

# USER MANUAL

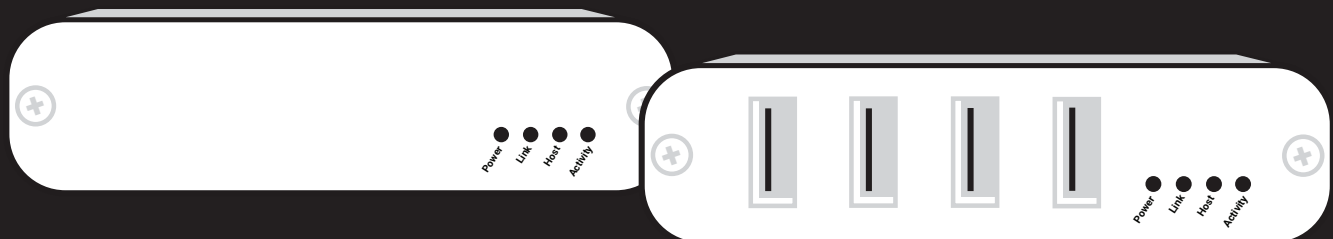
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IC404A-R2, IC406A-R2

# 4-PORT USB 2.0 FIBER EXTENDER

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



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## PRODUCT OPERATION AND STORAGE

Please read and follow all instructions provided with this product, and operate for intended use only.

Do not attempt to open the product casing as this may cause damage and will void warranty. Use only the power supply provided with this product. When not in use, the product should be stored in a dry location between -4 to +158° F (-20 to +70° C).



**CHAPTER 1: SPECIFICATIONS****TABLE 1-1. SPECIFICATIONS**

<b>SPECIFICATION</b>	<b>DESCRIPTION</b>
<b>General</b>	
Distance	IC404A-R2: Up to 1600 feet (500 m) over multimode fiber (OM2+); IC406A-R2: Up to 6.2 miles (10 km) over single-mode fiber
<b>USB Device Support Speeds</b>	
Maximum Throughput	USB 2.0: Up to 480 Mbps; USB 1.1: Up to 12 Mbps
Traffic Types	All USB 2.0 and 1.1 traffic types
Device Types	All USB 2.0 and 1.1 device types
Maximum Number of Devices	Up to 30 devices
<b>Local Extender</b>	
USB Connector	(1) USB 2.0 Type B receptacle
Link Connector	(1) SFP duplex LC
Dimensions	1"H x 3.9"W x 3"D (2.6 x 10 x 7.6 cm)
Enclosure Material	Black anodized aluminum
<b>Remote Extender</b>	
USB Connector	(4) USB 2.0 Type A receptacles
Link Connector	(1) SFP duplex LC
Dimensions	1"H x 3.9"W x 3"D (2.6 x 10 x 7.6 cm)
Enclosure Material	Black anodized aluminum
Available Current	Up to 1 Amp per port; 2.5 Amps total shared
Power Supply	Input: 100-240 VAC Output: 24 VDC, 1 A
<b>Environmental</b>	
Operating Temperature Range	32 to 122° F (0 to 50° C)
Storage Temperature Range	-4 to +158° F (-20 to +70° C)
Operating Humidity	20 to 80% relative humidity, noncondensing
Storage Humidity	10 to 90% relative humidity, noncondensing
<b>Compliance</b>	
FCC	Class B
CE	Class A
Environmental	RoHS2



## CHAPTER 2: OVERVIEW

### 2.1 INTRODUCTION

The instructions in this guide assume a general knowledge of computer installation procedures, familiarity with cabling requirements, and some understanding of USB devices.

The 4-Port USB 2.0 MM Fiber Extender (IC404A-R2) extends high-speed USB 2.0 connections up to 1600 feet (500 m) using multimode fiber optic cable. The 4-Port USB 2.0 SM Fiber Extender (IC406A-R2) extends up to 6.2 miles (10 km) over single-mode fiber optic cable. Both SM and MM models extend USB peripherals including keyboards, mice, interactive whiteboards, flash drives, hard drives, audio devices, web cameras, and any other USB device across a dedicated fiber optic connection.

