

USB 3-2-1 Raven™ 3124

4-Port USB 3.1, 200m Multimode Fiber
Point-to-Point Extender System

User Guide



Thank you for purchasing the USB 3-2-1 Raven™ 3124.

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 3-2-1 Raven 3124	01-00666	01-00667	01-00668	01-00669	01-00670

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, an Analog Devices brand, declare under our sole responsibility that the USB 3-2-1 Raven™ 3124, to which this declaration relates, is in conformity with European Standards EN 55032, EN 55035, EN 61000, and RoHS Directive 2011/65/EU + 2015/863/EU.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003.
CAN ICES-3 (B)/NMB-3 (B)

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.

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Introduction

This guide provides product information for the USB 3-2-1 Raven™ 3124, 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: Notes provide additional information that could be useful.

 CAUTION: Cautions provide important information about an operational requirement.

Product Contents

Your Raven 3124 extender system contains:

- Local Extender
- Remote Extender
- USB 3.1 Gen 1 Cable
- Local Extender 24V DC 1A International Power Adapter
- Remote Extender 24V DC 2.71A International Power Adapter
- 2 x Country Specific Power Cables
- Quick Start Guide

Features


The Raven 3124 incorporates ExtremeUSB-C™ technology, enabling users to extend USB 3.1 beyond the standard 3m cable limit for USB 3.1 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 200m of extension when directly connected over OM3 multimode fiber
- Support for new USB 3.1 Gen 1/2 host controllers and devices (up to 5Gbps)
- Support for all device USB types
- Backwards compatible to USB 2.0 devices

The Raven 3124 includes the ExtremeUSB-C™ suite of features:



- Transparent USB extension supporting USB 3, 2 and 1
- True plug and play; no software drivers required
- Works with all major operating systems: Windows®, macOS™, Linux® and Chrome OS™

 The Raven 3124 only works with OM3 multimode fiber or higher grade.

The Local Extender

The Local Extender connects to the computer using a standard USB 3.1 Gen 1 cable. Power for this unit is provided by the included 24V 1A adapter.

Front View



Rear View

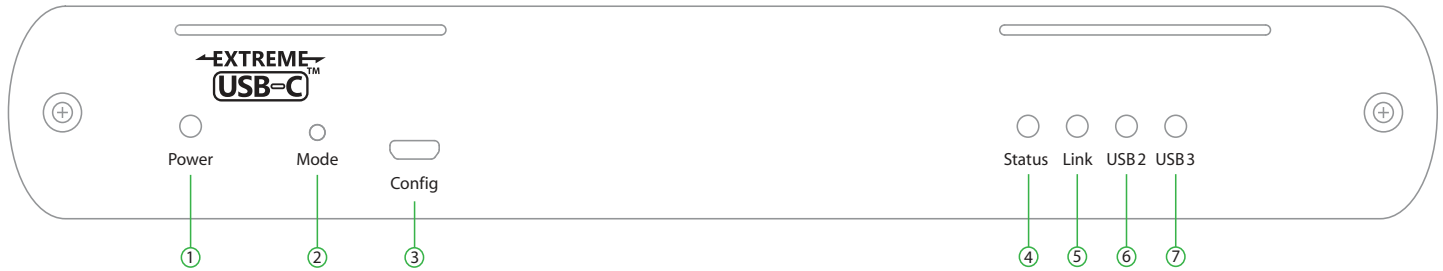


ITEM	TYPE	DESCRIPTION
1	Power LED	LED is SOLID ON when DC is supplied to the extender unit. LED is OFF when no power is supplied by the AC Adapter.
2	Mode	Reserved for manufacturer use.
3	Config	Reserved for manufacturer use.
4	Status LED	LED is SOLID ON when system is functioning normally. LED BLINKS when system is booting OR to indicate a temperature warning in unison with the LINK, USB 2, and USB 3 LEDs.
5	Link LED	LED is SOLID ON when Local Extender is linked to an opposite Remote Extender. LED is OFF when there is no connection between the Local and Remote Extenders.
6	USB 2 LED	LED is SOLID ON when an active USB 2 connection is established through the extender system. LED BLINKS when the USB 2 connection is suspended/asleep. LED is OFF when no USB 2 connection is detected.
7	USB 3 LED	LED is SOLID ON when an active USB 3 connection is established through the extender system. LED BLINKS when the USB 3 connection is suspended/asleep. LED is OFF when no USB 3 connection is detected.
8	LAN Port (100Mbps)	Ethernet pass through channel connects to a network or Ethernet device.
9	Link Port	Extension link Duplex LC fiber optic transceiver port.
10	USB Host Port	USB 3 Type B receptacle used to connect Local Extender to USB 3 Host computer.
11	DC Power Port	Locking connector for the included power adapter – accepts 24VDC 1A.

