

ILLUMiFlex™

High Quality Flexible LED Strip User Guide

Revision 1.4.0



INNOVATIVE ILLUMINATION

www.IllumiSci.com

Safety, Handling, & Support

Important Safety Information

Do Not Skip This!

WARNING:

Failure to follow these safety instructions could result in fire, electric shock, or other injuries, or damage to IllumiSci™ products or other property. Read all the safety information below before using. Also, read this entire User Guide prior to using this or any other IllumiSci™ product.

Heat, Cold & Moisture

FOR INDOOR USE ONLY. Do NOT expose to excessive heat (>90°F), cold (<45°F) or any moisture/liquids, or place in a location that is likely to be exposed to moisture.

Handling & Installation Considerations

Handle IllumiTile™ and other IllumiSci products with care. They work using electricity and are sensitive to metal, glass, and plastic and have sensitive electronic components in or on them. They can be damaged if dropped, burned, punctured, or crushed, or if they come in contact with liquid. IllumiTile™ SHOULD NOT be used for architectural applications such as permanent inside or outside of a building, structure, etc. since they are not designed for such applications.

The line voltage power supply cord should not be concealed or run through openings in the cabinets, walls, furniture, ceilings, floors, etc.. This requirement does not apply to the low voltage wiring between the light and the power supply. The National Electric Code (NEC) does not permit high voltage (>70V) cords to be concealed where damage to insulation may go unnoticed. To prevent fire danger, do not run any cord or cable behind walls, ceilings, soffits, or cabinets where it may be inaccessible for examination. Cords should be visually examined periodically and immediately replaced when any damage is noticed.

(Continued on next page.)

Repairing

Do NOT attempt to repair any IllumiSci products yourself. The light source of this product is non-changeable light emitting diodes (LED). Do not disassemble the product, as the light diodes can cause damage to the eyes or cause the device to function unsafely.

Overloading

Be sure not to overload the circuits of IllumiSci products, short the IllumiFlex or any other part of the circuit. Determine the proper load as specified for each product. Do not use IllumiSci products if you do not have at least a basic understanding of electricity and what understand what overloading (excessive current) means. A maximum of 5 Amps can be passed through an IllumiTile circuit.

Ventilation

Be sure that IllumiSci components have proper ventilation so that they do not overheat. IllumiSci products should have ample ventilation to room temperature (64 degrees F or 18 degrees C). Consider and accommodate this when using them.

Metal & Conductive Material

Keep metal and conductive materials not intended to be in the circuit away from IllumiSci products since they can cause a short-circuit and damage the product, cause bodily harm or property damage.

Use Around Some Equipment or Environments

Do NOT use IllumiSci products around medical equipment, explosive atmospheres, such as at a fueling area, or in areas where the air contains chemicals or particles such as grain, dust, or metal powders. DO NOT use around equipment sensitive to radio frequency, electromagnetic or electrical equipment. DO NOT use for high-consequence activities where failure could lead to death, personal injury or environmental damage. DO NOT use where children can access IllumiTile™ products.

***Please contact IllumiSci with any questions about any of these or other issues of concern prior to using any IllumiSci products.
e-mail: info@IllumiSci.com Phone: (310) 953-8807***

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IllumiSci™ Products are Ideal for Easily Illuminating Many Types of Applications!

Home

- * Recreational Vehicles & Campers
- * Cove lighting
- * Accent/Effects/Task Lighting
- * Movie and Game Room Lighting
- * Home Theater Backlighting
- * Under-Cabinet or In-Cabinet Lighting
- * Shelf Lighting
- * Drawer Lighting

Commercial

- * Retail Display Lighting
- * Point of Sale Display Lighting
- * Hotel, Restaurant and Bar Lighting Effects
- * Sign and Graphics Display Illumination
- * Architectural Models
- * Storefront Display (*Dry & Room Temperature Only*)
- * TV and Entertainment Units
- * Desk/Workbench/Task Area Lighting
- * Display Case Lighting (*Dry & Room Temperature Only*)
- * Accent & Decor Lighting
- * Under Cabinet Lighting
- * Photography/Film/TV Lighting

