USB 2.0 RG2324/2344

4-Port USB 2.0 Fiber Optic Extender System
User Guide

EXTREME USB®

Thank you for purchasing the USB 2.0 RG2324 or RG2344.

Please read this guide thoroughly.

This document applies to the following part numbers:

Model	North American System	European System	United Kingdom System	Australia System	Japan System
USB 2.0 RG2324	01-00614	01-00615	01-00616	01-00617	01-00618
USB 2.0 RG2344	01-00619	01-00620	01-00621	01-00622	01-00623

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, Icron Technologies Corporation, declare under our sole responsibility that the USB 2.0 RG2324/2344, to which this declaration relates, is in conformity with European Standards EN 55022, EN 61000 and EN 55024.

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

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. Please check with your local and state government guidelines for safe disposal and recycling or contact your national WEEE recycling agency for more information.

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 (if applicable). When not in use, product should be stored in a dry location between -20°C and 70°C.

Contents

Introduction

This guide provides product information for the USB 2.0 RG2324 and 2344 models, installation instructions and troubleshooting guidelines. The instructions in this guide assume a general knowledge of computer installation procedures, familiarity with cabling requirements and some understanding of USB devices.

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

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

Product Contents

Your RG2324/2344 extender system contains:
- Local Extender
- Remote Extender
- USB 2.0 Cable
- Remote Extender AC International Power Adapter
- Country Specific Power Cable
- Quick Start Guide

Features

The RG2324/2344 incorporates ExtremeUSB® technology, enabling users to extend USB beyond the standard 5m cable limit for USB 2.0 peripheral devices. This extender system is composed of two individual units, the Local Extender and the Remote Extender, and has the following key features:
- Up to 500m of extension when directly connected over multimode fiber (RG2324), and up to 10km over singlemode fiber (RG2344)
- Support for new USB 3.0 host controllers and devices (up to 480 Mbps)
- Support for all device USB types

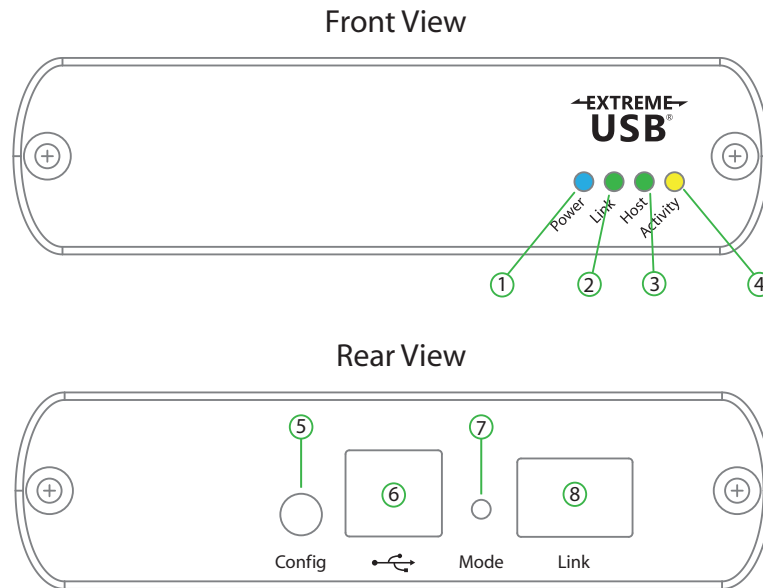The RG2324/44 includes the ExtremeUSB® suite of features:

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

note USB 3.0 devices will perform at USB 2.0 speeds if extended through the RG2324/44 extender.

note The RG2324 only works with multimode fiber, and the RG2344 with singlemode fiber.
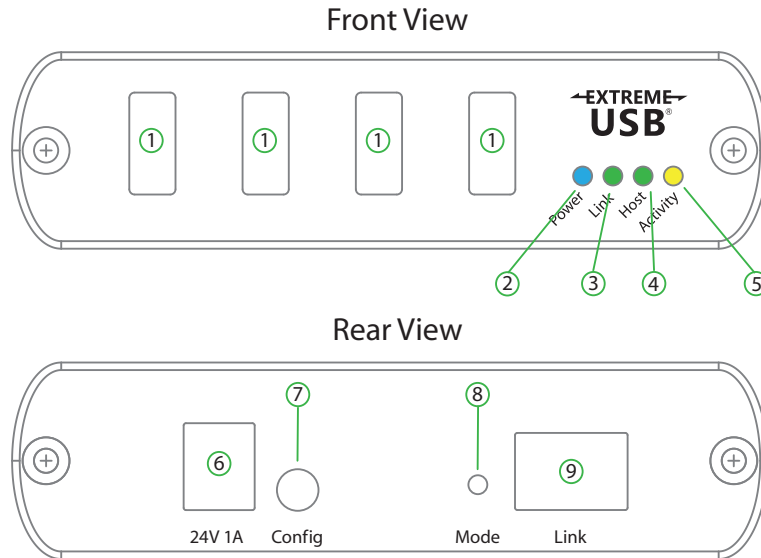
The Local Extender

The local extender connects to the computer using a standard USB 2.0 cable. Power for this unit is provided by the host computer.

