icron

USB 2.0 Ranger® 2324/2344

4-Port USB 2.0 Fiber Optic Extender System
User Guide

EXTREME
USB®

Thank you for purchasing the USB 2.0 Ranger® 2324 or 2344.

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 Ranger 2324	00-00411	00-00412	00-00413	00-00414	00-00415
USB 2.0 Ranger 2344	00-00416	00-00417	00-00418	00-00419	00-00420

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 Ranger® 2324/2344, 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 Ranger® 2324 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 Ranger 2324/2344 extender system contains:
- LEX (Local Extender)
- REX (Remote Extender)
- USB 2.0 Cable
- REX AC International Power Adapter
- Country Specific Power Cable
- Quick Start Guide

Features

The Ranger 2324/2344 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 LEX and the REX, and has the following key features:
- Up to 500m of extension when directly connected over multimode fiber (Ranger 2324), and up to 10km over singlemode fiber (Ranger 2344)
- Support for new USB 3.0 host controllers and devices (up to 480 Mbps)
- Support for all device USB types

The Ranger 2324/44 includes the ExtremeUSB® suite of features:

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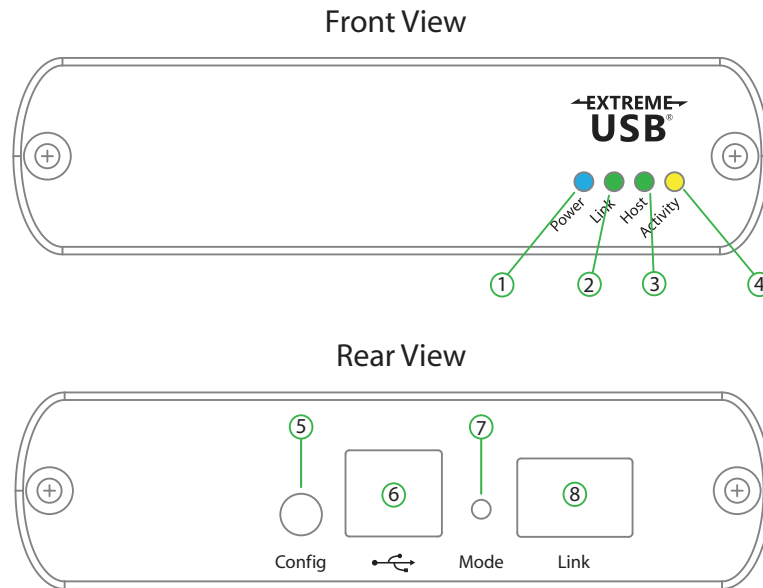- Works with all major operating systems: Windows®, macOS™ and Linux®

note   USB 3.0 devices will perform at USB 2.0 speeds if extended through the Ranger 2324/44 extender.

note   The Ranger 2324 only works with multimode fiber, and the Ranger 2344 with singlemode fiber.
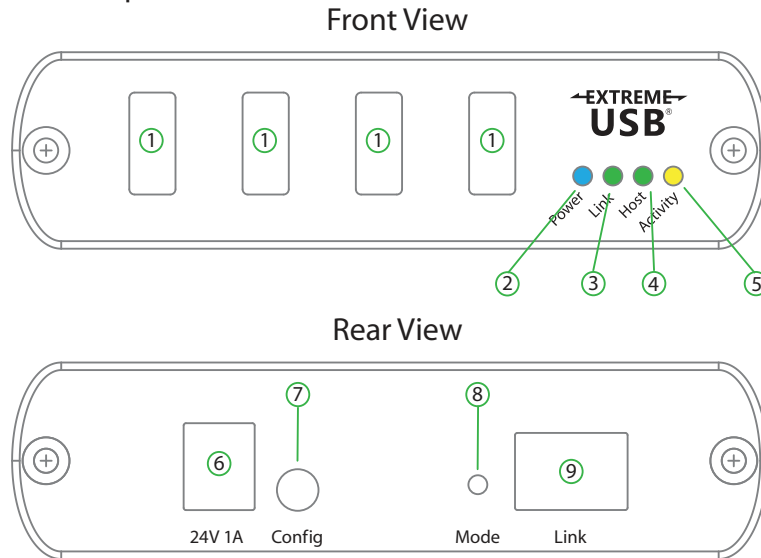
The LEX Unit

