

# USB 2.0 RG2224

4-port USB 2.0 Multimode Fiber Optic Extender  
**User Guide**



Thank you for purchasing the USB 2.0 RG2224.

Please read this guide thoroughly.

This document applies to Part Numbers: 01-00298, 01-00299, 01-00300 and 01-00301.

### **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.

### **CE Statement**

We declare under our sole responsibility that the USB 2.0 RG2224, to which this declaration relates, is in conformity with European Standard EN 55022 Class B, EN 61000 and EN 55024.

### **IC Statement**

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

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# Contents

<b>Introduction .....</b>	<b>3</b>
USB 2.0 RG2224 Product Contents .....	3
Requirements .....	3
About the USB 2.0 RG2224 .....	3
Local Extender Description .....	4
Remote Extender Description .....	5
<b>Installation guide .....</b>	<b>6</b>
Installing the Local Extender .....	6
Installing the Remote Extender .....	6
Connecting the Local Extender to the Remote Extender .....	7
Checking the Installation .....	7
Connecting a USB Device .....	8
<b>Troubleshooting .....</b>	<b>8</b>
<b>Specifications .....</b>	<b>11</b>
<b>Contacting Technical Support .....</b>	<b>12</b>
<b>Technical Glossary .....</b>	<b>13</b>

## Introduction

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


 **NOTE:** Notes provide additional information that could be useful.

 **CAUTION:** Cautions provide important information about an operational requirement.

## USB 2.0 RG2224 Product Contents

Your RG2224 is packaged with:


- Local Extender
- Remote Extender
- AC power adapter
- USB 2.0 Cable

 An additional AC power adapter may be purchased for the local extender in the event that your USB port can not supply the required 500mA current.

## Requirements

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)
- 2-strand fiber optic cable with Duplex LC connectors (if using surface cabling), **or** 2-strand fiber optic cabling with two information outlets and two 2-strand fiber optic patch cords with Duplex LC connectors (if using premise cabling)

 The maximum length of the multimode fiber optic cable (MMF) supported by the RG2224 system, including patch cords is 500m over OM2 (or greater), or 275m over OM1.

## About the USB 2.0 RG2224

The USB 2.0 RG2224 enables users to extend beyond the standard 5m cable limit for USB peripheral devices. With the RG2224, USB devices can be located up to 500 meters from the computer. The RG2224 is composed of two individual units: the local extender and the remote extender.

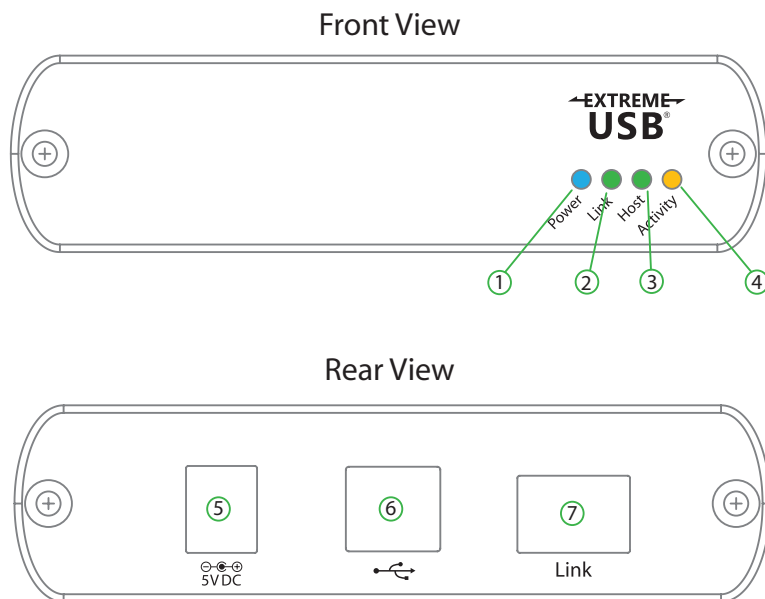
The RG2224 includes the ExtremeUSB® suite of features:



- Transparent USB extension
- True plug and play; no software drivers required
- Works with all major operating systems: Windows®, Mac OS X®, and Linux®

