

# USER MANUAL

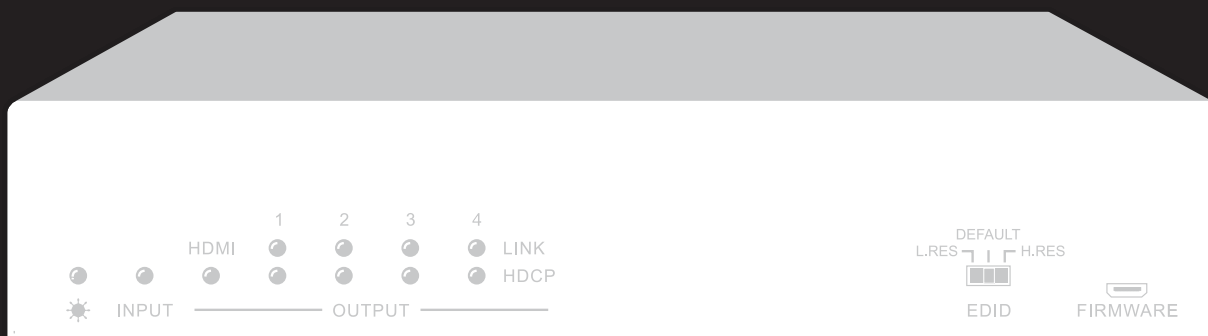
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VS-HDB-1X4

# CATX VIDEO SPLITTER 1X4

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24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT [BLACKBOX.COM](http://BLACKBOX.COM)



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## **SAFETY PRECAUTIONS**

To ensure the best performance from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- ◆ Unpack the equipment carefully and save the original box and packing material for possible future shipment.
- ◆ Follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to persons.
- ◆ Do not dismantle the housing or modify the product. This may cause electrical shock or burn.
- ◆ Using supplies or parts not meeting the product's specifications may cause damage, deterioration, or malfunction.
- ◆ Refer all servicing to qualified service personnel.
- ◆ To prevent fire or shock hazard, do not expose the unit to rain, moisture, or install this product near water.
- ◆ Do not put any heavy items on the extension cable in case of extrusion.
- ◆ Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
- ◆ Install the device in a location with proper ventilation to avoid damage caused by overheating.
- ◆ Keep the product away from liquids.
- ◆ Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on the housing, unplug the unit immediately.
- ◆ Do not twist or pull by force the ends of the cable. It can cause malfunction.
- ◆ Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- ◆ Unplug the power cord when left unused for a long period of time.
- ◆ Information on disposal for scrapped devices: do not burn or mix with general household waste. Treat the product as normal electrical waste.

## CHAPTER 1: SPECIFICATIONS

TABLE 1-1. SPECIFICATIONS

SPECIFICATION	DESCRIPTION
<b>Video Input</b>	
Input	(1) HDMI
Input Connector	(1) HDMI Type A female
HDMI Input Resolution	Up to 4K x 2K @ 60 Hz 4:2:0
<b>Video Output</b>	
Output	(1) HDMI, (4) CATx
Output Connector	(1) HDMI Type A female, (4) RJ-45
Output Video Signal	HDMI, CATx
HDMI Output Resolution	Up to 4K x 2K @ 60 Hz 4:2:0
CATx Output Resolution	Up to 4K x 2K @ 60 Hz 4:2:0
<b>Control</b>	
Control Port	(1) EDID, (1) ID PRESET, (1) IR ALL IN/LOOP IN, (1) IR OUT, (1) IR LOOP OUT, (1) RS-232 IN, (1) RS-232 OUT
Control Connector	(1) 3-pin DIP switch, (1) DIP switch, (3) 3.5-mm mini jacks, (2) 3-pin Phoenix connectors
<b>Power</b>	
AC Adapter Input Power	100 to 240 VAC, 50/60 Hz
Input Power	24 VDC, 2.71 A
Power Consumption	45 W (max.)
<b>General</b>	
HDMI Standard	HDMI 1.4 with HDCP 2.2
Transmission Mode	CATx
Transmission Distance	1080p < or = 229 feet (70 meters); 4K < or = 131 feet (40 meters)
Operating Temperature	14 to 131° F (-10 to 55° C)
Storage Temperature	-13 to +158° F (-25 to +70° C)
Humidity	10 to 90% relative humidity
Dimensions	1.7" H x 8.7" W x 5.8" D (4.4 x 22 x 14.8 cm)
Weight	1.6 lb. (0.7 kg)

NOTE: Use quality CAT Ethernet cable compliant with CAT6e or higher standard for reliable transmission.



## CHAPTER 2: OVERVIEW

### 2.1 INTRODUCTION

The CATx Video Splitter, 1 x 4, 4K UHD, Smart EDID accepts a single HDMI input and splits it into four CATx outputs. The splitter is designed with an HDMI loop out, which is intended to cascade to additional units. It supports video resolutions up to 4K@60Hz and all HDMI audio formats. It can extend 1080p signals on each output to a distance up to 229 feet (70 meters) and 4K signals to a distance up to 131 feet (40 meters) over a single CATx Ethernet cable. It supports the Power over CATx (PoC) feature, which allows the compatible receivers to be powered from the splitter over the Ethernet cables. It supports bidirectional IR and RS-232 pass-through and loop output.

### 2.2 FEATURES

- ◆ Splits a single HDMI input to four CATx outputs and one HDMI loop output.
- ◆ Supports video resolutions up to 4K @ 60 Hz 4:2:0.
- ◆ Extends 1080p signals on each output to a distance up to 229 feet (70 meters) and 4K signals to a distance up to 131 feet (40 meters) over a CATx Ethernet cable.
- ◆ Supports the Power over CATx (PoC) feature, allowing the compatible CATx receivers to be powered by the splitter over the Ethernet cables.
- ◆ Supports bidirectional IR and RS-232 pass-through and loop out.
- ◆ Smart EDID management. Features DIP switch to select the output resolution to match the connected displays.
- ◆ Fully compliant with the HDMI 1.4 specification.
- ◆ Supports HDCP pass-through management.
- ◆ Supports firmware update.
- ◆ Intuitive indicator for connection status.