The LEX unit 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 LEX and REX. LED turns on when link between the LEX and REX units is established. LED is off when there is no link between the LEX and REX units. 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 LEX and REX units. LED blinks intermittently with or without a USB device connected. When the LEX and REX units are in suspend mode, the LED is off.
5	Config	Reserved for manufacturer use.
6	USB Host Port	Used to connect the LEX 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 REX Unit

The REX 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 REX unit. The REX 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 LEX and REX. LED turns on when link between the LEX and REX units is established. LED is off when there is no link between the LEX and REX units. 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 LEX and REX units. LED blinks intermittently with or without a USB device connected. When the LEX and REX units 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
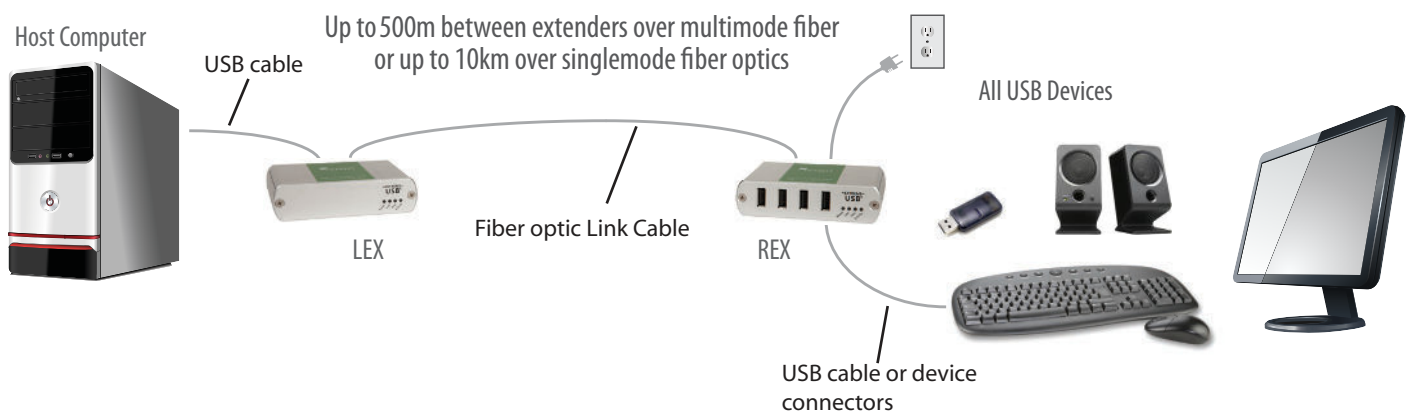
Installing the USB 2.0 Ranger 2324/44 System

Fiber Optic Link Cabling

The LEX and REX extenders are interconnected by fiber optic cabling. Two strands of multimode fiber cabling is required for the Ranger 2324 for extending up to 500m using 50/125µm or up to 275m using 62.5/125µm. The Ranger 2344 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

Up to 500m between extenders over multimode fiber or up to 10km over singlemode fiber optics

All USB Devices

LEX

Fiber optic Link Cable

REX

USB cable or device connectors

Preparing Your Site

Before installing the Ranger 2324/44 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 Ranger 2324 supports a maximum distance of 500m over multimode fiber, while the Ranger 2344 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 (Ranger 2324) or singlemode (Ranger 2344) 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 LEX Unit

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

Connecting the LEX to the REX

With Surface Cabling:

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

With Premise Cabling:

1.   Plug one end of a fiber optic patch cord (not included) into the Link port on the LEX.
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 REX.
4.   Plug the other end of the second patch cord into the fiber optic information outlet near the USB device.

Installing the REX Unit
1.   Place the REX 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 REX.

