



Created To **AMAZE**

USB-EXT-2

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

User Guide



FSR Inc. 244 Bergen Blvd. Woodland Park NJ 08724 1-800-332-3771 or +1-973-998-2300 www.fsrinc.com

Thank you for purchasing the USB-EXT-2.

Please read this guide thoroughly.

This document applies to, but is not limited to, Part Numbers: 01-00585, 01-00586, 01-00587, 01-00588 and 01-00589.

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, FSR Inc. Technologies Corporation, declare under our sole responsibility that the USB-EXT-2, 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.

©2017 All rights reserved.


Contents

Introduction	3
USB-EXT-2 Product Contents	3
Requirements.....	3
Features.....	3
The Local Extender.....	4
The Remote Extender	5
Installation Guide	6
Preparing for Installation.....	6
Installing the Local Extender	6
Installing the Remote Extender	6
Installing Flexible Power	6
Connecting the Local Extender to the Remote Extender.....	7
Connecting a USB Device	7
Checking the Installation	8
Compatibility.....	8
Optional USB Extender Mounting Options	9
Option 1: USB Extender Mounting Kit	9
Option 2: USB Extender Direct Surface Mounting	10
Option 3: Cable-Tie Mounting.....	10
Troubleshooting	11
Contacting Technical Support	13
Technical Glossary	14
Specifications.....	15

Introduction

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-EXT-2 Product Contents

Your USB-EXT-2 is packaged with:

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

 The USB-EXT-2 features **flexible power**, allowing the installer to connect the supplied 24V, 1A power adapter to either the local or remote extender for normal extension system operation. Please note, when powering at the local extender, take care not to plug the remote side of the CAT 5e/6/7 link cable directly into equipment other than the remote extender to avoid possible damage as flexible power is different from Power over Ethernet (PoE) and will only properly power the remote extender.

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 USB-EXT-2 enables users to extend USB beyond the standard 5m cable limit for USB 2.0 peripheral devices. The USB-EXT-2 extender system is composed of two individual units, the local extender and the remote extender, and has the following key features:

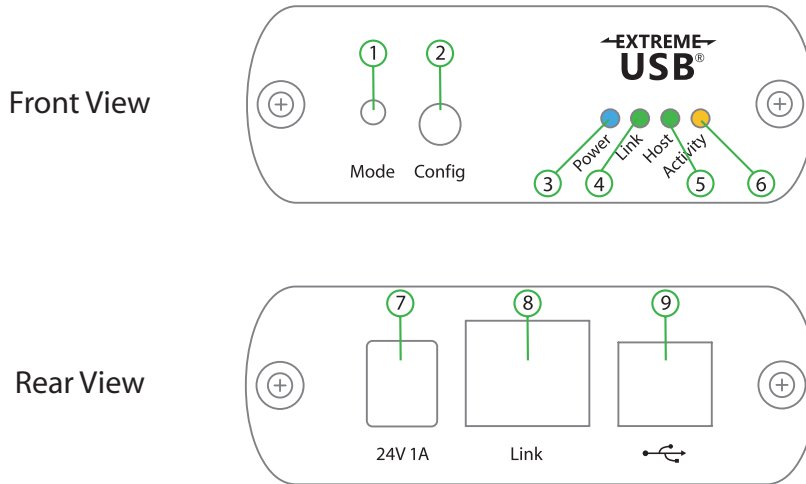
- USB device(s) can be located up to 100 meters (330 feet) from the computer
- Support for new USB 3.0 host controllers and devices (up to 480 Mbps)
- Support for all device USB types

The USB-EXT-2 includes the USB® 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 Local Extender

