

# USB 2.0 RG2304

## 4-Port USB 2.0 100m CAT 5e/6/7 Extender System User Guide



←EXTREME→  
USB®

Thank you for purchasing the USB 2.0 RG2304 Extender System.

Please read this guide thoroughly.

This document applies to Part Numbers: 01-00448, 01-00449, 01-00450, 01-00451, 01-00537, 02-00028, and 02-00029.

### **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 declare under our sole responsibility that the USB 2.0 RG2304, 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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## Introduction

This guide provides product information for the USB 2.0 RG2304, 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.

## USB 2.0 RG2304 Product Contents

Your RG2304 is packaged with:

- Local Extender
- Remote Extender
- USB 2.0 Cable
- Remote Extender AC International Power Adapter
- Country Specific Power Cable
- Quick Start Guide

## About the RG2304

The USB 2.0 RG2304 incorporates ExtremeUSB® technology, enabling users to extend USB beyond the standard 5m cable limit for USB 2.0 peripheral devices. The RG2304 extender system is composed of two individual units: the Local Extender and the Remote Extender and has the following key features:

- 100m of extension when directly connected over CAT 5e/6/7 cables
- Support for new USB 3.0 host controllers and devices
- Support for bulk and HID type devices (storage and mouse/keyboard types)



USB 3.0 devices will perform at USB 2.0 speeds if extended through the RG2304.

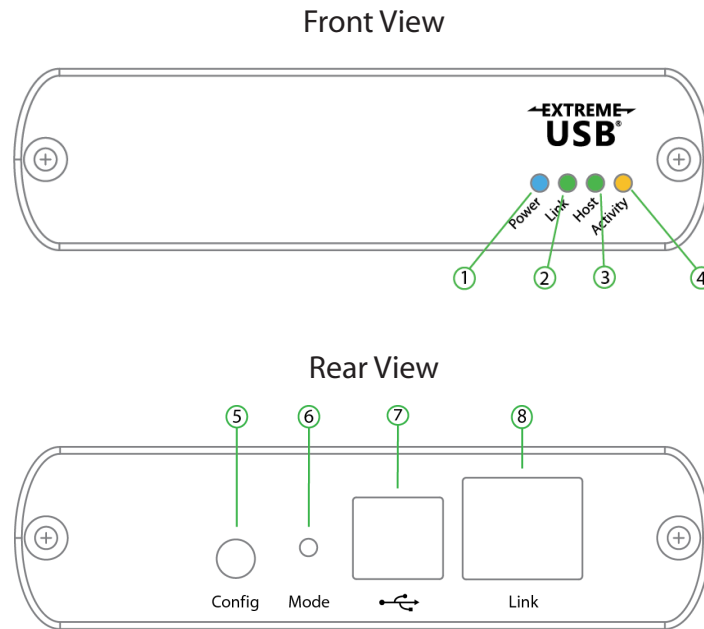
The RG2304 includes the ExtremeUSB® suite of features:



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

## The Local Extender

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

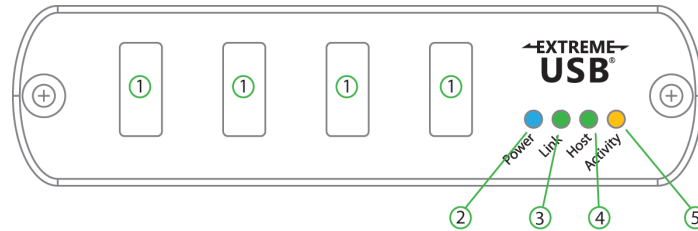


ITEM	TYPE	DESCRIPTION
1	Power LED (Blue)	LED turns on when power is supplied. LED is off when no power is supplied by the host computer.
2	Link LED (Green)	Indicates a valid ExtremeUSB link is established between the local and remote extenders. LED turns on when link between local and remote extender is established. LED is off when there is no link between local and remote extenders. LED is slow blinking when the unit is attempting to establish a link.
3	Host LED (Green)	LED turns on when the RG2304 system is properly enumerated on the host computer. LED blinks when in a suspended state.
4	Activity LED (Amber)	Indicates data transmission is occurring between local and remote extenders. LED blinks intermittently with or without a USB device connected. When the local and remote extenders are in suspend mode, the LED is off.
5	Config	Reserved for manufacturer use.
6	Mode	Reserved for manufacturer use.
7	USB Host Port	Used to connect the local extender unit to the host computer. Accepts Type B connector into the local extender unit.
8	Link Port (RJ45)	Accepts RJ45 connector for CAT5e/6/7 cabling to connect the local extender unit to the remote extender unit.

