USB 3 Extenders

4-Port Point-to-Point Extender System
User Guide

Contents

Introduction

This guide provides product information, installation instructions and troubleshooting guidelines for Vaddio USB 3 Extenders. The instructions in this guide assume a general knowledge of computer installation procedures, familiarity with cabling requirements and some understanding of USB devices.

Features

This product enables you to extend USB 3.1 beyond the standard 3m cable limit for USB 3.1 peripheral devices. This product also supports USB 3.0, 2.0, and 1.1. This extender system is composed of two individual units, the Local Extender and the Remote Extender, and has the following key features:

- Support for new USB 3.1 host controllers and devices (up to 5 Gbps)
- Transparent USB extension supporting USB 3.1, 3.0, 2.0, and 1.1
- Up to 328 ft (100 m) of extension when directly connected over Cat-6/Cat-7 cable
- True plug and play; no software drivers required
- Works with all major operating systems: Windows®, macOS™, Linux® and Chrome OS™

Unpacking

999-1005-032 – North America
999-1005-132 – Europe and UK

Your USB 3 Extender system contains:

- Local (Rx) extender
- Remote (Tx) extender
- USB 3.0 cable, 6 ft (1.8 m)
- Local extender 24V DC 1A power adapter with AC cord set(s)
- Remote extender 24V DC 2.71A power adapter with AC cord set(s)
- Quick-Start Guide

A Quick Look at the USB 3 Extenders

The local (receiver) and remote (transmitter) extenders look similar, but are not interchangeable. They use different power supplies as well. Please take the time to identify each part correctly.

The Local (Rx) Extender

The local (receiver) extender connects to the computer using a standard USB 3.1 cable. Power for this unit is provided by the included 24V 1A adapter.

Front View

Rear View

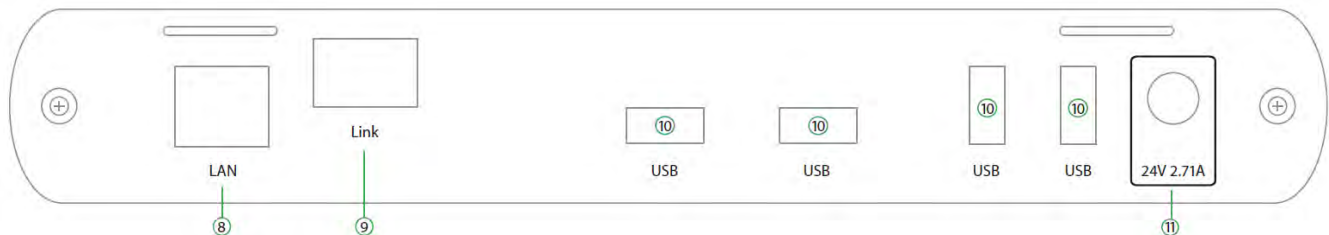| ITEM	TYPE	DESCRIPTION
1	Power LED	ON when DC is supplied to the extender unit. OFF when no power is supplied by the AC Adapter.
2	Mode	Reserved for manufacturer use.
3	Config	Reserved for manufacturer use.
4	Status LED	ON when system is functioning normally. BLINKS when system is booting. BLINKS in unison with the LINK, USB 2, and USB 3 LEDs to indicate a temperature warning.
5	Link LED	ON when Local Extender is linked to an opposite Remote Extender. OFF when there is no connection between the Local and Remote Extenders.
6	USB 2 LED	ON when an active USB 2 connection is established through the extender system. BLINKS when the USB 2 connection is suspended/asleep. OFF when no USB 2 connection is detected.
7	USB 3 LED	ON when an active USB 3 connection is established through the extender system. BLINKS when the USB 3 connection is suspended/asleep. OFF when no USB 3 connection is detected.
8	LAN Port (100/1000 Mbps)	Ethernet pass through channel connects to a network or Ethernet device.
9	Link Port (RJ45)	Accepts RJ45 connector for Cat-6/Cat-7 cabling to connect the Local Extender to the Remote Extender.
10	USB Host Port	USB 3 Type B receptacle used to connect Local Extender to USB 3 Host computer.
11	DC Power Port	Locking connector for the included power adapter – accepts 24VDC 1A.