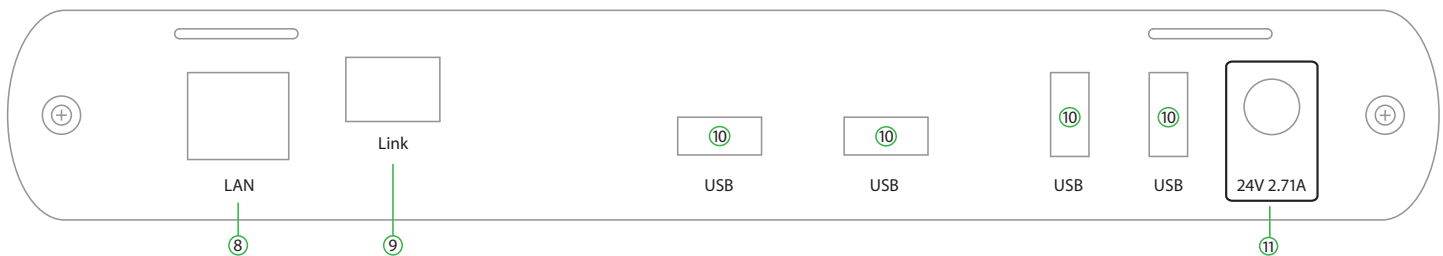
The Remote Extender

The Remote Extender provides USB 3.1 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 three USB hubs to the Remote Extender. The Remote Extender is powered by an external AC 24V 2.71A adapter, supplying up to 1.2 Amp per USB port.

Front View



Rear View



ITEM	TYPE	DESCRIPTION
1	Power LED	LED is SOLID ON when DC is supplied to the extender unit. LED is OFF when no power is supplied by the AC Adapter.
2	Mode	Reserved for manufacturer use.
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5	Link LED	LED is SOLID ON when Local Extender is linked to an opposite Remote Extender. LED is OFF when there is no connection between the Local and Remote Extenders.
6	USB 2 LED	LED is SOLID ON when an active USB 2 connection is established through the extender system. LED BLINKS when the USB 2 connection is suspended/asleep. LED is OFF when no USB 2 connection is detected.
7	USB 3 LED	LED is SOLID ON when an active USB 3 connection is established through the extender system. LED BLINKS when the USB 3 connection is suspended/asleep. LED is OFF when no USB 3 connection is detected.
8	LAN Port (100Mbps)	Ethernet pass through channel connects to a network or Ethernet device.
9	Link Port	Extension link Duplex LC fiber optic transceiver port.
10	Device Ports (Type A)	Accepts all USB devices.
11	DC Power Port	Locking connector for the included power adapter – accepts 24VDC 2.71A.