**CAUTION:** The local and remote extenders may be hot to the touch during operation.

### 2.2 FEATURES

- ◆ Supports USB throughputs of up to 480 Mbps
- ◆ Operates with USB 2.0 and 1.1 devices and hubs
- ◆ Supplies up to 1 Amp per USB port and 2.5 Amps total shared for all four ports used concurrently
- ◆ Integrated hub provides ports for four USB devices, use hubs to add more
- ◆ Supports mass storage acceleration for USB 2.0 device bulk transfer speeds
- ◆ Provides electrical isolation
- ◆ Offers transparent USB extension
- ◆ True plug-and-play; no software drivers needed
- ◆ Works with all major operating systems, including Windows®, Mac OS®, and Linux®.
- ◆ True plug and play; no software drivers required
- ◆ Works with all major operating systems: Windows®, Mac OS™ and Linux®

### 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).

- ◆ Local Extender
- ◆ Remote Extender
- ◆ International AC Power Adapter
- ◆ Country Specific Power Cord
- ◆ USB 2.0 Cable
- ◆ Quick Start Guide

## CHAPTER 2: OVERVIEW

### 2.4 ADDITIONAL ITEMS YOU WILL NEED

To complete the installation, you will also require the following items that are not included with the product:

- USB 1.1 or 2.0 compatible computer (host computer) with a USB compliant operating system
- USB 1.1 or 2.0 compatible device(s)
- Fiber optic cabling

### 2.5 HARDWARE DESCRIPTION

#### 2.5.1 LOCAL EXTENDER MM or SM (IC404A-R2 or IC406A-R2)

The local extender connects to the computer using a standard USB cable (included).

Figures 2-1 and 2-2 show the front and back of the Local Extender. Table 2-1 describes its components.



FIGURE 2-1. LOCAL EXTENDER, FRONT VIEW

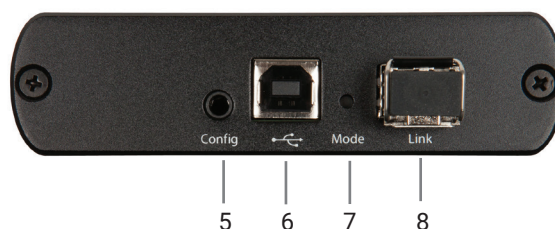


FIGURE 2-2. LOCAL EXTENDER, BACK VIEW

**TABLE 2-1. LOCAL EXTENDER COMPONENTS**

NUMBER IN FIGURE 2-1 OR 2-2	COMPONENT	DESCRIPTION
1	Power LED (Blue)	LED turns on when power is supplied. LED is off when no power is supplied by the host computer.
2	Link LED (Green)	Indicates a valid link is established between the local and remote extender. LED turns on when link between the local and remote extenders is established. LED is off when there is no link between the local and remote extenders. LED is slow blinking when the unit is attempting to establish a link.
3	Host LED (Green)	Indicates that the extender system is properly enumerated on the host computer. LED blinks when the extender system is in a suspended state.
4	Activity LED (Amber)	Indicates data transmission is occurring between the local and remote extenders. LED blinks intermittently with or without a USB device connected. When the local and remote extenders are in suspend mode, the LED is off.
5	Config	Reserved for future use.
6	USB host port	Used to connect the local extender to the host computer. Accepts USB Type B connector.
7	Mode	Reserved for future use.
8	Link Port (duplex LC)	Extension link duplex LC fiber optic transceiver port.

## CHAPTER 2: OVERVIEW

### 2.5.2 REMOTE EXTENDER MM or SM (IC404A-R2 or IC406A-R2)

The remote extender provides a USB Type A port for connecting standard USB devices. The remote extender allows you to connect four USB devices directly. Additional devices may be connected by attaching USB hubs to the remote extender. The remote extender is powered either directly by the included power supply.

Figures 2-3 and 2-4 show the front and back of the Remote Extender. Table 2-2 describes its components.

