Revision 1.0 12th August 2012

Installation and Operations Manual

LIMITED WARRANTY

Rose Electronics warrants the CrystalLink 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.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of he 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.

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FCC/IC STATEMENTS, EU DECLARATION OF CONFORMITY

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

The product 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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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, or circuitry of the product 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.

Introduction

Thank you for choosing the Rose Electronics CrystalLink USB2.0 Peripheral Extender. This is the extender of choice for businesses that need to extend and operate USB2.0 devices from a distant location.
The CrystalLink USB2.0 extends up to 330 feet (100 meters) over CATx (CAT5e, CAT6) 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 extender. Additional USB devices can be connected using a powered USB hub.

The CrystalLink USB2.0 extension system consists of two Units, a transmitter and a receiver. The transmitter connects to your CPUs' USB port. The transmitter is linked directly to the receiver using industry standard CATx cable and the USB devices connect to the receiver.
The CrystalLink USB2.0 is a unique extender providing the option to apply power at the local or remote extender. 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.

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 CATx 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
- Plug and Play. No software drivers required
- Supports all major Operating Systems: Windows, MAC OS X, Linux
- Attach up to 3 powered USB hubs for additional remote USB device support
- Robust ESD and EFT immunity for industrial environments
- Made in North America

Application Examples

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

▪ Interactive Whiteboard	▪ Board-room presentations
▪ Office device extension. Printer or Scanner	▪ Keyboard or Mouse extension
▪ Industrial control	▪ Computer room – Server management
▪ Sensor/Data Acquisition	▪ Temporary office relocations
▪ Web camera operation	▪ Remote hard drive and flash drive

Package Contents

- Transmitter Unit
- Receiver Unit
- AC Power Adapter (1)
- One USB-AB (6ft) cable
- Installation & Operation Guide

Additional Installation Items (not included in the package)

- 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
- CATx Unshielded Twisted Pair (UTP) cable with two RJ45 connectors (if using surface cabling), or CATx cabling with two information outlets and two CAT5ee patch cords with RJ45 connectors (if using premise cabling).
- For optimum performance, the CATx cable should be run straight and not coiled, and not routed close to electrical cables. Pin cables according to T568A/T568B.

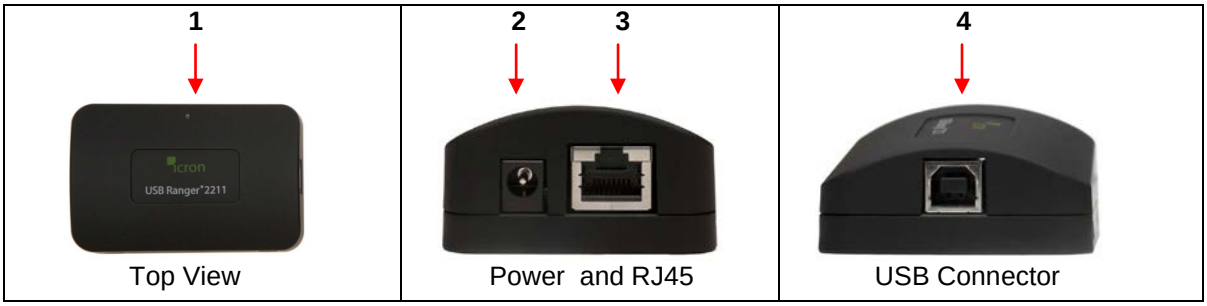
All references to CATx cable in this document refer to solid-core cable (CAT5e UTP or better) and represents the minimum CATx specification requirements. CAT6 or shielded (STP) cables may be substituted. Use of CATx patch-cables will reduce the recommended cable extension distances.