Installation Guide

Raven 3124 Cabling System Guidelines

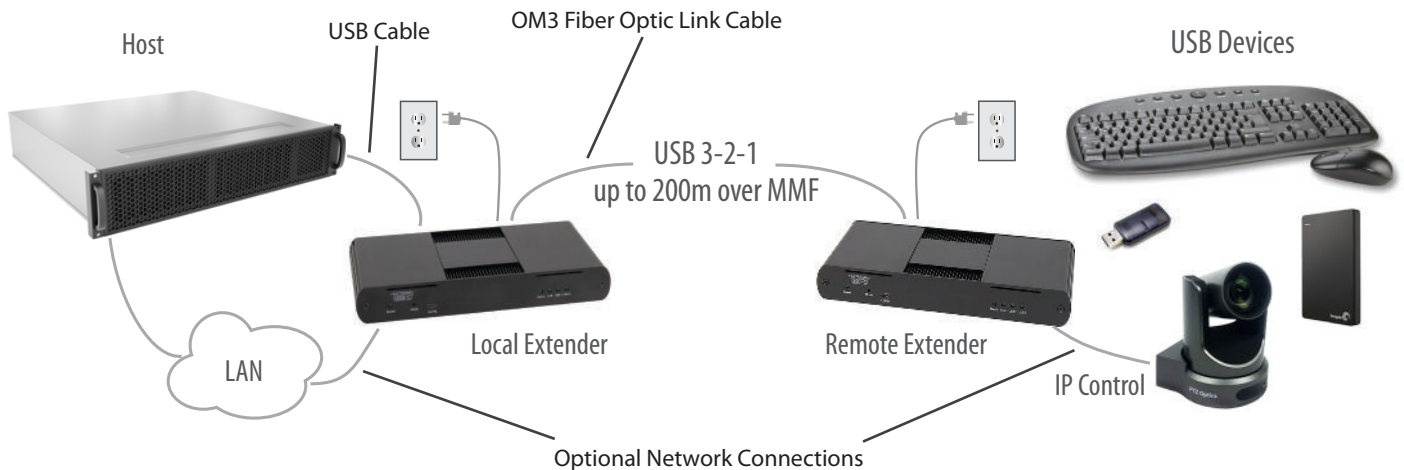
Requirements

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)
- OM3 Fiber optic cabling

Fiber Optic Link Cabling

The Local and Remote Extenders are interconnected by fiber optic cabling. Duplex multimode fiber cabling is required for the Raven 3124 for extending up to 200m using 50/125µm OM3 grade cable. The cabling subsystem must provide a duplex connection with crossover, and must be terminated with Duplex LC connectors at both ends.



Preparing Your Site

Before installing the Raven 3124 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 Raven 3124 supports a maximum distance of 200m over OM3 multimode fiber.
4. If using premise cabling, ensure compatible fiber optic cabling is installed between the two locations and does not to exceed the specified distance.

Installing the Local Extender

1. Place the Local Extender near the computer.
2. Assemble the 24V 1A power adapter and country specific power cord together and connect them into a suitable AC outlet.
3. Connect the supplied USB 3.1 Gen cable between the Local Extender host port and a USB 3 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. Connect the 24V 2.71A power adapter to the Remote Extender.

Checking the Installation

1. On the Local and Remote Extenders, check that the Power, Status, Link, USB 2 and USB 3 LEDs are on. If the 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 (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 two separate instances of "Generic SuperSpeed USB Hub" listed.



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 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 two separate instances of “Hub” under the USB SuperSpeed Bus.



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.

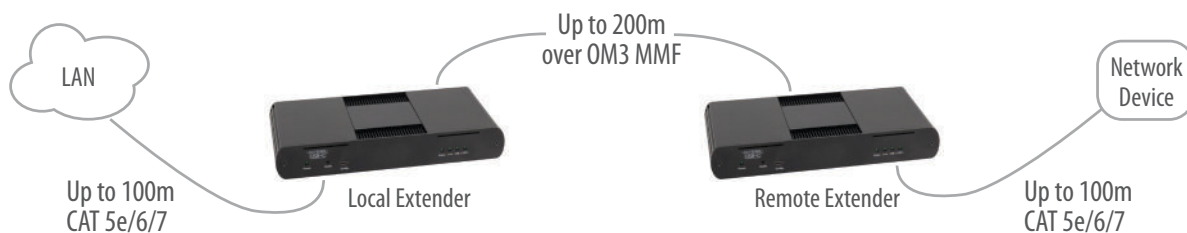
Compatibility

The USB 3-2-1 Raven 3124 complies with USB 2.0 and USB 3.1 Gen 1 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 Ethernet Pass Through Connection

The Raven 3124 offers a 100Mbps Ethernet pass through connection that can be used for a variety of purposes including:

- Connecting network devices
- Providing remote network access to the same location as the Remote Extender
- Leveraging existing cabling to provide USB 3-2-1 connectivity without losing network connectivity



Connect any network device or access port into the RJ45 socket label “LAN” using up to 100 meters of standard CAT 5e, 6 or 7 cabling.

