



# USB 2.0 Ranger<sup>®</sup> 2312

2-port USB 2.0 100m CAT 5e/6/7 Extender System  
with Flexible Power

## User Guide



Thank you for purchasing the USB 2.0 Ranger® 2312.

Please read this guide thoroughly.

This document applies to, but is not limited to, Part Numbers: 00-00406, 00-00407, 00-00408, 00-00409 and 00-00410.

**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 2312, to which this declaration relates, is in conformity with European Standard 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. When not in use, product should be stored in a dry location between -20°C and 70°C.

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Document # 90-01524-A02


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## Introduction

This guide provides product information for the USB 2.0 Ranger® 2312, 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.


 Notes provide additional information that could be useful.

 Caution symbols are followed by very important information about an operational requirement.

## USB 2.0 Ranger 2312 Product Contents

Your Ranger 2312 is packaged with:

- LEX (Local Extender)
- REX (Remote Extender)
- USB 2.0 Cable
- International AC Power Adapter
- Country Specific Power Cord
- Quick Start Guide

 The Ranger 2312 features **flexible power**, allowing the installer to connect the supplied 24V, 1A power adapter to either the LEX or REX unit for normal extension system operation. Please note, when powering at the LEX, take care not to plug the remote side of the CAT 5e/6/7 link cable directly into equipment other than the REX to avoid possible damage as flexible power is different from Power over Ethernet (PoE) and will only properly power the REX.

## 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)
- CAT 5e/6/7 solid core Unshielded Twisted Pair (UTP) cable with two RJ45 connectors (if using surface cabling), or CAT 5e/6/7 cabling with two information outlets and two CAT 5e/6/7 patch cords with RJ45 connectors (if using premise cabling)

## Features

The Ranger 2312 incorporates ExtremeUSB® technology, enabling users to extend USB beyond the standard 5m cable limit for USB 2.0 peripheral devices. The Ranger 2312 extender system is composed of two individual units, the LEX and the REX, and has the following key features:

- USB device(s) can be located up to 100 meters (330 feet) from the computer
- Support for new USB 3.0 host controllers and devices (up to 480 Mbps)
- Support for all device USB types

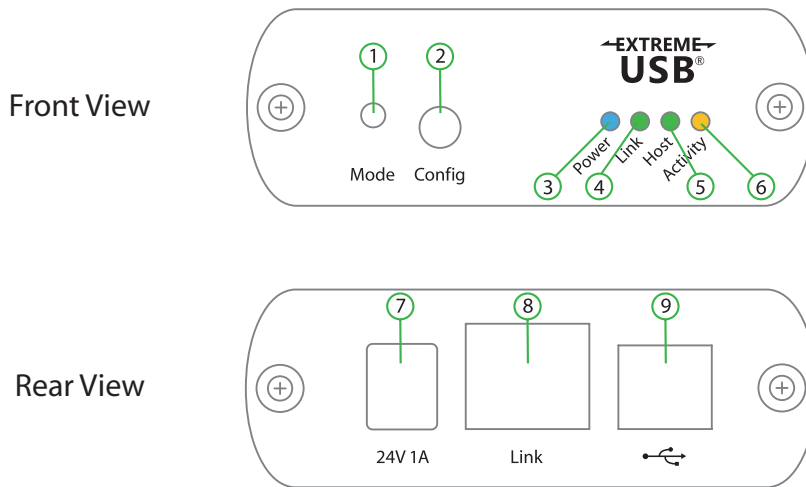
The Ranger 2312 includes the ExtremeUSB® suite of features:



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

## The LEX Unit

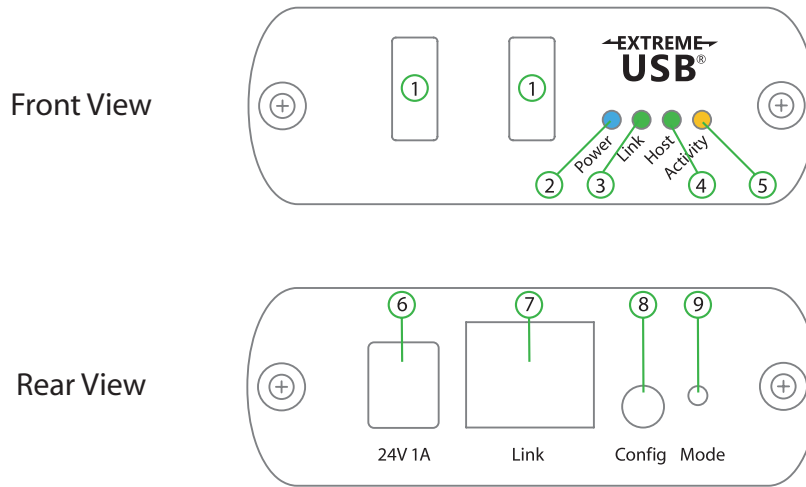
The LEX unit connects to the computer using a standard USB cable (included). Power for the LEX is provided by the host computer. Power for the REX is provided by the 24V AC adapter connected at **either** the LEX or REX. The LEX delivers power over the CAT 5e/6/7 extension link to the REX when the included power supply is connected to the LEX.



ITEM	TYPE	DESCRIPTION
1	Mode	Reserved for manufacturer use.
2	Config Port	Reserved for manufacturer use.
3	Power LED (Blue)	LED turns on when power is supplied. LED is off when no power is supplied by the host computer.
4	Link LED (Green)	Indicates a valid ExtremeUSB link is established between the LEX and REX units. 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.
5	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.
6	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.
7	Power Port	Connects to the AC power supply.
8	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the LEX to the REX.
9	USB Host Port	Used to connect the LEX to the host computer. Accepts USB Type B connector.

## The REX Unit

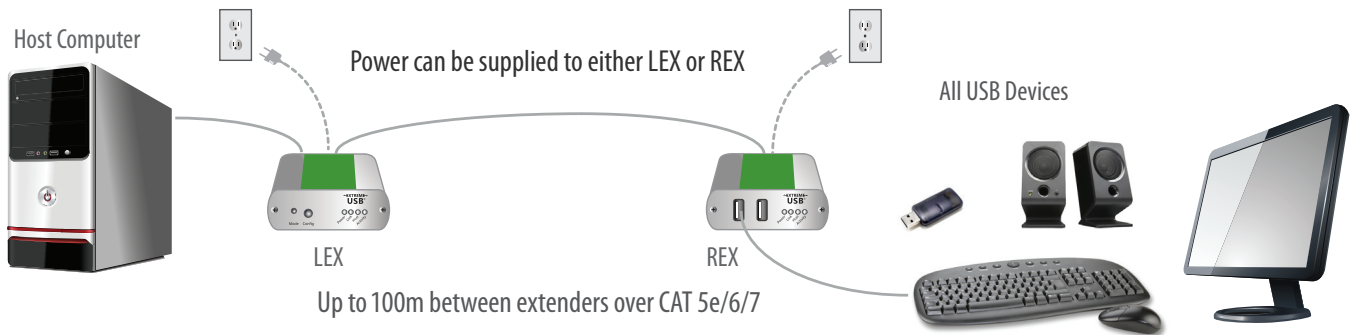
The REX unit provides two USB Type A ports for connecting standard USB devices allowing up to 1 Amp per USB port, or 1.5 Amps total when both ports are used concurrently. Additional devices may be connected by attaching USB hubs to the REX. The REX is powered either directly by the included power supply, or via the CAT 5e/6/7 link extension cable from the LEX.



ITEM	TYPE	DESCRIPTION
1	USB Device Ports	Accepts USB device(s) using Type A connectors.
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 units. LED turns on when link between 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 (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.
6	Power Port	Connects to the AC power supply.
7	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the LEX to the REX.
8	Config Port	Reserved for manufacturer use.
9	Mode	Reserved for manufacturer use.

## Installation Guide

Connect the provided power adapter to **either** the LEX or REX.