The Remote (Tx) Extender

The remote (transmitter) extender provides USB 3.1 Type A ports for standard USB devices and allows you to connect up to four USB devices directly. The remote extender is powered by an external AC 24V 2.71A adapter, supplying up to 1.2 Amp per USB port. Additional devices may be connected by attaching up to three USB hubs to the remote extender.

Front View

Rear View

ITEM	TYPE	DESCRIPTION
1	Power LED	ON when DC is supplied to the extender unit. OFF when no power is supplied by the AC Adapter.
2	Mode	Reserved for manufacturer use.
3	Config	Reserved for manufacturer use.
4	Status LED	ON when system is functioning normally. BLINKS when system is booting. BLINKS in unison with the LINK, USB 2, and USB 3 LEDs to indicate a temperature warning.
5	Link LED	ON when Remote Extender is linked to an opposite Local Extender. OFF when there is no connection between the Local and Remote Extenders.
6	USB 2 LED	ON when an active USB 2 connection is established through the extender system. BLINKS when the USB 2 connection is suspended/asleep. OFF when no USB 2 connection is detected.
7	USB 3 LED	ON when an active USB 3 connection is established through the extender system. BLINKS when the USB 3 connection is suspended/asleep. OFF when no USB 3 connection is detected.
8	LAN Port (100/1000 Mbps)	Ethernet pass through channel connects to a network or Ethernet device.
9	Link Port (RJ45)	Accepts RJ45 connector for Cat-6/Cat-7 cabling to connect the Remote Extender to the Local Extender.
10	Device Ports (Type A)	Accepts all USB devices.
11	DC Power Port	Locking connector for the included power adapter – accepts 24VDC 2.71A.

Installation

Preparing Your Site

Before installing Vaddio USB 3 Extenders, you will need to prepare your site:

1. Place the equipment where desired and set it up.
2. Be sure your USB devices are within 328 ft (100 m) of the computer. If not, adjust the location of your device(s) and/or computer accordingly.

Cabling Guidelines

Use foiled (FTP) or shielded (STP) cabling if the cable run installation has any of these characteristics:

- The cable is bundled with other cables
- The cable is run tight against other Category cables
- The cable is placed near sources of interference like power lines and radios
- The cable is looped or coiled

The maximum installation distance is 328 ft (100 m). This includes the length of any patch cables. Up to 33 ft (10 m) of patch cable can be used.

For best performance, use shielded or foiled Cat-6/Cat-7 cable.

When terminating cables, ensure the matching RJ45 connector is used for the cable type. For example, if Cat-6a cable is used, then Cat-6a compatible RJ45 connectors must be used. Otherwise, the benefits of using higher grade cabling may not be realized.

When installing, ensure the cable is installed away from, or isolated from potential sources of interference such as electrical wiring, fluorescent lighting, etc.

Other Items You Will Need

To complete the installation, you will also require the following items that are not included with this system:

- USB compatible computer (host computer) with a USB compliant operating system
- USB compatible device(s)
- Cat-6/Cat-7 unshielded twisted pair (UTP) cable and RJ45 connectors, ensuring the total cable length (including patch cables, if any) does not exceed 328 ft (100 m).

