



# USB 2.0 Ranger® 2104

Cat 5e 100m USB Extender System

## User Guide



Thank you for purchasing the USB 2.0 Ranger 2104.

Please read this guide thoroughly.

This document applies to Part Numbers: 00-00234 through 00-00236 and 00-00241.

### **FCC Radio Frequency Interference Statement Warning**

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### **CE Statement**

We, Icron Technologies Corporation, declare under our sole responsibility that the Ranger 2104, to which this declaration relates, is in conformity with European Standard EN 55022 Class A, EN 61000, and EN 55024.

### **IC Statement**

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

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Document #90-00524-A05

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## Introduction

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

 NOTE: Notes provide additional information that could be useful.

 CAUTION: Cautions provide important information about an operational requirement.

## Ranger 2104 Product Contents

Your Ranger 2104 is packaged with:

- Ranger 2104 Quickstart Guide - Located on the outer box sleeve
- LEX unit (Local Extender)
- REX unit (Remote Extender)
- REX AC power adapter
- Country specific AC power cord
- Warranty card

## Requirements

To complete the installation, you will also require the following items that are not included with the product:

- USB 2.0 or 1.1 compatible computer (host computer) with a USB compliant operating system
- USB 2.0 or 1.1 compatible device
- Cat 5e Unshielded Twisted Pair (UTP) cable with two RJ45 connectors (if using surface cabling), OR, Cat 5e cabling with two information outlets and two Cat 5e patch cords with RJ45 connectors (if using premise cabling)

This product supports solid core Cat 5e or better cabling (i.e.: Cat 6, Cat 7, etc). All references to “Cat 5e” should be read as “Cat 5e or better”.

 NOTE

## About the Ranger 2104

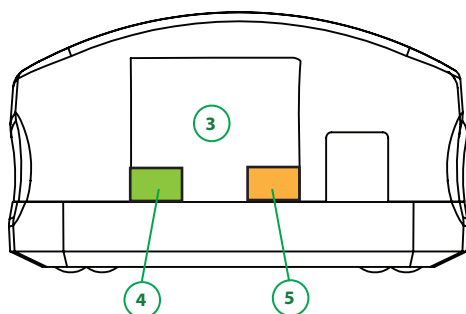
The Ranger 2104 incorporates Icron’s patented ExtremeUSB® technology, enabling users to extend beyond the standard 5m cable limit for USB peripheral devices. With the Ranger 2104, USB devices can be located up to 100 meters (330 ft) from the computer.

The Ranger is composed of two individual units; the LEX unit and the REX unit.

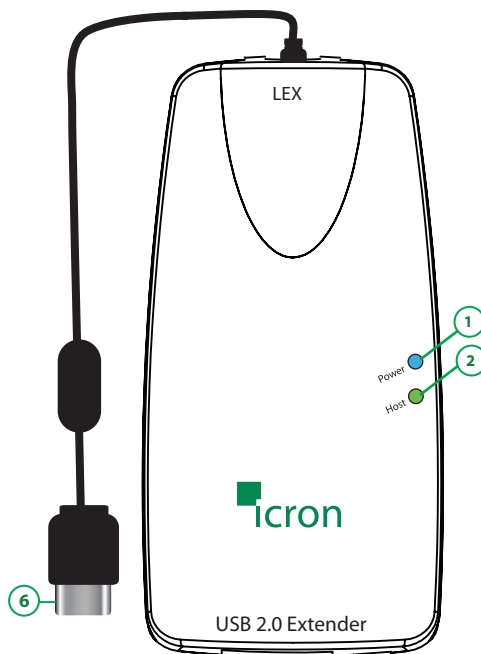
## LEX unit description

The LEX unit connects to the computer using the attached USB cable. Power for this unit is provided by the USB on the host computer.