## Preparing for Installation

Before you can install the Ranger 2312, 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 Ranger 2312 supports a maximum distance of 100m.

OR

If you are using premise cabling, ensure CAT 5e/6/7 cable is installed between the two locations, with CAT 5e/6/7 information outlets located near both the computer and the USB device(s), and the total length, including patch cords is no more than 100m.

## Installing the LEX

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

## Installing the REX

1. Place the REX near the USB device(s) in the desired remote location.

## Installing Flexible Power

1. Connect the 24V 1A supplied AC power adapter into the desired unit—either the LEX unit or REX unit, based on your installation requirement.



The Ranger 2312 features **flexible power**, allowing the installer to connect the supplied 24V, 1A power adapter to either the LEX or REX unit for normal extension system operation. Please note, when powering at the LEX, take care not to plug the remote side of the CAT 5e/6/7 link cable directly into equipment other than the REX to avoid possible damage as flexible power is different from Power over Ethernet (PoE) and will only properly power the REX.

## Connecting the LEX to the REX



To ensure proper operation, it is recommended that only solid core CAT 5e/6/7, Unshielded Twisted Pair (UTP) cabling be used to connect the LEX to the REX. The cabling must have a straight-through conductor configuration with no crossovers and must be terminated with 8 conductor RJ45 connectors at both ends. The combined length of any patch cords using stranded conductors must not exceed 100m.

### With Surface Cabling:

1. Plug one end of the CAT 5e/6/7 cabling (not included) into the Link port (RJ45) on the LEX.
2. Plug the other end of the CAT 5e/6/7 cabling into the Link port (RJ45) on the REX.

### With Premise Cabling:

1. Plug one end of a CAT 5e/6/7 patch cord (not included) into the Link port (RJ45) on the LEX.
2. Plug the other end of the patch cord into the CAT 5e/6/7 information outlet near the host computer.
3. Plug one end of the second CAT 5e/6/7 patch cord (not included) into the Link port (RJ45) on the REX.
4. Plug the other end of the second patch cord into the CAT 5e/6/7 information outlet near the USB device.

## 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(s) to the device port on the REX.
3. Check that the device is detected and installed properly in the operating system.



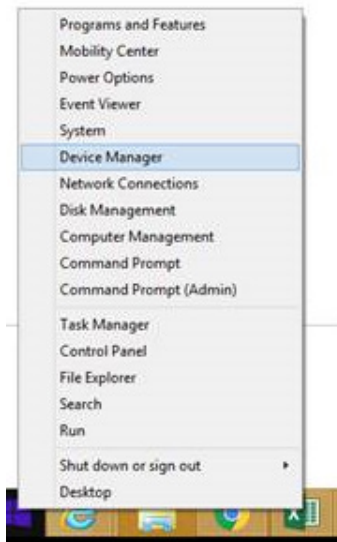
## Checking the Installation

1. Check that the Power, Activity, Link and Host LEDs on the LEX and REX units 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 Ranger 2312 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 Ranger 2312 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 Ranger 2312 extender system is not detected correctly or fails to detect, please consult the Troubleshooting section in this guide.

## Compatibility

The Ranger 2312 complies with USB 1.1 and USB 2.0 specifications governing the design of USB devices. However, there is no guarantee that all USB devices will be compatible, as there are a number of different factors that may impact the operation of USB devices over extended distances.

## Optional USB Extender Mounting Options

The bottom of the Ranger 2312 enclosure features four convenient pre-drilled holes for optional direct surface mounting and four mounting slots for easy cable-ties. Based on your requirements, choose from three available mounting options:

1. **USB Extender Mounting Kit**
2. **USB Extender Direct Surface Mounting**
3. **USB Extender Cable-Tie Mounting**