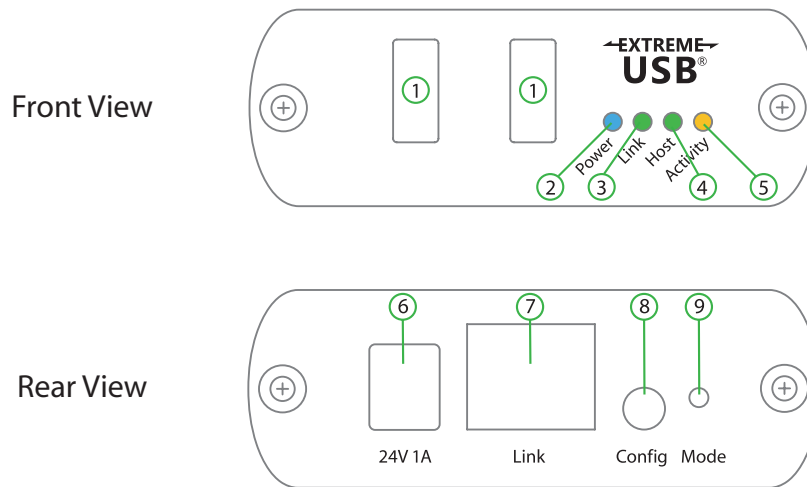
The local extender connects to the computer using a standard USB cable (included). Power for the local extender is provided by the host computer. Power for the remote extender is provided by the 24V AC adapter connected at **either** the local or remote extender. The local extender delivers power over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



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 USB link is established between the local and remote extenders. LED turns on when link between the local and remote extenders is established. LED is off when there is no link between the local and remote extenders. 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 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.
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 local extender to the remote extender.
9	USB Host Port	Used to connect the local extender to the host computer. Accepts USB Type B connector.

The Remote Extender

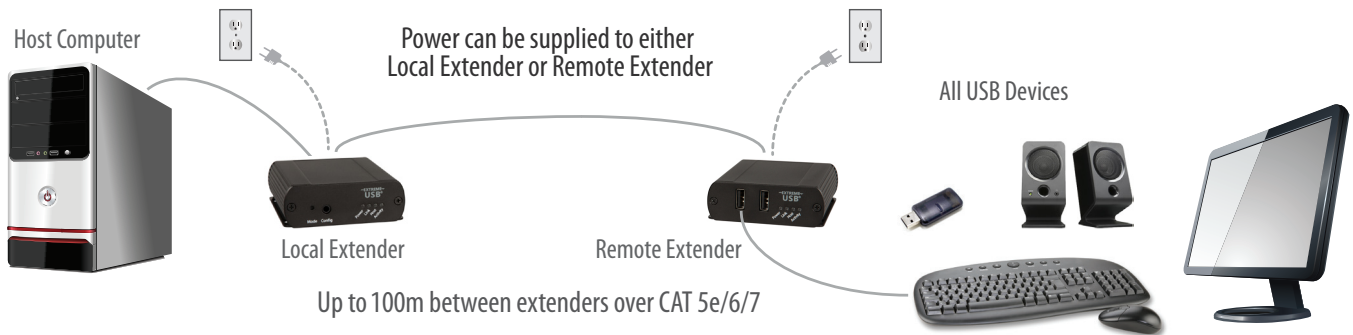
The remote extender provides two USB Type A ports for connecting standard USB devices allowing up to 1 Amp per USB port, or 1.5 Amps total when both ports are used concurrently. Additional devices may be connected by attaching USB hubs to the remote extender. The remote extender is powered either directly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



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 USB 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 the local and remote extenders. 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 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	Power Port	Connects to the AC power supply.
7	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the local extender to the remote extender.
8	Config Port	Reserved for manufacturer use.
9	Mode	Reserved for manufacturer use.

Installation Guide

Connect the provided power adapter to **either** the local or remote extender.



Preparing for Installation

Before you can install the USB-EXT-2, 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 USB-EXT-2 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 Local Extender

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

Installing the Remote Extender

1. Place the remote extender 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 local extender or remote extender, based on installation requirement.



The USB-EXT-2 features **flexible power**, allowing the installer to connect the supplied 24V, 1A power adapter to either the local or remote extender for normal extension system operation. Please note, when powering at the local extender, take care not to plug the remote side of the CAT 5e/6/7 link cable directly into equipment other than the remote extender to avoid possible damage as flexible power is different from Power over Ethernet (PoE) and will only properly power the remote extender.

Connecting the Local Extender to the Remote Extender



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 local extender to the remote extender. 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 local extender.
2. Plug the other end of the CAT 5e/6/7 cabling into the Link port (RJ45) on the remote extender.