### 2.3 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or [info@blackbox.com](mailto:info@blackbox.com)

- ◆ (1) CATx Video Splitter, 1 x 4, 4K UHD, Smart EDID
- ◆ (2) Mounting Ears with 4 Screws
- ◆ (4) Circular Plastic Cushions
- ◆ (1) 3-pin to 3-pin RS-232 Cable (for RS-232 loop out cascading)
- ◆ (1) 3-pin to DB9 RS-232 Cable
- ◆ (1) 3.5-mm Audio Cable (for IR loop out cascading)
- ◆ (4) IR Receivers
- ◆ (1) IR Emitter
- ◆ (1) Power Adapter (24 VDC, 2.71 A)

# CHAPTER 2: OVERVIEW

## 2.4 HARDWARE DESCRIPTION

Figures 2-1 and 2-2 show the front and back panels of the Splitter. Tables 2-1 and 2-2 describe their components.

### 2.4.1 FRONT PANEL

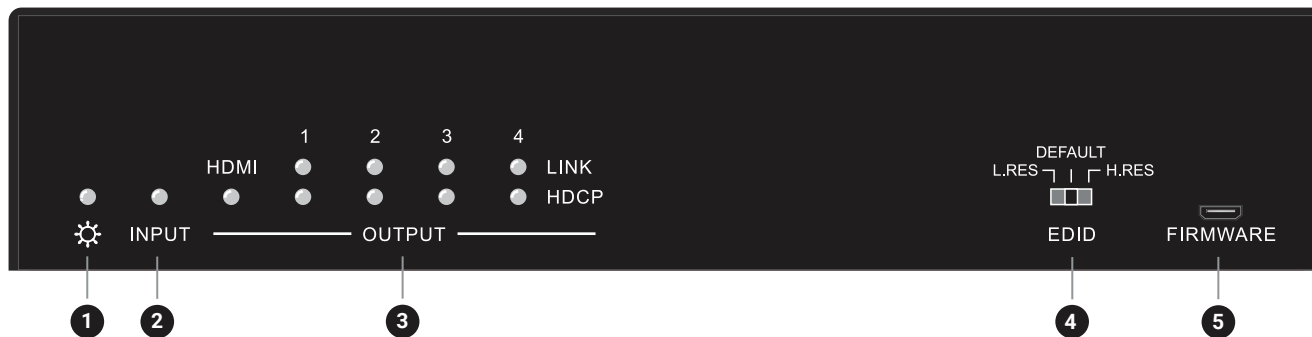


FIGURE 2-1. FRONT PANEL

TABLE 2-1. FRONT-PANEL COMPONENTS

NUMBER IN FIGURE 2-1	COMPONENT	DESCRIPTION
1	Power LED	Lights red when power is on
2	Input LED	Lights green when there is an HDMI source input
3	Output LEDs	<ul style="list-style-type: none"> <li>• HDMI: The LED illuminates green when there is an HDMI output.</li> <li>• LINK: Each LINK LED illuminates green when there is a valid connection between the splitter and each of the four receivers.</li> <li>• HDCP: Each HDCP LED illuminates green when the corresponding receiver supports HDCP and blinks green when the corresponding receiver does not support HDCP. Each LED is off when there is no connected corresponding receiver.</li> </ul>
4	EDID	DIP switch for the Extended Display Identification Data (EDID) value setting.
5	Firmware	USB port for firmware upgrading