Front View

Rear View

ITEM	TYPE	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 ExtremeUSB link is established between the local and remote extender. LED turns on when link between local and remote extender is established. LED is off when there is no link between 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 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 manufacturer use.
6	USB Host Port	Used to connect the local extender to the host computer. Accepts USB Type B connector.
7	Mode	Reserved for manufacturer use.
8	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

The Remote Extender

The remote extender unit provides USB Type A ports for standard USB devices and allows you to connect up to four USB devices directly. Additional devices may be connected by attaching up to four USB hubs to the remote extender unit. The remote extender is powered by an external AC adapter, supplying up to 1 Amp per USB port when two or less are in use or 2.5 Amps shared across all four ports.

Front View

Rear View

ITEM	TYPE	DESCRIPTION
1	Device Ports (USB Type A)	Accepts USB devices.
2	Power LED (Blue)	LED turns on when power is supplied.
3	Link LED (Green)	Indicates a valid ExtremeUSB link is established between the local and remote extender. LED turns on when link between local and remote extender is established. LED is off when there is no link between 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 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	DC Power Port	Connects to the AC power supply. Required for proper operation.
7	Config	Reserved for manufacturer use.
8	Mode	Reserved for manufacturer use.
9	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

Installation Guide
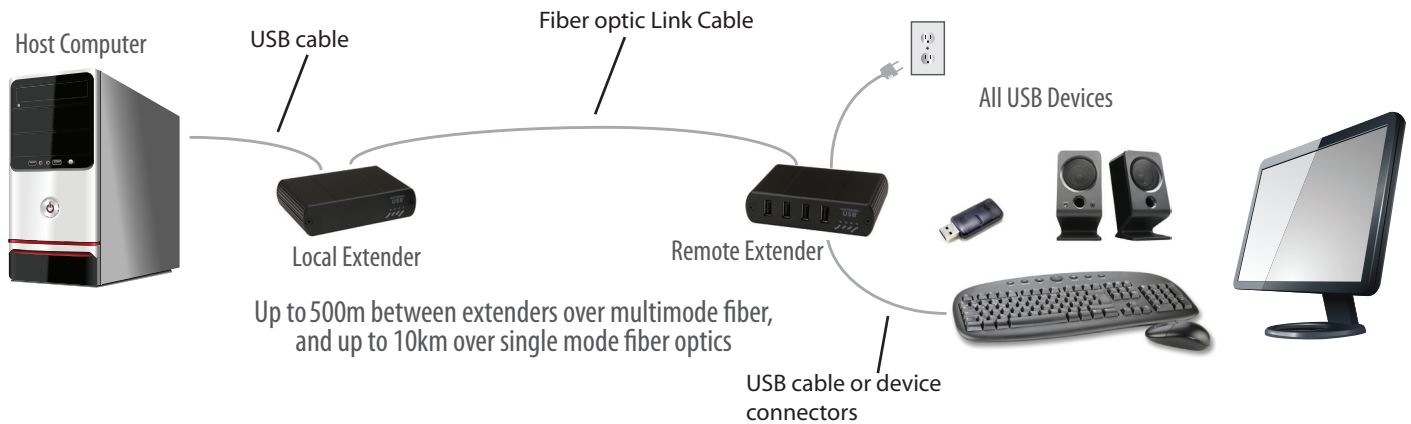
Installing the USB 2.0 RG2324/44 System

Fiber Optic Link Cabling

The local and remote extenders are interconnected by fiber optic cabling. Two strands of multimode fiber cabling is required for the RG2324 for extending up to 500m using 50/125µm or up to 275m using 62.5/125µm. The RG2344 supports up to 10km of singlemode fiber cable. The cabling subsystem must provide a duplex connection with crossover, and must be terminated with Duplex LC connectors at both ends.