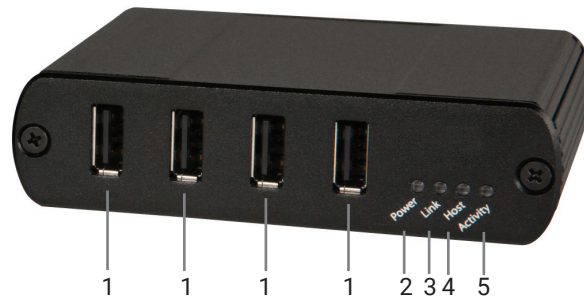


FIGURE 2-3. REMOTE EXTENDER, FRONT VIEW

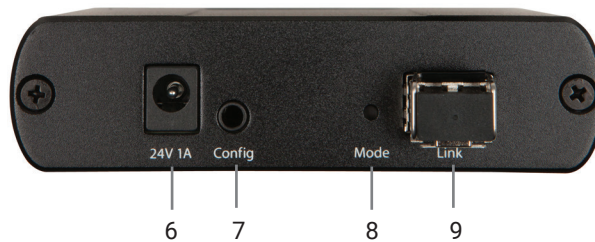


FIGURE 2-4. REMOTE EXTENDER, BACK VIEW



**TABLE 2-2. REMOTE EXTENDER COMPONENTS**

NUMBER IN FIGURE 2-3 OR 2-4	COMPONENT	DESCRIPTION
1	(4) USB Device Ports	Accepts USB device using Type A connector.
2	Power LED (Green)	LED turns on when power is supplied.
3	Link LED (Green)	Indicates a valid link is established between the local and remote extenders. LED turns on when link between local and remote extenders is established. LED is off when there is no link between the local and remote extenders. LED is slow blinking when the unit is attempting to establish a link.
4	Host LED (Green)	Indicates that the extender system is properly enumerated on the host computer. LED blinks when the extender system is in a suspended state.
5	Activity LED (Green)	Indicates data transmission is occurring between the local and remote extenders. LED blinks intermittently with or without a USB device connected. When the local and remote extenders are in suspend mode, the LED is off.
6	Power Port	Connects to the AC power supply. Required for proper operation.
7	Config port	Reserved for manufacturer use.
8	Mode button	Reserved for manufacturer use.
9	Link Port (Duplex LC)	Extension link duplex LC fiber optic transceiver port.

## CHAPTER 3: INSTALLATION

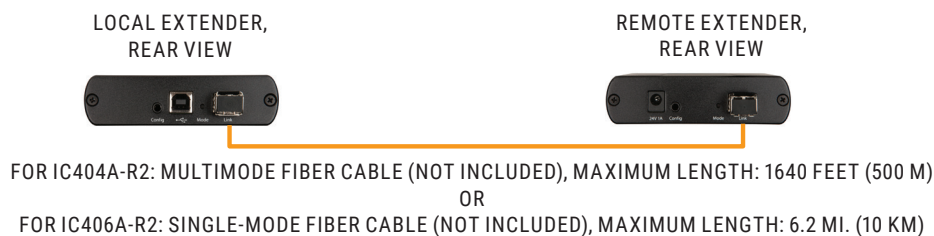


FIGURE 3-1. INSTALLATION DIAGRAM

### 3.1 PREPARING FOR INSTALLATION

Before you can install the Extender, you need to prepare your site:

1. Determine where the computer is to be located and set up the computer.
2. Determine where you want to locate the USB device(s).
3. If you are using surface cabling, the Extender supports a maximum distance of 1640 feet (500 meters) over multimode fiber or 6.2 miles (10 km) over single-mode fiber.

OR

If you are using premise cabling, ensure that compatible fiberoptic cable is installed between the two locations and the total does not exceed the specified distance.

### 3.2 INSTALLING THE LOCAL EXTENDER

1. Place the local extender near the computer.
2. Install the supplied USB cable between the local extender and USB port on the host computer.

