CrystalLink USB2.0 Dual Port

USB2.0 Dual Port CAT5e/6/7 Extender

Installation and Operation Manual

ROSE ELECTRONICS

LIMITED WARRANTY

Rose Electronics® warrants the CrystalLink USB2.0 Dual Port Extender to be in good working order for one year from the date of purchase from Rose Electronics or an authorized dealer. Should this product fail to be in good working order at any time during this one-year warranty period, Rose Electronics will, at its option, repair or replace the Unit as set forth below. Repair parts and replacement units will be either reconditioned or new. All replaced parts become the property of Rose Electronics. This limited warranty does not include service to repair damage to the Unit resulting from accident, disaster, abuse, or unauthorized modification of the Unit, including static discharge and power surges.

Limited Warranty service may be obtained by delivering this unit during the one-year warranty period to Rose Electronics or an authorized repair center providing a proof of purchase date. If this Unit is delivered by mail, you agree to insure the Unit or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or its equivalent. You must call for a return authorization number first. Under no circumstances will a unit be accepted without a return authorization number. Contact an authorized repair center or Rose Electronics for further information.

ALL EXPRESS AND IMPLIED WARRANTIES FOR THIS PRODUCT INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF ONE YEAR FROM THE DATE OF PURCHASE, AND NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THIS PERIOD. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER AS WARRANTIED ABOVE, YOUR SOLE REMEDY SHALL BE REPLACEMENT OR REPAIR AS PROVIDED ABOVE. IN NO EVENT WILL ROSE ELECTRONICS BE LIABLE TO YOU FOR ANY DAMAGES INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR THE INABILITY TO USE SUCH PRODUCT, EVEN IF ROSE ELECTRONICS OR AN AUTHORIZED DEALER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS, SO THE ABOVE MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

DECLARATIONS OF CONFORMITY

This is to certify that, when installed and used according to the instructions in this manual, the units listed and described here are shielded against the generation of radio interferences in accordance with the application of Council Directives 2014/30/EU and 2014/30/EU, as well as these standards:

- EN 55022: 2010/AC:2011 (Class B)
- EN 55024:2010 + A1:2015
- EN 61000
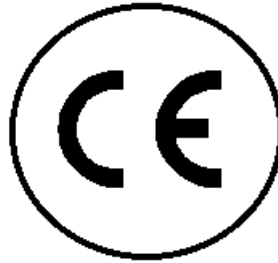
This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, 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 their own expense.

The product safety of the devices is proven by their compliance with the following standards:

- CAN/CSA-ICES-003

The manufacturer complies with the EU Directive 2012/19/EU on the prevention of waste electrical and electronic equipment (WEEE). The device labels carry a respective marking.

These devices comply with Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2, RoHS II). The device labels carry a respective marking.

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INTRODUCTION

Disclaimer

While every precaution has been taken in the preparation of this manual, the manufacturer assumes no responsibility for errors or omissions. Neither does the manufacturer assume any liability for damages resulting from the use of the information contained herein. The manufacturer reserves the right to change the specifications, functions, circuitry of the product, and manual content at any time without notice.

The manufacturer cannot accept liability for damages due to misuse of the product or other circumstances outside the manufacturer's control. The manufacturer will not be responsible for any loss, damage, or injury arising directly or indirectly from the use of this product (See limited warranty).

System Introduction

Thank you for choosing the Rose Electronics CrystalLink USB2.0 Dual Port CAT5e/6/7 extender.
The CrystalLink USB2.0 Dual Port provides transparent USB extension up to 330 feet (100 meters) over CAT5e/6/7 UTP cable. Individual USB devices such as a keyboard or mouse, USB thumb-drive, USB printer, game controllers, flash drives, web cameras, interactive whiteboard and USB joystick can be extended away from the host PC using the CrystalLink USB2.0 Dual Port extender. Additional USB devices can be connected using a powered USB hub.

The CrystalLink USB2.0 Dual Port extension system consists of two units, a transmitter and a receiver. The transmitter connects to your computers' USB port. The transmitter is linked directly to the receiver using industry standard CAT5e/6/7 cable and the USB devices connect to the receiver.
The CrystalLink USB2.0 Dual Port is a unique extender providing the option to apply power at the local or remote unit. The supplied 24V/1A power adapter can be connected to either the transmitter or receiver unit for normal operation. This option gives added flexibility/convenience for customers who may have power outlet limitations.
NEVER power BOTH the transmitter and receiver as the units may be damaged. This is not a Power over Ethernet (PoE) product.

