TL-FO-USB3-01

USB 3.0 Over Fiber Optic Extender
User Guide

Thank you for purchasing the TechLogix TL-FO-USB3-01.

Please read this guide thoroughly.

FCC Radio Frequency Interference Statement Warning
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

CE Statement
We, TechLogix Networx, LLC, declare under our sole responsibility that the TechLogix TL-FO-USB3-01, to which this declaration relates, is in conformity with European Standard EN 55022, EN 61000 and EN 55024.

IC Statement
This Class B digital apparatus complies with Canadian ICES-003.

WEEE Statement
The European Union has established regulations for the collection and recycling of all waste electrical and electronic equipment (WEEE). Implementation of WEEE regulations may vary slightly by individual EU member states. Please check with your Host and state government guidelines for safe disposal and recycling or contact your national WEEE recycling agency for more information.

Product Operation and Storage
Please read and follow all instructions provided with this product, and operate for intended use only.

Do not attempt to open the product casing as this may cause damage and will void warranty. Use only the power supply provided with this product. When not in use, product should be stored in a dry location between -20°C and 70°C.

Contents

Introduction

This guide provides product information for the TL-FO-USB3-01, installation instructions, and troubleshooting guidelines.

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

NOTE: Notes provide additional information that could be useful.

CAUTION: Cautions provide important information about an operational requirement.

TL-FO-USB3-01 Product Contents

Your TL-FO-USB3-01 is packaged with:

- Host Extender
- Client Extender
- Client Extender Locking AC power adapter
- USB 3.0 cable
- Country specific power cable
- Quick Start Guide

About the TechLogix TL-FO-USB3-01

The TL-FO-USB3-01 incorporates Icron's patented ExtremeUSB® technology, enabling users to extend beyond the approximate 3m cable limit for USB 3.0 peripheral devices. With the TL-FO-USB3-01, USB 3.0 devices can be located up to 100 meters from the computer. This extender system is composed of two individual units: the Host Extender unit and the Client Extender unit.

CAUTION: The TL-FO-USB3-01 supports only USB 3.0 devices. USB 2.0 and 1.1 devices will not function with this extender.
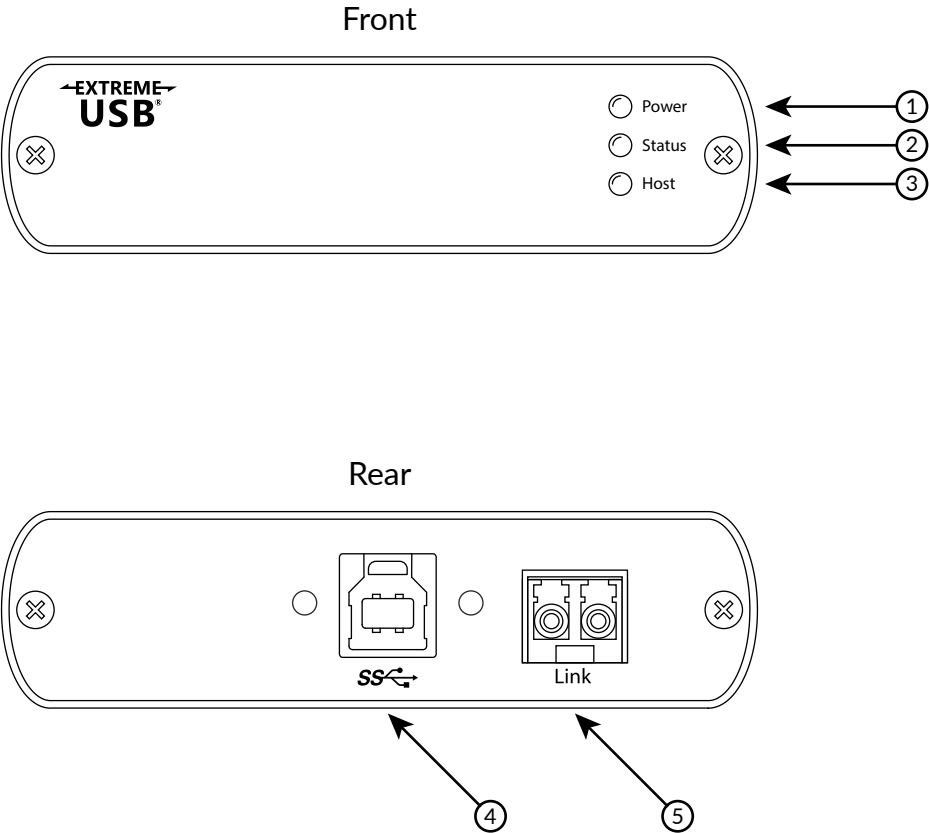
The TL-FO-USB3-01 includes the ExtremeUSB® suite of features:

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

Device Overview

Host Extender

Front

EXTREME
USB®

○ Power ← ①
○ Status ← ②
○ Host ← ③

Rear

SS⇌   Link

④   ⑤

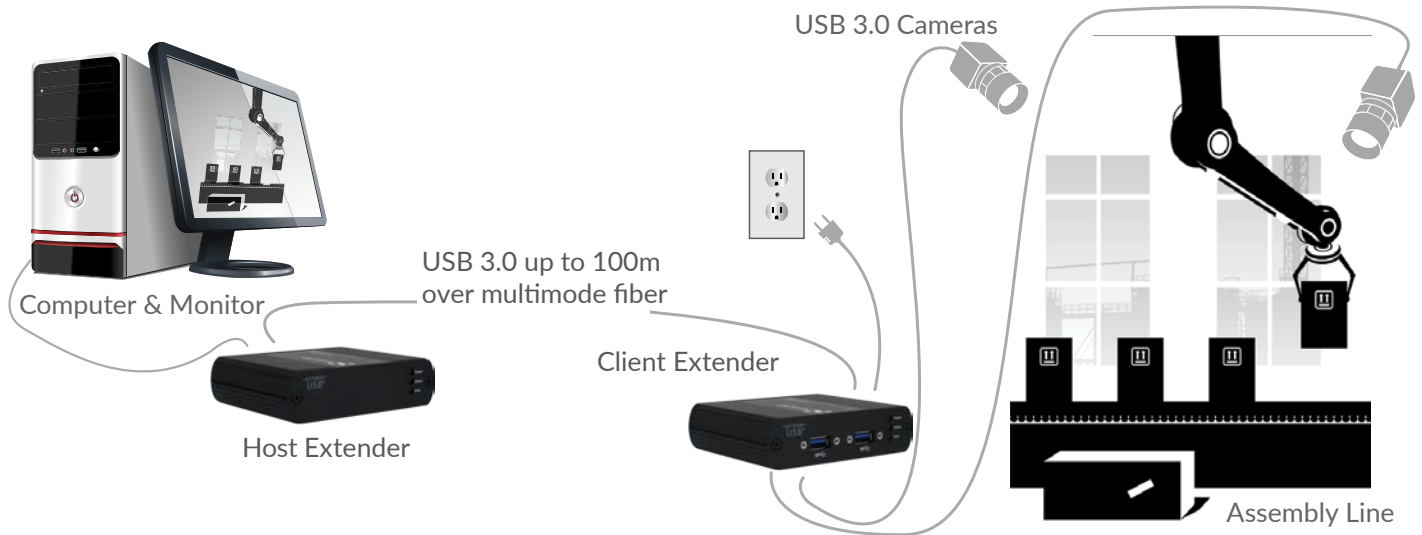| Item	Type	Description
1	Power ON	Unit is powered properly.
1	Power OFF	Unit is not powered or not powered properly.
2	Status Blinking	Waiting for connection to Remote Extender.
2	Status ON	Local/Remote Extender are linked and operating normally.
2	Status OFF	Fault detected; power cycle required.
3	Host ON	SuperSpeed Host detected on upstream facing port.
3	Host OFF	SuperSpeed Host not detected.
3	Host Blinking	SuperSpeed Host is suspended.
4	USB 3.0 Type B port	Used to connect the Host Extender to the host computer. Port accepts locking or non-locking USB 3.0 Type B connectors. (Read the message on the white sticker and remove sticker from the back of Local Extender before usage.)
5	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

Client Extender

Front

Rear
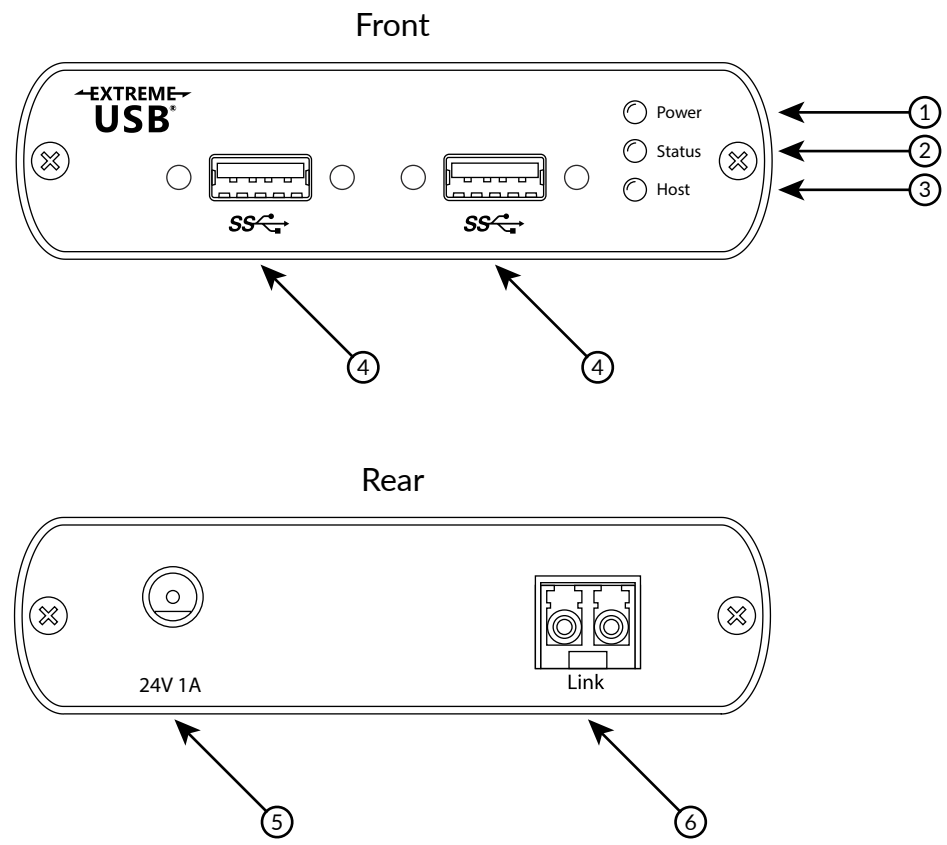
Item	Type	Description
1	USB 3.0 Type A ports	Used to connect USB 3.0 device(s) to the Client Extender unit. Ports accept locking or non-locking USB 3.0 Type A connectors.
2	Power ON	Unit is powered properly.
	Power OFF	Unit is not powered or not powered properly.
3	Status Blinking	Waiting for connection to Local Extender.
	Status ON	Local/Remote Extender are linked and operating normally.
	Status OFF	Fault detected; power cycle required.
4	Host ON	SuperSpeed Host detected on upstream facing port.
	Host OFF	SuperSpeed Host not detected.
	Host Blinking	SuperSpeed Host is suspended.
5	Power Port	Connects to the locking AC power supply. Required on Client Extender for proper operation.
6	Link Port (Duplex LC)	Extension link Duplex LC fiber optic transceiver port.

Installation Guide

Example Application

USB 3.0 Cameras

USB 3.0 up to 100m over multimode fiber

Computer & Monitor

Client Extender

Host Extender

Assembly Line

Requirements

To complete installation of the TL-FO-USB3-01, you will also require the following items that are not included with the product:

- USB 3.0 compatible computer (host computer) with a USB 3.0 compliant operating system
- USB 3.0 compatible device
- 2-strand 50/125μm multimode (MMF) fiber optic cable with Duplex LC connectors

Fiber Optic Link Cabling

The Host and Clent Extender units are interconnected by fiber optic cabling. This cabling must be:

- 50/125μm multimode fiber (MMF)
- Terminated with Duplex LC connectors

The following maximum distances are achievable depending upon the application and cabling standard:

Multimode Fiber Class	Cameras	Storage
OM2	50m	50m
OM3	100m	50m

Up to 50m with USB 3.0 storage type devices and up to 100m is achievable when using USB 3.0 bulk traffic cameras. For Microsoft Kinect applications, please use an active extension cable.