Hobby

- * Trains
- * Models
- * Crafts

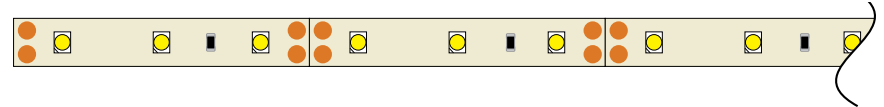
Car & Vehicle Interior Lighting

- * Automotive Interior Accent Lighting
- * Boats and Marine Crafts (*for non-wet areas*)
- * Interior Effects Lighting
- * Parade Floats
- * Stage Vehicles

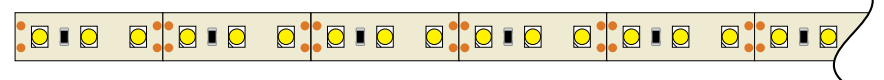
IllumiSci™ Products and Accessories

(for purchase separately)

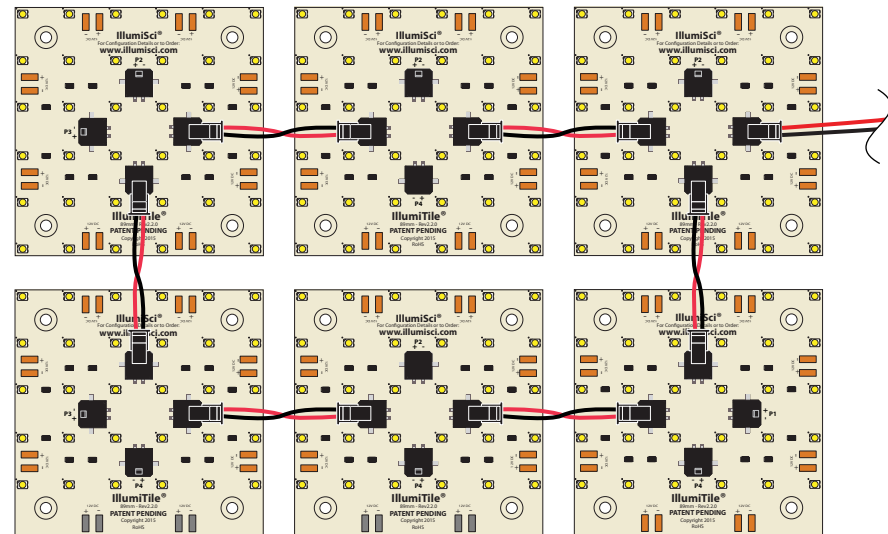
IllumiFlex Flexible LED Strips - 60/Meter Standard Density



IllumiFlex Flexible LED Strips - 120/Meter Double Density



IllumiTile 2-D Arrays - 60/Meter Standard Density



*IllumiFlex & IllumiTile Available in these Color temperatures: 6000K, 4500K, 2800K)

(Continued on next page.)

IllumiSci Products and Accessories (continued)

IllumiSnap Precision Connection Harnesses

Male to Male
(for Precise
IllumiTile spacing)



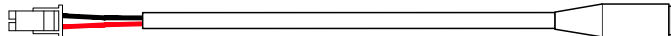
Male to Male
(Varied Lengths)



Male to
Bare Ends



Male to 2.1mm
Female Barrel
(for Power Supply)



Female to
Female
IllumiSnap



Female to Male



Custom Length
(Any Connectors)



IllumiSnap™ Male to Male Precision Connection Harness Standard Options

IllumiSnap™ D Harness with Connectors (Direct link Length)

IllumiSnap™ 1 Harness with Connectors (1 Span Length)

IllumiSnap™ 2 Harness with Connectors (2 Span Length)

IllumiSnap™ X Harness with Connectors (Custom Span Length)

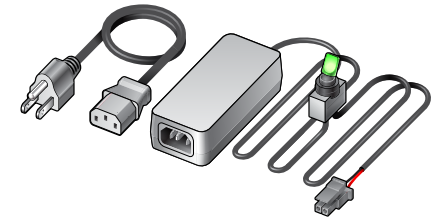
(Continued on next page.)