Requirements

To complete the installation, you will also require the following items that are not included with this system:
  - USB compatible computer (host computer) with a USB compliant operating system
  - USB compatible device(s)
  - Fiber optic cabling

Host Computer | USB cable | Fiber optic Link Cable | All USB Devices

Local Extender | Remote Extender

Up to 500m between extenders over multimode fiber, and up to 10km over single mode fiber optics

USB cable or device connectors

Preparing Your Site

Before installing the RG2324/44 extender, you will need to prepare your site:

1.   Place the computer where desired and set it up.
2.   Ensure to locate the USB device(s) within the cable-length of the computer. If not, adjust the location of the device(s) and/or computer accordingly.
3.   If you are using surface cabling, the RG2324 supports a maximum distance of 500m over multimode fiber, while the RG2344 extends up to 10km over singlemode fiber.
4.   If using premise cabling, ensure compatible fiber optic cabling is installed between the two locations and not to exceed the specified distance.

note   Two strands of multimode (RG2324) or singlemode (RG2344) fiber are required to support the long reach connection. The cabling must provide a duplex connection with crossover, and must be terminated with Duplex LC connectors at both ends.

Installing the Local Extender

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

Connecting the Local Extender to the Remote Extender

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.

Installing the Remote Extender

1.   Place the remote extender near the USB device(s).
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.

Checking the Installation

1.   On the local and remote extender, 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 extender 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 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".

note To open Device Manager in Windows XP:
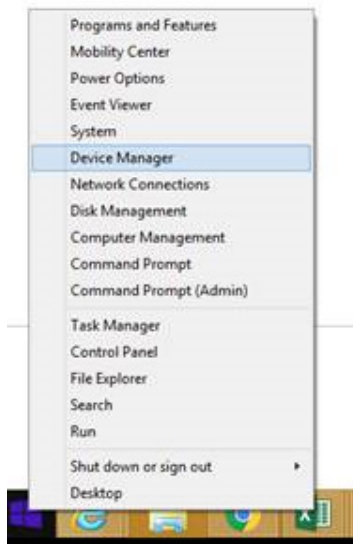Right click "My Computer" then select: Properties >> Hardware tab >> Device Manager

note To open Device Manager in Windows 7:
Open the Start Menu, right click on "Computer" then select: Manage >> Device Manager

note To open Device Manager in Windows 8, 8.1 or 10:
Right click the Start Menu and then select: Device Manager

3. For macOS users, open the System Profiler to confirm that the 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.

note To open System Profiler in macOS:
Open the Finder, select Applications, then open the Utilities folder and double click on the System Profiler icon.

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

Connecting a USB Device

1. Install any software required to operate the USB device. Refer to the documentation for the USB device, 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 USB 2.0 RG2324/44 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 or hosts will be compatible as there are a number of different characteristics that may impact the operation of USB devices over extended distances.

Optional USB Extender Mounting Options

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 Order Part #10-00394 USB Mounting Kit - Black)

2. USB Extender Direct Surface Mounting (Using your own hardware, stencil provided on page 10)

OPTION 1: USB Extender Mounting Kit - each kit includes:
- 2 mounting brackets
- 4 (M3.0) locking washers
- 4 (M3.0 x 5mm) Phillips pan head screws
- Mounting bracket installation guide *(see diagram below)*

1 kit required to mount per Local Extender <u>or</u> Remote Extender

Using a Phillips screwdriver, in the order as illustrated below, fasten and secure the provided screws, locking washers and brackets into place.
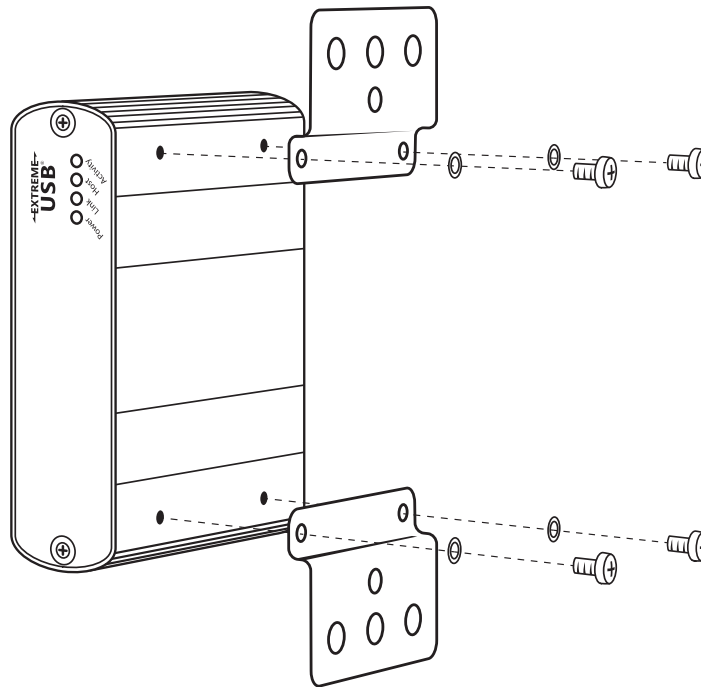
Once the bracket mounting is secured onto the extender, it is ready for mounting onto a surface. Please note you will need to provide your own screws to secure the extender using the available slots on each bracket.