With Premise Cabling:

1. Plug one end of a CAT 5e/6/7 patch cord (not included) into the Link port (RJ45) on the local extender.
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 remote extender.
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 remote extender.
3. Check that the device is detected and installed properly in the operating system.

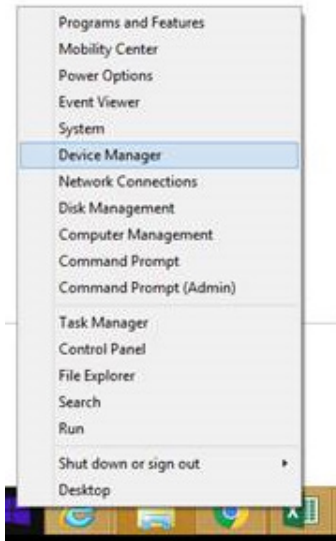
Checking the Installation

1. Check that the Power, Activity, Link and Host LEDs on the local and remote extenders 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, 8.1, 10), open Device Manager to confirm that the USB-EXT-2 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 USB-EXT-2 Series extender system has been 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.

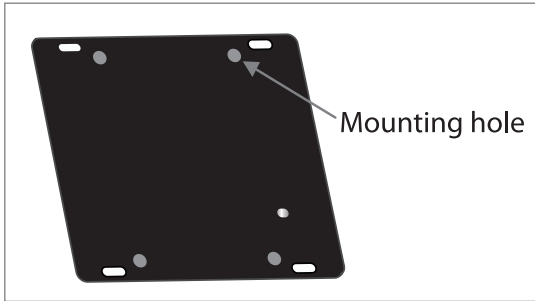
4. If the USB-EXT-2 Series extender system is not detected correctly or fails to detect, please consult the Troubleshooting section in this guide.

Compatibility

The USB-EXT-2 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.

USB Extender Direct Surface Mounting (using your own hardware)

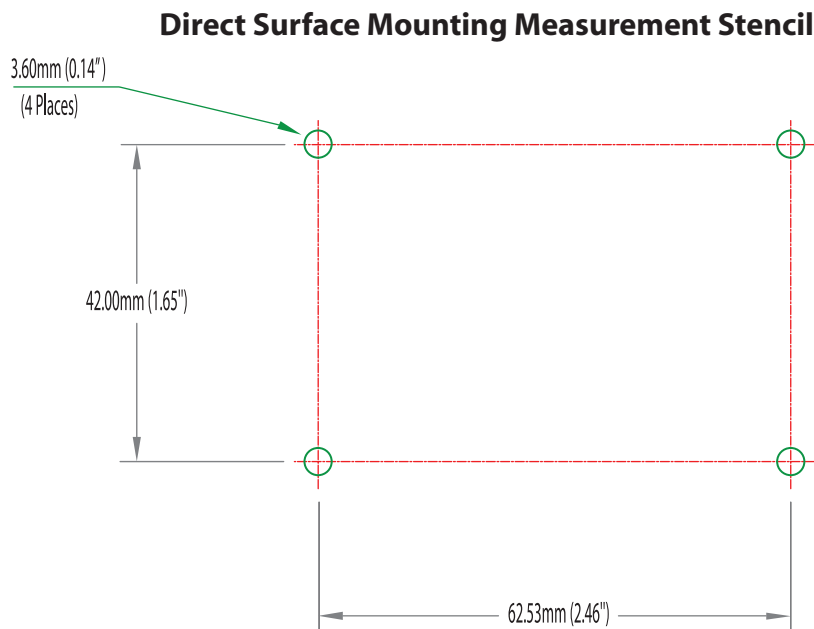
The bottom of the USB-EXT-2 enclosure features four pre-drilled holes for optional direct surface mounting. Using the stencil below, along with your own hardware you can directly mount your USB Extender on a surface.



Distance between the enclosure mounting holes:
42.00 x 62.53mm

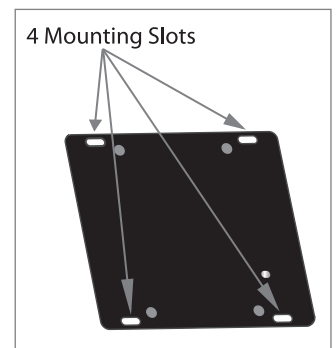
1. Mark the center point of each of the four holes on your mounting surface either by directly measuring or using a print out of the stencil below.
2. Hardware recommendation: M2.5 locking washers and M2.5 screws (4 of each per extender) noting screw length will depend upon thickness of mounting surface.
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".