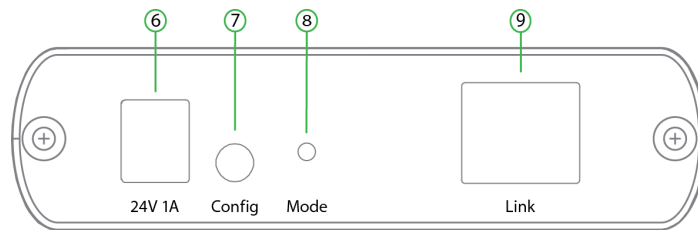
## The Remote Extender

The remote extender unit provides USB Type A ports for standard USB devices. The remote extender unit allows you to connect up to four USB devices directly. Additional devices may be connected by attaching up to four USB hubs to the remote extender unit. The remote extender is powered by an external AC adapter and can supply up to 600mA to each USB port.

Front View



Rear View



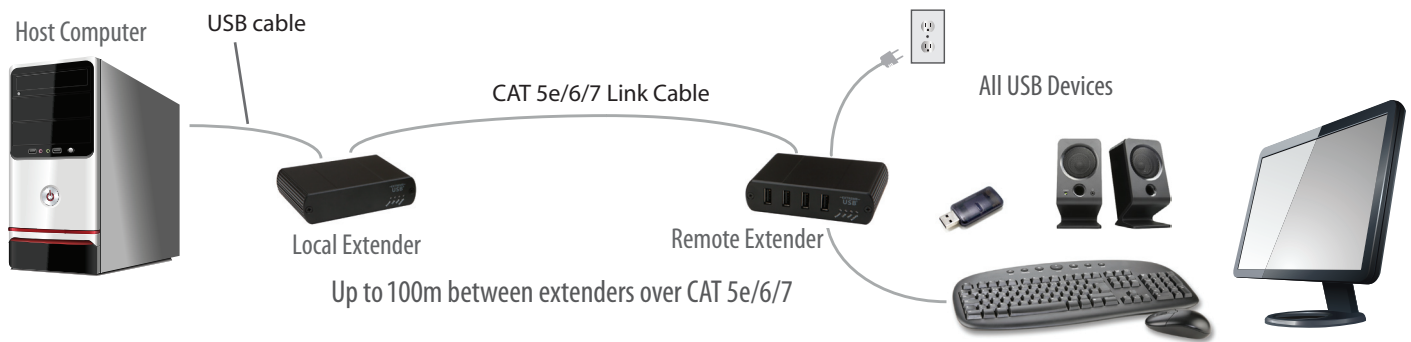
ITEM	TYPE	DESCRIPTION
1	USB Device Ports	Accepts USB device(s) using Type A connectors.
2	Power LED (Blue)	LED turns on when power is supplied, off when no power is supplied.
3	Link LED (Green)	Indicates a valid ExtremeUSB link is established between the local and remote extenders. LED turns on when link between local and remote extenders is established. LED is off when there is no link between local and remote extenders.
4	Host LED (Green)	Indicates that the RG2304 system is properly enumerated on the host computer. The LED blinks when in a suspended state.
5	Activity LED (Amber)	Indicates data transmission is occurring between local and remote extenders. LED blinks intermittently with or without a USB device connected. When the local and remote extenders are in suspend mode, the LED is off.
6	DC Power Port	Connects to the AC power supply. Required at the remote extender for proper operation.
7	Config	Reserved for manufacturer use.
8	Mode	Reserved for manufacturer use.
9	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the local extender to the remote extender unit.

# Installing the RG2304 System

## Requirements

To complete the installation, you will 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)
- CAT 5e/6/7 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).



## Preparing Your Site

Before installing the RG2304, 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 a cable-length distance of 100m to the computer. If not, adjust the location of the devices and/or computer accordingly.
3. If you are using surface cabling, install the CAT 5e/6/7 cabling as desired and terminate it with the appropriate RJ45 ends.
4. If using premise cabling (in-building network infrastructure), ensure your cabling does not exceed 100m and that it meets CAT 5e/6/7 specification.

If you are using premise cabling, ensure CAT 5e/6/7 cabling is installed between the two locations and if necessary patched together. CAT 5e/6/7 information outlets should be located near the computer and the USB device(s), and the total length, including patch cords must be less than 100m.

**!** Cable installation is important, particularly if high throughput applications are used. When installing, ensure the cable is installed away from, or isolated from potential sources of interference such as electrical wiring, fluorescent lighting, etc.