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.
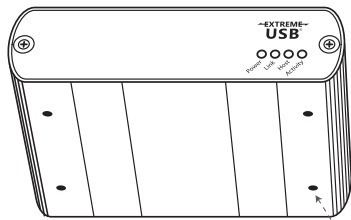
Distance between the enclosure mounting holes:
42.0mm x 77.0mm

mounting hole

1. Mark the center point of each of the four holes on your mounting surface either by directly measuring or using a print out 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 4.7625mm (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".

Direct Surface Mounting Measurement Stencil

4.8mm (3/16")
(4 Places)

42.0mm (1.6535")

77.0mm (3.0315")
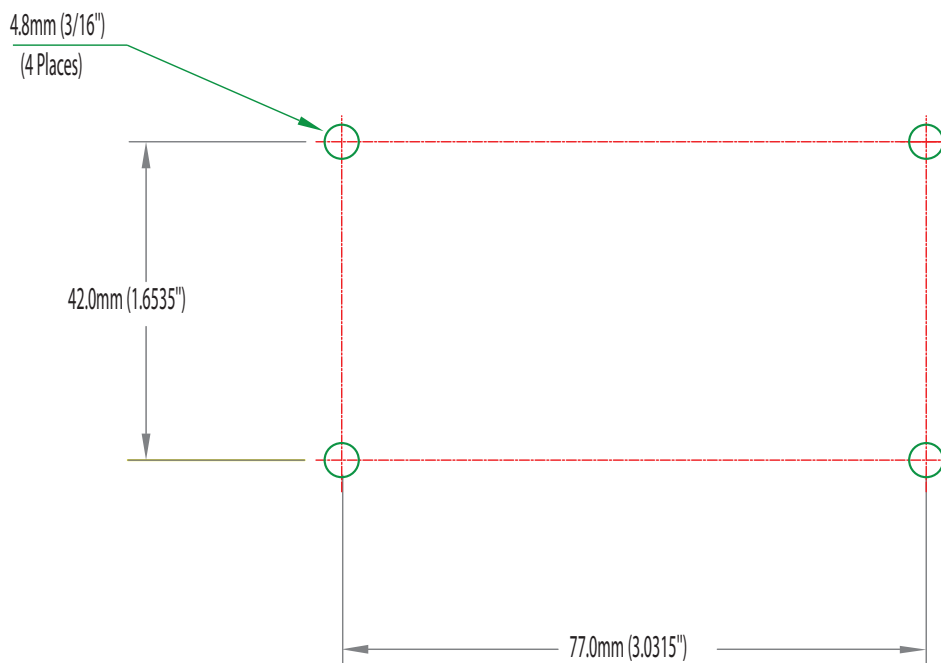
Troubleshooting

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 local extender are off.	• The local extender is not receiving enough power from the USB port or the (optional) local extender AC adapter.	1. Ensure that the USB connection between the local extender and host computer is properly installed. 2. Move the USB connector to another USB port on the host computer.
All LEDs on remote extender are off.	• The remote extender is not receiving power from the AC adapter.	1. Ensure that the AC power adapter is properly connected to the remote extender. 2. Check that the AC adapter is connected to a live source of electrical power. Check that the remote extender power LED is illuminated.
Link LEDs on local and remote extender units are off.	• There is no connection between the local extender and remote extender.	1. Ensure that a singlemode fiber optic cable with crossover is connected between the local and remote extenders. 2. Connect a short fiber optic crossover patch cord between the local and remote extenders. Recheck operation of the system.
Link LED on local and remote extender units are on, Host LED on local and remote extender units are off.	• The host computer is not powered on. • The local extender is not connected to the computer (when used with the optional local extender AC adapter). • The computer does not support USB hubs. • The RG2324/44 is malfunctioning.	1. Disconnect all USB devices from the remote extender. 2. Disconnect the local extender from the computer. 3. Disconnect the remote extender from the AC power adapter. 4. Reconnect the local extender to the computer. 5. Reconnect the remote extender to the AC power adapter. 6. In the Universal Serial Bus controllers section of Device Manager, check that the RG2324/44 is recognized as a "Generic USB Hub".
Both extenders were working, but then the Host LED on remote extender unit is suddenly blinking.	• The remote extender is in suspend mode. The operating system may put the RG2324/44 in suspend mode when the computer is put into a Suspend/Standby state or when no USB device(s) are attached.	1. Recover/Resume the operating system from Suspend/Standby mode (see your operating system's documentation). 2. Attach a USB device to the Ranger 2324/44.