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 # 10-00621 USB Mounting Kit - Black)
2. **USB Extender Direct Surface Mounting** (Using your own hardware, stencil provided on page 10)

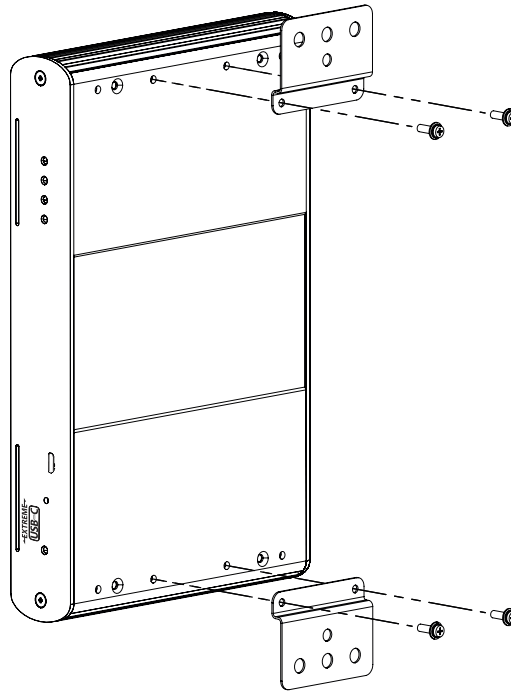
OPTION 1: USB Extender Mounting Kit

Contents:

- 2 mounting brackets
- 4 (M3) locking washers
- 4 (M3 x 10mm) Phillips screws with split lock washers
- Mounting bracket installation guide (*see diagram below*)

1 kit required to mount per Local Extender or Remote Extender

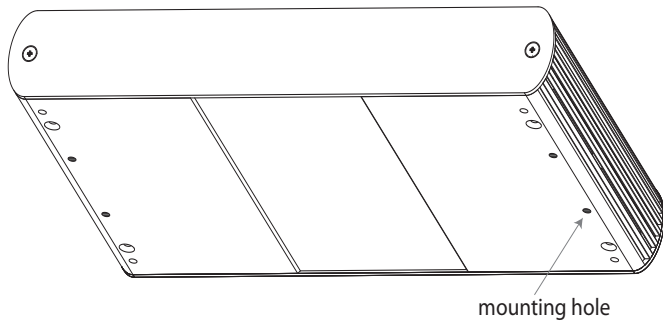
Using a Phillips screwdriver, in the order as illustrated below, fasten and secure the provided screws and brackets into place.



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 205.5mm

1. Mark the center point of each of the four holes on your mounting surface either by directly measuring or printing a stencil from www.icron.com/pdf/R-M-stencil.pdf.
2. Hardware recommendation: M3 locking washers and M3 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 3.97mm (5/32") 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.



Do not exceed a screw depth of 10mm (0.4") into the unit or damage may occur.

Direct Surface Mounting Measurement Stencil

The stencil illustration pictured below is only 50% of the original size. To access this stencil file (to scale), simply go to: www.icron.com/pdf/R-M-stencil.pdf.