### Option 1: USB Extender Mounting Kit

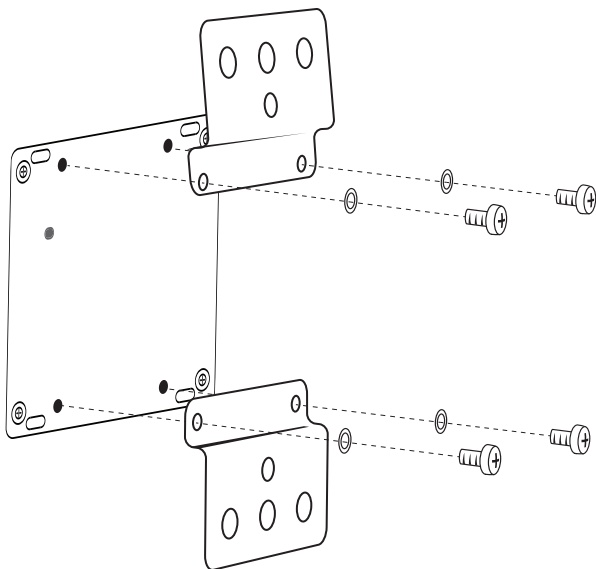
Order Part #10-00535 USB Mounting Kit (2301/12) - Silver (Available for purchase separately)

1 kit required to mount per LEX or REX

Each kit includes:

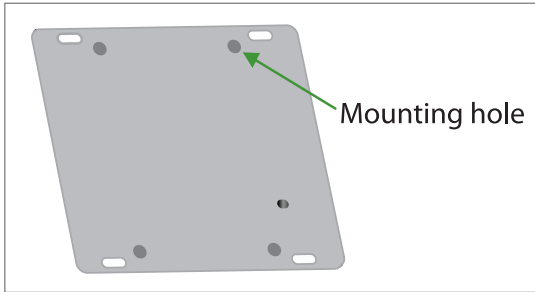
- 2 mounting brackets
- 4 (M2.5) locking washers
- 4 (M2.5 x 7.0mm) Phillips pan head screws
- Mounting bracket installation guide (*see diagram below*)

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



## Option 2: USB Extender Direct Surface Mounting (using your own hardware)

The bottom of the Ranger 2312 enclosure features four pre-drilled holes for optional direct surface mounting. Using the stencil below, along with your own hardware you can directly mount your USB Extender on a surface.

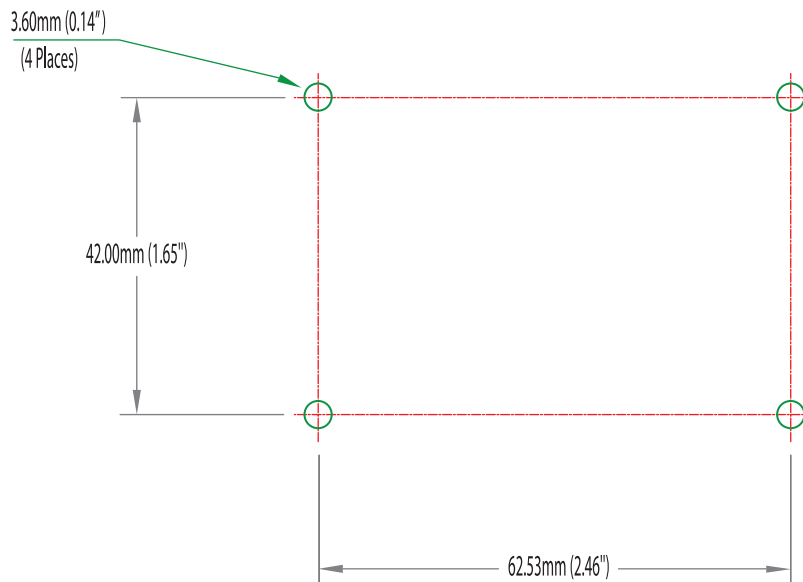


Distance between the enclosure mounting holes:  
42.00 x 62.53mm

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: M2.5 locking washers and M2.5 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 3.70mm (0.1457") 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.