IllumiSci Products and Accessories (continued)

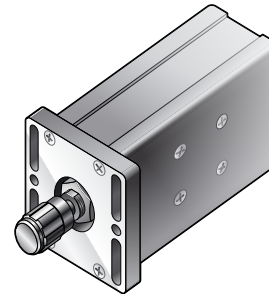
Power Supply with IllumiSnap Connector



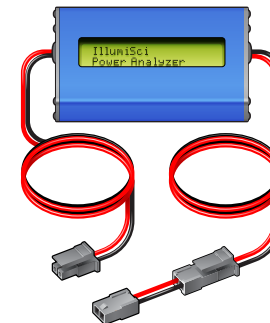
Power Supply with IllumiSnap Connector & Switch



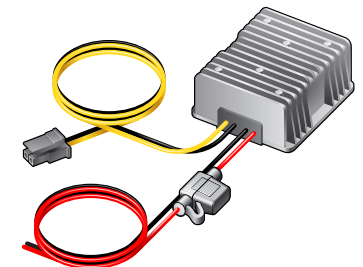
IllumAdjust Smart Dimmer Kit



IllumiSci System Analyzer



Vehicle Adapter



See more products, detail and other information on our
website: www.IllumiSci.com

IllumiFlex™ Flexible LED Strip at a Glance

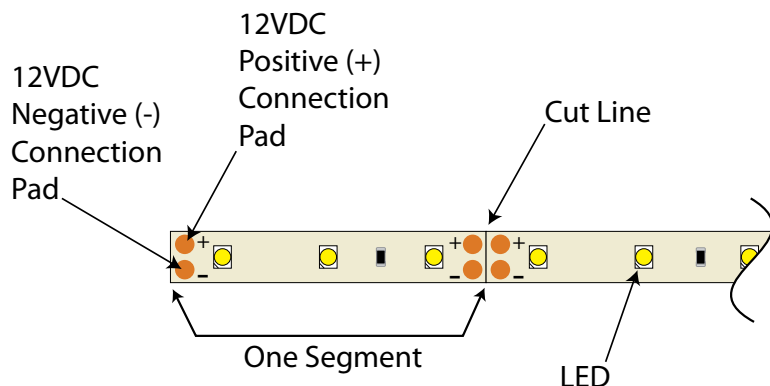
Congratulations on your purchase of this IllumiSci product!

IllumiSci provides you with innovative products that make lighting your project, simple.

IllumiFlex flexible LED strip is a liner array of LED's on a flexible material that allows them to flex to many lighting applications. Each strip is divided into three LED segments with densities of 60 LED's/meter or 120 LED's/meter. Each strip can be cut to length at intervals, and has quality adhesive applied to its back for easy installation. Moisture resistant IllumiFlex is encapsulated in a resin that protects the strip from moisture. Each LED radiates light energy at 120 degrees to give you a wide and even dispersion without dark gaps or spotting as close as one inch with appropriate diffusion material!

IllumiFlex LED strips are made of high-quality materials and manufacturing processes, unlike most other LED strips on the market. They are designed to stand-out from the rest, and offer years of consistent and reliable lighting.

The Anatomy of an IllumiFlex Flexible LED Strip*



*(60 LED/Meter Strip Shown)

System Configuration Guide

Follow this Step-by-Step Guide to configure a system with IllumiSci products to fit your needs.

Step 1 - Determine Lighting Requirements (pages 12-13)

Overview: Choose your IllumiSci lighting products such as IllumiFlex LED strips or IllumiTile 2-D arrays and determine your physical layout.

- * With IllumiSnap connectors.
- * Without IllumiSnap connectors (requires soldering) See "System Connection Options" to determine an appropriate electrical connectivity option.

Step 2 - Determine IllumiFlex Strip Lengths (pages 14-16)

Overview: Determine and note the following:

- * Quantity and length of each IllumiFlex LED strip (*Consider IllumiTile products too if they are being used in the system. See IllumiTile User Guide for configuration details or contact IllumiSci.*)

Step 3 - Determine Electrical Requirements (pages 18-23)

Overview: Determine the quantity of circuits and quantity of power supplies. (Each circuit should have ONLY one power supply.)

Step 4 - Create a System Layout

Overview: Determine the location of the power supply.

- * Determine how you will control your system (or just switch on/off).
- * Determine what physical and electrical layout is best.
- * Determine how wiring will be routed.
- * (See "Wire Length Considerations" Section)

Step 5 - Examine, Connect and Test

Overview: Examine and Test your system

- * See "System Layout Options" to determine

Step 6 - Install the System

Overview:

System Configuration Guide

* See “System Layout Options” to determine

Step 1: Determine Lighting Requirements

Determine Components and System Layout

There are many possible system layouts, and, of course, we cannot illustrate all of them in this documentation. However, we do provide some basic configurations, rules and guidelines to help you create an effective and safe lighting system.