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

Features

- Supports CAT5e/6/7 cable distances up to 330 feet (100 meters)
- Extends USB2.0 high-speed devices up to 480Mbps
- Will also extend USB1.1 (low-speed, full-speed) devices
- One power supply (installed at either end) will power the opposite device
- Provides up to 1 Amp per USB receiver port, or 1.5 Amps total shared
- Plug and Play. No software drivers required
- Supports all major operating systems: Windows, MAC OS X, Linux
- Attach up to 4 powered USB hubs for additional remote USB device support
- Robust ESD and EFT immunity for industrial environments
- Made in North America

Package Contents

The package contents consist of the following:

- Transmitter unit
- Receiver unit
- AC Power Adapter (1) and AC power cable (1)
- One USB-AB cable, 6ft (2.0m)
- Installation & Operation Manual

Additional Items required

- 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) for remote-end connection
- CAT5e/6/7 Unshielded Twisted Pair (UTP) cable with two RJ45 connectors (if using surface cabling), or CAT5e/6/7 cabling with two information outlets and two CAT5e/6/7 patch cords with RJ45 connectors (if using premise cabling).
- For optimum performance, the CAT5e/6/7 cable should be run straight and not coiled, and not routed close to electrical cables. Pin cables according to T568A/T568B.

All references to CAT5e/6/7 cable in this document refer to solid-core cable and represent the minimum CAT5e/6/7 specification requirements. Use of CAT5e/6/7 patch-cables will reduce the recommended cable extension distances

Application Examples

The CrystalLink USB2.0 Dual Port is ideal for use in office or industrial environments, or in computer room environments where USB devices need to be connected at short distances away from a host PC.

- Industrial control
- Interactive whiteboard
- Boardroom presentations
- Keyboard or mouse extension
- Computer room – server management
- Office device extension. printer or scanner

MODELS

CrystalLink USB2.0 Dual Port Models

The CrystalLink USB2.0 Dual Port enables users to extend beyond the standard 5m cable limit for USB peripherals by locating USB device(s) up to 330 feet (100 meters) from the computer.

Transmitter Unit

The transmitter connects to the host computer using the supplied standard USB cable. Power for the transmitter is provided by the Host PC. Power for the receiver is provided by the 24V/1A adapter connected at **either** the transmitter or receiver end. The transmitter delivers power over the CAT5e/6/7 extension link to the receiver when the included power supply is connected to the transmitter.