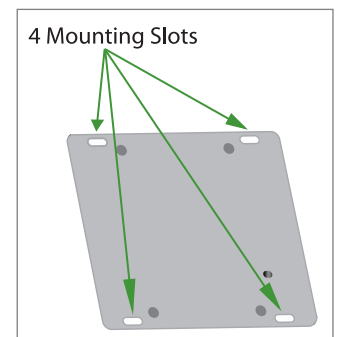
**note** To ensure the stencil below prints to scale be sure to set the page scaling setting to "none".

### Direct Surface Mounting Measurement Stencil



## Option 3: Cable-Tie Mounting

The bottom of the Ranger 2312 enclosure also features four convenient slots for cable mounting. Simply thread a cable tie, (also called tie-wrap or zip tie), into the mounting slot and through the cable tie head, and secure it to a pole or other surface by pulling it tight. Cable ties are not included with this system due to varying lengths dependent upon the application.



## 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
USB device is attached but not functioning.	<ul style="list-style-type: none"> <li>The USB device requires drivers that were not installed.</li> <li>The USB device does not support USB hubs.</li> <li>The USB device has malfunctioned.</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 into the REX. Please see your USB device manufacturer's website for details.</li> <li>2. In the Universal Serial Bus controllers section of Device Manager, check that the USB device has enumerated.</li> <li>3. Contact <a href="#">Technical Support</a> for assistance.</li> </ol>
USB device is attached but not functioning.	<ul style="list-style-type: none"> <li>Overcurrent condition has occurred because the USB device has drawn more current than can be supplied per USB specification (1A). Operating system may generate a status bubble indicating an issue.</li> </ul>	<ol style="list-style-type: none"> <li>1. Power cycle REX by unplugging the power adapter from the extender. Wait approximately 30 seconds and then plug the power adapter back into the REX.</li> <li>2. If overcurrent continues to occur, either:               <ol style="list-style-type: none"> <li>(a) the USB device may use more power than the USB specification, or</li> <li>(b) the USB device may be damaged.</li> </ol> </li> <li>3. Consult your USB device documentation and power your USB device with the required power supply.</li> </ol>
Link LED on the LEX and REX units blink intermittently.	<ul style="list-style-type: none"> <li>The CAT 5e/6/7 cable connecting the LEX and REX is faulty.</li> </ul>	<ol style="list-style-type: none"> <li>1. Ensure the CAT 5e/6/7 cable is of decent quality.</li> <li>2. Contact <a href="#">Technical Support</a> for assistance.</li> </ol>

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Link LED on the LEX and REX is off.	<ul style="list-style-type: none"> <li>• The REX is not receiving power.</li> <li>• The LEX is not receiving power.</li> <li>• The link cable is malfunctioning.</li> <li>• The extender system is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Confirm the host computer is on and providing power to LEX.</li> <li>2. Ensure the supplied AC power adapter is properly connected to one unit, either the LEX or REX.</li> <li>3. Ensure the CAT 5e/6/7 cabling between the LEX and REX is properly installed or replace the link cable.</li> <li>4. Check that the AC adapter is connected to a live source of electrical power.</li> <li>5. Contact <a href="#">Technical Support</a> for assistance.</li> </ol>

## 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.

## Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting section, contact **Icron Technical Support**:

[www.icron.com/support](http://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
- Make and model of any USB device(s) attached to the product
- Description of the installation
- 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](mailto:sales@icron.com)

Tel: +1 604 638 3920

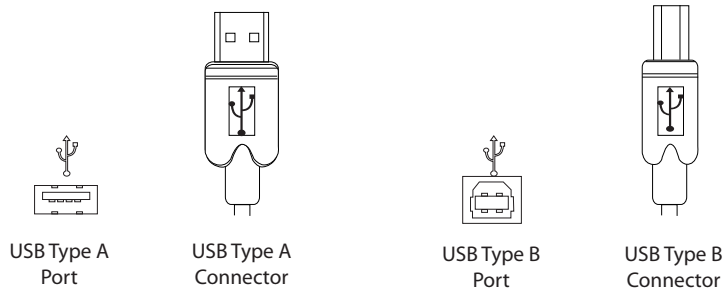
# Technical Glossary

## Category 5e/6/7 (CAT 5e/6/7) Network Cabling

Category 5e/6/7 cable is commonly also referred to as CAT 5e or CAT 6 or CAT 7. This cabling is available in either solid or stranded twisted pair copper wire variants and as UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair). UTP cables are not surrounded by any shielding making them more susceptible to Electromagnetic Interference (EMI). STP cables include shielding the copper wires and provide better protection against EMI.