PROBLEM	CAUSE	SOLUTION
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.	• The USB device is malfunctioning. • The computer does not recognize the USB device. • The application software for the device is not operating. • The RG2324/44 is malfunctioning.	1. Disconnect the RG2324/44 from the computer. 2. Connect the USB device directly to the USB port on the computer. 3. If the device does not operate properly, consult the user documentation for the device. 4. Update your system BIOS, chipset or USB Host controller drivers from your System/Mother board manufacturer's website. 5. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the RG2324/44. Connect the RG2324/44 to the computer. 6. If the second device does not operate, the RG2324/44 system may be malfunctioning. Contact technical support for assistance. 7. If the second device does operate properly, the first device may not be compatible with the RG2324/44.
USB device is attached to remote extender's USB port, but remote extender device LED is off.	• A USB device must have the appropriate driver installed on the computer operating system.	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. 2. Consult your USB device documentation and power your USB device with the additional, USB device manufacturer supplied, power supply (if available).
Device LED is orange and units are no longer functioning.	• Overcurrent condition has occurred because USB device draws more power than can be supplied per USB specification (500mA).	1. Power cycle remote extender.
LED Host and LINK LEDs on local and remote extenders blink intermittently.	• Firmware mismatch between the local and remote extenders.	1. Use a different local and remote extender pair which have the same firmware revision. 2. Upgrade the local and remote extender firmware, contact technical support for assistance.

Specifications

| RANGE	
USB 2.0 RG2324	Up to 500m (1,640 ft) over OM2+ multimode fiber Up to 275m (902 ft) over OM1 multimode fiber
USB 2.0 RG2344	Up to 10km (6.2 miles) over singlemode fiber
USB DEVICE SUPPORT	
Maximum Throughput	Up to 480 Mbps
Traffic Types	All Traffic Types
Device Types	All Device Types
Maximum Number of Devices and/or Hubs	Up to 30 devices
LOCAL EXTENDER	
USB Connector	1 x USB 2.0 Type B Receptacle
Link Connector	1 x SFP Duplex
Dimensions	100.0mm x 76.0mm x 26.0mm (3.9" x 3.0" x 1.0")
Enclosure Material	Black Anodized Aluminum
REMOTE EXTENDER	
USB Connector	4 x USB 2.0 Type A Receptacles
Link Connector	1 x SFP Duplex
Dimensions	100.0mm x 76.0mm x 26.0mm (3.9" x 3.0" x 1.0")
Enclosure Material	Black Anodized Aluminum
Available Current	Up to 1 Amp to each USB port; 2.5 Amps total shared
Power Supply	100-240V AC input, 24V 1A DC Output
ENVIRONMENTAL	
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
COMPLIANCE	
EMC	FCC (Class B), CE (Class B)
Environmental	RoHS2 (CE)
SUPPORT	
Warranty	2-year

Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting Guide, contact Technical Support at the company where you purchased this product 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 units
- Make and model of any USB device(s) attached to this extender system
- Description of the installation such as Host computer model, transmission media used and information about the USB device(s)
- Description of the problem

Technical Glossary

USB 2.0 Cables

USB 2.0 cables have two distinct full-sized 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.

USB Type A port   USB Type A connector   USB Type B port   USB Type B connector
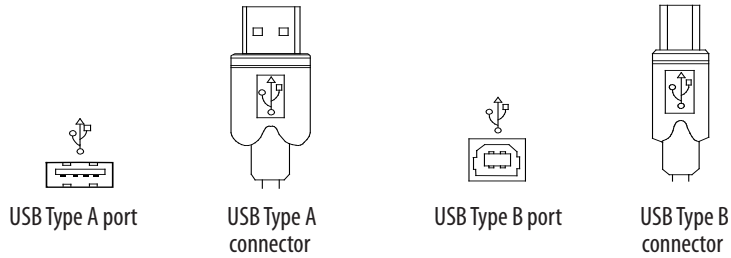
Duplex LC

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.

TX

RX