Checking the Installation

1.   On the LEX and REX units, 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 LEX and REX units 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
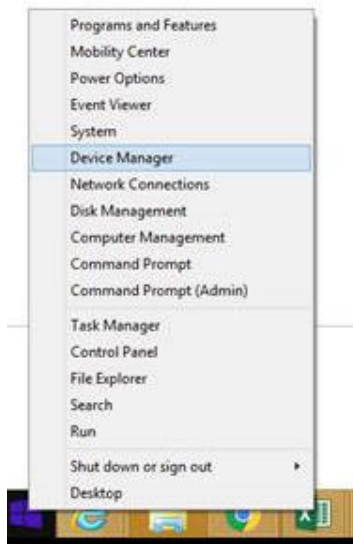
note To open Device Manager in Windows 7:
Open the Start Menu, right click on "Computer" then select: Manage >> Device Manager

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 REX.
3. Check that the device is detected and installed properly in the operating system.

Compatibility

The USB 2.0 Ranger 2324/44 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 #10-00406 USB Mounting Kit - Silver)

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 LEX <u>or</u> REX

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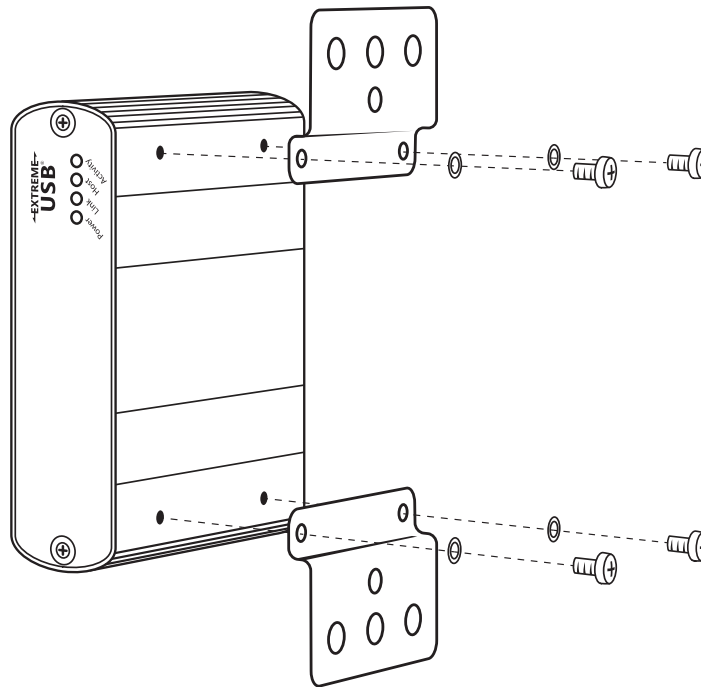
Once the bracket mounting is secured onto the extender, it is ready for mounting onto a surface. Please note you will need to provide your own screws to secure the extender using the available slots on each bracket.

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.
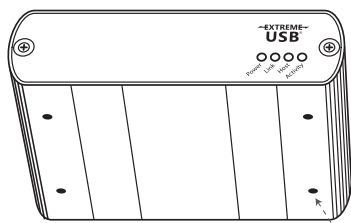

Distance between the enclosure mounting holes:
42.0mm x 77.0mm

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")
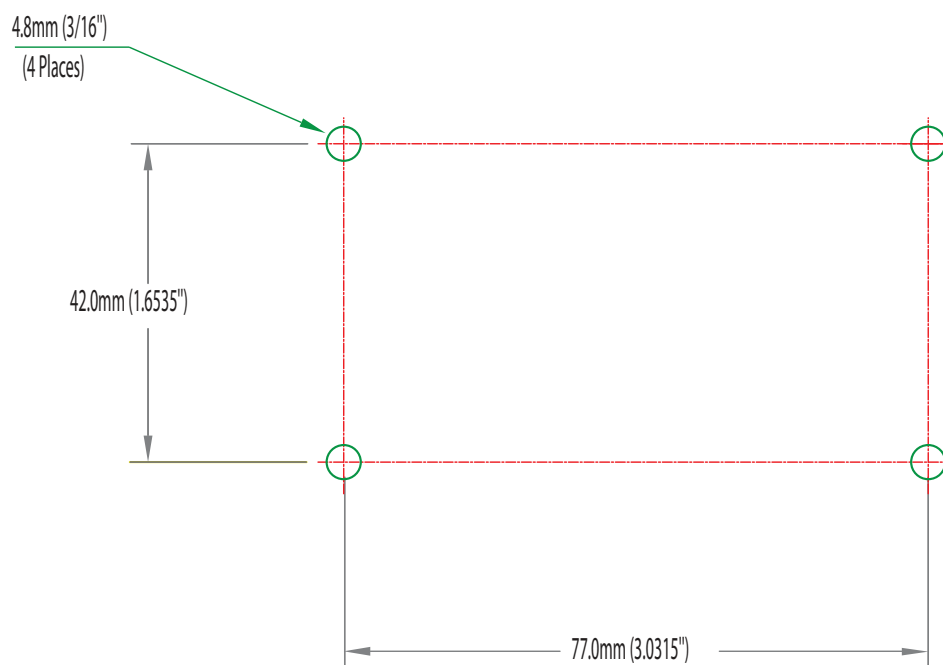
Troubleshooting