Option 3: Cable-Tie Mounting

The bottom of the USB-EXT-2 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 Technical Support for further assistance.

PROBLEM	CAUSE	SOLUTION
USB device is attached but not functioning.	<ul style="list-style-type: none"> • The USB device requires drivers that were not installed. • The USB device does not support USB hubs. • The USB device has malfunctioned. 	<ol style="list-style-type: none"> 1. Install the required USB device driver on the computer operating system prior to attaching the USB device into the remote extender. Please see your USB device manufacturer's website for details. 2. In the Universal Serial Bus controllers section of Device Manager, check that the USB device has enumerated. 3. Contact Technical Support for assistance.
USB device is attached but not functioning.	<ul style="list-style-type: none"> • 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. 	<ol style="list-style-type: none"> 1. Power cycle remote extender by unplugging the power adapter from the extender. Wait approximately 30 seconds and then plug the power adapter back into the remote extender. 2. If overcurrent continues to occur, either: <ol style="list-style-type: none"> (a) the USB device may use more power than the USB specification, or (b) the USB device may be damaged. 3. Consult your USB device documentation and power your USB device with the required power supply.
Link LED on the local and remote extenders blink intermittently.	<ul style="list-style-type: none"> • The CAT 5e/6/7 cable connecting the local and remote extenders is faulty. 	<ol style="list-style-type: none"> 1. Ensure the CAT 5e/6/7 cable is of decent quality. 2. Contact Technical Support for assistance.

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

Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting Guide, contact Technical Support at FSR Inc. and provide them with the following information:

- Host computer make and mode
- Type of operating system installed (e.g. Windows 10, macOS 10.12, etc.)
- Part number and serial number of both the Local Extender and Remote Extender unit
- Make and model of any USB device(s) attached to the product
- Description of the installation
- Description of the problem

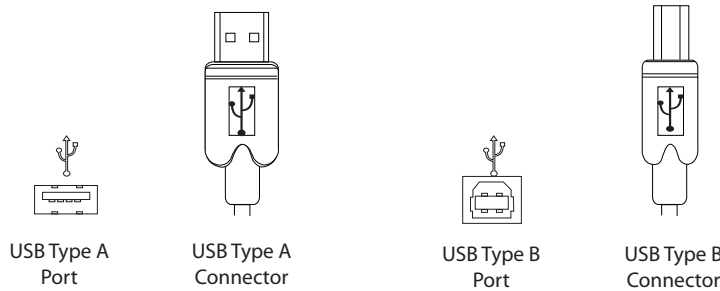
Technical Glossary

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 local and remote extenders. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination as the USB-EXT-2 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.

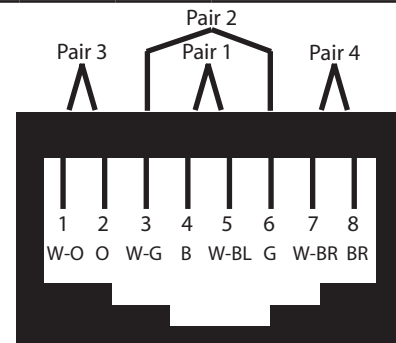
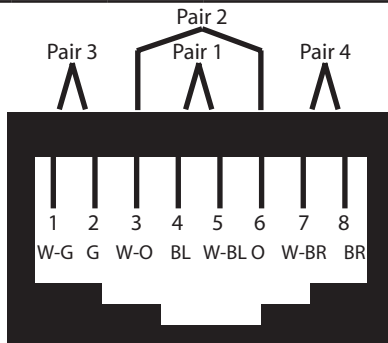
RJ45 Pin Positioning

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 Remote Extender	Up to 1 Amp per USB port, 1.5 Amps total shared
Mounting	Slots for Cable Ties or Optional Mounting Kit available
Enclosure Material	Black Anodized Aluminum
System Shipping Weight	760 g (1.675 lbs.)
LOCAL EXTENDER	
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")
REMOTE EXTENDER	
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")
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	Contact FSR Inc.