Back View



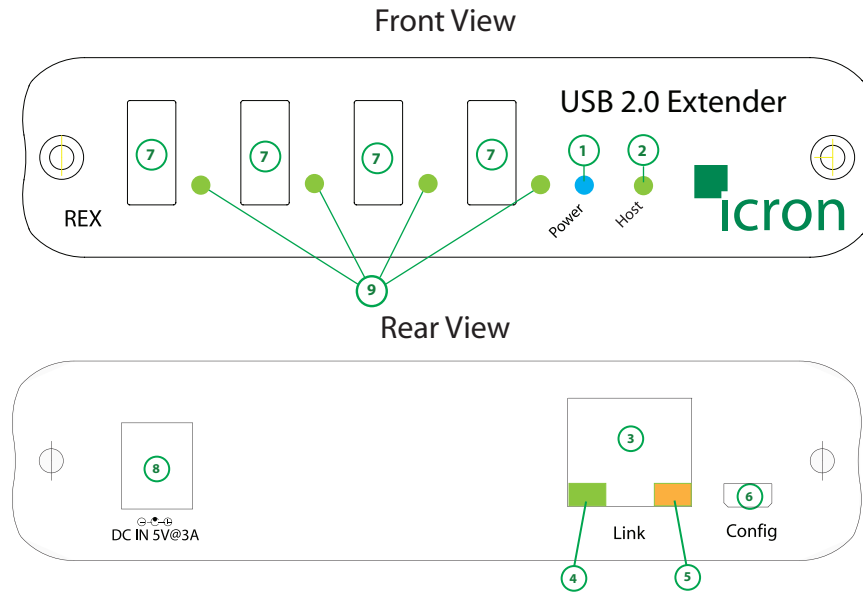
Top View



ITEM	TYPE	DESCRIPTION
1	Power LED (Blue)	LED turns on when power is supplied. Off when no power is supplied.
2	Host LED (Green)	LED turns on when the Ranger is installed properly.
3	Link Port (RJ45)	Accepts RJ45 connector for Cat 5e cabling (or better).
4	Link LED (Green) on RJ45	Indicates connectivity between LEX and REX. LED turns on when link between LEX and REX is established. Off when there is no link between LEX and REX.
5	Activity LED (Amber) on RJ45	Indicates activity on RJ45 port. LED blinks intermittently when data is transmitted between LEX and REX.
6	USB Type A connector	Used to connect the LEX unit to the host computer.