## Local Extender Description

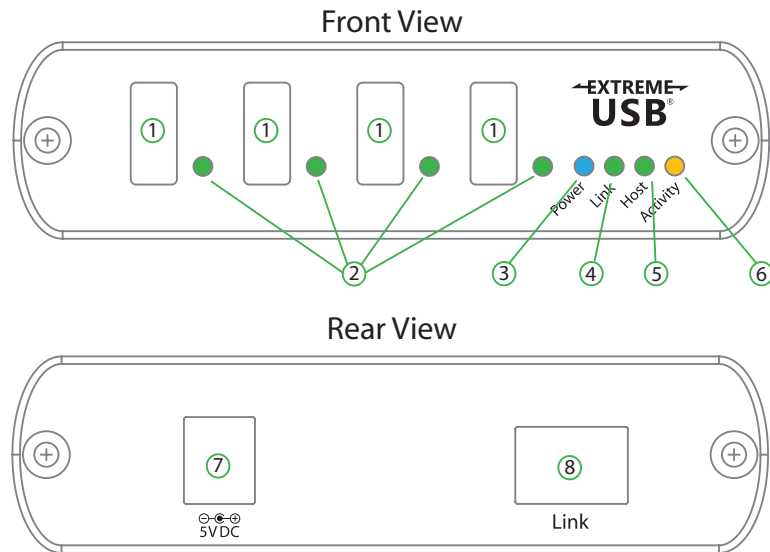
The local extender connects to the computer using a standard USB cable. Power for this unit is provided by the USB on the host computer.



ITEM	TYPE	DESCRIPTION
1	Power LED (Blue)	LED turns on when power is supplied. The LED light is off when no power is supplied.
2	Link LED (Green)	Indicates a valid ExtremeUSB® link is established between the local and remote extenders.
3	Host LED (Green)	Indicates that the RG2224 system is properly enumerated on the host computer. LED blinks when in suspend state.
4	Activity LED (Amber)	Indicates activity when data transmission is active 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	Power Port (optional)	Not required in normal operation. An optional 5V power supply can be connected to the local extender to provide power if the USB port on the host computer is not capable of delivering 500mA to the unit.
6	USB Type B connector	Used to connect the local extender to the host computer.
7	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

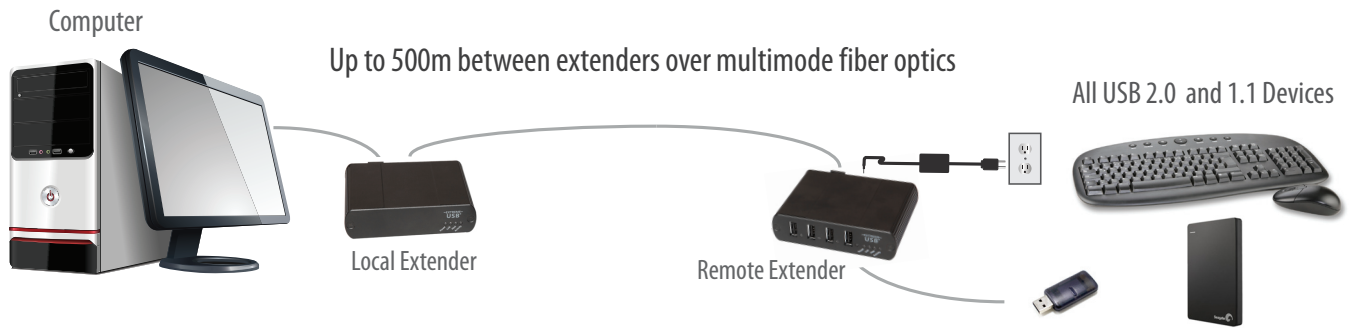
## Remote Extender Description

The remote extender provides USB Type A ports for standard USB devices. The remote extender allows you to connect up to four USB devices directly. Additional devices may be connected by attaching USB hubs to the remote extender. The remote extender is powered by an external AC adapter and can supply up to 500mA to each USB port.



ITEM	TYPE	DESCRIPTION
1	Device Port (USB Type A)	Accepts USB device(s).
2	Device LED (Green/Orange)	Indicates when a USB device is connected to the Device Port. Solid green when device is plugged in and active. Off when device is in suspend mode or remote extender is powered off. Orange when the remote extender detects an overcurrent condition, and the attached USB device attempts to draw more than the 500mA current.
3	Power LED (Blue)	LED turns on when power is supplied. Off when no power is supplied.
4	Link LED (Green)	Indicates a valid ExtremeUSB® link is established between the local and remote extenders.
5	Host LED (Green)	Indicates that the RG2224 system is properly enumerated on the host computer. LED blinks when in suspend mode.
6	Activity LED (Amber)	Indicates activity when data transmission is active 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.
7	Power Port	Connects to the AC power supply. Required on REX for proper operation.
8	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

## Installation Guide



### Fiber Optic Link Cabling

The local and remote extenders are interconnected by up to 500 meters of fiber optic cabling. Two strands of 50/125 $\mu$ m (500m) MMF or 62.5/125 $\mu$ m (275m) MMF cabling are required. The cabling subsystem must provide a duplex connection with crossover, and must be terminated with Duplex LC connectors at both ends.

### Installing the RG2224 System

Before you can install the RG2224, 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 RG2224 supports a maximum distance of 500m.