When terminating cables, ensure the matching RJ45 connector is used for the cable type. For example, if CAT 6 cable is used, then CAT 6 compatible RJ45 connectors must be used. If this care is not taken, the benefits of higher grade cabling may not be realized.

## **Installing the Local Extender**

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

## **Connecting the Local Extender to the Remote Extender**

### With Surface Cabling

1. Connect the CAT 5e/6/7 cable into the Link port of the Local Extender.
2. Connect the CAT 5e/6/7 cable into the Link port of the Remote Extender.

### With Premise Cabling

1. Connect a CAT 5e/6/7 patch cable (not provided) into the information outlet near the host computer.
2. Connect the patch cable into the Link port of the local extender.
3. Connect a CAT 5e/6/7 patch cable (not provided) into the information outlet near the USB devices.
4. Connect the patch cable into the Link port of the remote extender.

## **Installing the Remote Extender**

1. Place the remote extender near the USB device(s).
2. Assemble the power adapter and country specific power cord together and connect them into a suitable AC outlet.
3. Connect the power adapter to the remote extender.



## Checking the Installation

1. On the local and remote extenders, check that the Power, Status, Link and Host LEDs are on. If the Host or 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 (XP, 7, 8), open Device Manager to confirm that the RG2304 has installed correctly. Expand the entry for Universal Serial Bus controllers by clicking the “+” sign. If the RG2304 has been installed correctly, you should find it listed as a “Generic USB Hub”.



To open Device Manager in Windows XP:

Right click “My Computer” then select: Properties >> Hardware tab >> Device Manager



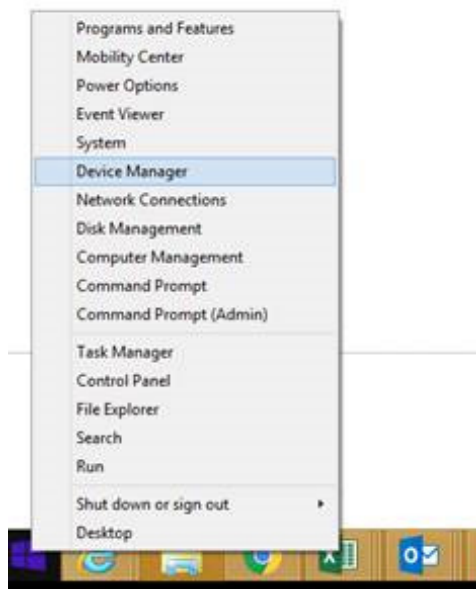
To open Device Manager in Windows 7:

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 OS X users, open the System Profiler to confirm that the RG2304 has installed correctly. In the left hand column under Hardware, select “USB” and inspect the right hand panel. If the RG2304 has been installed correctly, you should find it listed as a “Hub” under the USB High-Speed Bus/USB Bus.



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.

4. If the RG2304 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(s). Refer to the documentation for the USB device(s), as required.
2. Connect the USB device to the device port on the remote extender.
3. Check that the device is detected and installed properly in the operating system.

## **Compatibility**

The USB 2.0 RG2304 complies with USB 1.1 and USB 2.0 specifications governing the design of USB devices. However, it is not possible to guarantee that all USB devices or hosts will be compatible with the RG2304, as there are a number of different characteristics that may impact the operation of USB devices over extended distances.

## USB Extender Mounting Options

The bottom of the RG2304 enclosures feature four convenient pre-drilled holes for optional mounting. Based on your requirements, choose from two available mounting options:

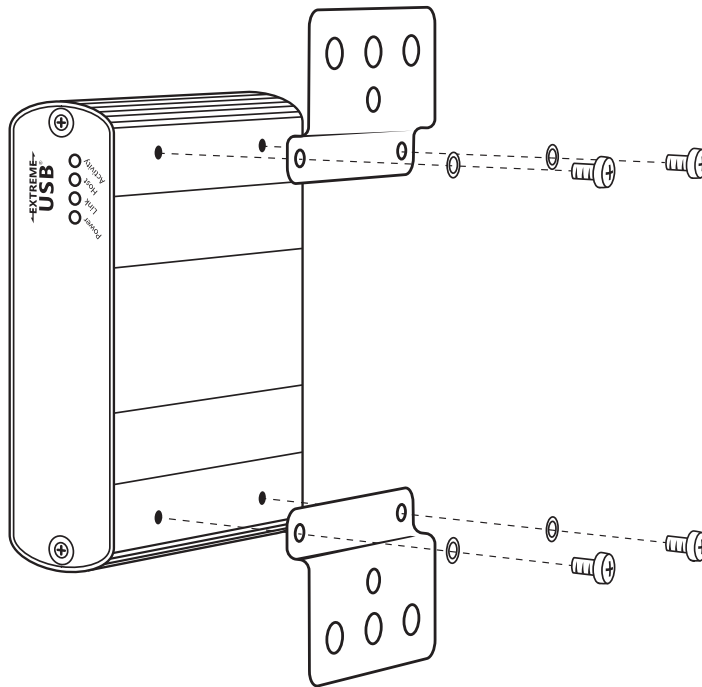
1. **USB Extender Mounting Kit** (Purchased separately Order Part # 10-00394 USB Mounting Kit - Black)
2. **USB Extender Direct Surface Mounting** (Using your own hardware, stencil provided on page 11)