Basic Connections

In this scenario, USB and network connectivity extend to a camera installed some distance away.
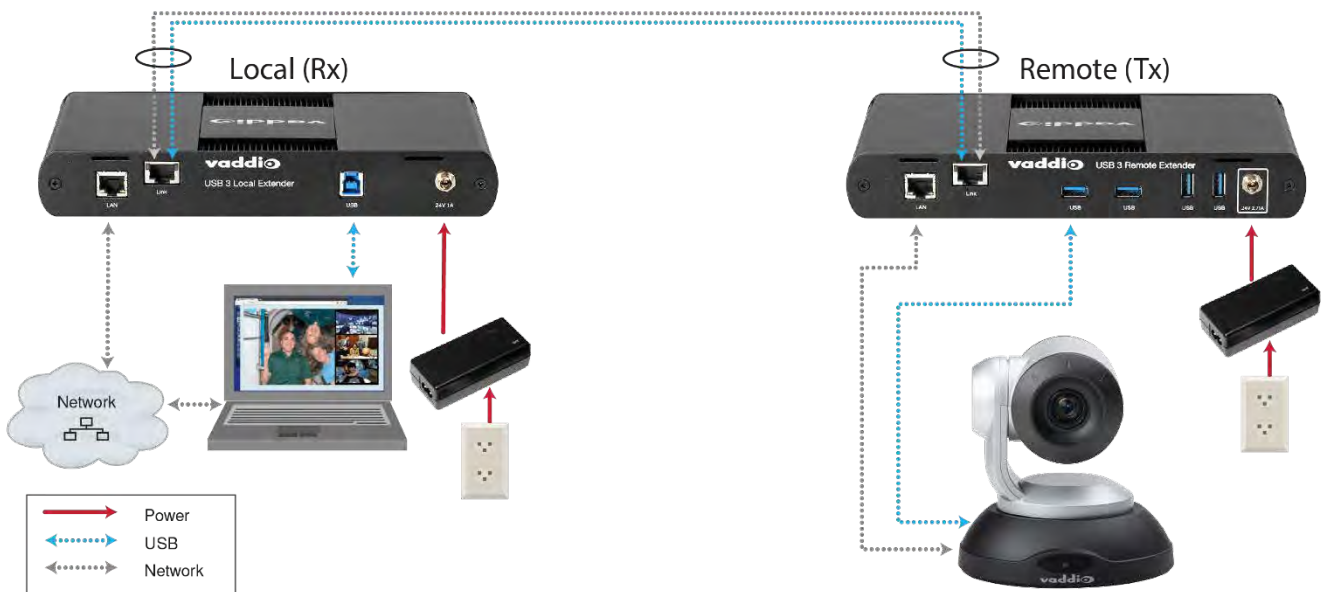

Optional Ethernet Pass-Through Connection

The USB 3 Extenders offer a 100/1000 Mbps Ethernet pass through connection that can be used for:

- Connecting network devices
- Extending network access to the same location as the Remote Extender
- Leveraging existing cabling to provide USB connectivity without losing network connectivity

On one of the extenders, connect the LAN port to the network. On the other extender, connect the LAN port to the network port on a device requiring network connectivity.

CAUTION: DO NOT CONNECT BOTH EXTENDERS TO THE NETWORK.
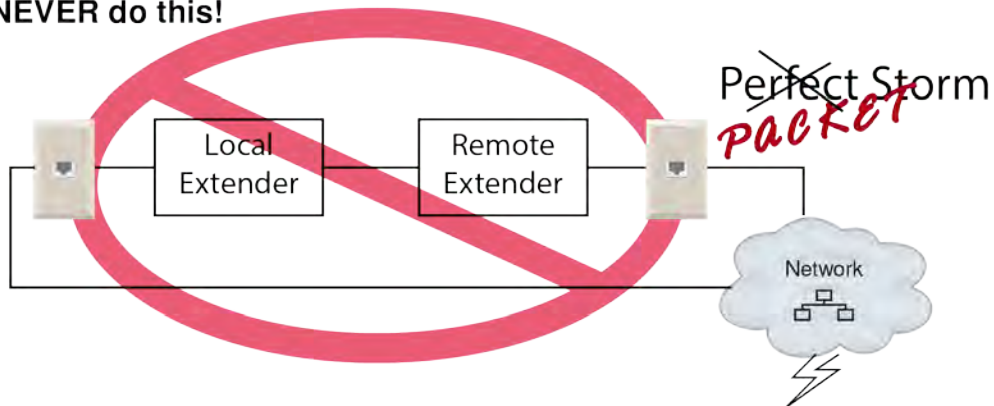
Connections for a Presenter BYOD Scenario

