USER MANUAL

USB 2.0 CAT5E/6/7 EXTENDER

24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM

Mode   Config
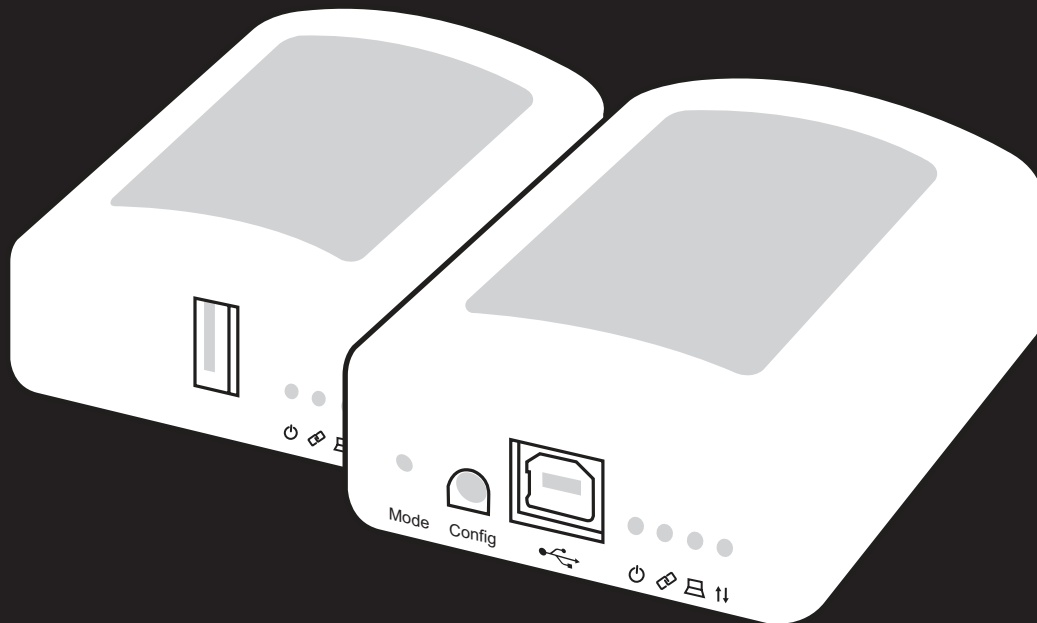
BLACK BOX®

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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 the warranty. Use only the power supply provided with this product. When not in use, the product should be stored in a dry location between -4 to +158° F (-20 to +70° C).

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TABLE 1-1. SPECIFICATIONS

SPECIFICATION	DESCRIPTION
General	
Range	Up to 100 m (330 ft.) 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	Input: 100-240 VAC
	Output: 24 VDC, 1 A
AC Adapter Connector	2.1-mm center-positive jack
Current Available to USB Device at Remote Extender	Up to 1 Amp
Mounting	Slots for cable ties
Enclosure Material	Black ABS with rubberized coating
System Shipping Weight	1.416 lb. (0.642 kg)
Local Extender	
USB Connector	(1) USB 2.0 Type B
Link Connector	(1) RJ-45
Dimensions	1.2"H x 3.4"W x 2.6"D (3 x 8.75 x 6.5 cm)
Remote Extender	
USB Connector	(1) USB 2.0 Type A
Link Connector	(1) RJ-45
Dimensions	1.2"H x 3.4"W x 2.6"D (3 x 8.75 x 6.5 cm)
Environmental	
Operating Temperature Range	32 to 122° F (0 to 50° C)
Storage Temperature Range	-4 to +158° F (-20 to +70° C)
Storage Humidity	10 to 90% relative humidity, noncondensing
Compliance	
EMC	
FCC	Class A
CE	Class A
Environmental	RoHS2 (CE)
Safety	Flammability V-0

CHAPTER 2: OVERVIEW

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2.1 INTRODUCTION

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

The 1-port, USB 2.0, 100-m, CAT 5e/6/7 Extender with Flexible Power enables users to extend beyond the standard 16-foot (5-meter) cable limit for USB peripheral devices. With the Extender, USB device(s) can be located up to 330 feet (100 meters) from the computer. The Extender is composed of two individual units: the local extender and remote extender.