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 Icron Technologies' Technical Support for further assistance.

PROBLEM	CAUSE	SOLUTION
All LEDs on the LEX are off.	• The LEX is not receiving enough power from the USB port or the (optional) LEX AC adapter.	1. Ensure that the USB connection between the LEX and host computer is properly installed. 2. Move the USB connector to another USB port on the host computer.
All LEDs on the REX are off.	• The REX is not receiving power from the AC adapter.	1. Ensure that the AC power adapter is properly connected to the REX. 2. Check that the AC adapter is connected to a live source of electrical power. Check that the REX power LED is illuminated.
Link LEDs on the LEX and REX units are off.	• There is no connection between the LEX and REX units.	1. Ensure that a singlemode fiber optic cable with crossover is connected between the LEX and REX units. 2. Connect a short fiber optic crossover patch cord between the LEX and REX units. Recheck operation of the system.
Link LED on LEX and REX units are on, Host LED on LEX and REX units are off.	• The host computer is not powered on. • The LEX is not connected to the computer (when used with the optional LEX adapter). • The computer does not support USB hubs. • The Ranger 2324/44 is malfunctioning.	1. Disconnect all USB devices from the REX extender. 2. Disconnect the LEX unit from the computer. 3. Disconnect the REX from the AC power adapter. 4. Reconnect the LEX to the computer. 5. Reconnect the REX to the AC power adapter. 6. In the Universal Serial Bus controllers section of Device Manager, check that the Ranger 2324/44 is recognized as a "Generic USB Hub".
Both extenders were working, but then the Host LED on the REX unit is suddenly blinking.	• The REX unit is in suspend mode. The operating system may put the Ranger 2324/44 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 LEX and REX units 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 Ranger 2324/44 is malfunctioning.	1. Disconnect the Ranger 2324/44 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 Ranger 2324/44. Connect the Ranger 2324/44 to the computer. 6. If the second device does not operate, the Ranger 2324/44 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 Ranger 2324/44.
USB device is attached to the REX unit's USB port, but REX unit 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 REX. 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 the REX unit.
LED Host and LINK LEDs on the LEX and REX units blink intermittently.	• Firmware mismatch between the LEX and REX units.	1. Use a different LEX and REX pair which has the same firmware revision. 2. Upgrade the LEX and REX firmware, contact Technical Support for assistance.

Warranty Information

Limited Hardware Warranty
Icron Technologies Corporation warrants that any hardware products accompanying this documentation shall be free from significant defects in material and workmanship for a period of **two years from the date of purchase**. Icron Technologies Corporation's hardware warranty extends to Licensee, its customers and end users.

The Warranty does not include repair of failures caused by: misuse, neglect, accident, modification, operation outside a normal operating environment, failure caused by service of the device by non-authorized servicers, or failure caused by a product for which Icron Technologies Corporation is not responsible. Opening the enclosures will void warranty.