## 2.4.2 BACK PANEL

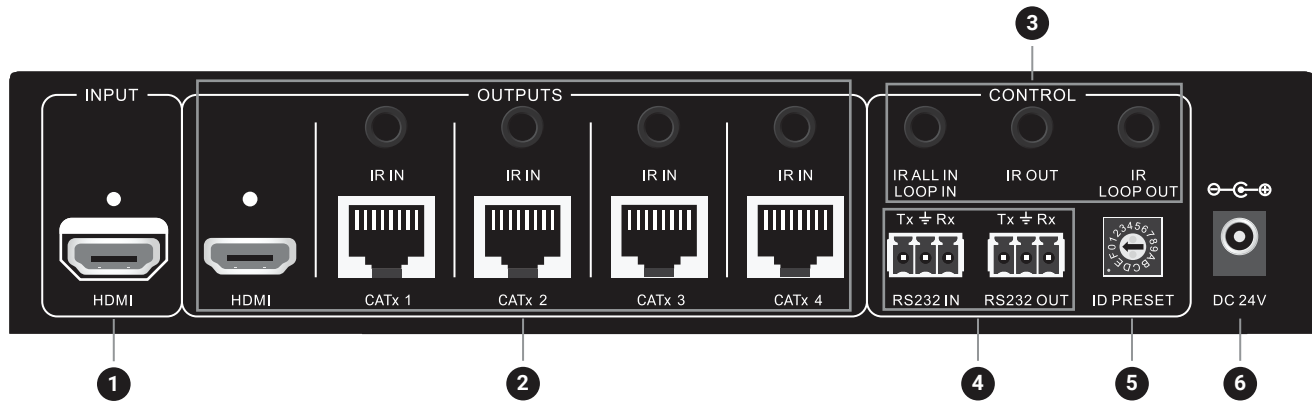


FIGURE 2-2. BACK PANEL

TABLE 2-2. BACK-PANEL COMPONENTS

NUMBER IN FIGURE 2-2	COMPONENT	DESCRIPTION
1	HDMI IN	HDMI port for connecting the HDMI source device (Blu-ray Disc™ or DVD player, gaming console, etc.)
2	Outputs	<ul style="list-style-type: none"> <li>HDMI: HDMI loop output port for connecting a local display.</li> <li>CATx 1–4: Four CATx RJ-45 jacks with PoC support for connecting four CATx receivers.</li> <li>IR IN: Four 3.5-mm IR input jacks for connecting the four IR receivers.</li> </ul>
3	IR Control	<ul style="list-style-type: none"> <li>IR ALL IN/LOOP IN: 3.5-mm IR jack for connecting an IR receiver or cascading to a previous device</li> <li>IR OUT: 3.5-mm IR jack for connecting an IR emitter</li> <li>IR LOOP OUT: 3.5-mm IR LOOP output jack for cascading to next device</li> </ul>
4	RS-232 Control	<ul style="list-style-type: none"> <li>RS-232 IN: 3-pin RS-232 connector. Connect to the PC using a 3-pin to DB9 cable.</li> <li>RS-232 OUT: If cascading multiple units, use the 3-pin to 3-pin cable to connect the output to the RS-232 IN on the next device in the chain.</li> </ul>
5	ID Preset	Assigns a single digit ID to the splitter when cascading multiple splitters and using RS-232 control, each splitter must have a unique ID. Use a small, flat-head screwdriver to set the ID. There are sixteen positions, with 0 at the fully counterclockwise position and F at the fully clockwise position. After setting the ID, the device must be restarted for the new ID to take effect.
6	24-VDC connector	DC barrel connector for the included AC power adapter

# CHAPTER 3: SYSTEM CONNECTION

## 3.1 USAGE PRECAUTIONS

- ◆ Verify all components and accessories are included before installation.
- ◆ System should be installed in a clean environment with proper temperature and humidity.
- ◆ All of the power switches, plugs, sockets and power cords should be insulated.
- ◆ All devices should be connected before power on.

## 3.2 SYSTEM DIAGRAM

The following diagram illustrates typical input and output connections that can be used with the splitter.

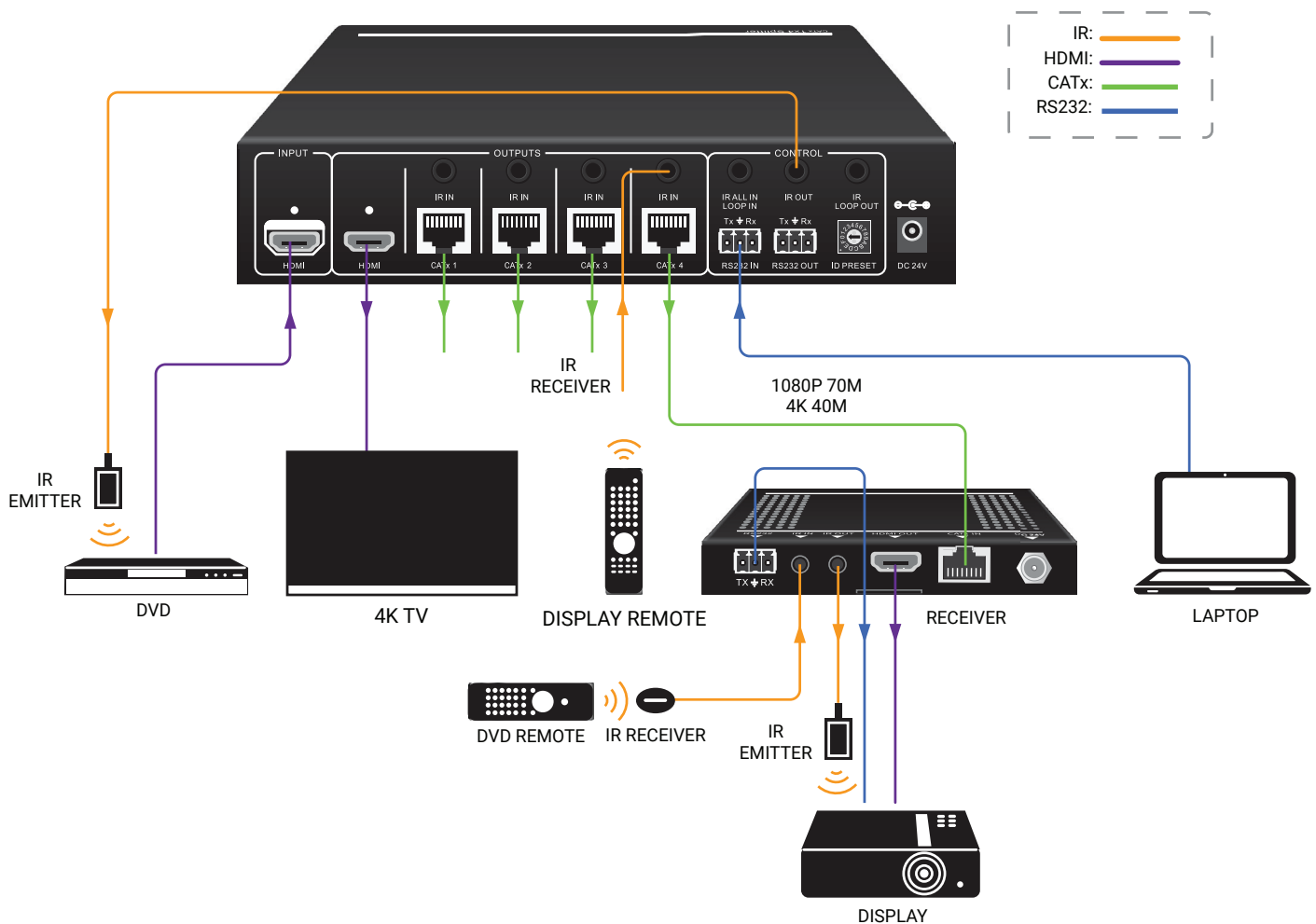


FIGURE 3-1. TYPICAL APPLICATION

NOTE: The CATx receivers do not need power adapters. They can be powered by the splitter with PoC support.