CAUTION: The local and remote extenders may be hot to the touch during operation.

2.2 FEATURES

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

2.3 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com.

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

The IC280A-R2 provides flexible power, allowing the installer to connect the supplied 24 V, 1 Amp 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 CAT5e/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.

2.4 ADDITIONAL ITEMS YOU WILL NEED

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 RJ-45 connectors (if using surface cabling), or CAT 5e/6/7 cabling with two information outlets and two CAT 5e/6/7 patch cords with RJ-45 connectors (if using premise cabling)

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2.5 HARDWARE DESCRIPTION

2.5.1 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 24-VAC 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.

Figures 2-1 and 2-2 show the front and back of the Local Extender. Table 2-1 describes its components.
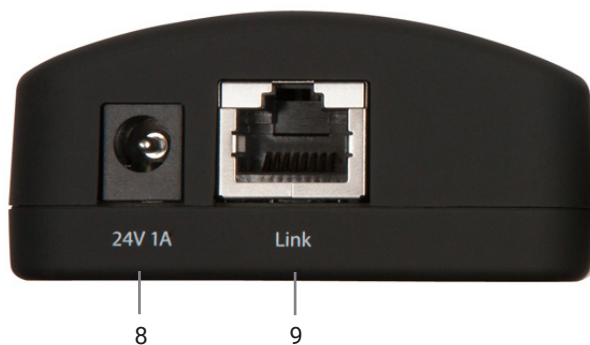
FIGURE 2-1. LOCAL EXTENDER, FRONT VIEW

FIGURE 2-2. LOCAL EXTENDER, BACK VIEW

TABLE 2-1. LOCAL EXTENDER COMPONENTS

NUMBER IN FIGURE 2-1 OR 2-2	COMPONENT	DESCRIPTION
1	Mode button	Reserved for manufacturer use.
2	Config port	Reserved for manufacturer use.
3	USB host port	Used to connect the local extender to the host computer. Accepts USB Type B connector.
4	Power LED (Green)	LED turns on when power is supplied. LED is off when no power is supplied by the host computer.
5	Link LED (Green)	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. LED is fast blinking to indicate the unit is in Pairing Mode.
6	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.
7	Activity LED (Green)	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.
8	Power Port	Connects to the AC power supply.
9	Link Port	Accepts RJ-45 connector for CAT 5e/6/7 cabling to connect the local extender to the remote extender.

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2.5.2 REMOTE EXTENDER

The remote extender provides a USB Type A port for connecting standard USB devices. The remote extender allows you to connect one USB device directly. 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. The USB port delivers up to 1 Amp of current to the attached USB device.

Figures 2-3 and 2-4 show the front and back of the Local Extender. Table 2-2 describes its components.

FIGURE 2-3. REMOTE EXTENDER, FRONT VIEW

FIGURE 2-4. REMOTE EXTENDER, BACK VIEW

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TABLE 2-2. REMOTE EXTENDER COMPONENTS

NUMBER IN FIGURE 2-3 OR 2-4	COMPONENT	DESCRIPTION
1	USB Device Port	Accepts USB device using Type A connector.
2	Power LED (Green)	LED turns on when power is supplied.
3	Link LED (Green)	Indicates a valid 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. LED is fast blinking to indicate the unit is in Pairing Mode.
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 (Green)	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	Accepts RJ-45 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 button	Reserved for manufacturer use.

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CAUTION: Connect the provided power adapter to **either** the local or remote extender, not both.