### 3.3 INSTALLING THE REMOTE EXTENDER

1. Place the remote extender near the USB device(s) in the desired remote location.
2. Assemble the power adapter and country-specific power cord together and connect them into a suitable AC outlet.
3. Connect the power adapter to the remote extender.

**CAUTION:** Use only the AC adapter supplied with the Extender. Use of substitute adapters may cause permanent damage to the system and will void the warranty.

## CHAPTER 3: INSTALLATION

### 3.4 CONNECTING THE LOCAL EXTENDER TO THE REMOTE EXTENDER

#### WITH SURFACE CABLING:

1. Plug one end of the fiberoptic cabling (not included) into the Link port on the local extender.
2. Plug the other end of the fiberoptic cabling into the Link port on the remote extender.

#### WITH PREMISE CABLING:

1. Plug one end of a fiberoptic patch cord (not included) into the Link port on the local extender.
2. Plug the other end of the patch cord into the fiberoptic information outlet near the host computer.
3. Plug one end of the second fiberoptic patch cord (not included) into the Link port on the remote extender.
4. Plug the other end of the second patch cord into the fiberoptic information outlet near the USB device.

### 3.5 CONNECTING A USB DEVICE

1. Install any software required to operate the USB device(s). Refer to the documentation for the USB device(s), as required.
2. Connect the USB device to the device port on the remote extender.
3. Check that the device is detected and installed properly in the operating system.

### 3.6 CHECKING THE INSTALLATION

1. On the local and remote extenders, check that the Power, Activity, Link, and Host LEDs are on. If the Host or Link LEDs are permanently off, then the cabling between the local and remote extenders may not be installed properly or is defective.
2. For Windows users (XP, 7, 8, 8.1, 10), open Device Manager to confirm that the Extender extender system has been installed correctly. Expand the entry for Universal Serial Bus controllers by clicking the "+" sign. If the extender system has been installed correctly, you should find it listed as a "Generic USB Hub."

#### TO OPEN DEVICE MANAGER IN WINDOWS XP:

Right-click "My Computer" then select: Properties >> Hardware tab >> Device Manager.

#### TO OPEN DEVICE MANAGER IN WINDOWS 7:

Open the Start Menu, right-click on "Computer" then select: Manage >> Device Manager.

#### TO OPEN DEVICE MANAGER IN WINDOWS 8, 8.1, OR 10:

Right-click the Start Menu and then select: Device Manager .

3. For Mac OS users, open the System Profiler to confirm that the Extender Series extender system has installed correctly. In the left-hand column under Hardware, select "USB" and inspect the right-hand panel. If the extender has been installed correctly, you should find it listed as a "Hub" under the USB High-Speed Bus/USB Bus.

#### TO OPEN SYSTEM PROFILER IN MAC OS:

Open the Finder, select Applications, then open the Utilities folder and double-click on the System Profiler icon.

4. If the Extender Series extender system is not detected correctly or fails to detect, consult the Troubleshooting section in this guide.

## CHAPTER 3: INSTALLATION

### 3.7 COMPATIBILITY

The Extender complies with USB 1.1 and USB 2.0 specifications governing the design of USB devices. However, there is no guarantee that all USB devices will be compatible, as there are a number of different factors that may impact the operation of USB devices over extended distances.

### 3.8 USB EXTENDER MOUNTING (OPTIONAL)

The bottom of the enclosure features four convenient pre-drilled holes for optional mounting. Based on your requirements, choose from two available mounting options:

1. USB Extender Mounting Kit (purchased separately, part number IC400MK)
2. USB Extender Direct Surface Mounting (using your own hardware)

#### OPTION 1: USB EXTENDER MOUNTING KIT (PART NUMBER IC400MK, ORDERED SEPARATELY)

Each kit includes:

- ♦ (2) mounting brackets
- ♦ (4) M3.0 locking washers
- ♦ (4) M3.0 x 5-mm Phillips pan head screws
- ♦ Mounting bracket installation guide (see diagram below)

**NOTE:** One kit is required to mount per Local Extender or Remote Extender.

Using a Phillips screwdriver, in the order as illustrated below, fasten and secure the provided screws, locking washers and brackets into place.