If premise cabling will be used for the installation, then the distances provided above must be met when measuring from the Host to the Client Extender unit, inclusive of the premise cabling and the patch cables. All cables must meet the ratings specified. Patch cables must be terminated with Duplex LC connectors.

Installing the TL-FO-USB3-01 System

Preparing Your Site

Before you can install the TL-FO-USB3-01, 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. Ensure fiber optic cabling is in place, prepared, properly terminated, and within the maximum distances as defined for the cabling standard used.

Preparing Your Computer

The TL-FO-USB3-01 does not support suspend modes of operation. As such, your computer should be configured to not go into "suspend mode" or to "suspend" the USB ports. Please refer to the instructions for your operating system listed below.
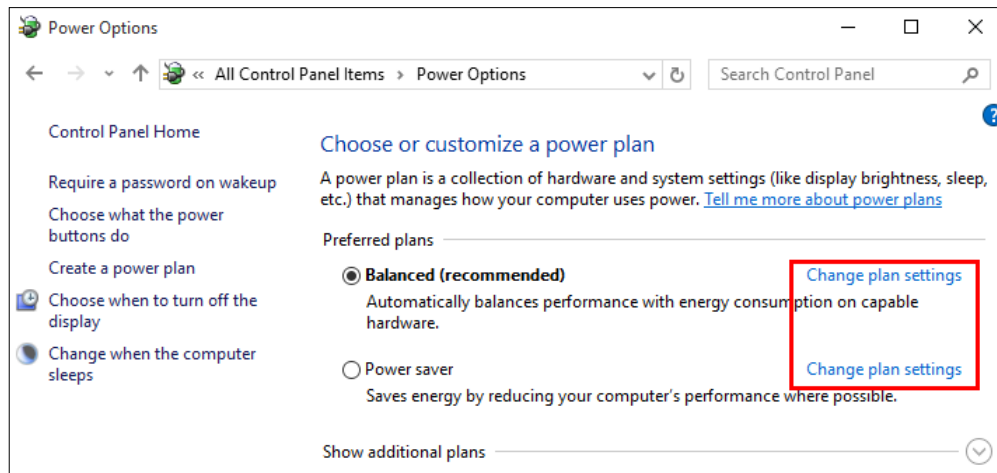
Windows (7/8/8.1/10)
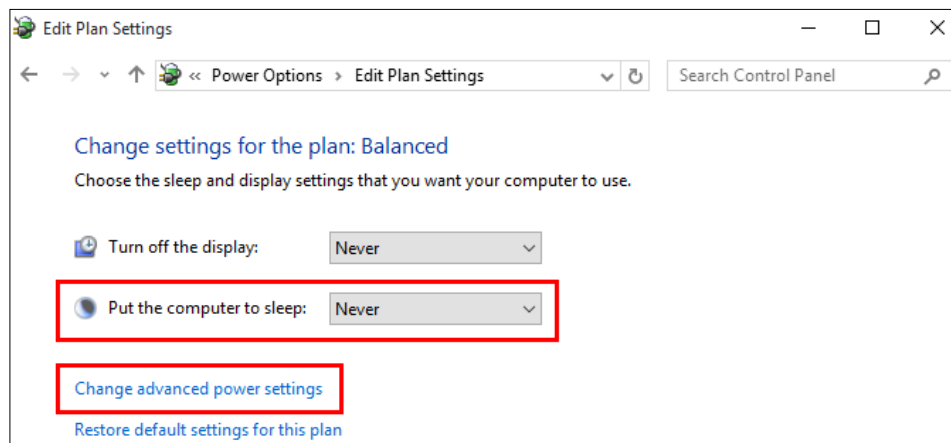
1. Open *Control Panel*.
2. Open *Power Options*.
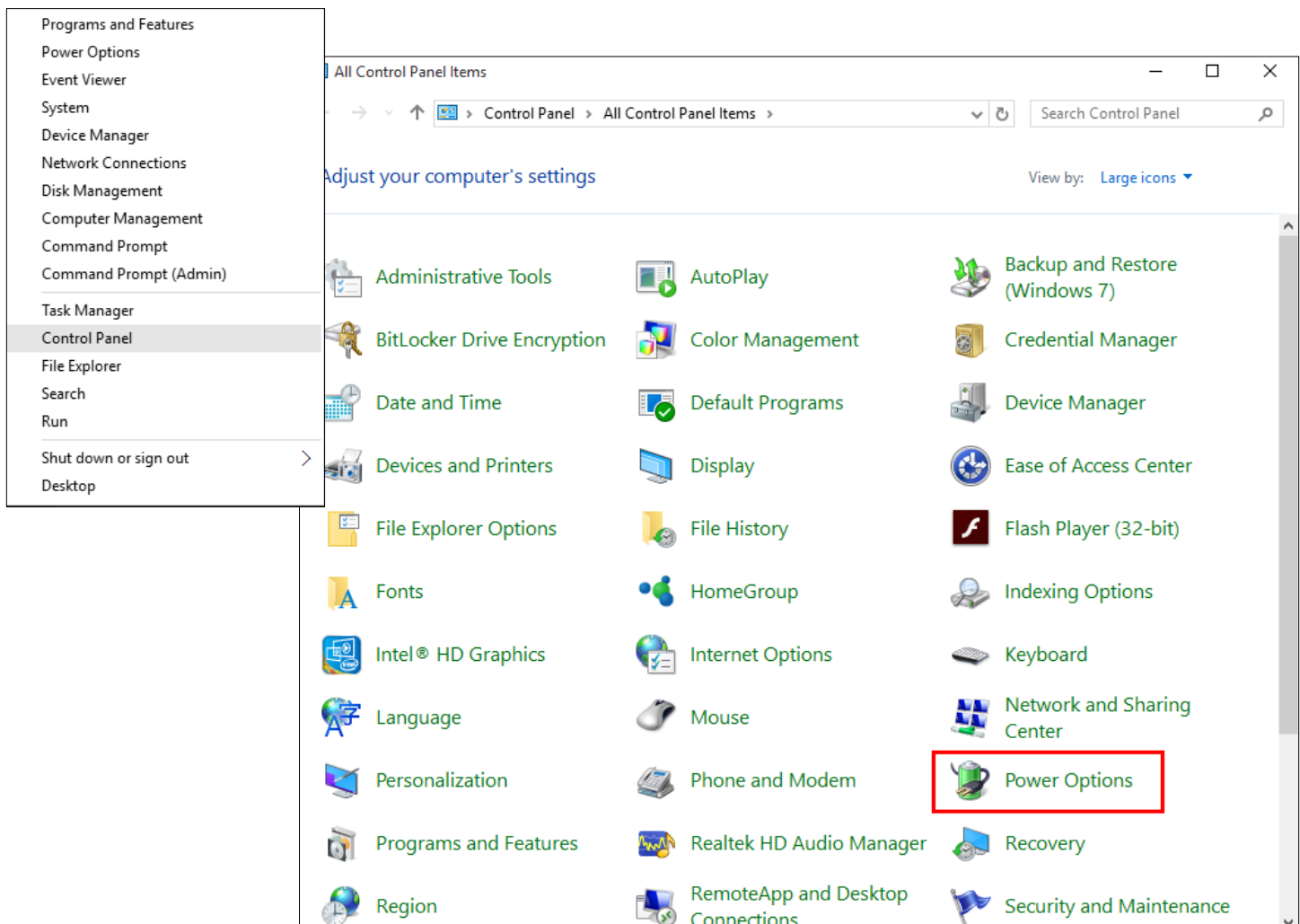
3. Click on *Change Plan Settings*.