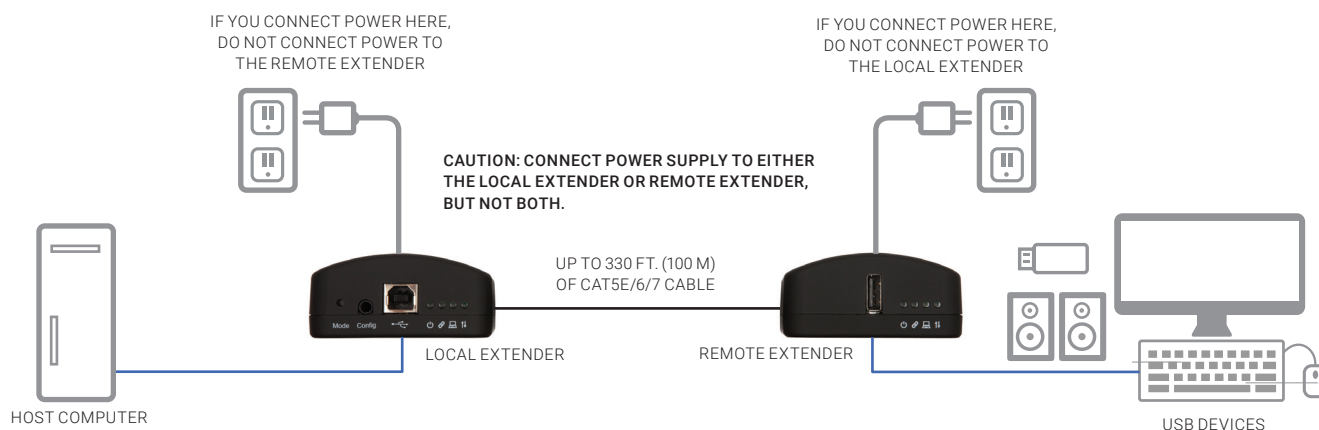FIGURE 3-1. INSTALLATION DIAGRAM

3.1 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 cable tie/zap straps (not included).

3.2 PREPARING FOR INSTALLATION

Before you can install the 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 330 ft. (100 m).

OR

If you are using premise cabling, ensure that CAT 5e/6/7 cable is installed between the two locations, with CAT5e/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 330 ft. (100 m).

3.3 INSTALLING THE LOCAL EXTENDER

1. Place the local extender near the computer.

2. Install the supplied USB cable between the local extender and USB port on the host computer.

3.4 INSTALLING THE REMOTE EXTENDER

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

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3.5 INSTALLING FLEXIBLE POWER

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

NOTE: The IC280A-R2 features flexible power, allowing the installer to connect the supplied 24 V, 1 Amp power adapter to either the local or remote extender for normal extension operation. Please note, when powering at the local extender, take care not to plug the remote side of the CAT5e/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.

3.6 CONNECTING THE LOCAL EXTENDER TO THE REMOTE EXTENDER

To ensure proper operation, we recommend that you use only solid core CAT 5e/6/7, Unshielded Twisted Pair (UTP) cabling 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 RJ-45 connectors at both ends. The combined length of any patch cords using stranded conductors must not exceed 330 ft. (100 m).

WITH SURFACE CABLING:

1. Plug one end of the CAT 5e/6/7 cabling (not included) into the Link port (RJ-45) on the local extender.

2. Plug the other end of the CAT 5e/6/7 cabling into the Link port (RJ-45) on the remote extender.

WITH PREMISE CABLING:

1. Plug one end of a CAT5e/6/7 patch cord (not included) into the Link port (RJ-45) 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 (RJ-45) 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.

3.7 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.

CHAPTER 3: INSTALLATION

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3.8 CHECKING THE INSTALLATION

1. On the local and remote extenders, check that the Power, Activity, 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, open Device Manager to confirm that the Extender 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."

TO OPEN DEVICE MANAGER IN WINDOWS 10:

 Right-click the Start Menu and then select: Device Manager .

3. For Mac OS™ users, open the System Profiler to confirm that the Extender Series extender system has 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.

TO OPEN SYSTEM PROFILER IN MAC OS:

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

4. If the Extender Series extender system is not detected correctly or fails to detect, consult the Troubleshooting section in this guide.

3.9 COMPATIBILITY

The Extender 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.

CHAPTER 4: TROUBLESHOOTING

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4.1 TROUBLESHOOTING TIPS

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, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com for further assistance.