Transmitter unit – front view	Transmitter unit – rear view

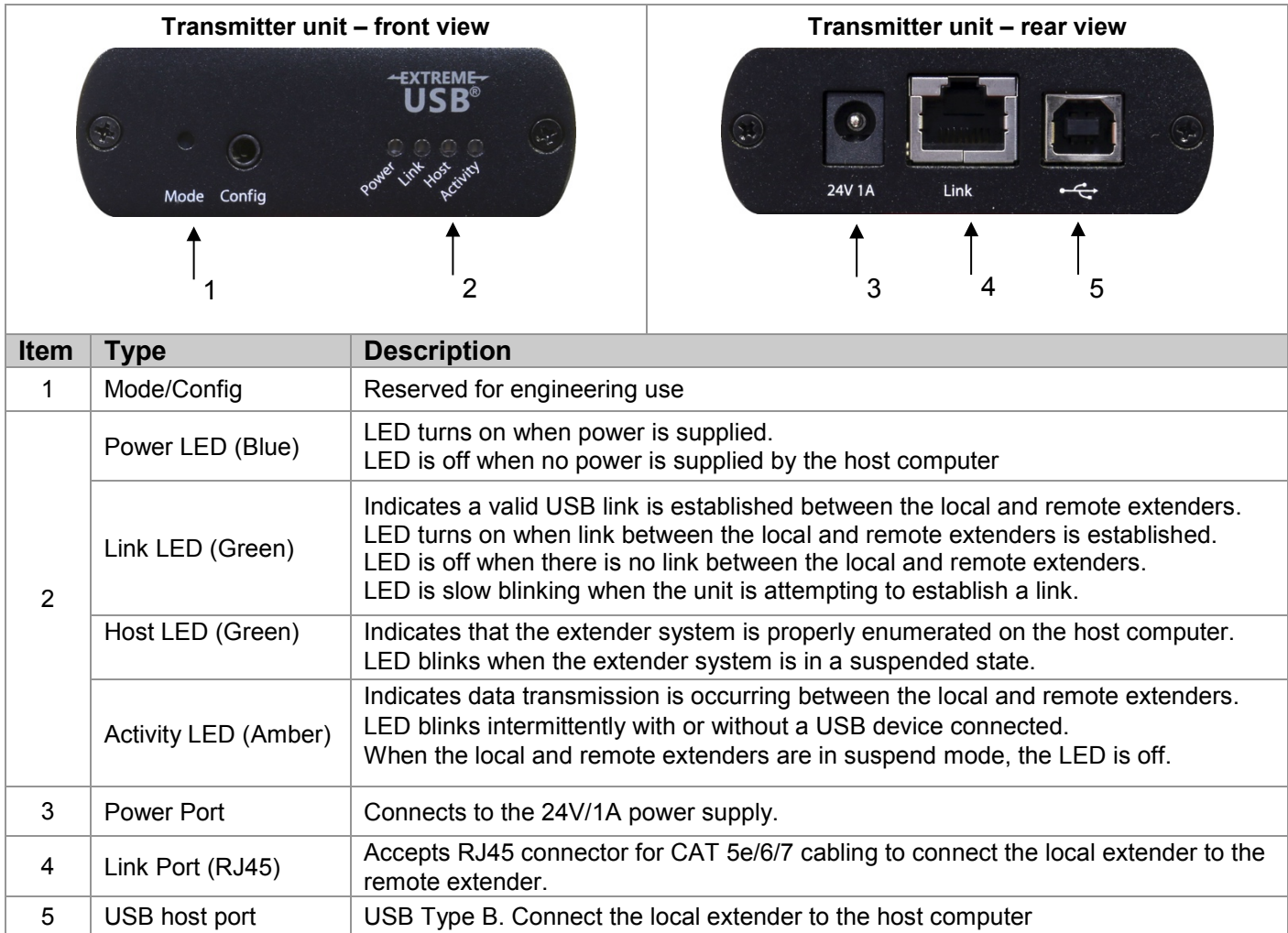| Item	Type	Description
1	Mode/Config	Reserved for engineering use
2	Power LED (Blue)	LED turns on when power is supplied. LED is off when no power is supplied by the host computer
	Link LED (Green)	Indicates a valid USB link is established between the local and remote extenders. LED turns on when link 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.
	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.
	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.
3	Power Port	Connects to the 24V/1A power supply.
4	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the local extender to the remote extender.
5	USB host port	USB Type B. Connect the local extender to the host computer