In this scenario, the presenter needs to run a soft conferencing application. The laptop's USB is extended to the AV Bridge MatrixMIX elsewhere in the auditorium, with cameras (and possibly audio equipment) connected to it. The AV operator controls the video source for the conference. The presenter's laptop is the local (Rx end) device, but the closest network connection is closer to the Remote (transmit) end equipment.
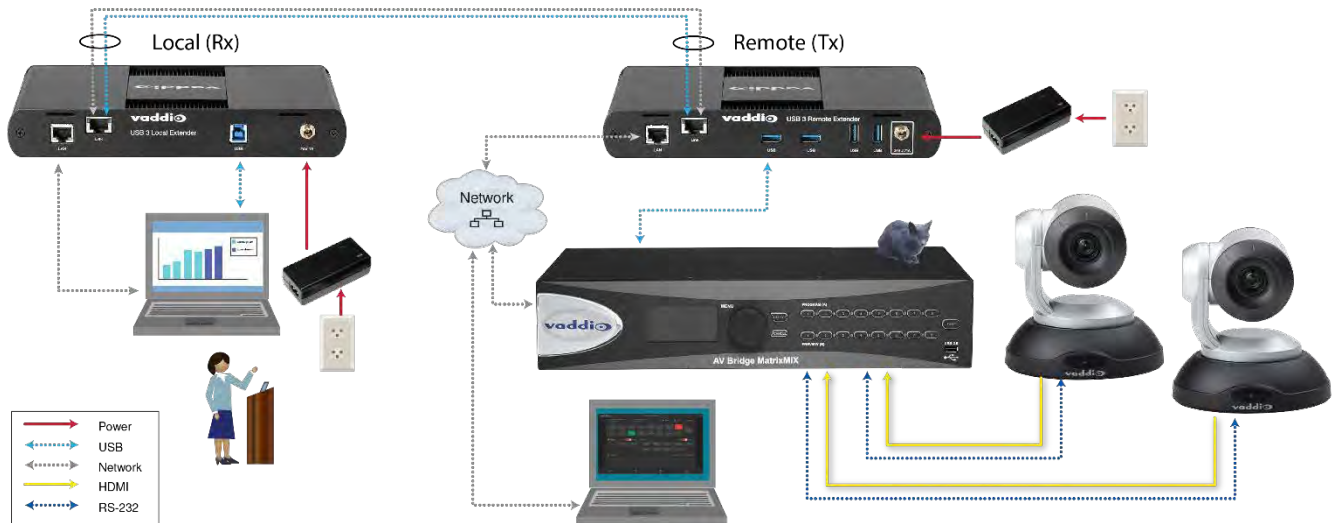
Installing the Extenders

⚠️ The two extenders use different power supplies. Use the correct power supply for each extender. Using the wrong power supply on either extender could damage the system and void your warranty.

1. Place the local (Rx) extender near the computer and use its 24V, 1A power supply to connect it to power.
2. Connect the local extender's Host port to a USB 3 port on the computer using the supplied USB 3.1 cable.
3. Place the remote (Tx) extender near the USB device.
4. Connect the Link port on the local (Rx) extender to the Link port on the remote (Tx) extender using a Cat-6/Cat-7 cable.

   📝 Do not exceed 33 ft (10 m) total of patch cable when using premise cabling.

5. Connect the 24V, 2.71A power supply to the remote (Tx) extender and to power.

Checking the Installation

1. On both extenders, check that the Power, Status, Link, USB 2 and USB 3 LEDs are on. If the Link LEDs are off, check the cabling between the extenders. Correct the problem before continuing.
2. Windows: On the connected computer, open Device Manager. Expand the entry for Universal Serial Bus controllers by clicking the "+" sign. If the extenders are installed correctly, two instances of "Generic SuperSpeed USB Hub" are listed.

   📝 Windows 7: Open the Start Menu, right click Computer, select Manage >> Device Manager.
   Windows 8, 8.1 or 10: Right click the Start Menu; select: Device Manager.