OR

If you are using premise cabling, ensure compatible fiber optic cabling is installed between the two locations, with fiber optic information outlets located near both the computer and the USB device(s), and the total length including patch cords is no more than 500m over MMF.

### 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.

### Installing the Remote Extender

1. Place the remote extender near the USB device(s).
2. Plug the power adapter into a suitable AC outlet.
3. Connect the power adapter to the remote extender.

## Connecting the Local Extender to the Remote Extender



To ensure proper operation, the maximum length of the fiber optic cable, including patch cords, must not exceed 500 meters. The cabling must provide a duplex connection with crossover and must be terminated with Duplex LC connectors at both ends.

### With Surface Cabling

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

### With Premise Cabling

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

## Checking the Installation

1. On the local and remote extenders, check that the Power, Host, and Link LEDs are on and that the Activity LED is blinking. If the Link LED is permanently off, then the cabling between the local and remote extenders is not installed properly or is defective.
2. For Windows users (2000, XP, Vista, Windows 7, Windows 8), open Device Manager to confirm that the RG2224 has installed correctly. Expand the entry for Universal Serial Bus controllers by clicking the "+" sign. If the RG2224 has been installed correctly, you should find it listed as a "Generic USB Hub".
3. For Mac OS X users, open the System Profiler to confirm that the RG2224 has installed correctly. In the left hand column under Hardware, select "USB" and inspect the right hand panel. If the RG2224 has been installed correctly, you should find it listed as a "Hub" under the USB High-Speed Bus/USB Bus.
4. If the RG2224 is not detected correctly or fails to detect, please consult the Troubleshooting section in this User Guide (page 8).



Check if the USB device is detected by your operating system.

To open System Profiler in Mac OS X:

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

To open Device Manager in Windows 2000 or XP:

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

To open Device Manager in Windows Vista or Windows 7:

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

To open Device Manager in Windows 8:

Right click on the lower left bottom corner of your screen, then select: Device Manager



## 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.

## Compatibility

The RG2224 complies with USB1.1 and USB 2.0 specifications governing the design of USB devices. However, it is not possible to guarantee that all USB devices are compatible with the RG2224, as there are a number of different configurations that may impact the operation of USB devices over extended distances.

## Troubleshooting

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, please contact technical support for further assistance.

PROBLEM	CAUSE	SOLUTION
All LEDs on the local extender are off.	<ul style="list-style-type: none"><li>• The local extender is not receiving power from the USB port or the (optional) local extender AC adapter.</li></ul>	<ol style="list-style-type: none"><li>1. Ensure that the USB connection between the local extender and the host computer is properly installed.</li><li>2. Move the USB connector to another USB port on the host computer.</li></ol>
All LEDs on remote extender are off.	<ul style="list-style-type: none"><li>• The remote extender is not receiving power from the AC adapter.</li></ul>	<ol style="list-style-type: none"><li>1. Ensure that the AC power adapter is properly connected to the remote extender.</li><li>2. Check that the AC adapter is connected to a live source of electrical power. Check that the remote extender power LED is illuminated.</li></ol>
Link LEDs on local and remote extenders are off.	<ul style="list-style-type: none"><li>• There is no connection between the local and remote extenders.</li></ul>	<ol style="list-style-type: none"><li>1. Ensure that a multimode fiber optic cable with crossover is connected between the local and remote extenders.</li><li>2. Connect a fiber optic crossover patch cord between the local and remote extenders. Recheck operation of the system.</li></ol>

PROBLEM	CAUSE	SOLUTION
<p>Link LED on local and remote extenders are on, Host LED on local and remote extenders are off.</p>	<ul style="list-style-type: none"> <li>• The host computer is not powered on.</li> <li>• The local extender is not connected to the computer (when used with the optional local extender AC adapter).</li> <li>• The computer does not support USB hubs.</li> <li>• The RG2224 is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Disconnect all USB devices from the remote extender.</li> <li>2. Disconnect the local extender from the computer.</li> <li>3. Disconnect the remote extender from the AC power adapter.</li> <li>4. Reconnect the local extender to the computer.</li> <li>5. Reconnect the remote extender to the AC power adapter.</li> <li>6. In the Universal Serial Bus controllers section of Device Manager, check that the RG2224 is recognized as a "Generic USB Hub".</li> </ol>
<p>The system was working, but the Host LED on local/remote extenders are suddenly blinking.</p>	<ul style="list-style-type: none"> <li>• The remote extender is in suspend mode. The operating system may put the RG2224 in suspend mode when the computer is put into a Suspend/Standby state or when no USB devices are attached.</li> </ul>	<ol style="list-style-type: none"> <li>1. Recover/Resume the operating system from Suspend/Standby mode (see your operating system's documentation).</li> <li>2. Attach a USB device to the RG2224.</li> </ol>
<p>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.</p>	<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 RG2224 is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Disconnect the RG2224 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/Mother board 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 RG2224. Then connect the RG2224 to the computer.</li> <li>6. If the second device does not operate, the extender system may be malfunctioning. Contact technical support for assistance.</li> <li>7. If the second device does operate properly, the first device may not be compatible with the RG2224.</li> </ol>