TABLE 4-1. TROUBLESHOOTING TIPS

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.	1.. Install the required USB device driver on the computer operating system before attaching the USB device into the remote extender. 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 Black Box Technical Support at 877-877-2269 or info@blackbox.com for assistance.
USB device is attached but not functioning.	An overcurrent condition has occurred because the USB device has drawn more current than can be supplied per USB specification (1A). The operating system may generate a status bubble indicating an issue.	1. Power cycle the 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 the overcurrent continues to occur, either :(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.
The Link LEDs on the local and remote extenders blink intermittently.	The CAT 5e/6/7 cable connecting the local and remote extenders is faulty.	1. Make sure the CAT 5e/6/7 cable is of decent quality. 2. Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com for assistance.
The Link LEDs on the local and remote extenders are off.	◆ The remote extender is not receiving power. ◆ The local extender is not receiving power. ◆ The link cable is malfunctioning. ◆ The extender system is malfunctioning.	1. Confirm that the host computer is on and providing power to the local extender. 2. Make sure the supplied AC power adapter is properly connected to either the local or the remote extender. 3. Make sure 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 Black Box Technical Support at 877-877-2269 or info@blackbox.com for assistance.

4.2 CONTACTING TECHNICAL SUPPORT

If you are experiencing problems not referenced in the Troubleshooting Guide, contact Black BoxTechnical Support at 877-877-2269 or info@blackbox.com for assistance and provide them with the following information:

◆ Host computer make and mode

◆ Type of operating system installed (e.g. Windows®, macOS, 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

APPENDIX A: REGULATORY INFORMATION

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A.1 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.

A.2 CE STATEMENT

We, Black Box Corporation, declare under our sole responsibility that the USB 2.0 IC280A-R2, to which this declaration relates, is in conformity with European Standard.

A.3 IC STATEMENT

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

A.4 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. Check with your local and state government guidelines for safe disposal and recycling or contact your national WEEE recycling agency for more information.

Category 5 (CAT5) Network Cabling: Category 5 cable is commonly also referred to as CAT5. This cabling is available in either solid or stranded twisted pair copper wire and as UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair). UTP cables are not surrounded by any shielding, making them more susceptible to electromagnetic interference (EMI). STP cables include shielding over each individual pair of copper wires and provide better protection against EMI. Category 5 has been superseded by CAT5e cabling, which includes improved data integrity to support high-speed communications.

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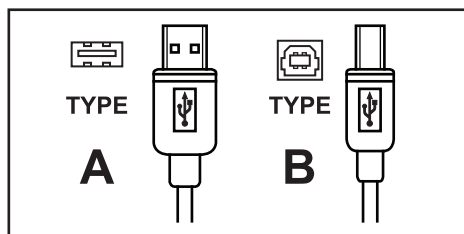

FIGURE B-1. USB TYPE A AND TYPE B CABLE CONNECTORS

RJ-45: The Registered Jack (RJ) physical interface is what connects the network cabling (CAT5) to the local unit and the remote unit. You may use either the T568A scheme (see Table 5-1 and Figure 5-2) or the T568B scheme (see Table 5-2 and Figure 5-3) for cable termination. RJ-45 connectors are sometimes also referred to as 8P8C connectors.

RJ45 Pin Positioning:

TABLE B-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
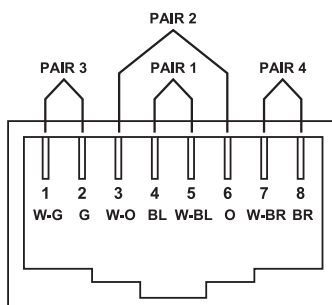
FIGURE B-2. T568A WIRING

APPENDIX B: TECHNICAL GLOSSARY

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TABLE B-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
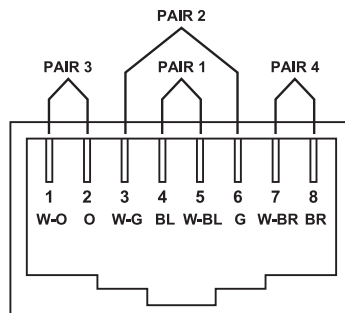
FIGURE B-3. T568B WIRING

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