3. MacOS: On the connected computer, open the System Profiler. In the left-hand column under Hardware, select "USB". If the extender has been installed correctly, two separate instances of "Hub" are listed under the USB SuperSpeed Bus.

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

4. If the extender system is not detected correctly or fails to detect, consult the Troubleshooting section.

Connecting a USB Device

1. If necessary, install any software required to operate the USB device. Refer to the documentation for the USB device, as required.
2. Connect the USB device to a USB device port on the Remote Extender.
3. Check that the device is detected and installed properly in the operating system.

Compatibility

The USB 3 Extenders comply with USB 2.0 and USB 3.1 Gen 1 specifications governing the design of USB devices and support USB 3.1, 3.0, 2.0, and 1.1. However, there is no guarantee that all USB devices or hosts will be compatible as several factors affect the operation of USB devices over extended distances.

Troubleshooting

If you are unable to resolve an issue after following these instructions, please contact Technical Support for further assistance.

PROBLEM	POSSIBLE CAUSE	SOLUTION
ALL LEDs are OFF on the Local and/or Remote Extender.	The Local Extender and/or Remote Extender is not receiving power from the AC power adapter.	Ensure that the AC power adapter is properly connected to the Local Extender and/or Remote Extender. Check that the AC adapter is connected to a live source of AC power.
POWER LED is ON, STATUS LED is OFF.	The unit has malfunctioned and requires re-programming.	Contact Technical Support for assistance.
Link LEDs on the Local and Remote Extenders are OFF.	There is no connection between the Local and Remote Extenders.	Ensure that no more than 100m of Cat-6/Cat-7 cabling is connected between the Local and Remote Extenders. Connect a short patch cable between the Local and Remote Extenders. Recheck the link status. If the LINK LED is now ON, the previous cable is defective or not capable of supporting the link.
LINK LEDs on the Local and Remote Extenders are ON, but the USB 2 and USB 3 LEDs are OFF.	• The host computer is not powered on. • The Local Extender is not connected to a computer. • The host computer does not support USB Hubs. • The unit is malfunctioning.	Follow these steps: 1. Disconnect all USB devices from the Remote Extender. 2. Disconnect Local Extender from the host computer. 3. Disconnect AC adapters from Local and Remote Extenders. 4. Reconnect the Local Extender to the host computer. 5. Reconnect the AC adapters to the Local and Remote Extenders. 6. Check that the Local and Remote Extenders have enumerated as USB hubs in Windows Device Manager, macOS System Profiler or using "lsusb" command in a Linux Terminal. If the problem is not resolved, contact Technical Support.

PROBLEM	POSSIBLE CAUSE	SOLUTION
The USB 2 LED is ON, but the USB 3 LED is OFF.	• The Local Extender is not connected to a USB 3 port. • The Local Extender is connected to the host using a USB 2 cable. • The USB 3 cable connecting the Local Extender to the host computer is defective. • The host computer's USB 3 controller has malfunctioned.	• Ensure that the Local Extender is connected to a USB 3 port on the host computer. • Ensure that the included USB 3.1 Gen 1 cable is being used between the host computer and Local Extender. • Cold boot the host computer. • Replace the USB 3.1 Gen 1 cable with a different cable. • If the problem is not resolved, contact Technical Support.
The USB 3 LED is ON, but the USB 2 LED is OFF.	• The USB cable connecting the Local Extender to the host computer is defective. • The host computer's USB 2.0 controller has malfunctioned. • The host computer does not support USB 2.	• Ensure that the included USB 3.1 Gen 1 cable is being used between the host computer and Local Extender. • Cold boot the host computer. • Replace the USB 3.1 Gen 1 cable with a different cable. • If the problem is not resolved, contact Technical Support.
Both the Local and Remote Extenders are working, but the USB 2 or USB 3 LEDs on the Local and Remote Extenders are blinking.	The Local and/or Remote Extender is in suspend mode. For a variety of reasons, the host computer may place the Local/Remote Extender into suspend mode. Typically, it is because there are no USB devices attached, the USB device is asleep, or the host computer is in a sleep state or hibernating.	• Recover/resume the operating system from sleep or hibernate modes (refer to your operating system's documentation). • Connect a USB device to the Remote Extender. • Use the connected device. If the problem persists, contact Technical Support.
ALL LEDs on both the Local and Remote Extenders are ON, but the USB device is not operating correctly, or is detected as an "Unknown Device" in the operating system.	• The USB device is malfunctioning. • The computer does not recognize the USB device. • The application software for the USB device is not operating. • The USB extender is malfunctioning.	Follow these steps: 1. Disconnect the extender from the computer. 2. Connect the USB device directly to the host computer. If the device does not operate as expected, consult the user documentation for the device. 3. Update the host computer BIOS, chipset or USB controller drivers from the manufacturer's website. 4. If the device operates as expected when directly connected to the computer, connect another device to the extender and reconnect it to the host computer. If the second device does not operate, the extender may be malfunctioning. Contact Technical Support for assistance. If the second device operates as expected, then the first device may not be compatible with this extender. Contact Technical Support.