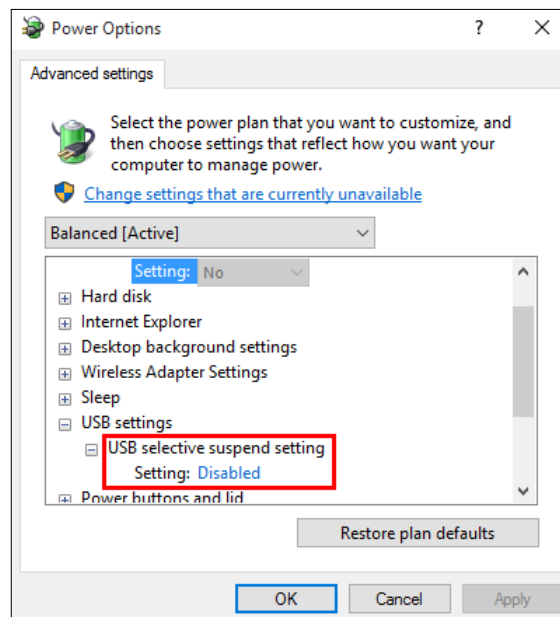4. Select "Never" for "Put the computer to sleep" for all the configurations presented.
5. Click *Change advanced power settings*.
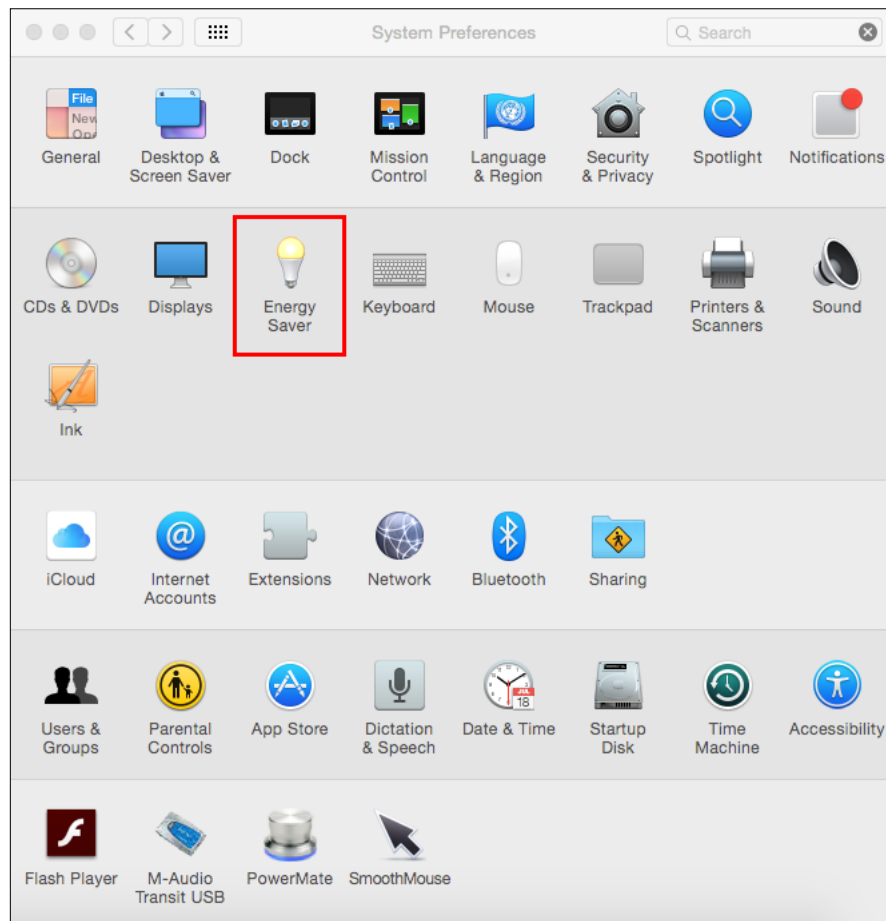