# CHAPTER 3: SYSTEM CONNECTION

## 3.3 CASCADE CONNECTION

The splitter supports cascade connection to distribute a video signal to multiple video displays. Use the following connection diagram as a guide for cascading multiple units.

NOTE: Each unit must have a unique ID if using RS-232 control.

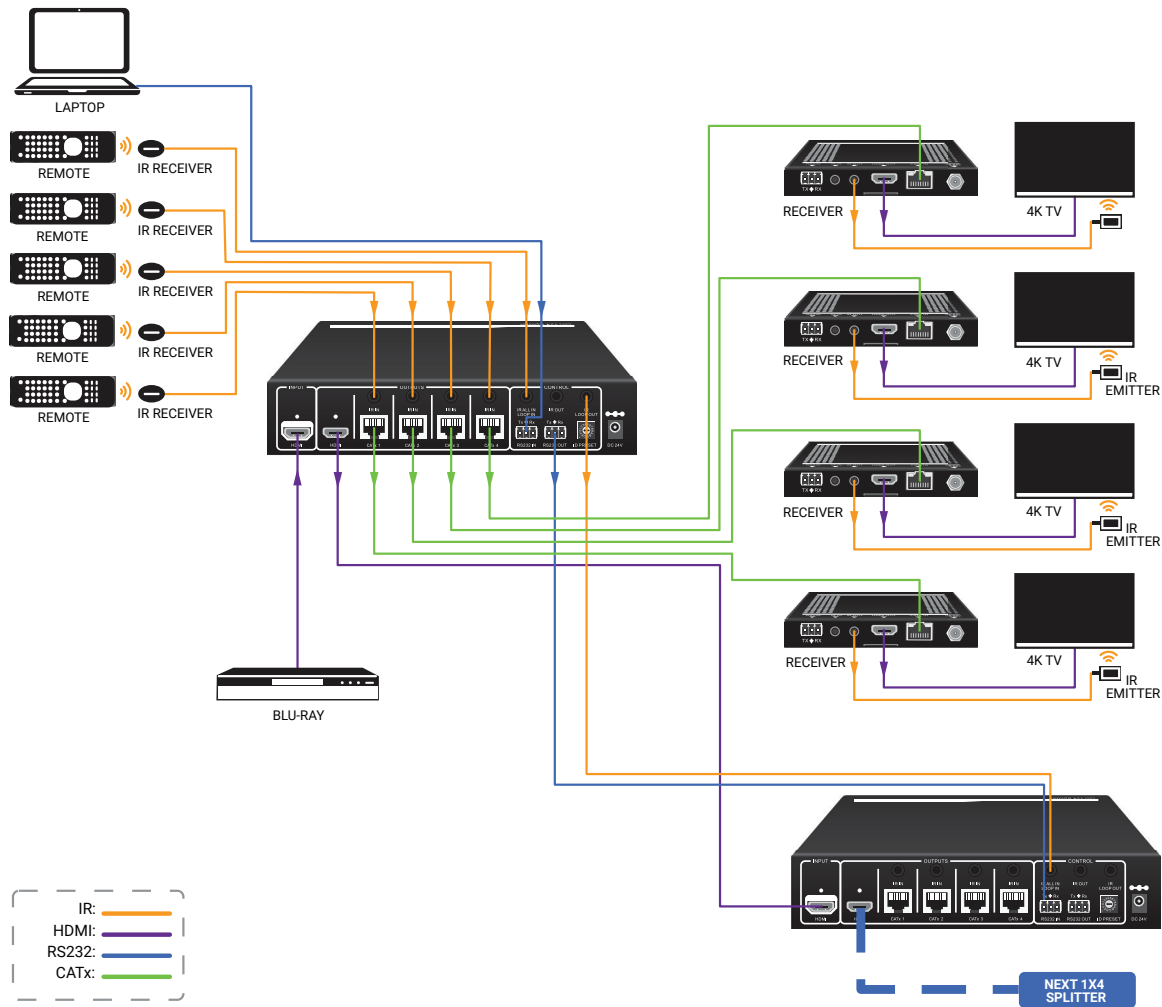


FIGURE 3-2. CASCADE CONNECTION

# CHAPTER 4: IR CONTROL

The IR receivers and emitters can be connected to the system to allow for IR control of remote devices. The bidirectional IR feature provides the two-way control either for the source or display device(s). Use the following sample connection diagrams to connect for IR remote control.

## 4.1 CONTROLLING THE DISPLAY DEVICE BY IR IN

The four IR IN ports of the splitter can receive IR signals from remotes to send to control displays. Connect four IR receivers to IR IN ports of the splitter, and then connect four IR emitters to IR OUT ports on CATx receivers.