Hardware Remedies
Icron Technologies Corporation's entire liability and the Licensee's exclusive remedy for any breach of warranty shall be, at Icron Technologies Corporation's option, either (a) return of the price paid or (b) repair or replacement of hardware; which will be warranted for the remainder of the original warranty period or 30 days, whichever is longer. These remedies are void if failure of the hardware has resulted from accident, abuse, or misapplication.

Limitation of Liability
The hardware warranty set forth in this agreement replaces all other warranties. Icron Technologies Corporation expressly disclaims all other merchantability and fitness for a particular purpose and noninfringement of third-party rights with respect to the hardware.

Icron Technologies Corporation dealer, agent, or employee is not authorized to make any modification extension or addition to this warranty. Under no circumstances will Icron Technologies Corporation, its suppliers or licensors be liable for any costs of procurement or substitute products or services, lost profits, loss of information or data, or any other special, indirect, consequential, or incidental damages arising in any way out of the sale of, use of, or inability to use Icron Technologies Corporation product or service, even if Icron Technologies Corporation, its suppliers or licensors have been advised of the possibility of such damages. In no case shall Icron Technologies Corporation, its suppliers and licensors' liability exceed the actual money paid for the products at issue.

Since some jurisdictions do not allow the limitation of implied warranties of liability for incidental, consequential, special or indirect damages, the above limitation may not always apply. The above limitation will not apply in case of personal injury where and to the extent that applicable law requires such liability.

Obtaining Warranty Service

To obtain warranty service, you must first contact Icron Technologies Corporation within the warranty period for a Return Material Authorization (RMA) number. Icron Technologies Corporation will not accept returns without an authorized RMA number. Prior to contacting Icron Technologies Corporation, be sure you have recorded the serial numbers of the LEX and REX. Package the product appropriately for safe shipment and mark the RMA number on the outside of the package. The package must be sent prepaid to Icron Technologies Corporation. We recommend that you insure it or send it by a method that provides for tracking of the package. The repaired or replaced item will be shipped to you, at Icron Technologies Corporation's expense, not later than thirty days after Icron Technologies Corporation receives the defective product.

Specifications

RANGE	
USB 2.0 Ranger 2324	Up to 500m (1,640 ft) over OM2+ multimode fiber Up to 275m (902 ft) over OM1 multimode fiber
USB 2.0 Ranger 2344	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 (LEX)	
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	Silver Anodized Aluminum
REMOTE EXTENDER (REX)	
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	Silver 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 section, contact **Icron Technical Support**:

> **www.icron.com/support**
> Tel: +1 604 638 3939

To help us serve you better, please include the following information with your technical support request:
- Host computer make and model
- Type of Operating System installed (e.g. Windows 10, macOS 10.12, etc.)
- Part number and serial number for both the LEX and REX 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

> **Address the returned product to:**
>
> RMA Coordinator
> Icron Technologies Corporation
> 4664 Lougheed Highway, Suite 221
> Burnaby, BC Canada
> V5C 5T5

Contacting Sales

> Email: **sales@icron.com**
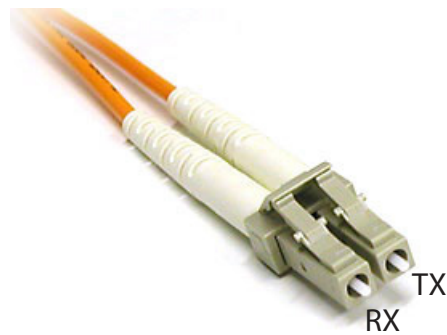> Tel: +1 604 638 3920

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
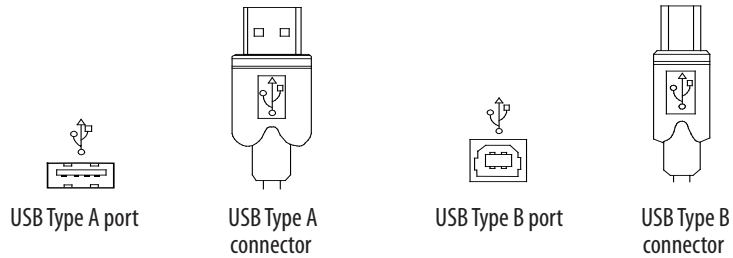
Duplex LC

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