6. Expand "USB settings"
7. Expand "USB selective suspend setting"
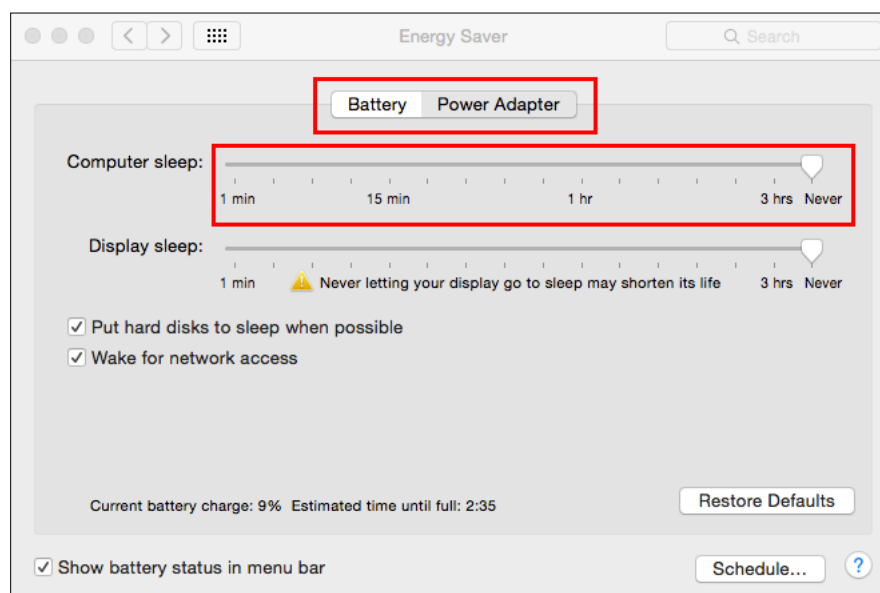8. Select "Disabled".

OS X/macOS

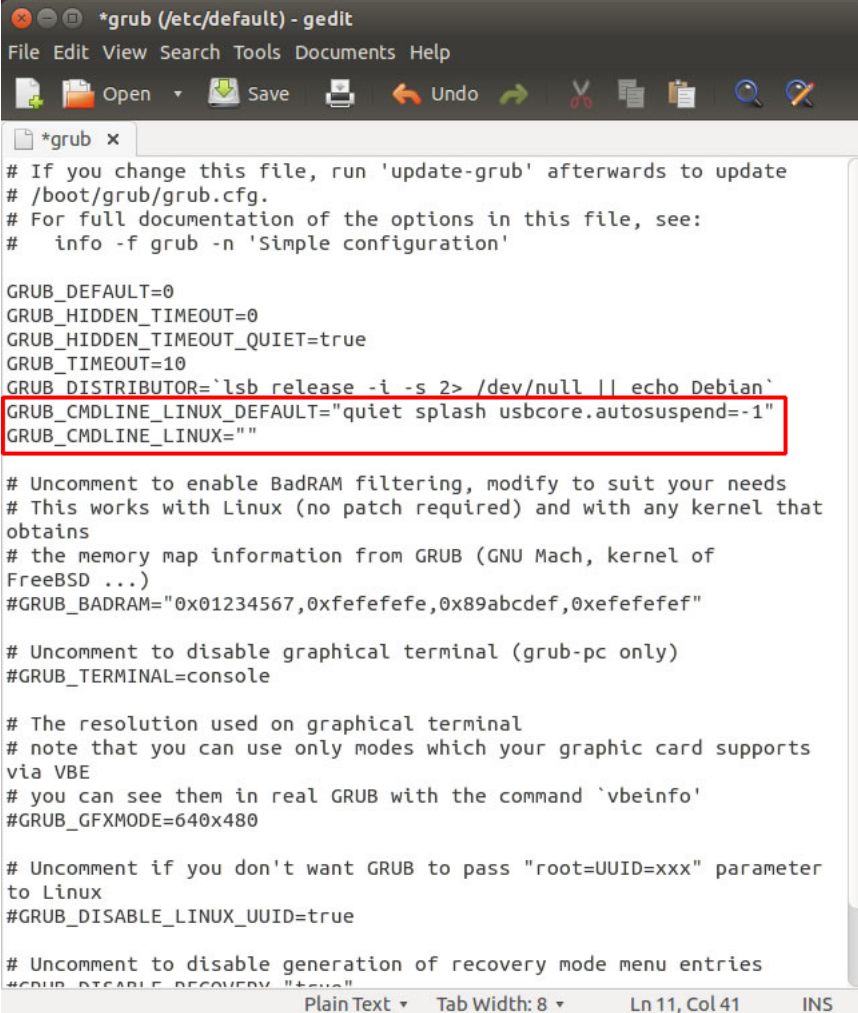1. Open *System Preferences.*
2. Select *Energy Saver.*

3. For both *Battery* and *Power Adapter* power settings, move slider bar to "Never" for "Computer Sleep".

Linux (Ubuntu 14.04)

1. Edit */etc/default/grub* as root.
2. Append `usbcore.autosuspend=-1` to the `GRUB_CMDLINE_LINUX_DEFAULT` variable.

3. Run *update-grub* as root under Ubuntu.
4. Reboot the host computer.

Install Device and Drivers on Host PC

1. Install any software required to operate the USB device(s). Refer to the documentation for the USB device(s), as required.
2. Check that the device is detected and installed properly in the operating system.

Windows (7/8/8.1/10)

For Windows users, open *Device Manager* to confirm that the USB 3.0 device has been installed correctly.

> NOTE: To open *Device Manager* in Windows 10/8/8.1 or Windows 7: Open the *Start* menu, right click on "Computer" then select: *Manage >> Device Manager*.

OS X/macOS

For OS X/macOS users, open the *System Profiler* to confirm that the USB 3.0 device has been installed correctly.

> NOTE: 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.

Linux (Ubuntu 14.04)

For Linux users, open a terminal and run the `lsusb` command to confirm that the USB 3.0 device has been installed correctly.

Install the Host Extender Unit

1. Remove the white sticker covering the USB 3.0 port that reads "Important Step: Disable Suspend settings on your computer prior to using this product".
2. Ensure your computer's suspend settings have been disabled (see the Preparing Your Computer section in the User Guide).
3. Place the Host Extender Unit near the computer.
4. Connect the link cable to the Host and the Client Extender Unit.

   With Surface Cabling
   1. Plug one end of the fiber optic cabling (not included) into the Link port on the Host Extender.
   2. Plug the other end of the fiber optic cabling into the Link port on the Client Extender.

