select the priority as NONE or as INPUT 1.

This priority selection only applies to Auto mode. If INP 1 priority is selected, the AC1032A-2A will automatically select 'Input 1' whenever it detects the presence of video at 'Input 1' connector, regardless of what is happening at the 'Input 2' connector.

For example, if the 'Output' is playing the video & audio from 'Input 2' and video from 'Input 1' is detected, the output of the AC1032A-2A will change to select 'Input 1' video immediately. With priority set to none, the unit stays selected to the current input as long as it is detecting video there.

4.4 Long Cable Equalization

The use of long DVI cables can cause the 'Video' image to degrade to unacceptable levels.

By pressing and holding BOTH the 'Mode SELECT' and 'Priority SELECT' buttons for 3 seconds, the video boost circuit will be enabled and the LED's will flash momentarily acknowledging the selection was changed. Both of the GREEN LED's flash when the BOOST is enabled and the RED LED's flash when the BOOST is disabled.

4.5 RS-232 Control Port Usage

The AC1032A-2A can also be controlled via a serial device. The unit operates at a baud rate of 4800 bps. From the serial port, you have full control over the operation of the switched output, mode, and priority buttons.

The AC1032A-2A will output a menu to the serial port on power-up. This menu can also be displayed when the appropriate command is sent to the AC1032A-2A via the serial port. To view the menu, an ASCII serial terminal or terminal emulator software is needed. An example is Microsoft Windows® HyperTerminal (generally found in the Accessories -> Communication folder)

4.6 To configure HyperTerminal

- Connect direct to any available COM port
- 4800 Baud, 8 bits, No Parity, 1 Stop bit, No flow control
- Settings per following figures:



After power-up the unit will output the following menu in ASCII through its serial port:

```
-----  
                        MENU - Version 1.0  
-----  
1 = PC 1 Input      | B = Blank  
2 = PC 2 Input      | U = Un-blank  
A = Auto mode       | E = Enable boost  
M = Manual mode     | D = Disable boost  
P = PC 1 priority   | R = Report  
N = No priority     | F = Factory Defaults  
                    | C = Command menu  
-----
```

4.7 Serial Port Control Codes

Control codes are 1 byte commands from an external device to the Serial Port on the AC1032A-2A.

ASCII '1' (Hex 31 or Decimal 49)

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

If the device is in AUTO mode, the device will respond with: **Error: The unit is in auto mode**

ASCII '2' (Hex 32 or Decimal 50)

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

If the device is in AUTO mode, the device will respond with: **Error: The unit is in auto mode**

ASCII 'M' or 'm' (Hex 4D/6D or Decimal 77/109)

Enters Manual mode.

The device will respond with: **Manual mode**

In Manual mode, the device stays on the currently selected video & audio, regardless of the presence of video signal.

ASCII 'P' or 'p' (Hex 50/70 or Decimal 80/112)

Selects Input #1 priority.

The device will respond with: **PC 1 priority selected**

If 'Input #1' priority is selected, the unit will select input #1 automatically whenever the presence of the video at the 'Input 1' DVI connector is detected even if the output from 'Input 2' is currently playing.

ASCII 'N' or 'n' (Hex 4E/6E or Decimal 78/110)

Selects no priority for Input #1.

The device will respond with: **No priority selected**

ASCII 'F' or 'f' (Hex 46/66 or Decimal 70/102)

Causes the system to be reset to its DEFAULT factory settings.

The device will respond with: **Factory default settings restored**

ASCII 'v' (Hex 76 or Decimal 118)

Causes the system to display the firmware version number.

The device will respond with:

Firmware Version: X.Y where 'X.Y' is the numeric version level of the firmware software.

ASCII 'A' or 'a' (Hex 41/61 or Decimal 65/97)

Enters Auto mode. The user must select the desired detection method by entering a number from 1 to 3 within 20 seconds. Values outside this range or delaying entry longer than 20 seconds will result in an error message: **Invalid entry! Current detection stays the same.**

The device will respond with:

Auto mode selected

Detection Method

1 = Vertical sync

2 = 5V Power

3 = Vertical sync & 5V power

Current detection is [X](1-3)?