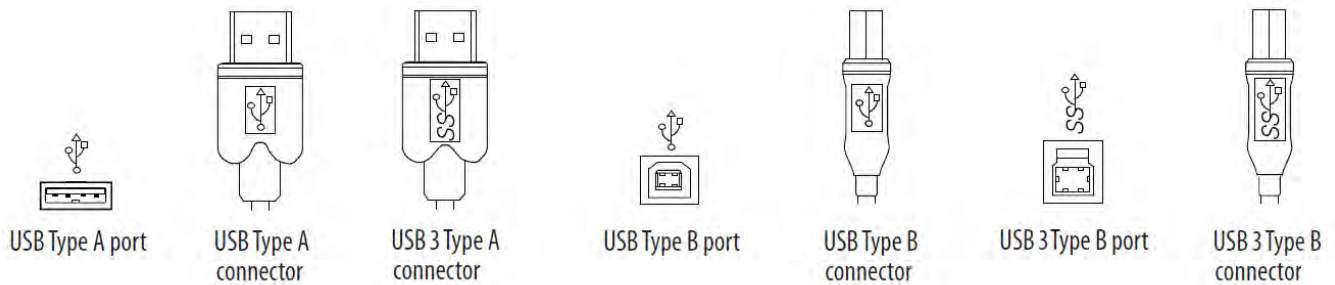| PROBLEM	POSSIBLE CAUSE	SOLUTION

A USB 3 device is not enumerating as USB 3, or the operating system is notifying the user that the device can "Perform Faster if connected to a USB 3 port".	• The USB device is malfunctioning.
	• The computer does not recognize the USB device.
	• The application software for the USB device is not operating.
	• The USB 3 port on the computer is malfunctioning.
	• The USB extender is malfunctioning.
		Follow these steps:
		1. Disconnect the extender from the computer.
		2. Connect the USB 3 device directly to the host computer.
		    If the device does not operate as expected as a USB 3 device, consult the user documentation for that device or try a different USB port on the host computer.
		3. Update the host computer BIOS, chipset or USB controller drivers from the manufacturer's website.
		4. If the device operates as USB 3 device when directly connected to the computer, connect another USB 3 device to the extender and reconnect it to the host computer.
		    If the second device does not operate as a USB 3 device, the extender may be malfunctioning. Contact Technical Support for assistance.
		    If the second device operates as a USB 3 device as expected, the first device may not be compatible with this extender. Contact Technical Support.

All LEDs are flashing and the system is operational.	Unit is or was operating at an unsafe temperature.	• Check ambient temperature. Ensure temperature does not exceed 50°C (122°F). • Power cycle the unit to remove LED status.
All LEDs are flashing and the system is NOT operational.	Unit has exceeded safe operating temperature.	• Remove external sources of heat or change location of the unit. • Power cycle the unit to return to operation.
LEDs are scrolling LEFT to RIGHT, starting with STATUS.	Unit is programming.	Wait for the unit to finish programming.