Figure 1. Transmitter unit front and rear

Receiver Unit

The receiver has two USB Type-A ports for connecting two standard USB device. Additional devices may be connected by attaching a USB hub to the receiver unit. The receiver is powered either directly by the included power supply, or via the external power supply located at the transmitter end. The USB port delivers 1Amp of current per port or 1.5 Amps per port when both ports are used concurrently.
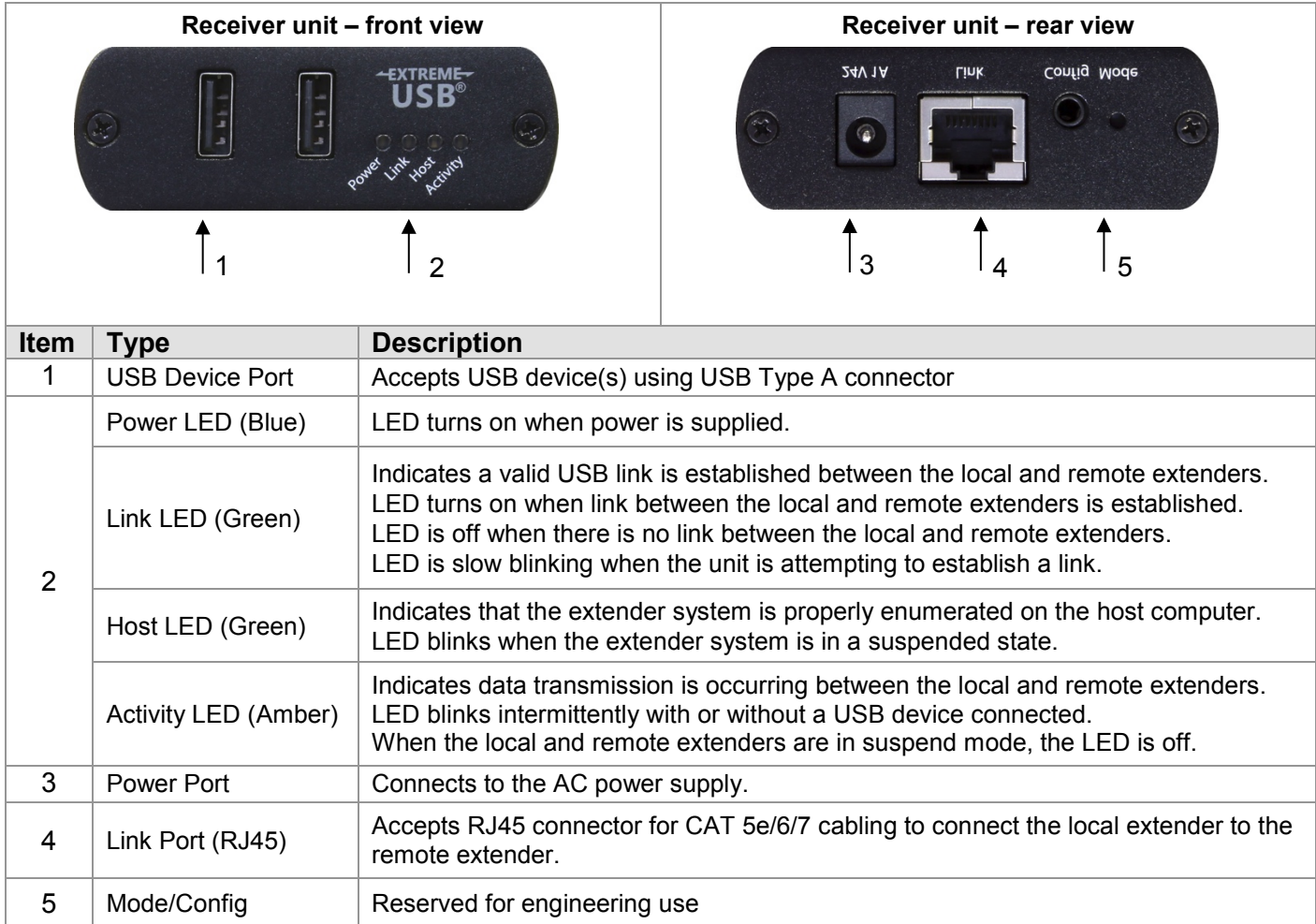

Item	Type	Description
1	USB Device Port	Accepts USB device(s) using USB Type A connector
2	Power LED (Blue)	LED turns on when power is supplied.
	Link LED (Green)	Indicates a valid USB link is established between the local and remote extenders. LED turns on when link between the local and remote extenders 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.
	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.
	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.
3	Power Port	Connects to the AC power supply.
4	Link Port (RJ45)	Accepts RJ45 connector for CAT 5e/6/7 cabling to connect the local extender to the remote extender.
5	Mode/Config	Reserved for engineering use

Figure 2. Receiver unit front and rear

INSTALLATION

Installation Procedure

Before beginning an installation, ensure you have all products and components ready for the installation
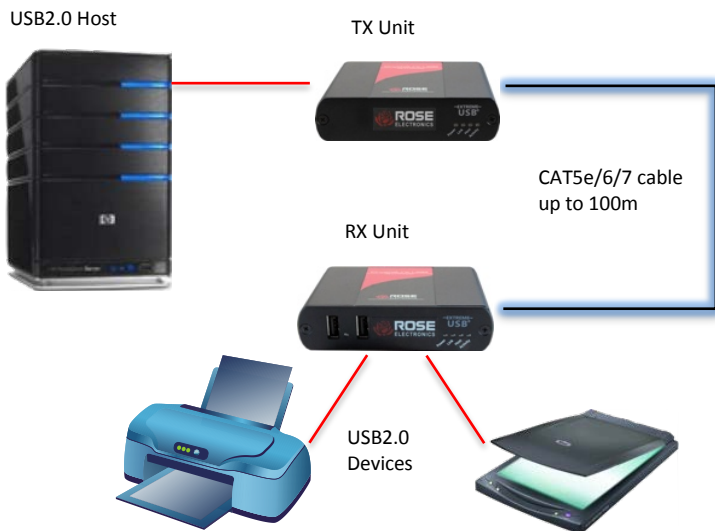

Figure 3. CrystalLink USB2.0 Dual Port – standard installation

- Determine where the computer is to be located and set up the computer.
- Determine where you want to locate the remote USB device(s).
- Remember the product supports a maximum distance of 330ft (100m) for transparent USB devices. If using patch (stranded) cables or premise wiring, the achievable extension distance may be less.