### OPTION 1: USB Extender Mounting Kit - each kit includes:

- 2 mounting brackets
- 4 (M3.0) locking washers
- 4 (M3.0 x 5mm) Phillips pan head screws
- Mounting bracket installation guide (*see diagram below*)

1 kit required to mount per Local Extender or Remote Extender

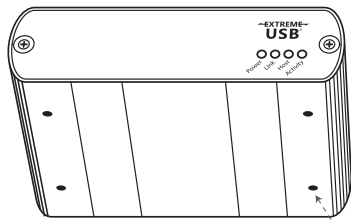
Using a Phillips screwdriver, in the order as illustrated below, fasten and secure the provided screws, locking washers and brackets into place.



Once the bracket mounting is secured onto the extender, it is ready for mounting onto a surface. Please note you will need to provide your own screws to secure the extender using the available slots on each bracket.

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

The bottom of the RG2304 enclosures features four pre-drilled holes for optional surface mounting.



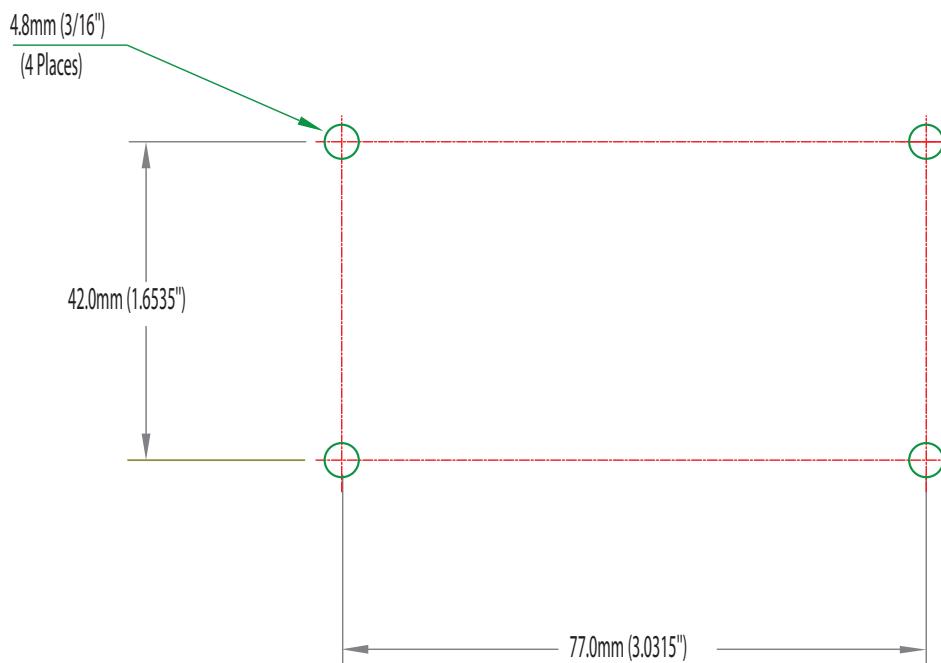
Distance between the enclosure mounting holes:  
42.0mm x 77.0mm