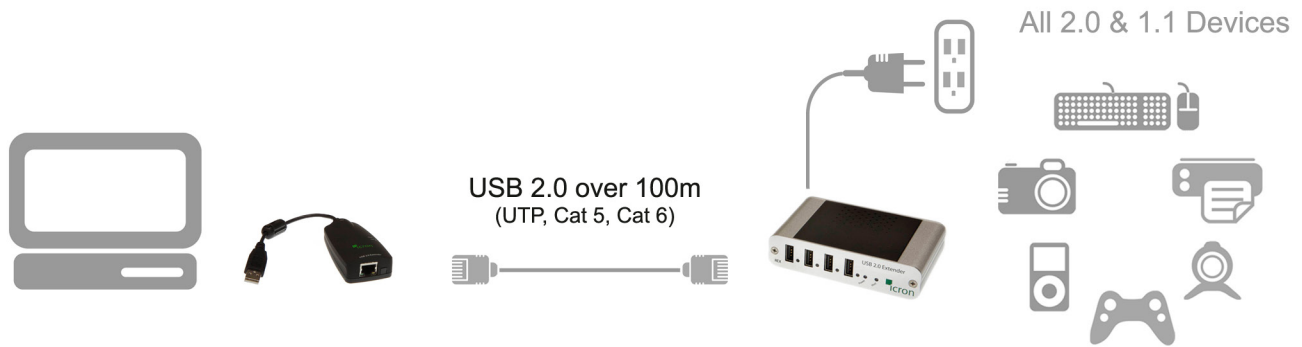
## REX unit description

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



ITEM	TYPE	DESCRIPTION
1	Power LED (Blue)	LED turns on when power is supplied. Off when no power is supplied.
2	Host LED (Green)	LED turns on when the Ranger is installed properly.
3	Link Port (RJ45)	Accepts RJ45 connector for Cat 5e cabling.
4	Link LED (Green) on RJ45	Indicates connectivity between LEX and REX. LED turns on when link between LEX and REX is established. Off when there is no link between LEX and REX.
5	Activity LED (Amber) on RJ45	Indicates activity on RJ45 port. Blinks intermittently when data is transmitted between LEX and REX.
6	Config port	Manufacturer use only.
7	Device Port (USB Type A port)	USB device connection.
8	Power port	Connects to the AC power supply. Required on REX for proper operation.
9	Device LED (Green)	Indicates when a USB device is connected to the Device Port. Solid green when device is plugged in and active. Off when device is in suspend mode or REX unit is powered off.

## Installation guide



USB extension up to 100m Cat 5e cable

Before you can install the Ranger 2104, 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 2104 supports a maximum distance of 100m.

OR

If you are using premise cabling, ensure Cat 5e cabling is installed between the two locations, with Cat 5e information outlets located near both the computer and the USB device(s).

### Installing the LEX unit

1. Place the LEX unit near the computer.
2. Plug the USB Type A connector on the LEX into a USB port on the computer.

### Installing the REX unit

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

**!** Use only the AC adapter supplied with the Ranger. Use of substitute adapters may cause permanent damage to the system and will void the warranty.

## Connecting the LEX unit to the REX unit

**note** To ensure proper operation, it is recommended that only solid core Cat 5e or better, Unshielded Twisted Pair (UTP) cabling be used to connect the LEX unit to the REX unit. 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 10m.

### With Surface Cabling

1. Plug one end of the Cat 5e cabling (not included) into the Link port (RJ45) on the LEX unit.
2. Plug the other end of the Cat 5e cabling into the Link port (RJ45) on the REX unit.

### With Premise Cabling

1. Plug one end of a Cat 5e patch cord (not included) into the Link port (RJ45) on the LEX unit.
2. Plug the other end of the patch cord into the Cat 5e information outlet near the host computer.
3. Plug one end of the 2<sup>nd</sup> Cat 5e patch cord (not included) into the Link port (RJ45) on the REX unit.
4. Plug the other end of the 2<sup>nd</sup> patch cord into the Cat 5e information outlet near the USB device.

**note** The maximum length of the CAT 5 cable, including patch cords, must not exceed 100 meters. The combined length of any patch cords using stranded conductors must not exceed 10m.

## Checking the Installation

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

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

To open Device Manager in Windows 2000 or XP:  
Right click "My Computer" then select: Properties >> Hardware tab >> Device Manager button

To open Device Manager in Windows Vista, 7 or 8:  
Open Windows Explorer, then right click on "Computer" then select: Manage >> Device Manager



## Connecting a USB Device

1. Install any software required to operate the USB device(s). Refer to the documentation for the USB device(s), as required.
2. Connect the USB device to the Device port on the REX unit.
3. Check that the Device is detected and installed properly in the operating system.

## Compatibility

The Ranger 2104 complies with USB 2.0 and USB 1.1 specifications governing the design of USB devices. Icron Technologies Corporation does not, however, guarantee that all USB devices are compatible with the Ranger as there are a number of different configurations that may impact the operation of USB devices over extended distances.

## Troubleshooting

The following table provides troubleshooting tips. The topics are arranged in the order in which they should be executed in most situations. If you are unable to resolve the problem after following these instructions, please contact technical support for further assistance.