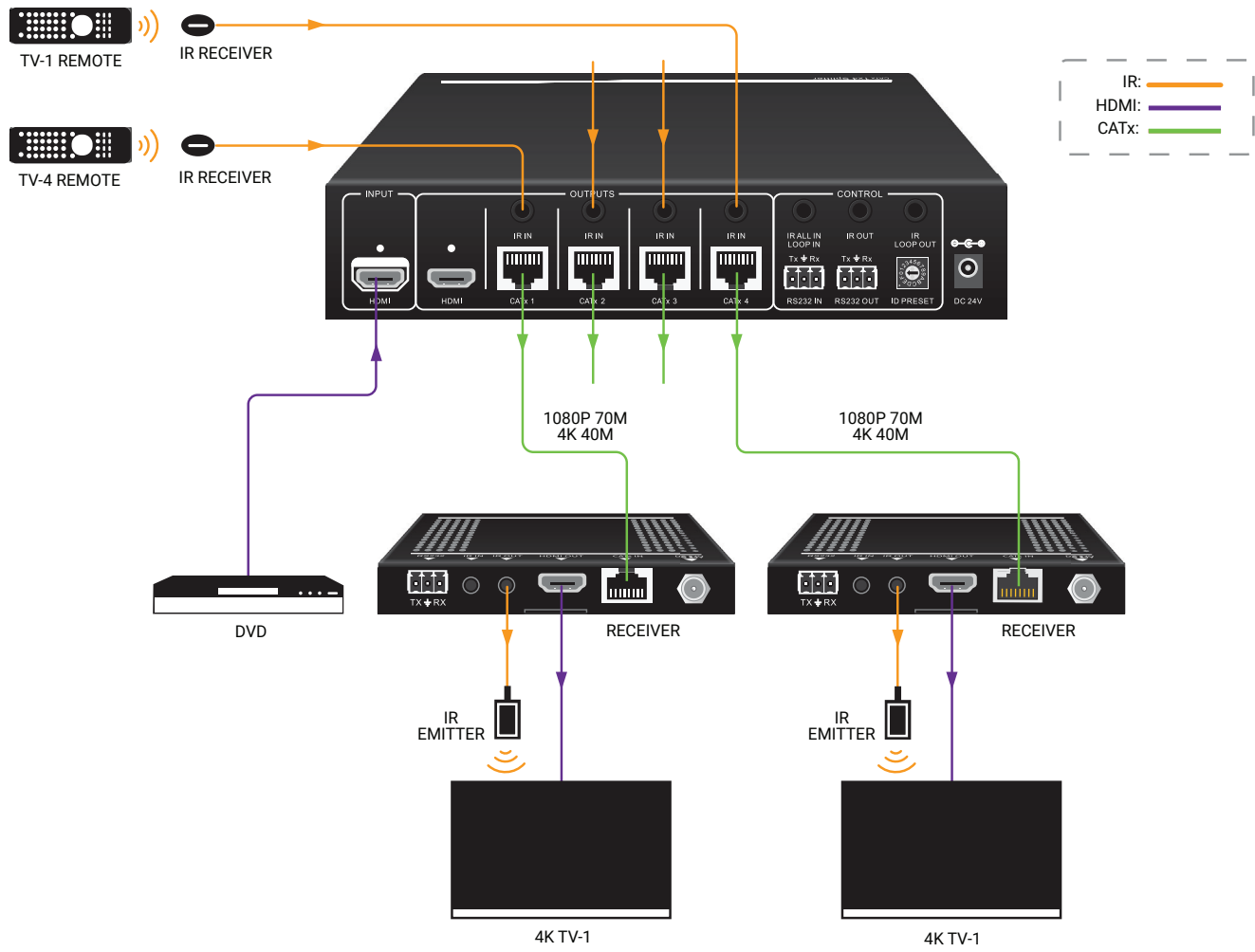


FIGURE 4-1. CONTROL DISPLAY DEVICE BY IR IN

# CHAPTER 4: IR CONTROL

## 4.2 CONTROLLING THE DISPLAY DEVICE BY IR ALL IN

The IR ALL IN port of the splitter can receive all IR signals from remotes to send to control displays. Connect an IR receiver to IR ALL IN port of the splitter, and then connect four IR emitters to IR OUT port on CATx receivers.

