



BLACK BOX[®]
NETWORK SERVICES



March 2005
AC1031A-2
AC1031A-4

2 and 4 Channel DVI Splitter / Extender



AC1031A-2
2-Channel



AC1031A-4
4-Channel

**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 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. Introduction	page 6
1.1 General	page 6
1.2 Features	page 6
2. Installation	page 7
2.1 Cascade Operation	page 8
3. Troubleshooting	page 9
3.1 Problem Solving FAQ	page 9
3.2 Calling Black Box	page 10
3.3 Shipping & Packaging	page 10
4. Specifications	page 11

1. Introduction

1.1 General

The Black Box Model AC1031A-2 and Model AC1031-4 Splitters allow routing of a single DVI equipped device (such as PC) to multiple DVI displays (such as plasma or LCD screens). The Splitters support single-link, DVI-I (integrated Analog and/or Digital) video signals at resolutions of up to 1600x1200. The DVI Splitters feature front panel LED indicator for power on state, plus they can be used to extend the DVI output to 10 meters (33 ft). A DVI-I input cable is included with the unit.

1.2 Features

- Clear & sharp image at resolution up to 1600x1200 (including 1080i).
- Supports both digital and analog DVI signals (DVI-I), allowing you to connect a DVI-I equipped PC to monitors that have DVI-I or legacy monitors with VGA inputs only (*In this case HD15 to DVI cable or adapter will be necessary*)
- Can be cascaded (2-levels deep) for more outputs
- Installs in minutes
- Compliant with the specification of DVI 1.0
- Includes high quality DVI-I input cable
- Includes Universal (110-220 Vac) Power supply

2. Installation

1. Your package includes the Splitter box, a power supply, an input cable, and this Manual. You may need to purchase additional long DVI cables for connection your monitors. Black Box sells high quality DVI cables and adapters at various lengths.



Figure 1.
Example of DVI Cable



Figure 2.
Example of DVI-to-VGA Adapter



Figure 3.
Basic DVI Connector Types

2. Make sure the PC, the Splitter, and the monitors are all turned off
3. Plug the monitor's cables into the DVI OUT ports of the Splitter *(Note that at least one monitor needs to be connected to the output A of the Splitter)*
4. Plug a male-to-male extension cable from PC's DVI port to the Splitter

(Note that a DVI-I input cable is provided with the Splitter. Referring to figure 3, the DVI-I cable has the analog pins surrounding the ground blade. Since the Splitter is DVI-I, its connectors have all the sockets, and since most PCs have DVI-I output connectors with all the pin sockets, in most cases you can use the supplied cable to make the connection to your video source. However, if your video source is purely digital DVI-D, then the connector may not have the sockets for the additional analog pins in which case you will not be able to use the supplied

cable as it cannot plug in to your PC's output and you need to purchase a DVI-D cable that does not have the extra analog pins. The DVI-D cable can plug to the Splitter, it just does not have the extra analog pins Furthermore, it does not make any difference if the cable is Single or Dual Link. The Splitter is a Single-Link unit but you can physically plug either a Dual-Link or a Single Link cable into it)

5. Plug the supplied power adapter to the unit (The green LED on the front panel turns on)
6. Turn on the monitors.
7. Turn on the PC.

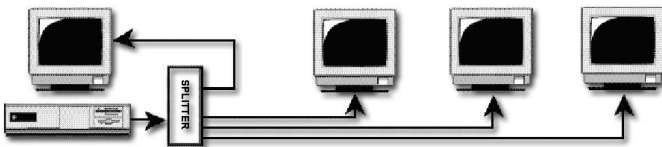


Figure 4.
Setup Block Diagram

2.1 Cascade Operation

For more outputs you can connect output #1 of the Splitter to the input of a Slave Splitter. It is recommended to keep cascading to only 2-levels deep.

3. Troubleshooting

3.1 Problem Solving FAQ

1. What are the Cable Length Limitations?

The splitter can accept up to 5 meters of cable on its input and 10 meters on its output for a total of 15 meters (50 feet total). At long distances if you start to experience video degradation, you should turn the refresh rate and/or resolution of the video signal lower.

2. What about HDCP (High-bandwidth Digital Content Protection) in home entertainment systems?

The Splitter is designed to primarily work with PC's with DVI outputs. If you want to use it in a Home-Theatre setup with DVI connections, it may or may not work. The splitters do not provide compatibility with HDCP encoded video sources. For example if you have a DVD player with DVI output, depending on the brand, or the DVD, it could enforce HDCP content protection. If HDCP is not enforced, then the Splitter will function well, however if HDCP is enforced, then at best the DVD player will output at 480p mode, and at worst it will not output any video on its DVI output instead a message will be displayed to use another output!.

3.2 Calling Black Box

If you determine that your splitter 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.

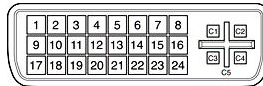
3.3 Shipping and Packaging

If you need to transport or ship your Splitter:

- 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.

4. Specifications

Standards	DVI-I Single Link, Compliant with DDWG DVI 1.0 Standard
Resolutions	PC resolutions up to 1600x1200 @ 60 Hz & HDTV to 1080i
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	From utility-power (mains) outlet, through included external power supply. Output Voltage: 9v DC Center-Positive at 1.7 A
Size (hxwx d)	2-Port: 1.38" x 7.80" x 2.7" 4-Port: 1.38" x 10.6" x 4"
Weight	2-Port: 1.4 pounds 4-Port: 2.2 pounds



DVI Connector pinout

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		



© Copyright 2005. Black Box Corporation. All rights reserved.

1000 Park Drive

Lawrence, PA 15055-1018

724-746-5500

Fax 724-746-0746