PROBLEM	CAUSE	SOLUTION
All LEDs on LEX unit are off.	The LEX unit is not receiving enough power from the USB port.	<ol style="list-style-type: none"><li>1. Ensure that the USB Type A connector from LEX to host computer is properly inserted directly in a USB port.</li><li>2. Move the LEX USB Type A connector to another USB port on the host computer.</li></ol>
All LEDs on REX unit are off.	The REX unit is not receiving power from the AC adapter.	<ol style="list-style-type: none"><li>1. Ensure that the AC power adapter is properly connected to the REX unit.</li><li>2. Check that the AC adapter is connected to a live source of electrical power.</li></ol>
Link LEDs on LEX unit and REX unit are off.	There is no connection between the LEX unit and REX unit.	<ol style="list-style-type: none"><li>1. Ensure that a solid core Cat 5e cable (or better) with straight-through conductors is connected between the LEX unit and REX unit.</li><li>2. To determine if the original Cat 5e cable is defective, connect a short Cat 5e patch cord between the LEX and REX.</li><li>3. Contact Technical Support.</li></ol>

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Link LED is on, Host LED is off.	<ul style="list-style-type: none"> <li>• The host computer is not powered on.</li> <li>• The computer does not support USB hubs.</li> <li>• The Ranger is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Disconnect all USB devices from the REX unit.</li> <li>2. Disconnect the LEX unit from the computer.</li> <li>3. Disconnect the REX unit from the AC power adapter.</li> <li>4. Reconnect the LEX unit to the computer.</li> <li>5. Reconnect the REX unit to the AC power adapter.</li> <li>6. In the Universal Serial Bus controllers section of Device Manager, check that the Ranger is recognised as a "Generic USB Hub".</li> </ol>
Ranger units were working but the Host LED on REX unit is suddenly blinking.	The REX unit is in suspend mode. The operating system may put the Ranger in suspend mode when the computer is put into a Suspend/Standby state or when no USB devices are attached.	<ol style="list-style-type: none"> <li>1. Recover/Resume the operating system from Suspend/Standby mode (see your operating system's documentation).</li> <li>2. Attach a USB device to the Ranger.</li> </ol>
All LEDs on both the LEX unit and REX unit are on but the USB device does not operate correctly or is detected as an "Unknown Device" in the operating system.	<ul style="list-style-type: none"> <li>• The USB device is malfunctioning.</li> <li>• The computer does not recognise the USB device.</li> <li>• The application software for the device is not operating.</li> <li>• The Ranger is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>1. Disconnect the Ranger from the computer.</li> <li>2. Connect the USB device directly to the USB port on the computer.</li> <li>3. If the device does not operate properly, consult the user documentation for the device.</li> <li>4. Update your system BIOS, chipset or USB Host controller drivers from your System/Mother board manufacturer's website.</li> <li>5. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the Ranger. Connect the Ranger to the computer.</li> <li>6. If the second device does not operate, the Ranger may be malfunctioning. Contact technical support for assistance.</li> <li>7. If the second device does operate properly, the first device may not be compatible with the Ranger.</li> </ol>


<p>USB device is attached to REX USB port but REX device LED is off..</p>	<ul style="list-style-type: none"> <li>• A USB device must have the appropriate driver installed on the computer operating system.</li> <li>• The USB device is drawing more current than allowed by USB specification (&gt;500mA).</li> </ul>	<ol style="list-style-type: none"> <li>1. Install the required USB device driver on the computer operating system prior to attaching the USB device to the REX unit. Please see your USB device manufacturer's website for details.</li> <li>2. Consult your USB device documentation and power your USB device with the additional, USB device manufacturer supplied, power supply (if available).</li> </ol>
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**NOTES**

## Frequently Asked Questions

Please visit Icron's website for answers to FAQs: <http://www.icron.com/resources/faq/>