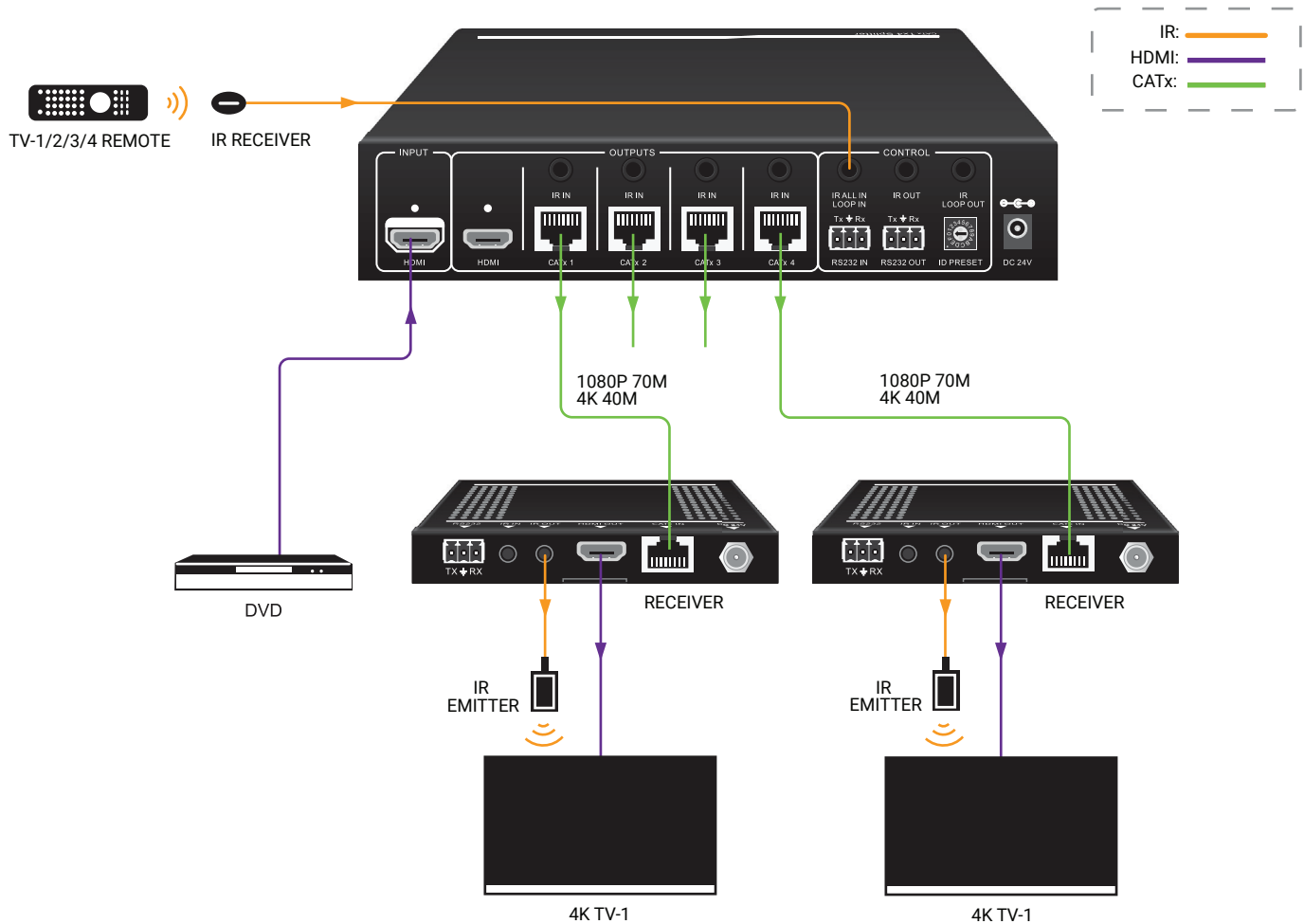


FIGURE 4-2. CONTROL DISPLAY DEVICE BY IR ALL IN

## 4.3 CONTROLLING THE SOURCE DEVICE

The IR OUT port of the splitter can send all IR signals to control source device. Connect four IR receivers to IR IN ports on CATx receivers, and then connect an IR emitter to IR OUT port of the splitter.

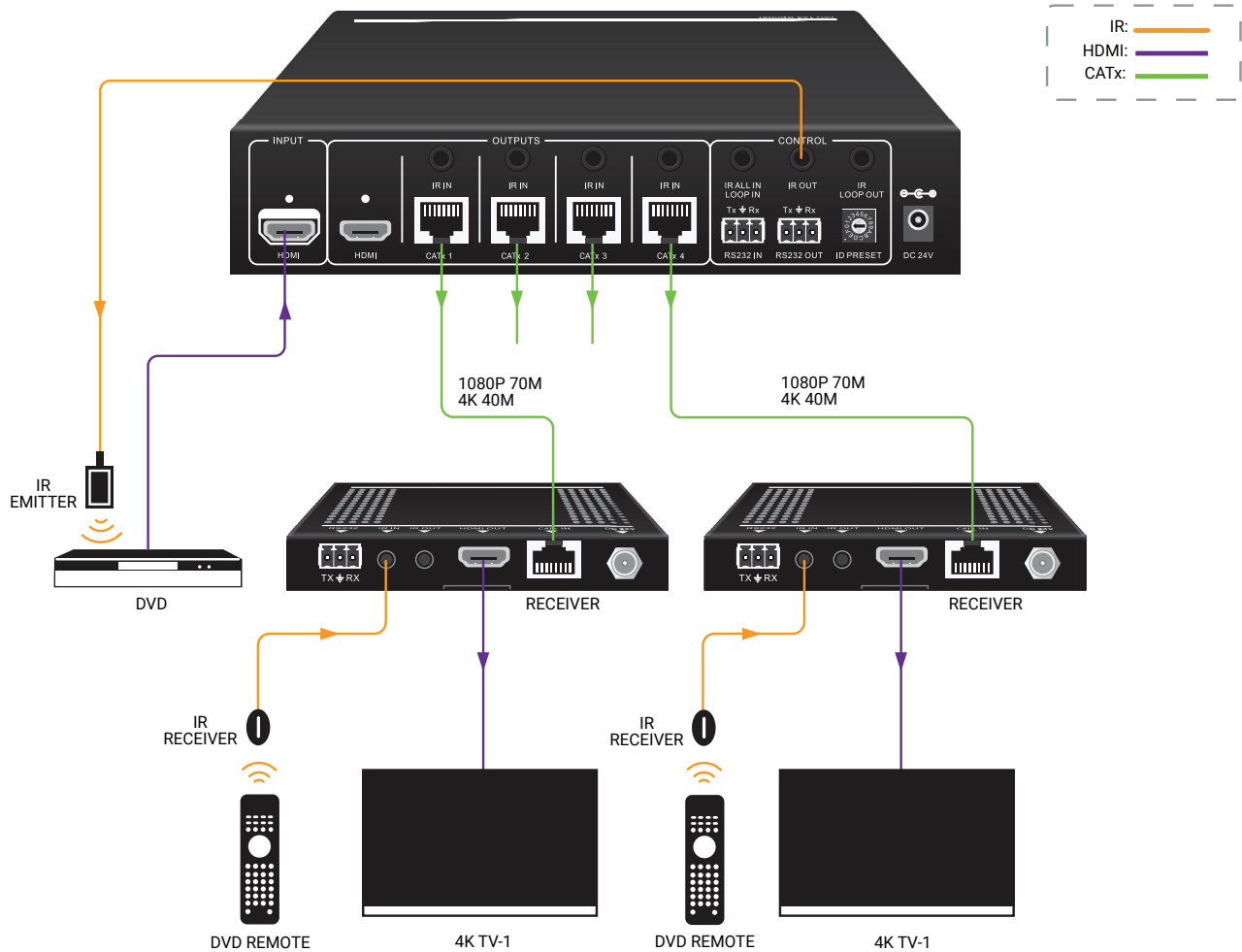


FIGURE 4-3. CONTROL SOURCE DEVICE

## CHAPTER 5: RS-232 CONTROL

The splitter and compatible receivers feature RS-232 ports to transmit RS-232 signals from computer to control far-end third-party devices by using 3-pin to DB9 cable and a RS-232 control software, such as CommWatch. Compatible receivers must be able to communicate at 2400, 4800, 9600, 19200, 38400, 57600, or 115200 baud.