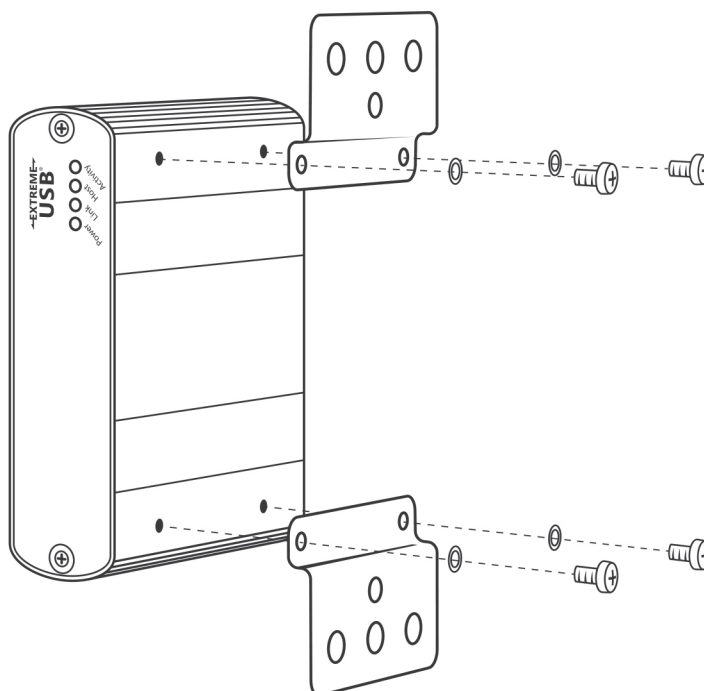


FIGURE 3-2. INSTALLING THE MOUNTING BRACKETS

## CHAPTER 3: INSTALLATION

Once the bracket mounting is secured onto the extender, it is ready for mounting onto a surface. Please note you will need to provide your own screws to secure the extender using the available slots on each bracket.

### OPTION 2: USB EXTENDER DIRECT SURFACE MOUNTING (USING YOUR OWN HARDWARE)

The bottom of the enclosure features four pre-drilled holes for optional surface mounting.

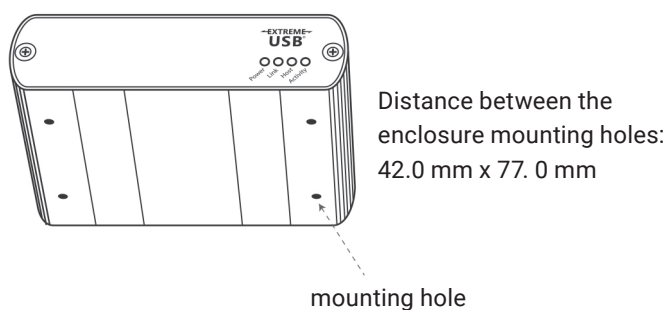


FIGURE 3-3. DIRECT SURFACE MOUNTING

1. Mark the center point of each of the four holes on your mounting surface either by directly measuring or using a printout of the stencil below.
2. Hardware recommendation: M3.0 locking washers and M3.0 screws (4 of each per extender) noting screw length will depend upon thickness of mounting surface.
3. Drill through each of the four hole markings on the mounting surface using a 4.7625-mm (3/16") drill bit.
4. Align the bottom enclosure holes to the newly drilled out holes on the mounting surface.
5. Place a locking washer on each of the four screws and using a screwdriver, fasten the extender into place.

To ensure the stencil below prints to scale be sure to set the page scaling setting to "none".