Transmitter and Receiver Models

The CrystalLink USB2.0 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.
The local and remote extenders may be hot to the touch when operating at or near the high end of the certified temperature range

Transmitter Unit

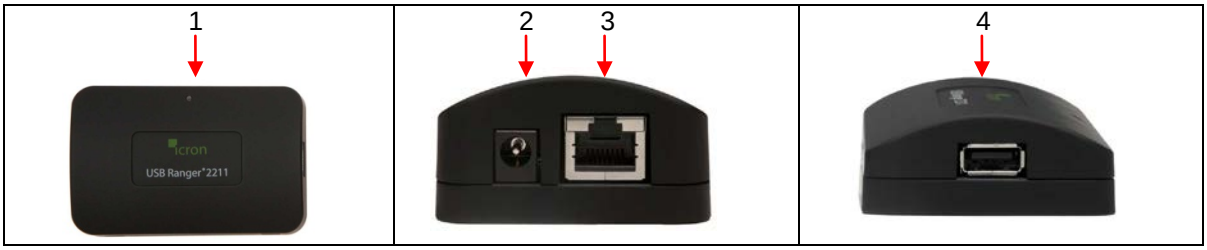
The transmitter connects to the host computer using the supplied standard USB cable. Power for the transmitter is provided by the Host PC. Power for the receiver is provided by the 24VAC adapter connected at **either** the transmitter or receiver end. The transmitter delivers power over the CATx extension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



Item	Type	Description
1	Link LED (green)	Indicates both the transmitter and receiver have power and that the CATx cable is connected properly.
2	Power Connector	The Power Port gives the option to connect power to either the transmitter or receiver. Connect the supplied 24V, 1A power adapter to **either** the transmitter **or** receiver.
3	Link Port (RJ45)	Accepts RJ45 connector for CAT5e cabling (or better).
4	USB Type B	Used to connect the transmitter unit to the host computer.

Receiver Unit

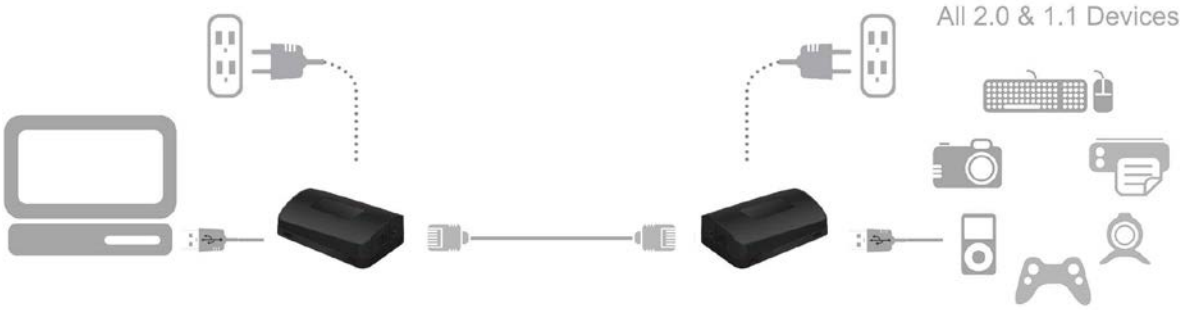
The receiver has a USB Type-A port for connecting standard USB devices. The receiver allows you to connect one USB device directly. Additional devices may be connected by attaching USB hubs to the receiver unit. The receiver is powered **either** directly by the included power supply, or via the CATx link extension cable from the transmitter. The USB port delivers 500mA of current to the attached USB device.



Item	Type	Description
1	Link LED (green)	Indicates both the transmitter and receiver have power and the CATx cable is connected properly.
2	Power Connector	The Power Port gives the option to connect power to either the transmitter or extender. Connect the supplied 24V, 1A power adapter to **either** the transmitter or receiver unit.
3	Link Port (RJ45)	Accepts RJ45 connector for CAT5ecabling (or better).
4	USB Type A	Accepts a USB device

Installation Procedure

Before you can install the CrystalLink extender, 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 extender supports a maximum distance of 100m.

Installation Using Premise Wiring

If you are using premise cabling, ensure CAT5e cabling is installed between the two locations, with CAT5e information outlets located near both the computer and the USB device(s), and the total length, including patch cords is no more than 100m.