### 5.1 RS-232 CONTROL SOFTWARE

- ♦ Installation: Copy the control software file to the computer connected with the splitter.
- ♦ Uninstallation: Delete all the control software files in corresponding file path.

#### BASIC SETTINGS

First, connect all input devices and output devices needed, then connect it with a computer that has RS-232 control software installed.

Double-click the software icon to run this software. Here take the software CommWatch.exe as example. The icon is shown next.



FIGURE 5-1. COMMWATCH.EXE ICON

The interface of the control software is shown next: 9600 baud rate, 8 data bits, 1 stop bit, no parity bits

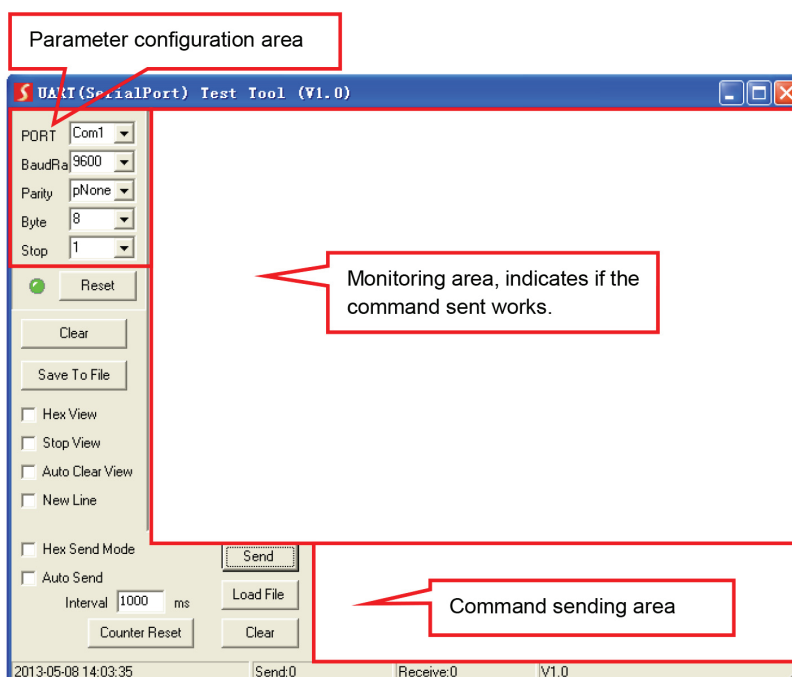


FIGURE 5-2. CONTROL INTERFACE

## CHAPTER 5: RS-232 CONTROL

Set the COM number, bound rate, data bit, stop bit, and parity bit parameters correctly, and the commands are ready to send in the Command Sending Area.

### 5.2 RS-232 COMMAND FORMAT

Each unit in a cascaded system must have a unique ID if using RS-232 control. Using the ID PRESET DIP switch, set the ID. For example, the unit ID of the first splitter is set as 0, and then the second is set as 1 and so on.

The system supports RS-232 pass-through control; if the RS-232 IN port is connected to a PC, and the others are connected to third-party devices, these third-party devices can be controlled by following these steps:

1. Send the command in the format below to select the unit to receive commands.

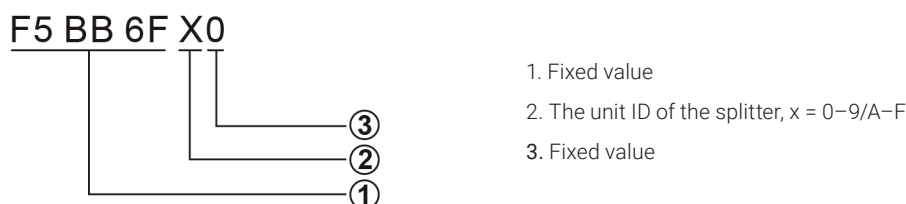


FIGURE 5-1. COMMAND FORMAT

2. Send the specific control command data (HEX) to control the selected third-party devices. For specific commands, refer to the user manuals of the devices you want to control. For example, send A5 A5 A5 5A 01 WW 02 0A 01 00 RR to mute the third-party devices.

### SWITCHING ON/OFF CATX OUTPUTS

The CATx outputs can be controlled by sending commands. Connect the PC to the RS-232 input, and then according to the next steps to switch on/off CATx outputs.

Take the unit ID of 2, for example.

1. First, send F5 BB 6F 20 to select the unit to receive commands.
2. Second, according to the format shown, send the command to switch on/off CATx outputs.

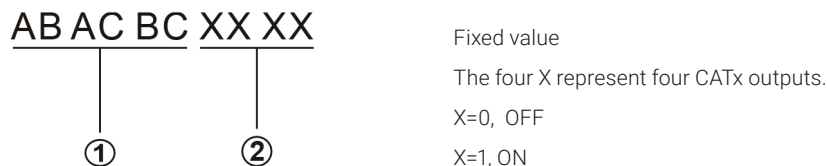


FIGURE 5-2. COMMAND EXAMPLE

If the CATx 1 port needs to be turned on, other ports are closed, send the command AB AC BC 10 00.