Note that failure to follow all instructions can result in an overload of the system that can result in system damage, a fire hazard and/or personal injury. If you are unsure of how to configure or install a system or any aspect of doing so, consult a licensed professional or contact IllumiSci.

Illumination Considerations

IllumiSci products are designed to provide indirect, accent or effects type light. They are not intended for architectural lighting such as to illuminate a room, work area, etc. since they have lower output compared a Luminaire (typical light fixtures) and are not designed to work as they would.

Warnings & Considerations

WARNING!! RISK OF FIRE AND BODILY HARM

DO NOT exceed the maximum specified LED strip lengths or wire lengths indicated for a single circuit/run as doing so may create a dangerous circumstance.

USE ONLY one power supply per circuit/run.

USE appropriate mounting and ventilation methods. Even though LED products emanate relatively low heat individually, a system's components can emanate significant heat. Be sure to mount so that proper cooling may occur.

Use IllumiSci products for indirect lighting ONLY. The light emanating from the LED's should be seen indirectly, by reflection from a surface, or through a an appropriate diffusion material. No LED products should be mounted in a way that allows them to emanate light directly into a person's eyes.

Contact IllumiSci before attempting if you are unsure of any safety issues.

(Step 1 is continued on the next page.)

Step 1: Determine Lighting Requirements (Continued)

Layout your system with correct and safe wire lengths

Wire Length Considerations

The total IllumiFlex strip length, the total wire lengths and the other IllumiSci components connected in a system determines the amount of current that is drawn from the connected power supply.

A maximum of five meters of a continuous strip or daisy chained IllumiFlex LED Strip should be powered by a typical desktop Power Supply. Do NOT use a length longer than five meters for a circuit/ Daisy Chained circuit. (Other configurations are possible, but are for advanced level users and require a complete knowledge of system design and load calculation.)

12V LED Strip Lighting is supplied in a maximum length of 5 meters for a reason. If more than 5 meters is powered in a circuit, the amount of current passing through the strip becomes too large and overloads the strip itself, causing damage to the strip and creates possible safety risks.

For installations requiring more than 5 metres of LED strip lights, each additional 5 metres must be either connected in parallel directly to the power supply bus with the original 12V driver/power supply (for advanced users) or connected directly to a separate 12V LED driver power supply (recommended method).

Be sure to consider safe and local/national electrical code compliant wire routing when determining the lengths of wire to use in the system.

More information on wire length considerations can be found in the “System Connections: Wire Type and Length Requirements” section.

(End of Step 1.)

Step 2: Determine the System Layout

System Layout Preparation

System layout is an important step to determine the physical orientation of components which ultimately affect the electrical characteristics of the system.

Generally a system consists of the following components:

- * Power Supply
- * IllumiFlex LED strips
- * Cabling/Wiring/Connection Methods
- * Control Device (optional)

Considering the necessary components of a system, there are several topics to consider for determination of an appropriate system layout:

- * Physical placement of the components
- * Power rating of the power supply
- * Routing of wires/ cables
- * Wire gauge and length from the power supply to the system.
- * Wire gauge and total length of segments used to bridge strips or IllumiTile.
- * Connection methods (IllumiSnap or soldering)
- * Control Method (optional)

Each of these issues affects how the system can be configured. It is easiest to stay within the guidelines presented in each section of this user manual for each topic.

Notes for Installations requiring Color (CCT) Critical Matching

For close color matching of multiple light strips, IllumiTile or other IllumiSci LED products, it is recommended that all LED's have a matching batch code which may require a special order, especially for a larger quantity. Please inquire with your retailer or with IllumiSci for details.

Otherwise, it is better not to place LED products from different manufacturing batches, next to each other, so that the differences in LED color rendering is not noticeable.

General Electrical Connectivity

IllumiFlex strips should always be connected in Parallel (not Series) to the power supply. (See glossary for a definition of Parallel wiring.)

(Step 2 is continued on the next page.)

Step 2: Determine the System Layout (Continued)

System Layout

When determining the length of the IllumiFlex strip you need, consider that the length must be measured in increments. (Usually this increment is 1.97" for single density, 60 LED's/Meter, v IllumiFlex strips.) Please check the segment length and multiply the segment lengths according to your needs.