Mounting the Local Extender or Remote Extender

If mounting is required, the local and remote extenders have two mounting slots on each side for use with tie/zip wraps (not included).	 Sample mounting using tie-wraps	

Installing the Transmitter Unit

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

Installing the Receiver Unit

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

Installing Flexible Power

1. 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 warrantly.
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 CAT5Ee UTP cabling or better to connect the Transmitter/Receiver units, up to 330feet (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 10m.

Connection Using Surface Cabling

1. Plug one end of the CAT5Ee cabling (not included) into the Link port (RJ45) on the transmitter unit.
2. Plug the other end of the CAT5e cabling into the Link port (RJ45) on the receiver unit.

Connection Using Premise Cabling

1. Plug one end of a CAT5e patch cord (not included) into the Link port (RJ45) on the transmitter unit.
2. Plug the other end of the patch cord into the CAT5e information outlet near the host computer.
3. Plug one end of the 2nd CAT5e patch cord (not included) into the Link port (RJ45) on the receiver unit.
4. Plug the other end of the 2nd patch cord into the CAT5e information outlet near the USB device.

Checking the Installation

1. Check that the green Link LED is illuminated on the both Transmitter and Receiver units.
2. For Windows users (2000, XP, Vista, 7), 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”.
3. 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.
4. If the CrystalLink Extender is not detected correctly or fails to detect, please consult the Troubleshooting Guide.
   - 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.
   - To open Device Manager in Windows Vista or Windows 7: Open the Start menu, 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 receiver unit.
3. Check that the device is detected and installed properly in the operating system.

Compatibility

The CrystalLink USB2.0 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.

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 (500mA). Operating systems 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:(a) the USB device may use more power than the USB specification, or (b) 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. • Firmware mismatch between the local and remote extenders	• Ensure the CAT5e cabling is of decent quality. • Use a different transmitter and receiver extender pair that has the same firmware revision. • Upgrade the local and remote extender firmware; 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 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.

Specifications

Transmission Range	100m (330ft) over Cat5e (or better) cable
USB device support	High-speed devices (480 Mb/s) (USB 2.0) Full speed devices (12 Mb/s) (USB 1.1) Low speed devices (1.5 Mb/s) (USB 1.1)
USB hub support	Any single chain can include up to 4 USB hubs plus 1 CrystalLink USB2.0 TX/RX pair.
USB host support	EHCI (USB 2.0) and OHCI/UHCI (USB 1.1)
Maximum USB devices supported	14 USB devices or 4 USB hubs with 10 USB devices.
AC adapter	Input: 100/240 V AC, 50 – 60 Hz, 600 mA maximum Output: 24V DC, 1A
AC adapter connector	2.1 mm centre-positive jack
Current available to USB device at receiver	500 mA
System shipping weight	1.35 lbs. (0.62 kg)
Transmitter Unit:	
USB connector	1 x USB Type B
Link connector	1 x RJ45
Dimensions	3.35” x 1.10” x 2.25” (85 mm x 28 mm x 57 mm)
Receiver Unit:	
USB connector	1 x USB Type A
Link connector	1 x RJ45
Dimensions	3.35” x 1.10” x 2.25” (85 mm x 28 mm x 57 mm)
Environmental:	
Operating temperature range	32°F to 122°F (0°C to 50°C)
Storage temperature range	-4°F to 158°F (-20°C to 70°C)
Operating humidity	20% to 80% relative humidity, non-condensing
Storage humidity	10% to 90% relative humidity, non-condensing
Regulatory testing	FCC (Class A), IC (Class A), CE (Class A) FCC Part 15 Class A, CE Class A, ICES-003 Class A

Product Part Number CLK-nnn

Product Safety

The CrystalLink extender has been tested for conformance to safety regulations and requirements, and has been certified for international use. Like all electronic equipment, the CrystalLink 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 or rack mounted.
- Provide proper ventilation and air circulation.
- 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.
- Operate this Unit only when the cover is in place.
- Do not use liquid or aerosol cleaners to clean this Unit.

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 in setting up, configuring or operating your product, consult the appropriate sections 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.