## Specifications

Range	100 metres over Cat 5e (or better) cable
USB device support	High-speed devices (480 Mb/s) (USB 2.0) Full speed devices (12 Mb/s) (USB 2.0 & 1.1) Low speed devices (1.5 Mb/s) (USB 2.0 & 1.1)
USB hub support	Any single chain can include up to 4 USB hubs plus one Ranger.
USB host support	EHCI (USB 2.0) and OHCI/UHCI (USB 1.1)
Maximum USB devices supported (Incl. USB Hubs)	14 USB Devices including any additional USB hubs connected to the REX.
AC adapter(s)  <b>Use only the AC adapter provided</b>	Input: 100/240 V AC, 50 – 60 Hz Output: 5 V DC, 3 A
AC adapter connector	1.7 mm centre-positive jack
Power available to USB device at REX unit	500 mA
USB cable length (LEX to host computer)	0.15 meters (0.49 ft)
LEX unit USB connector	1 x USB Type A connector
LEX unit Link connector	1 x RJ45
REX unit Link connector	1 x RJ45
REX unit USB connector	4 x USB Type A port
LEX unit dimensions	44 mm x 87 mm x 24 mm (1.72" x 3.43" x 0.95")
LEX unit weight	0.06 kg ( 0.13 lbs)
LEX power consumption	500 mA Maximum
REX unit dimensions	110 mm x 69 mm x 28 mm (4.33" x 2.72" x 1.10")
REX unit weight	0.20 kg ( 0.44 lbs)
REX power consumption	Approx. 500 mA (No Load). 2.5A (Full load)
System shipping weight	0.65 kg (1.42 lbs)
Operating temperature range	0°C – 50°C
Regulatory testing	FCC Class A, IC, CE Class A
ESD rating	EMC EN-61000-4-2 4kV Contact, 8kV Air

## Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting section, you may contact **Technical Support** ([techsupport@icron.com](mailto:techsupport@icron.com)) and send the following information:

- Host computer make and model
- Type of Operating System installed (e.g. Windows XP, Mac OS X, Windows 7 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

## 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.

### 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 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 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. Be sure you have the serial numbers of the local extender and remote extender before calling. 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.

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

## Contacting Technical Support

Click on: [Online Technical Support](#)  
Tel: +1 604 638 3920

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 XP, Mac OS X, Windows 7 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

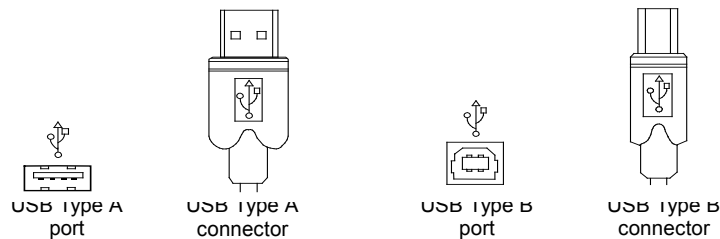
## Technical Glossary

### Category 5e (Cat 5e) Network Cabling

Category 5e cable is commonly also referred to as Cat 5e. 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 over each individual pair of copper wires and provides better protection against EMI.

### USB Cables

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



### RJ45

The Registered Jack (RJ) physical interface is what connects the network cabling (Cat 5e) to the LEX unit and REX unit. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination as the Ranger uses all four pairs of the cable. RJ45 connectors are sometimes also referred to as 8P8C connectors.

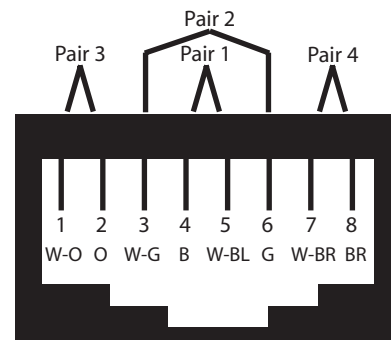
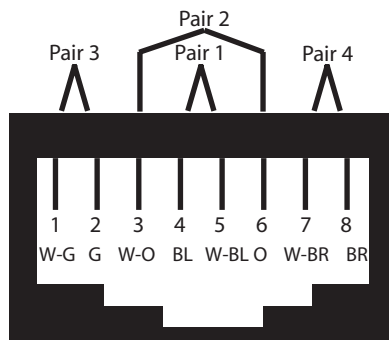
### RJ45 Pin Positioning

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





**Icron Technologies Corporation**  
4664 Lougheed Highway, Suite 221  
Burnaby, BC Canada  
V5C 5T5

Tel: +1 604 638 3920

Fax: +1 604 638 3930

[icron.com](http://icron.com)