Only cut the LED strips when they are not connected to the power supply. DO NOT modify the IllumiFlex LED strips, except as indicated as appropriate by these instructions. IllumiFlex LED strips should be cut carefully with scissors, only at the designated cut lines. Do not attempt to cut the IllumiFlex strips in any other place. Cutting, puncturing, stripping, shortening or splicing the IllumiFlex strips incorrectly will cause a dangerous condition of electrical shock or a fire hazard.

Always make sure that the LED strips and power supply have ample access to ambient (room) air for cooling as they do radiate heat. A single density IllumiFlex reel of 16.4ft is typically 24 to 30 Watts of heat.

System Location

- * The power supply should be located above ground in a place that will not be exposed to, contacted by or submerged in liquids or water.
- * BE SURE that all parts of the system, including the wires, cables, power supplies or any IllumiSci products are placed or mounted in a location that will not be exposed to, in the area of, contacted by or submerged in liquids or water.
- * DO NOT place or mount any IllumiSci LED products in a location that will allow the LED's to radiate light directly into a person's eyes. LED's should be projected onto a surface or an appropriate diffusion material used to diffuse the light.

(Step 2 is continued on the next page.)

Step 2: Determine the System Layout (Continued)

Installation Guidelines

- * DO NOT look directly into an LED when illuminated. Over exposure to LED light can heat your retina and cause permanent damage to your vision.
- * DO NOT use IllumiFlex products outdoors.
- * DO NOT cover or encapsulate IllumiFlex, any IllumiSci Product or any system component as doing so may cause overheating, damage to the components and a fire hazard. Ample airflow should be available to all components of a system.
- * DO NOT use a wire or IllumiFlex LED strip that exceeds the maximum length indicated for appropriate use. If you do not know of or see the appropriate length in this User Manual, contact IllumiSci technical Help. DO NOT exceed the maximum length of wire or cable indicated. Excessive lengths may cause excessive resistance that leads to heating and a fire hazard. Plus, excessive wire length will cause your IllumiFlex or other LED products to dim, and not perform to their potential.
- * DO NOT run cords, cables or wires through walls, windows doors or any or structural elements of a building. Doing so is unsafe. Have a licensed electrician provide necessary power through conduit or other means that are national and local safety code compliant.
- * To prevent injury, you should use proper tools, safety equipment and safety measures during the installation process. Follow this User Manual for the installation procedure and comply with the national electrical code (NEC) and local electrical codes for all aspects of the installation. An incorrect installation may cause an electrical shock or fire hazard.
- * Do not handle the system while wet. Do not assemble near or allow any moisture (any liquids or steam) to contact the system directly.
- * Do not allow any conductive materials to touch any part of the system as doing so will create an electrical shock or fire hazard.
- * Be sure to disconnect any part, piece or cable from the power source before handling, cutting, mounting or changing in any way.

(Step 2 is continued on the next page.)

Step 2: Determine the System Layout (Continued)

- * Do not disassemble or modify any component of the system from its manufactured state with the exception of cutting the IllumiFlex LED strips only where designated.
- * DO NOT use any component that has any indication of damage or malfunction.
- * If for some reason the system or any of its components are exposed to moisture, safely disconnect the main AC power and do not use the system further.

Heat

DO NOT allow any system components to be placed or mounted near heat sources such as heater vents, hot pipes/radiators, fireplaces/hearths, floor heaters, stoves, ovens, clothes dryers, or any other device that emanates heat.

Connections

Verify that the polarity (positive “+” and negative “-”) of connections is correct before connecting the power supply.

Use only IllumiSci harnesses, cables or wiring to connect components of a system unless indicated otherwise by this User Manual or by an IllumiSci representative.

Service or Repair

Never attempt to repair any IllumiSci component or any component used in a system. No components are user serviceable. Any misuse or attempt to modify or repair any component will void the Warranty. If a component appears to be damaged or is not functioning properly, check with IllumiSci for assistance. Failure to do so may result in a electrical shock hazard or a fire hazard.

IllumiSci can be contacted the following ways for technical help or repairs:

support@illumisci.com or call us at (310) 953-8807

(End of Step 2.)