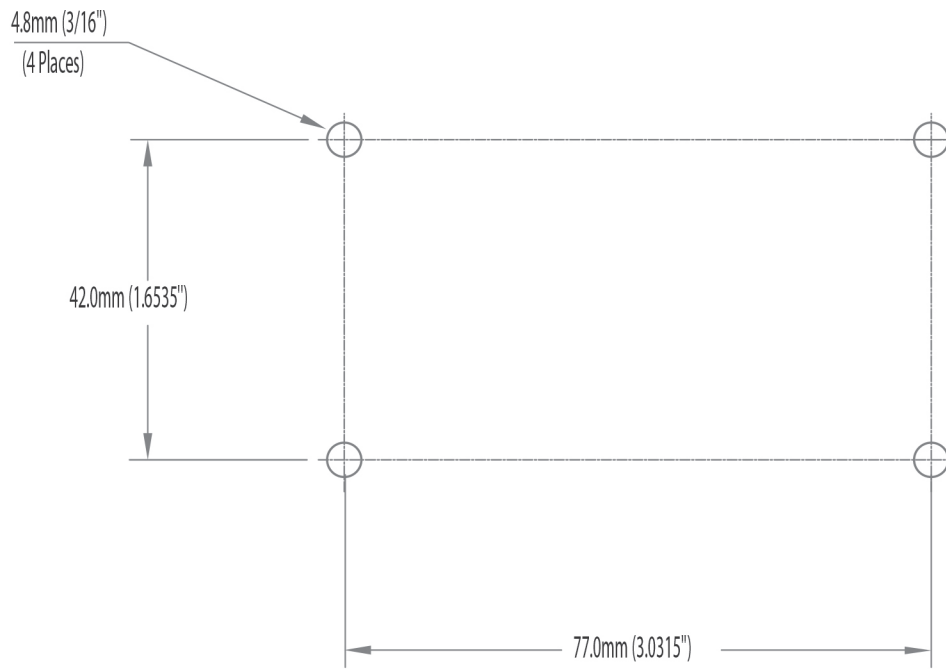


FIGURE 3-4. DIRECT SURFACE MOUNTING MEASUREMENT STENCIL

## CHAPTER 4: TROUBLESHOOTING

### 4.1 TROUBLESHOOTING TIPS

The following table provides troubleshooting tips. The topics are arranged in the order in which they should be executed in most situations. If you are unable to resolve the problem after following these instructions, contact Black Box Technical Support at 877-877-2269 or [info@blackbox.com](mailto:info@blackbox.com) for further assistance.

**TABLE 4-1. TROUBLESHOOTING TIPS**

PROBLEM	CAUSE	SOLUTION
All LEDs on the local extender are off.	<ul style="list-style-type: none"> <li>The local extender is not receiving enough power from the USB port.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure that the USB connection between the local extender and host computer is properly installed.</li> <li>Move the USB connector to another USB port on the host computer.</li> <li>Contact Black Box Technical Support at 877-877-2269 or <a href="mailto:info@blackbox.com">info@blackbox.com</a> for assistance.</li> </ol>
All LEDs on the remote extender are off.	<ul style="list-style-type: none"> <li>The remote extender is not receiving enough power from the AC adapter.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure that the AC power adapter is properly connected to the remote extender.</li> <li>Check that the AC adapter is connected to a live source of electrical power. Check that the remote extender power LED is lit.</li> </ol>
The Link LEDs on the local and remote extenders are off.	There is no connection between the local extender and the remote extender.	<ol style="list-style-type: none"> <li>For the IC406A-R2 only, ensure that a fiberoptic cable with crossover is connected between the local and remote extenders.</li> <li>Connect a short fiberoptic crossover patch cord between the local and remote extenders. Recheck operation of the system.</li> </ol>
The Link LEDs on the local and remote extenders are on, Host LED on local and remote extenders are off.	<ul style="list-style-type: none"> <li>The host computer is not powered on.</li> <li>The computer does not support USB hubs.</li> <li>The extender is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>Disconnect all USB devices from the remote extender.</li> <li>Disconnect the local extender from the computer.</li> <li>Disconnect the remote extender from the AC adapter.</li> <li>Reconnect the local extender to the computer.</li> <li>Reconnect the remote extender to the AC power adapter.</li> <li>In the Universal Serial Bus controllers section of Device Manager, check that the extender is recognized as "Generic USB Hub."</li> </ol>
Both extenders were working, but then the Host LED on the remote extender is suddenly blinking.	The remote extender is in suspend mode. The operating system may put the extender in suspend mode when the computer is put into Suspend/Standby state or when no USB device(s) are attached.	<ol style="list-style-type: none"> <li>Recover/Resume the operating system from Suspend/Standby mode (see your operating system's documentation).</li> <li>Attach a USB device to the extender.</li> </ol>