Specifications

RANGE	
Point-to-Point	Up to 100m (328 ft) over CAT6a/7 Cable
USB DEVICE SUPPORT	
Maximum Throughput	5 Gbps
Traffic Types	All Traffic Types
Device Types	All Device Types
Maximum Number of Devices and/or Hubs	Up to 30 devices
LOCAL EXTENDER	
USB Connector	1 x USB 3.1 Gen 1 Type B Receptacle
Link Connector	1 x RJ45 "LINK"
Network Pass Through:	1 x RJ45 "LAN"
Dimensions	137.3mm x 232.1mm x 33.0mm (5.4" x 9.1" x 1.3")
Enclosure Material	Black Anodized Aluminum
Power Supply	100-240V AC Input, 24V 1A DC Output
REMOTE EXTENDER	
USB Connector	4 x USB 3.1 Gen 1 Type A Receptacles
Link Connector	1 x RJ45 "LINK"
Network Pass Through:	1 x RJ45 "LAN"
Dimensions	137.3mm x 232.1mm x 33.0mm (5.4" x 9.1" x 1.3")
Enclosure Material	Black Anodized Aluminum
Available Current	Up to 1.2 Amp (6W) to each USB port
Power Supply	100-240V AC Input, 24V 2.71A DC Output
ENVIRONMENTAL	
Operating Temperature Range	0°C – 50°C (32°F – 122°F)
Storage Temperature Range	-20°C – 70°C (-4°F – 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)

Technical Glossary

Cat-6a/Cat-7 Network Cabling –also called Category 6a/Category 7. This cabling is available in either solid or stranded twisted pair copper wire variants and as UTP (unshielded twisted pair), FTP (foiled twisted pair) or STP (shielded twisted pair). UTP cables are not surrounded by any shielding making them more susceptible to electromagnetic interference (EMI). FTP/STP cables include shielding the copper wires and provide better protection against EMI.

USB 3 and 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.

| USB Type A port | USB Type A connector | USB 3 Type A connector | USB Type B port | USB Type B connector | USB 3 Type B port | USB 3 Type B connector |

RJ45 – the Registered Jack (RJ) physical interface connects the network cabling (Cat-6a/Cat-7) to the local (Rx) and remote (Tx) extenders. You may use either the T568A scheme (Table 1) or the T568B scheme (Table 2) for cable termination. The USB 3 Extenders require all four pairs of the cable. Note that any give cable must be terminated using the same T568 scheme on both ends to operate correctly.

RJ45 Pin-Outs

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

Pair 3 — Pair 1 (Pair 2) — Pair 4

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| W-G | G | W-O | BL | W-BL | O | W-BR | BR |
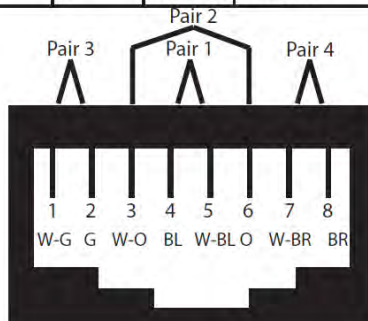
Table 2 - T568B Wiring

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

Pair 3 — Pair 1 (Pair 2) — Pair 4

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| W-O | O | W-G | B | W-BL | G | W-BR | BR |
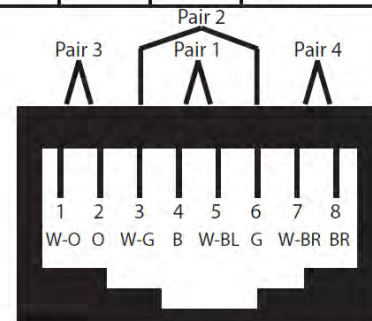
Contacting Technical Support

If you are experiencing problems not referenced in the Troubleshooting section, or require further assistance, contact Vaddio Technical Support.

Compliance Statements and Declarations 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 original manufacturer declares that this product is in conformity with European Standards EN 55022, EN 55024, EN 55032 and EN 61000.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003 Issue 6.

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 (if applicable). When not in use, product should be stored in a dry location between -20°C and 70°C.