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



# Troubleshooting

The following table provides troubleshooting tips. The topics are arranged in the order in which they should be executed in most situations.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
All LEDs on the local extender are off.	<ul style="list-style-type: none"> <li>The local extender is not receiving power from the USB port.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure that the host computer is connected to the local extender.</li> <li>Move the USB connector to another USB port on the host computer.</li> </ol>
All LEDs on the remote extender are off.	<ul style="list-style-type: none"> <li>The remote extender is not receiving power from the AC adapter.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure that the AC power adapter is properly connected to the remote extender.</li> <li>Check that the AC adapter is connected to a live source of electrical power. Check that the remote extender's power LED is illuminated.</li> </ol>
Link LEDs on the local and the remote extenders are off.	<ul style="list-style-type: none"> <li>There is no connection between the local and remote extenders.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure CAT 5e/6/7 cable is connected between the local and remote extender units; cable should be UTP or STP, with a straight through connector and no crossovers, and 8 conductor RJ45 connectors are used at both ends.</li> <li>Connect a short CAT 5e/6/7 patch cord between the local and remote extenders to determine if the original CAT 5e/6/7 cable is defective.</li> </ol>
Link LEDs are blinking.	<ul style="list-style-type: none"> <li>There is no connection between the local and remote extenders.</li> </ul>	<ol style="list-style-type: none"> <li>Ensure both the local and remote extenders are connected directly together.</li> </ol>
Link LED on the local extender is on, Host LED on the local extender is off.	<ul style="list-style-type: none"> <li>The host computer is not powered on.</li> <li>The local extender is not connected to the computer.</li> <li>The host computer is not recognizing the local extender.</li> <li>The computer does not support USB hubs.</li> <li>The RG2304 is malfunctioning.</li> </ul>	<ol style="list-style-type: none"> <li>Disconnect all USB devices from the remote extender.</li> <li>Disconnect the local extender from the host computer.</li> <li>Disconnect the remote extender from the AC power adapter.</li> <li>Reconnect the local extender to the host computer.</li> <li>Reconnect the remote extender to the AC power adapter.</li> <li>In the Universal Serial Bus controllers section of Device Manager, check that the RG2304 is recognized as a "Generic USB Hub".</li> </ol>

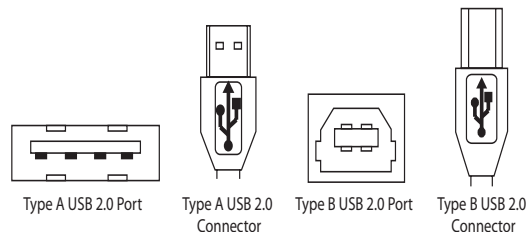
# Technical Glossary

## 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 provides better protection against electromagnetic interference (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 Local Extender unit and Remote Extender unit. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination as the USB 2.0 RG2304 requires all four pairs of the cable. RJ45 connectors are sometimes also referred to as 8P8C connectors. Note that any given 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

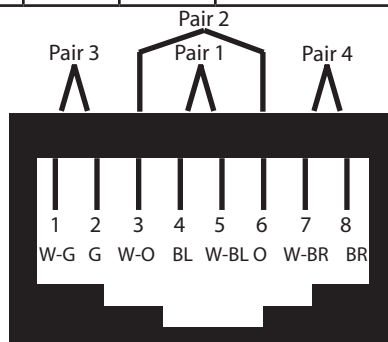
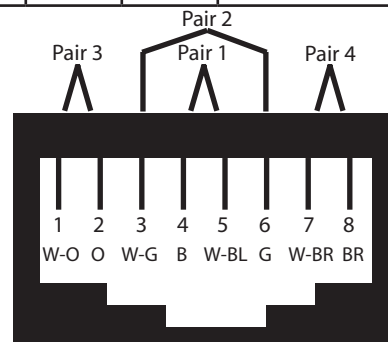


Table 2 - T568B Wiring

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

<b>RANGE</b>	
Direct Connect	Up to 100m (330 ft) over solid core CAT 5e/6/7
<b>USB SUPPORT</b>	
Maximum USB 2.0 Throughput	Up to 480 Mbps
Maximum USB 1.1 Throughput	Up to 12 Mbps
Traffic Types	All USB 2.0 and 1.1 Traffic Types
Device Types	All USB 2.0 and 1.1 Device Types
Number of Devices and/or Hubs	30
<b>LOCAL EXTENDER</b>	
USB Connector	1 x USB 2.0 Type B Receptacle
Link Connector	1 x RJ45
Dimensions	100mm x 76mm x 26mm (3.9" x 3.0" x 1.0")
Enclosure Material	Black Anodized Aluminum
<b>REMOTE EXTENDER</b>	
USB Connectors	4 x USB 2.0 Type A Receptacles
Link Connector	1 x RJ45
Dimensions	100mm x 76mm x 26mm (3.9" x 3.0" x 1.0")
Enclosure Material	Black Anodized Aluminum
Available Current	600mA at each USB port concurrently
Power Supply	100-240V AC input, 24V 1A DC Output
<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-years