   With Premise Cabling
   1. Plug one end of a fiber optic patch cord (not included) into the Link port on the Host Extender.
   2. Plug the other end of the patch cord into the fiber optic information outlet near the host computer.
   3. Plug one end of the 2nd fiber optic patch cord (not included) into the Link port on the Client Extender.
   4. Plug the other end of the 2nd patch cord into the fiber optic information outlet near the USB device.

5. Install the supplied USB 3.0 cable between the Host Extender and a USB 3.0 port on the host computer.

Install the Client Extender Unit

1. Place the Client Extender near the USB device(s).
2. Connect the USB device to the device port on the Client Extender unit. If using an AIA USB3 Vision™ compliant locking USB cable, then turn the locking knobs to lock the cable to the port on the Client Extender.
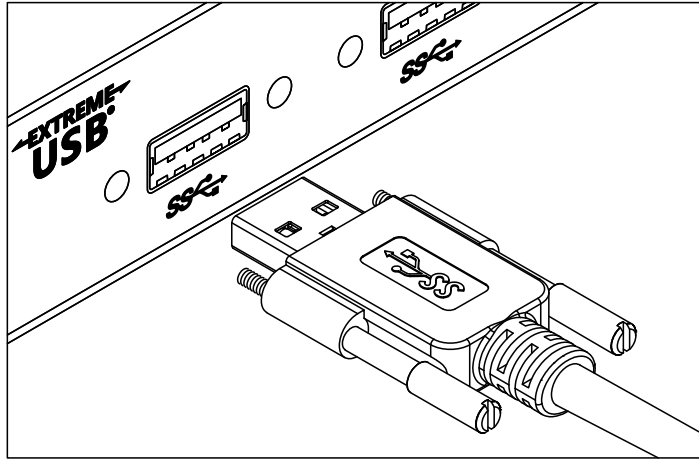
3. Plug the power adapter into a suitable AC outlet.
4. Connect the power adapter to the Client Extender and twist the connector to lock the power connector into the Client Extender.

Compatibility

The TL-FO-USB3-01 complies with USB 3.0 specifications governing the design of USB devices. However, TechLogix Networx does not guarantee that all USB 3.0 devices are compatible with the TL-FO-USB3-01, as there are a number of different configurations that may impact the operation of USB 3.0 devices over extended distances.

CAUTION: The TL-FO-USB3-01 supports only USB 3.0 devices. USB 2.0 and 1.1 devices will not function with this extender.

NOTE: For Microsoft Kinect applications, please use an active extension cable.

Checking the Installation

On the Host and Client Extender units, check that the Power, Status, and Host LEDs are on and solid. If the Host or Status LEDs are permanently off, then the cabling between the Host and Client Extender units may not be installed properly or is defective.

Windows (7/8/8.1/10)

1. Open *Device Manager* to confirm that the TL-FO-USB3-01 has installed correctly.
2. Expand the entry for *Universal Serial Bus controllers* by clicking the "+" sign. If the TL-FO-USB3-01 has been installed correctly, you should find it listed as two "Generic SuperSpeed Hubs" or "3.0 Hubs".

NOTE: To open *Device Manager* in Windows 10/8/8.1 or Windows 7: Open the *Start* menu, right click on "Computer" then select: *Manage >> Device Manager*.
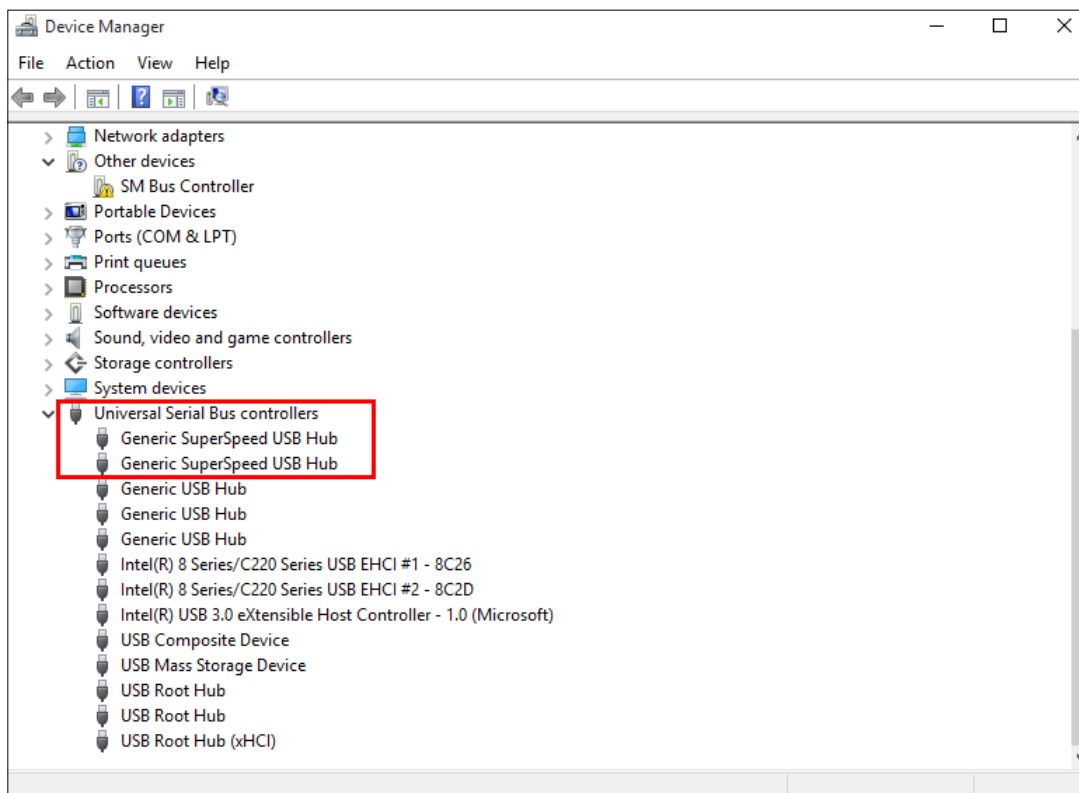
OS X/macOS

1. Open the *System Profiler* to confirm that the TL-FO-USB3-01 has installed correctly.
2. In the left hand column under Hardware, select "USB" and inspect the right hand panel. If the TL-FO-USB3-01 has been installed correctly, you should find it listed as a "Hub" under the "USB 3.0 SuperSpeed Bus".