Installation Using Premise Wiring

If you are using premise cabling, ensure CAT5e cabling is installed between the two locations, with CAT5e premise outlets located near both the computer and the USB device(s), and the total length, including patch cords is not more than 330ft (100m).

Installing the Transmitter Unit

- Place the transmitter unit near the computer.
- Install the supplied USB cable between the transmitter and USB port on the host computer.

Installing the Receiver Unit

- Place the receiver unit near the USB device(s) in the desired remote location.

Installing Flexible Power

- Connect 24V, 1A supplied AC power adapter to the local or remote extender based on installation requirement.

Note: Use only the AC adapter supplied with the CrystalLink Extender. Use of substitute adapters may cause permanent damage to the system and will void the warranty.
NEVER plug a power adapter to BOTH local and remote extenders, as this may cause permanent damage to the system and will void the warranty.

Connecting the Transmitter to Receiver

To ensure optimum operation, it is recommended to use only solid core CAT5e/6/7 UTP cabling or better to connect the Transmitter/Receiver units, up to 330 feet (100 meters). 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.

Connection Using Surface Cabling

- Plug one end of the CAT5e/6/7 cabling (not included) into the Link port (RJ45) on the transmitter unit.
- Plug the other end of the CAT5e/6/7 cabling into the Link port (RJ45) on the receiver unit.

Connection Using Premise Cabling

- Plug one end of a CAT5e/6/7 patch cord (not included) into the Link port (RJ45) on the transmitter unit.
- Plug the other end of the patch cord into the CAT5e/6/7 information outlet near the host computer.
- Plug one end of the second CAT5e/6/7 patch cord (not included) into the Link port (RJ45) on the receiver unit.
- Plug the other end of the second patch cord into the CAT5e/6/7 information outlet near the USB device.

Connecting a USB Device

- Install any software required to operate the USB device(s). Refer to the documentation for the USB device(s), as required.
- Connect the USB device to the device port on the remote extender.
- Check that the device is detected and installed properly in the operating system.

Checking the Installation

Check that the Power, Activity, Link and Host LEDs are on at each end. 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.

For Windows users (XP, 7, 8, 8.1, 10), open the Device Manager to confirm that the CrystalLink Extender has installed correctly. Expand the entry for Universal Serial Bus controllers. If the CrystalLink Extender has been installed correctly, you should find it listed as a "Generic USB Hub".

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

If the CrystalLink Extender is not detected correctly or fails to detect, please consult the Troubleshooting Guide. Check if the USB device is detected by your Operating System. (Note: If your computer does not correctly detect the USB device when it is attached to your computer, then it may not function correctly)

To open the System Profiler in MAC OS X:

Open Finder, Select Applications, then open the Utilities folder and double click on the System Profiler icon.

To open Device Manager in Windows 2000/XP:

Right click on "My Computer", then select Properties >>Hardware Tab>>Device Manager

To open Device Manager in Windows 7 and later:

Open the Start Menu, right click on "Computer", then select Manage>>Device Manager

Compatibility

The CrystalLink USB2.0 Dual Port extender complies with USB 1.1 and USB 2.0 specifications governing the design of USB devices. However, Rose Electronics does not guarantee that all USB devices are compatible with the CrystalLink USB2.0, as there are a number of different factors that may impact the operation of USB devices over extended distances.

CAT5e/6/7 Cable Termination

Use either T568A or T568B termination for your CAT5e/6/7 cable.

Use CAT5e or better, solid-core, either UTP or STP cable. STP is recommended for improved EMI protection.