<p>USB device is attached to remote extender USB port but the remote extender device LED is off.</p>	<ul style="list-style-type: none"> <li>The 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 prior to attaching the USB device to the remote extender. Please 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>
<p>Device LED is orange and local/remote extenders are no longer functioning.</p>	<ul style="list-style-type: none"> <li>Overcurrent condition has occurred because USB device draws more power than can be supplied per USB specification (500mA).</li> </ul>	<ol style="list-style-type: none"> <li>1. Power cycle the remote extender.</li> </ol>
<p>LED Host and LINK LEDs on local and remote extenders blink intermittently.</p>	<ul style="list-style-type: none"> <li>Firmware mismatch between the local and remote extender.</li> </ul>	<ol style="list-style-type: none"> <li>1. Use a different local/remote extender pair which have the same firmware revision.</li> <li>2. Upgrade the local and remote extender firmware, contact technical support for assistance.</li> </ol>

## NOTES

## Specifications

Range	Up to 500m (1640 feet) over OM2 or greater Up to 275m (902 ft) over OM1
Speeds	USB 2.0: Up to 480 Mbps; USB 1.1: Up to 12 Mbps
USB Hub Support	Any single chain can include up to 3 USB hubs plus one RG2224
USB Host Support	xHCI (USB 3.0) at USB 2.0 speed, EHCI (USB 2.0) and OHCI/UHCI (USB 1.1)
Maximum USB devices supported	15 USB devices or 4 USB hubs with 11 USB devices.
AC Adapter	Input: 100/240 V AC, 50 – 60 Hz, 600mA maximum; Output: 5 V DC, 3 A
AC Adapter Connector	1.7 mm centre-positive jack
System Shipping Weight	2.0 lbs. (0.9 kg)
<b>LOCAL EXTENDER</b>	
USB Connector	1 x USB Type B Receptacle
Link Connector	1 x SFP Duplex LC
Dimensions	100 mm x 76 mm x 26 mm (3.94" x 2.99" x 1.02")
Enclosure Material	Black Anodized Aluminum
<b>REMOTE EXTENDER</b>	
USB Connector	4 x USB Type A Receptacles
Link Connector	1 x SFP Duplex LC
Dimensions	100 mm x 76 mm x 26 mm (3.94" x 2.99" x 1.02")
Enclosure Material	Black Anodized Aluminum
Available Current	500 mA to each USB port
<b>ENVIRONMENTAL</b>	
Operating temperature range	0°C to 50°C (32°F to 122°F)
Storage temperature range	-20°C to 70°C (-4°F to 158°F)
Operating Humidity	20% to 80% relative humidity, non-condensing
Storage Humidity	10% to 90% relative humidity, non-condensing
<b>COMPLIANCE</b>	
EMC	FCC (Class B), IC (Class B), CE (Class B)
Environmental	RoHS2 (CE)
<b>SUPPORT</b>	
Warranty	2-year

## Contacting Technical Support

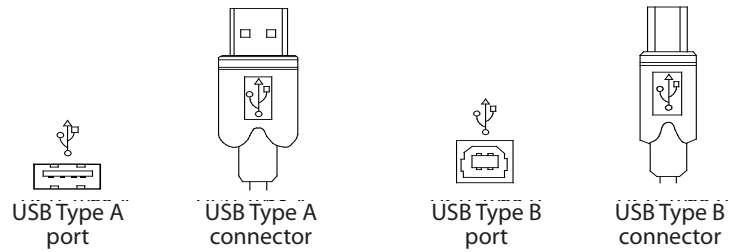
If you are experiencing problems not referenced in the Troubleshooting section of this Guide, then please contact Technical Support at the company where you purchased this product and provide them with the following information:

- Host computer make and model
- Type of Operating System installed (e.g. Windows 8, Mac OS X, etc.)
- Part number and serial number of both the local and remote extenders
- Make and model of the USB device attached to the RG2224
- Description of the installation
- Description of the problem

## Technical Glossary

### USB Cables

USB cables have two distinct connectors. The Type A connector is used to connect the cable from a USB device to the Type A port on a computer or hub. The Type B connector is used to attach the USB cable to a USB device.



### Duplex LC Crossover

When a crossover fiber-optic cable is called for, the cable has the transmit signal on one end connected to the receive signal at the other end.