NOTE: 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.
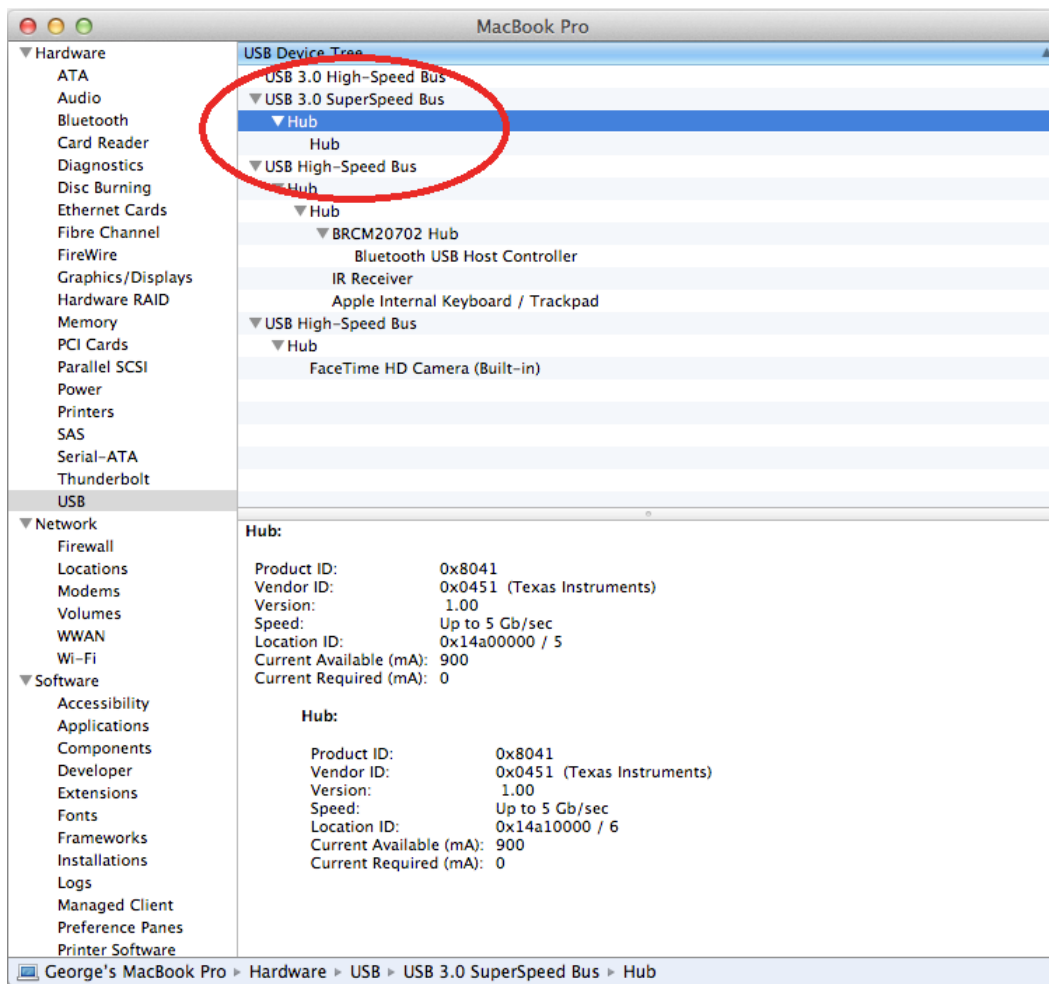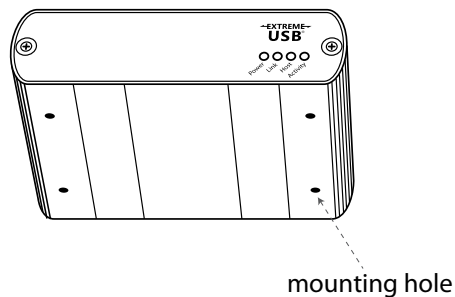

Linux (Ubuntu 14.04)

Open a terminal and run the `lsusb` command. The extender should show up as a USB 3.0 hub device with a Vendor ID of `0000h` and Product ID of `0000h`.
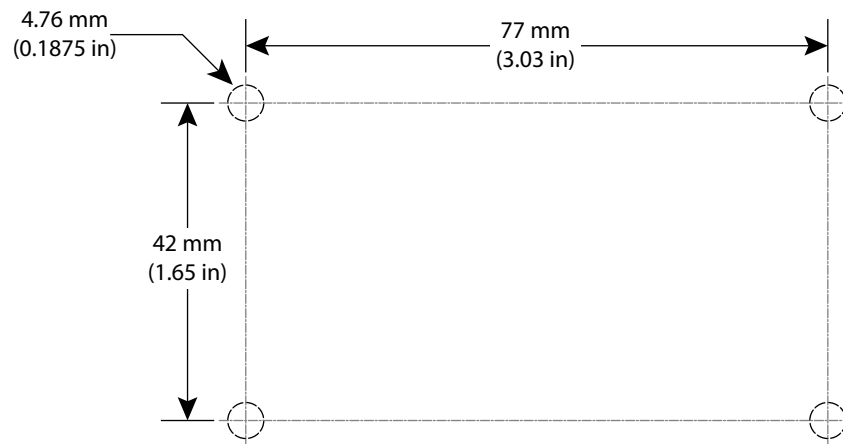
USB Extender Mounting

The bottom of the TL-FO-USB3-01 enclosures features four pre-drilled holes for optional surface mounting.

mounting hole

Distance between the enclosure mounting holes: 42.0 mm x 77.0 mm

1. Mark the center point of each of the four holes on your mounting surface either by directly measuring or using a print out of the stencil below.
2. Hardware recommendation: M3.0 locking washers and M3.0 screws (4 of each per extender) noting screw length will depend upon thickness of mounting surface.
3. Drill through each of the four hole markings on the mounting surface using a 4.7625mm (3/16") drill bit.
4. Align the bottom enclosure holes to the newly drilled out holes on the mounting surface.
5. Place a locking washer on each of the four screws and using a screwdriver, fasten the extender into place.