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

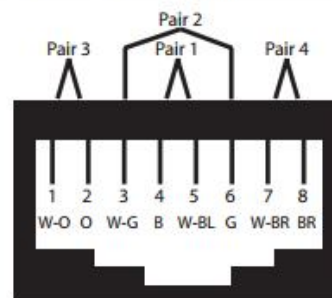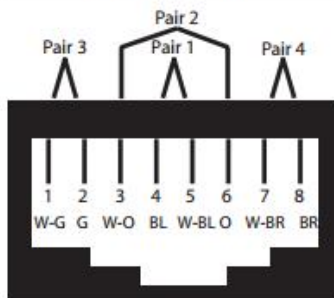| PIN	PAIR	WIRE	CABLE COLOR
1	2	1	WHITE/ORANGE
2	2	2	ORANGE
3	3	1	WHITE/GREEN
4	1	2	BLUE
5	1	1	WHITE/BLUE
6	3	2	GREEN
7	4	1	WHITE/BROWN
8	4	2	BROWN

Figure 4. CAT5e/6/7 cable termination pinning

Mounting Option

Transmitter and Receiver Mounting Options

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

- USB Extender Mounting Kit (Purchased separately - USB Mounting Kit - Black)
- USB Extender Direct Surface Mounting (Using your own M2.5 screws to your pre-drilled surface)

Option 1: CrystalLink USB3.1 Extender Mounting Bracket Kit

Contents:
2 mounting brackets
4 (M2.5) locking washers
4 (M2.5 x 7mm) Phillips screws
Mounting bracket installation guide (see diagram below)

1 kit is required to mount each transmitter chassis or receiver chassis
Using a Phillips screwdriver, fasten and secure the provided screws, locking washers and brackets into place.

Option 2: CrystalLink USB3.1 Extender Mounting Plate

The bottom of the enclosure features four pre-drilled holes for optional surface mounting with a spacing of 42.00mm x 62.53mm. Drill four holes into your surface and mount it using proper length M2.5 screws.
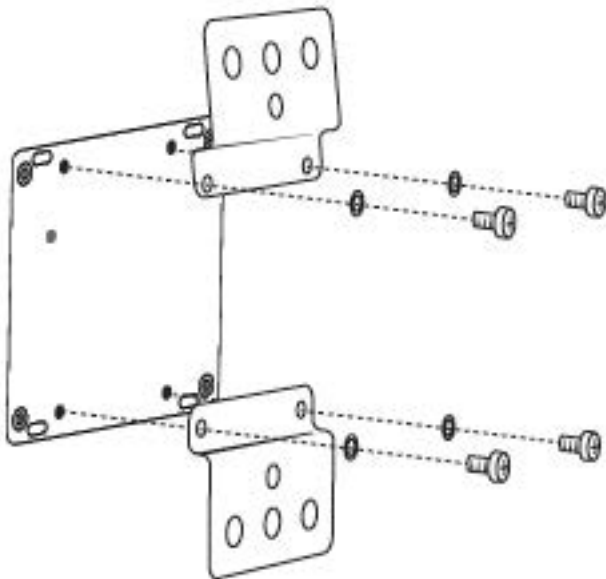Note: Do not exceed a screw depth of 3/16" (4.7625mm) into the chassis or damage may occur

Figure 5. Optional CrystalLink mounting bracket

TROUBLESHOOTING

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.	• The USB device requires drivers that were not installed. • The USB device does not support USB hubs. • The USB device has malfunctioned	• 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. • In the Universal Serial Bus controllers section of Device Manager, check that the USB device is enumerated. • Contact Technical Support for assistance.
USB device is attached but not functioning.	• Over-current condition has occurred because the USB device has drawn more current than can be supplied per USB specification (1Amp). • Operating system may generate a status bubble indicating an issue.	• Power cycle receiver unit: Unplug the power adapter from the extender, wait approximately 30 seconds, plug the power adapter into the extender. • If over-current continues to occur, either: • the USB device may use more power than the USB specification, or • the USB device may be damaged. • 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.	• The CAT5e cable connecting the transmitter and receiver is faulty.	• Ensure the CAT5e cabling is of high quality. • Use a different transmitter and receiver extender pair that has the same firmware revision. • Contact Technical Support for assistance.
Link LED on the local and remote extenders is off.	• The receiver unit is not receiving power. • The transmitter unit is not receiving power. • The link cable is malfunctioning. • The CrystalLink USB2.0 Extender is malfunctioning.	• Confirm Host PC is on and providing power to local extender. • Ensure the supplied AC power adapter is properly connected to either the transmitter or the receiver unit. • Ensure the CAT5e cabling between the transmitter and receiver units is properly installed or replace the link cable. • Check that the AC adapter is connected to a live source of electrical power. • Contact Technical Support for assistance.

PRODUCT SAFETY

Safety

The CrystalLink USB2.0 Dual Port, like all electronic equipment, should be used with care. To protect yourself from possible injury and to minimize the risk of damage to the Unit, read and follow these safety instructions.