Where 'X' is the current detection method of 1, 2 or 3.

In Auto mode, the device automatically switches to the video & audio input source that is active.

"Active" means that video signal has sync signal, it does not mean there is a non-static screen!

ASCII 'B' or 'b' (Hex 42/62 or Decimal 66/98)

Blanks the output.

The device will respond with: **Blank mode selected**

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

ASCII 'U' or 'u' (Hex 55/75 or Decimal 85/117)

Un-blanks the output.

The device will respond with: **Unblank mode selected**

ASCII 'E' or 'e' (Hex 45/65 or Decimal 69/101)

Causes the output signal equalization for long cabling to be enabled.

The device will respond with: **Boost enabled**

ASCII 'D' or 'd' (Hex 44/64 or Decimal 68/100)

Causes the output signal equalization for long cabling to be disabled.

The device will respond with: **Boost disabled**

ASCII 'R' or 'r' (Hex 52/72 or Decimal 82/114)

Request the status report. The device will respond with:

Report

Input = 1
Mode = Auto
Priority = None
Blank = Off
Boost = Disabled
Detection method = Vertical sync

This report displays the current selection of switched output, mode, and priority buttons.

ASCII 'C' or 'c' (Hex 43/63 or Decimal 67/99)

Displays the menu. The device will respond with:

```

MENU - Version 1.0
-----
1 = PC 1 Input      | B = Blank
2 = PC 2 Input      | U = Un-blank
A = Auto mode       | E = Enable boost
M = Manual mode     | D = Disable boost
P = PC 1 priority   | R = Report
N = No priority     | F = Factory Defaults
                    | C = Command menu
-----

```

5.0 Troubleshooting

5.1 Calling Black Box

If you determine that your switcher 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.
- The results of any testing you've already done.

5.2 Shipping and Packaging

If you need to transport or ship your Switcher:

- 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.

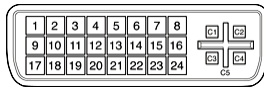
5.3 Problem Solving FAQ

1. What are the Cable Length Limitations?

The switcher cannot be used as an extender. Therefore it is best to plug the output of the switch directly to the display device and use input cables that are 5 meters (16 ft) maximum. In other words, try to keep the total length of cables from the video source to the box and from the box to the monitor should not exceed 16 feet. At longer distances you may experience video degradation. If you cannot use shorter cables, try to set the refresh rate and/or resolution of the video signal to a lower level.

6. Specifications

| | |
|---------------------|--|
| Video Inputs | DVI-D Single Link, HDCP & HDMI 1.3 Compliant |
| Resolutions | PC resolutions up to 1600x1200 @ 60 Hz and HDTV to 1080p |
| Audio Inputs | PC audio outputs |
| Temperature | 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 | 6V center positive via supplied Universal power supply |
| Size | 1.3" High x 8.5" Wide x 2.6" Deep |
| Weight | 1.1 pounds |



DVI Connector pin out N/U = Not Used

| Pin | Signal name | Pin | Signal name |
|-----|----------------------|-----|------------------------|
| 1 | TMDS Data2- | 13 | TMDS Data3+ (N/U) |
| 2 | TMDS Data2+ | 14 | +5V Power |
| 3 | TMDS Data2/4 Shield | 15 | Ground for +5V Power |
| 4 | TMDS Data4- (N/U) | 16 | Hot Plug Detect |
| 5 | TMDS Data4+ (N/U) | 17 | TMDS Data0- |
| 6 | DDC Clock | 18 | TMDS Data0+ |
| 7 | DDC Data | 19 | TMDS Data0/5 Shield |
| 8 | Analog vertical sync | 20 | TMDS Data5- (N/U) |
| 9 | TMDS Data1- | 21 | TMDS Data5+ (N/U) |
| 10 | TMDS Data1+ | 22 | TMDS Clock Shield |
| 11 | TMDS Data1/3 Shield | 23 | TMDS Clock+ |
| 12 | TMDS Data3- (N/U) | 24 | TMDS Clock- |
| C1 | Analog red | C4 | Analog horizontal sync |
| C2 | Analog green | C5 | Analog ground |
| C3 | Analog blue | | |



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