To ensure the stencil below prints to scale be sure to set the page scaling setting to "none".

4.76 mm
(0.1875 in)

77 mm
(3.03 in)

42 mm
(1.65 in)

Troubleshooting

Problem	Cause	Solution
All LEDs on Host Extender are off.	• The Host Extender is not receiving power from the USB port.	• Ensure that the USB connection between the Host Extender and host computer is properly installed. • Move the USB connector to another USB port on the host computer.
All LEDs on Host Extender are off.	• The Client Extender is not receiving power from the AC adapter.	• Ensure that the AC power adapter is properly connected to the Client Extender. • Check that the AC adapter is connected to a live source of electrical power.
Status LEDs on both the Host and Client Extender units are blinking.	• There is no connection between the Host and Client Extender units. • The Host Extender is not connected to a USB 3.0 port. • The host computer does not support USB 3.0.	• Ensure that the host computer supports USB 3.0, refer to your computer's manual for confirmation. • Ensure the Client Extender is connected to a USB 3.0 port. The center of the port should be blue. Another color, such as black usually indicates a USB 2.0 port. • Ensure that an LC multimode fiber optic cable is connected between the Host and Client Extender units. • Connect a fiber optic patch cord between the Host and Client Extender units. Recheck operation of the system.
Host LED is blinking on one or both units.	• The computer went into suspend, hibernate or sleep mode. • The computer tried to suspend the USB 3.0 port that is connected to the Host Extender.	• Follow the steps in "Preparing Your Computer" to disable suspend modes on your computer. Refer to your operating system's manual for additional instructions if necessary. • Power cycle the Client Extender and the devices connected to the Client Extender. • Power cycle the Host and Client Extender, and the devices connected to the Client Extender.
Host LED on Host/Client Extender is off.	• The host computer is not powered on. • The Host Extender is not connected to the computer (when used with the optional Host Extender AC adapter). • The Host Extender is not connected to a USB 3.0 host. • The extender is malfunctioning.	1. Disconnect all USB devices from the Client Extender. 2. Disconnect the Host Extender from the computer. 3. Disconnect the Client Extender from the AC power adapter. 4. Reconnect the Host Extender to the computer. 5. Reconnect the Client Extender to the AC power adapter. 6. In the *Universal Serial Bus controllers* section of *Device Manager*, check that the TL-FO-USB3-01 is recognized as two "Superspeed Hubs" or two "3.0 Hubs".

| Problem	Cause	Solution
All LEDs on both the Host and Client Extender units are on but the USB device does not operate 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 device is not operating. • The extender is malfunctioning.	1. Disconnect the TL-FO-USB3-01 from the computer. 2. Connect the USB device directly to the USB port on the computer. 3. If the USB device does not operate properly, consult the user documentation for the device. 4. Update your system BIOS, chipset, or USB Host controller drivers from your System/ Motherboard manufacturer's website. 5. If the USB device operates properly when directly connected to the computer, connect another device (of a different type) to the TL-FO-USB3-01. Connect the TL-FO-USB3-01 to the computer. 6. If the second USB device does not operate, the TL-FO-USB3-01 may be malfunctioning. If the second USB device does operate properly, the first device may not be compatible with the TL-FO-USB3-01.
There are issues with the Microsoft Kinect.	• This extender is not fully compatible with the Kinect.	• For Microsoft Kinect applications, please use an active extension cable.

Specifications

| Distance*	Multimode Fiber Class	Cameras	Storage
	OM2	50m	50m
	OM3	100m	50m
	* Up to 50m with USB 3.0 storage type devices and up to 100m is achievable when using USB 3.0 bulk traffic cameras.		
USB Device Support & Throughputs	USB 3.0 up to 5 Gbps (Not backward compatible with USB 2.0/1.1)		
USB Host Support	xHCI Controllers (Intel, AMD, Renesas (NEC), Fresco, AsMedia)		
Enclosure Material	Anodized Aluminum		
Host EXTENDER			
USB Connector	1 x USB 3.0 Type B Locking Receptacle per AIA USB3 Vision™ specification		
Link Connector	1 x Duplex LC Connector		
Dimensions	100mm x 76mm x 26mm (3.94" x 2.99" x 1.02")		
Client EXTENDER			
USB Connectors	2 x USB 3.0 Type A Locking Receptacles per AIA USB3 Vision™ specification		
Link Connector	1 x Duplex LC Connector		
Dimensions	100mm x 76mm x 26mm (3.94" x 2.99" x 1.02")		
Power Connector	24V DC, 1A, Locking, 2.5 mm, center-positive		
Available Current	900mA for each USB Port		
Power Supply	100-240V AC Brick, Locking		
ENVIRONMENTAL			
Operating Temperature Range	0°C to 50°C (32°F to 122°F)		
Storage Temperature Range	-20°C to 70°C (-4°F to 158°F)		
Operating Humidity	20% to 80% relative humidity, non-condensing		
Storage Humidity	10% to 90% relative humidity, non-condensing		
COMPLIANCE			
EMC	FCC (Class B), CE (Class B)		
Environmental	RoHS2 (CE)		
Machine Vision	Works with AIA USB3 Vision™ compliant devices		
SUPPORT			
Warranty	3-year		

Technical Glossary

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.
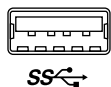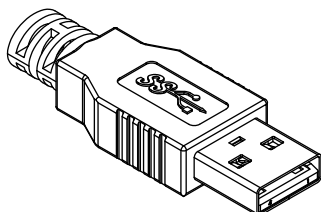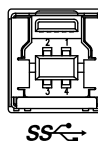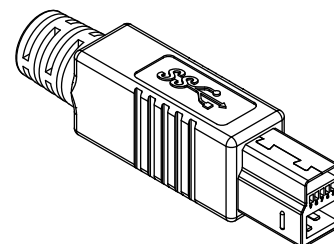
USB 3.0	USB 3.0	USB 3.0	USB 3.0
Type A	Type A	Type B	Type B
Jack	Plug	Jack	Plug

Duplex LC Crossover

When a crossover fiber optic cable is called for, the cable has the transmit signal on one end connected to the receive signal at the other end.

TX

RX