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 are OFF on the Local and/or Remote Extender.	1. The Local Extender and/or Remote Extender is not receiving power from the AC power adapter.	1. Ensure that the AC power adapter is properly connected to the Local Extender and/or Remote Extender. 2. Check that the AC adapter is connected to a live source of AC power. Check that the Local and/or Remote Extender's Power LED is illuminated.
POWER LED is ON, STATUS LED is OFF.	1. The unit has malfunctioned and requires re-programming.	1. Contact Technical Support for assistance.
Link LEDs on the Local and Remote Extenders are OFF.	1. There is no connection between the Local and Remote Extenders.	1. Ensure that a crossover OM3 multimode fiber optic cable of no more than 200m is connected between the Local and Remote Extenders. 2. Connect a short fiber optic patch cable between the Local and Remote Extenders. Recheck the link status. If the LINK LED is now SOLID ON, the previous cable is defective or not capable of supporting the link.
LINK LEDs on the Local and Remote Extenders are SOLID ON, but the USB 2 and USB 3 LEDs are OFF.	1. The host computer is not powered on. 2. The Local Extender is not connected to a computer. 3. The host computer does not support USB Hubs. 4. The unit is malfunctioning.	1. Disconnect all USB devices from the Remote Extender. 2. Disconnect Local Extender from the host computer. 3. Disconnect AC adapters from the Local and Remote Extenders. 4. Reconnect the Local Extender to the host computer. 5. Reconnect the AC adapters to the Local and Remote Extenders. 6. Check that the Local and Remote Extenders have enumerated as USB hubs in Windows Device Manager, macOS System Profiler or using "lsusb" command in a Linux Terminal. 7. If the problem is not resolved, contact Technical Support.
The USB 2 LED is SOLID ON, but the USB 3 LED is OFF.	1. The Local Extender is not connected to a USB 3 port. 2. The Local Extender is connected to the host using a USB 2 cable. 3. The USB 3 cable connecting the Local Extender to the host computer is defective. 4. The host computer's USB 3 controller has malfunctioned.	1. Ensure that the Local Extender is connected to a USB 3 port on the host computer. 2. Ensure that the included USB 3.1 Gen 1 cable is being used between the host computer and Local Extender. 3. Cold boot the host computer. 4. Replace the USB 3.1 Gen 1 cable with a different cable. 5. If the problem is not resolved, contact Technical Support.

PROBLEM	CAUSE	SOLUTION
The USB 3 LED is SOLID ON, but the USB 2 LED is OFF.	<ol style="list-style-type: none"> 1. The USB cable connecting the Local Extender to the host computer is defective. 2. The host computer's USB 2.0 controller has malfunctioned. 3. The host computer does not support USB 2. 	<ol style="list-style-type: none"> 1. Ensure that the included USB 3.1 Gen 1 cable is being used between the host computer and Local Extender. 2. Cold boot the host computer. 3. Replace the USB 3.1 Gen 1 cable with a different cable. 4. If the problem is not resolved, contact Technical Support.
Both Local and Remote Extenders are working, but the USB 2 or USB 3 LEDs on the Local and Remote Extenders are blinking.	<ol style="list-style-type: none"> 1. The Local and/or Remote Extender is in suspend mode. For a variety of reasons, the host computer may place the Local/Remote Extender into suspend mode. Typically, it is because there are no USB devices attached, the USB device is asleep, or the host computer is in a sleep state or hibernating. 	<ol style="list-style-type: none"> 1. Recover/resume the operating system from sleep or hibernate modes (refer to your operating system's documentation). 2. Connect a USB device to the Remote Extender. 3. Use the connected device. 4. If the problem persists, contact Technical Support.
ALL LEDs on both Local and Remote Extenders are SOLID ON, but the USB device is not operating correctly, or is detected as an "Unknown Device" in the operating system.	<ol style="list-style-type: none"> 1. The USB device is malfunctioning. 2. The computer does not recognize the USB device. 3. The application software for the USB device is not operating. 4. The USB extender is malfunctioning. 	<ol style="list-style-type: none"> 1. Disconnect the extender from the computer. 2. Connect the USB device directly to the host computer. 3. If the device does not operate as expected, consult the user documentation for the device. 4. Update the host computer BIOS, chipset or USB controller drivers from the manufacturer's website. 5. If the device operates as expected when directly connected to the computer, connect another device to the extender and reconnect it to the host computer. 6. If the second device does not operate, the extender may be malfunctioning. Contact Technical Support for assistance. 7. If the second device operates as expected, then the first device may not be compatible with this extender. Contact Technical Support.