- Follow all instructions and warnings marked on this Unit.

- Except where explained in this manual, do not attempt to service this Unit yourself.

- Do not use this Unit near water.

- Assure that the placement of this Unit is on a stable surface.

- Provide proper ventilation and air circulation.

- Keep connection cables clear of obstructions that might cause damage to them.

- Use only power cords, power adapter and connection cables designed for this Unit.

- Keep objects that might damage this Unit and liquids that may spill, clear from this Unit. Liquids and foreign objects might come in contact with voltage points that could create a risk of fire or electrical shock.

- Do not use liquid or aerosol cleaners to clean this Unit. Always unplug this Unit from the power source before cleaning.

Remove power from the unit and refer servicing to a qualified service center if any of the following conditions occur:

- The connection cables are damaged or frayed.

- The Unit has been exposed to any liquids.

- The Unit does not operate normally when all operating instructions have been followed.

- The Unit has been dropped or the case has been damaged.

- The Unit exhibits a distinct change in performance, indicating a need for service.

SERVICE AND MAINTENANCE

Maintenance and Repair

This Unit does not contain any internal user-serviceable parts. In the event a Unit needs repair or maintenance, you must first obtain a Return Authorization (RA) number from Rose Electronics or an authorized repair center. This Return Authorization number must appear on the outside of the shipping container.

See Limited Warranty for more information.

When returning a Unit, it should be double-packed in the original container or equivalent, insured and shipped to:

    Rose Electronics

    Attn: RA _____

    10707 Stancliff Road

    Houston, Texas 77099 USA

Technical Support

If you are experiencing problems, or need assistance installing your product, consult the appropriate section of this manual. If, however, you require additional information or assistance, please contact the Rose Electronics Technical Support Department at:

    Phone: (281) 933-7673

    E-mail: TechSupport@rose.com

    Web: www.rose.com

Technical Support hours are from: 8:00 am to 6:00 pm CST (USA), Monday through Friday.

Please report any malfunctions in the operation of this Unit or any discrepancies in this manual to the Rose Electronics Technical Support Department.

APPENDICES

Appendix A — Specifications

Part Numbers	Description
CLK-2U2TPB-100M/FP	CrystalLink USB2.0 Dual Port CAT5e/6/7 Extender
RM-UD/CLKU2F	Rackmount "L" bracket for mounting TX or RX unit on a shelf, under desk, or flat surface. (Not for 19" rack)
CAB-USBAB006	USB-AB cable, 6ft (2.0m)
CAB-USBAB010	USB-AB cable, 10ft (3.0m)
Chassis Dimensions (W x D x H)	
Transmitter and receiver chassis	3.0" x 3.4" x 1.0" (75 x 87 x 26 mm)
Power Requirements	
Power source	100-240VAC, AC input, 24V 1A DC output
Maximum current for USB device	Up to 1 Amp per USB port, or 1.5 Amps when shared in concurrent operation
Interconnect Cable Requirements	
CAT5e/6/7 RJ45	CAT5e/6/75e/6/7 solid core, UTP or STP, terminated as EIA/TIA 568-B
Cable Distances	
CAT5e/6/7 cable	Up to 330 feet (100 meters) over solid core CAT5e/6/7 cable.
USB Support	
USB Device Support	High-speed devices (USB 2.0) at 480Mbps Full-speed devices (USB 1.1), 12Mbps Low-speed devices (USB 1.1), 1.5Mbps
USB Hub Support	Up to 4 powered USB hubs with 26 USB devices. The extension distance will be reduced with each hub added to the system.
USB Host Support	XHCI (USB3.0), EHCI (USB 2.0) and OHCI/UHCI (USB 1.1) USB3.0 host supported at up to 480Mbps

Connectors		
	Transmitter unit	Receiver unit
USB connector	1 x USB Type B	2 x USB Type A female
Link cable connector	1 x RJ45	1 x RJ45

Environmental	
Operating Temp	32°F to 122°F (0°C to 50°C)
Storage Temp	-4°F to 158°F (-20°C to 70°C)
Operating Humidity	20% to 80% relative, non-condensing
Storage Humidity	10% to 90% relative, non-condensing
Approvals	FCC Part 15 Class B, CE Class B, ICES-003 Class B, EMC EN55022, EN55024, EN61000, CPSIA, Flammability V-1, RoHS2 (CE), WEEE

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