## CHAPTER 6: EDID MANAGEMENT

The Extended Display Identification Data (EDID) is used by the source device to match its video resolution with that of the connected display. By default, the source device obtains its EDID from the first connected display. However, since the displays with different capabilities can be connected to the splitter, the EDID DIP switch can be used to set the EDID to a fixed value.

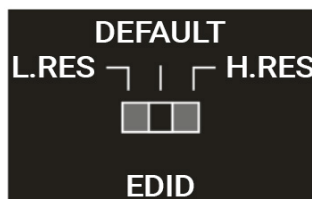


FIGURE 6-1. EDID DIP SWITCH

TABLE 6-1. EDID DIP SWITCH SETTINGS

SWITCH STATUS	DESCRIPTION
L. RES	The splitter reads EDID from all connected displays, and then the source device will automatically obtain the EDID that contains the lowest resolution.
DEFAULT	Reset to the default EDID to distribute 4K @ 30 Hz video.
H. RES	The splitter reads EDID from all connected displays, and then the source device will automatically obtain the EDID that contains the highest resolution.

**NOTE:** When the four displays have the same resolution parameter, the source device will obtain the EDID with priority from CATx 1 to CATx 4.

# CHAPTER 7: DIMENSIONAL DIAGRAM

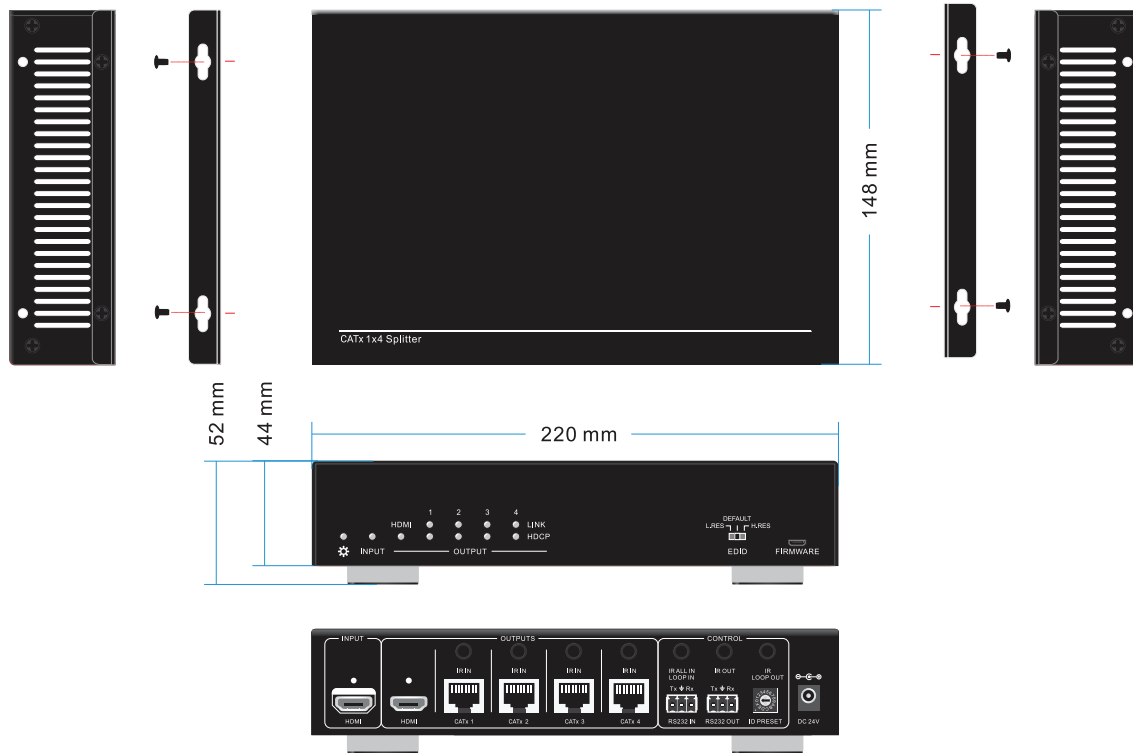


FIGURE 7-1. --DIMENSIONAL DIAGRAM



**TABLE 8-1. PROBLEMS/POSSIBLE CAUSES/SOLUTIONS**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
Loses color or no video signal input on HDMI display	1. Cables may not be connected correctly or may be broken 2. The display is not compatible with the present output resolution	1. Check whether the cables are connect correctly and in working condition 2. Make sure the resolution of the display(s) is compatible with the present resolution
No HDMI signal output in splitter while local HDMI input is in normal working state	The cables may not be connected properly or may be broken	Check whether the cables are connected correctly and in working condition
Splash screen in output devices not displaying correctly	Poor quality of the connecting cables	Swap out the cable for another cable of good quality.
Static becomes stronger when connecting the video connectors	Bad grounding	Check the grounding and make sure it is connected well

**NOTE:** If your problem still remains after following the troubleshooting steps listed in the table, contact Black Box Technical Support at 877-877-2269 or [info@blackbox.com](mailto:info@blackbox.com)

## APPENDIX A: REGULATORY INFORMATION

### A.1 FCC STATEMENT

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- ♦ Reorient or relocate the receiving antenna.
- ♦ Increase the separation between the equipment and receiver.
- ♦ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ♦ Consult an experienced radio/TV technician for help.

**CAUTION:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

### A.2 CE AND ROHS2

This product complies with CE and ROHS2 certifications.



## APPENDIX A: REGULATORY INFORMATION

### A.3 NOM STATEMENT

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.

## APPENDIX B: DISCLAIMER/TRADEMARKS

### B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

### B.2 TRADEMARKS USED IN THIS MANUAL

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







**NOTES**

NEED HELP?  
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