PROBLEM	CAUSE	SOLUTION
<p>A USB 3 device is not enumerating as USB 3, or the operating system is notifying the user that the device can "Perform Faster if connected to a USB 3 port".</p>	<ol style="list-style-type: none"> 1. The USB device is malfunctioning. 2. The computer does not recognize the USB device. 3. The application software for the USB device is not operating. 4. The USB 3 port on the computer is malfunctioning. 5. The USB extender is malfunctioning. 	<ol style="list-style-type: none"> 1. Disconnect the extender from the computer. 2. Connect the USB 3 device directly to the host computer. 3. If the device does not operate as expected as a USB 3 device, consult the user documentation for that device or try a different USB port on the host computer. 4. Update the host computer BIOS, chipset or USB controller drivers from the manufacturer's website. 5. If the device operates as USB 3 device when directly connected to the computer, connect another USB 3 device to the extender and reconnect it to the host computer. 6. If the second device does not operate as a USB 3 device, the extender may be malfunctioning. Contact Technical Support for assistance. 7. If the second device operates as a USB 3 device as expected, the first device may not be compatible with this extender. Contact Technical Support.
<p>All LEDs are flashing and the system is operational.</p>	<ol style="list-style-type: none"> 1. Unit is or was operating at an unsafe temperature. 	<ol style="list-style-type: none"> 1. Check ambient temperature. Ensure temperature does not exceed 50°C (122°F). 2. Power cycle the unit to remove LED status.
<p>All LEDs are flashing and the system is NOT operational.</p>	<ol style="list-style-type: none"> 1. Unit has exceeded safe operating temperature. 	<ol style="list-style-type: none"> 1. Remove external sources of heat or change location of the unit. 2. Power cycle the unit to return to operation.
<p>LEDs are scrolling LEFT to RIGHT, starting with STATUS.</p>	<ol style="list-style-type: none"> 1. Unit is programming. 	<ol style="list-style-type: none"> 1. Wait for the unit to finish programming.

Specifications

RANGE	
Point-to-Point	Up to 200m (656 ft) over OM3 or better multimode fiber
USB DEVICE SUPPORT	
Maximum Throughput	5Gbps
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 3.1 Gen 1 Type B Receptacle
Link Connector	1 x Duplex LC
Network Pass Through:	1 x RJ45
Dimensions	137.3mm x 232.1mm x 33.0mm (5.4" x 9.1" x 1.3")
Enclosure Material	Black Anodized Aluminum
Power Supply	100-240V AC Input, 24V 1A DC Output
REMOTE EXTENDER	
USB Connector	4 x USB 3.1 Gen 1 Type A Receptacles
Link Connector	1 x Duplex LC
Network Pass Through:	1 x RJ45
Dimensions	137.3mm x 232.1mm x 33.0mm (5.4" x 9.1" x 1.3")
Enclosure Material	Black Anodized Aluminum
Available Current	Up to 1.2 Amp (6W) to each USB port
Power Supply	100-240V AC Input, 24V 2.71A DC Output
ENVIRONMENTAL	
Operating Temperature Range	0°C – 50°C (32°F – 122°F)
Storage Temperature Range	-20°C – 70°C (-4°F – 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	RoHS2/3 (CE)
SUPPORT	
Warranty	2-year

Contacting Technical Support

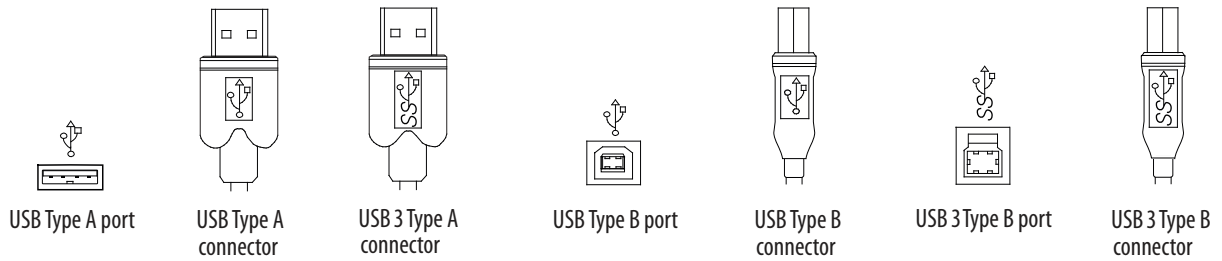
If you are experiencing problems not referenced in the Troubleshooting section, or require further assistance, contact Technical Support at the company where you purchased this product and include the following information:

- Host computer make and model
- Type of Operating System installed (e.g. Windows 10, macOS 10.14, etc.)
- Part number and serial number for both the Local 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 3 and USB 2.0 Cables

USB 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.



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.