**CHAPTER 4: TROUBLESHOOTING****TABLE 4-1 (CONTINUED). TROUBLESHOOTING TIPS**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
All LEDs on both the local and remote extenders are on, but the USB device does not operate correctly, or is detected as an "Unknown Device" in the operating system.	<ul style="list-style-type: none"> <li>◆ The USB device is malfunctioning.</li> <li>◆ The computer does not recognize the USB device.</li> <li>◆ The application software for the device is not operating.</li> <li>◆ The extender is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Disconnect the extender from the computer.</li> <li>2. Connect the USB device directly to the USB port on the computer.</li> <li>3. If the device does not operate properly, consult the user documentation for the device.</li> <li>4. Update your system BIOS, chipset or USB Host controller drivers from your system/motherboard manufacturer's website.</li> <li>5. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the extender. Connect the extender to the computer.</li> <li>6. If the second device does not operate, the extender system may be malfunctioning. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com for assistance.</li> <li>7. If the second device does operate properly, the first device may not be compatible with the extender.</li> </ol>
A USB device is attached to the remote extender's USB port, but the remote extender device LED is off.	<ul style="list-style-type: none"> <li>◆ A USB device must have the appropriate driver installed on the computer operating system.</li> </ul>	<ol style="list-style-type: none"> <li>1. Install the required USB device driver on the computer operating system before attaching the USB device to the remote extender. See your USB device manufacturer's website for details.</li> <li>2. Consult your USB device documentation and power your USB device with the additional, USB device manufacturer supplied, power supply (if available).</li> </ol>
The Device LED is orange and units are no longer functioning.	<ul style="list-style-type: none"> <li>◆ An overcurrent condition has occurred because the USB device draws more power than can be supplied per the USB specification (500mA).</li> </ul>	Power cycle the remote extender.
The LED Host and LINK LEDs on the local and remote extenders blink intermittently.	<ul style="list-style-type: none"> <li>◆ There is a firmware mismatch between the local and remote extenders..</li> </ul>	<ol style="list-style-type: none"> <li>1. Use a different local and remote extender pair that have the same firmware revision.</li> <li>2. Upgrade the local and remote extender firmware. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com for assistance.</li> </ol>





## CHAPTER 4: TROUBLESHOOTING

### 4.2 CONTACTING TECHNICAL SUPPORT

If you are experiencing problems not referenced in the Troubleshooting Guide, contact Black Box Technical Support at 877-877-2269 or [info@blackbox.com](mailto:info@blackbox.com) for assistance and provide them with the following information:

- ◆ Host computer make and mode
- ◆ Type of operating system installed (e.g. Windows 10, macOS 10.12, etc.)
- ◆ Part number and serial number of both the Local Extender and Remote Extender unit
- ◆ Make and model of any USB device(s) attached to the product
- ◆ Description of the installation
- ◆ Description of the problem

## APPENDIX A: REGULATORY INFORMATION

### A.1 FCC RADIO FREQUENCY INTERFERENCE STATEMENT WARNING

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

### A.2 CE STATEMENT

We, Black Box Corporation, declare under our sole responsibility that the IC404A-R2 and IC406A-R2, to which this declaration relates, is in conformity with European Standard EN 55022, EN 61000, and EN 55024.

### A.3 IC STATEMENT

This Class A digital apparatus complies with Canadian ICES-003.

### A.4 WEEE STATEMENT

The European Union has established regulations for the collection and recycling of all waste electrical and electronic equipment (WEEE). Implementation of WEEE regulations may vary slightly by individual EU member states. Check with your local and state government guidelines for safe disposal and recycling or contact your national WEEE recycling agency for more information.



## APPENDIX A: REGULATORY INFORMATION

### A.5 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.

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