## 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.



## RJ45

The Registered Jack (RJ) physical interface is what connects the network cabling (CAT 5e/6/7) to the LEX and REX units. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination as the Ranger 2312 requires all four pairs of the cable. RJ45 connectors are sometimes also referred to as 8P8C connectors. Note that any give cable must be terminated using the same T568 scheme on both ends to operate correctly.

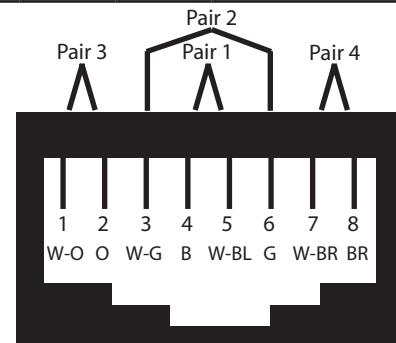
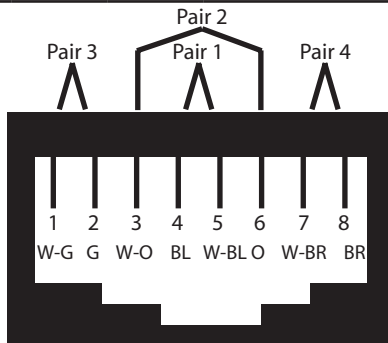
## RJ45 Pin Positioning

Table 1 - T568A Wiring

PIN	PAIR	WIRE	CABLE COLOR
1	3	1	WHITE/GREEN
2	3	2	GREEN
3	2	1	WHITE/ORANGE
4	1	2	BLUE
5	1	1	WHITE/BLUE
6	2	2	ORANGE
7	4	1	WHITE/BROWN
8	4	2	BROWN

Table 2 - T568B Wiring

PIN	PAIR	WIRE	CABLE COLOR
1	2	1	WHITE/ORANGE
2	2	2	ORANGE
3	3	1	WHITE/GREEN
4	1	2	BLUE
5	1	1	WHITE/BLUE
6	3	2	GREEN
7	4	1	WHITE/BROWN
8	4	2	BROWN





## Specifications

Range	Up to 100m (330ft) over Cat 5e/6/7 cable
USB Device Support	High-speed devices (480 Mbps) (USB 2.0) Full-speed devices (12 Mbps) (USB 1.1) Low-speed devices (1.5 Mbps) (USB 1.1)
Maximum USB Devices Supported	30 USB devices or 4 USB hubs with 26 USB devices.
Power Supply	100-240 V AC input, 24V 1A DC output
Current Available to USB Device(s) at REX	Up to 1 Amp per USB port, 1.5 Amps total shared
Mounting	Slots for Cable Ties or Optional Mounting Kit available
Enclosure Material	Silver Anodized Aluminum
System Shipping Weight	760 g (1.675 lbs.)
<b>LOCAL EXTENDER (LEX)</b>	
USB Connector	1 x USB 2.0 Type B
Link Connector	1 x RJ45
Dimensions	87.0mm x 75.0mm x 26.0mm (3.4" x 3.0" x 1.0")
<b>REMOTE EXTENDER (REX)</b>	
USB Connectors	2 x USB Type A
Link Connector	1 x RJ45
Dimensions	87.0mm x 75.0mm x 26.0mm (3.4" x 3.0" x 1.0")
<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), CE (Class B)
Environmental	RoHS2 (CE)
<b>SUPPORT</b>	
Warranty	2-year



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