Step 3: System Layout Option - Single Strip

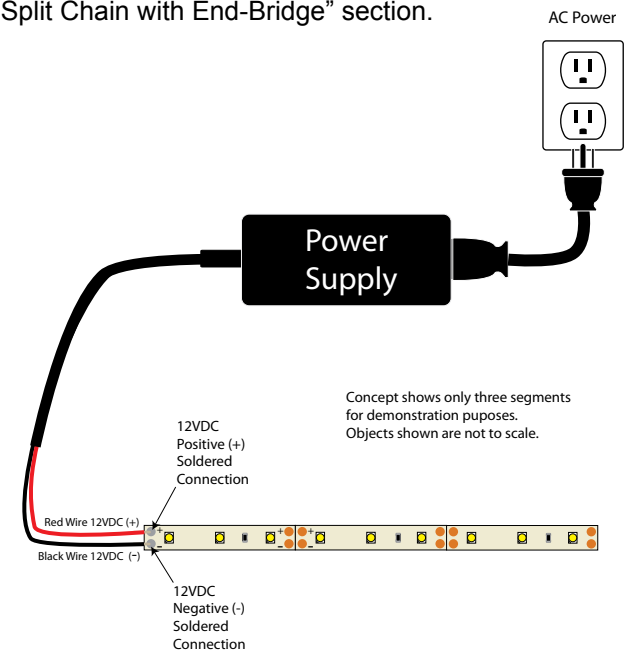
Use for one circuit containing one strip.

This option is the simplest system, and is best for shorter IllumiFlex runs that are an uncut strip or a run that contains few bridges between strips (Daisy Chain/Parallel connectivity).

Keep the total sum of wire lengths between the power supply and any of the bridges between strips under four feet.

Keep all wire lengths as short as possible to minimize resistance. The smallest gauge that should be used is 20ga wire, but larger gauge wire, such as 18ga, is better due to its lower resistance.

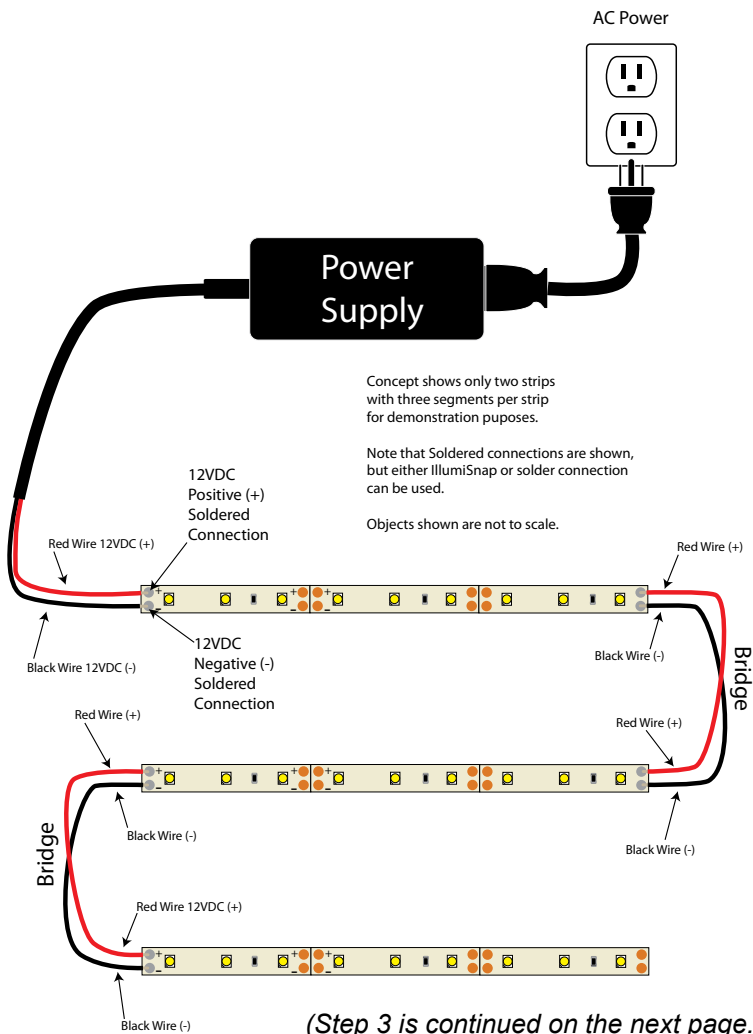
Note that a natural phenomena which we refer to as noticeable “Fall-Off” occurs with longer runs or runs with bridges between strips. Fall-Off occurs due to a voltage drop as the resistance adds down the length of the run. If the Fall-Off is not desirable for your application, then see “System Layout Option: Split Chain with End-Bridge” section.



(Step 3 is continued on the next page.)

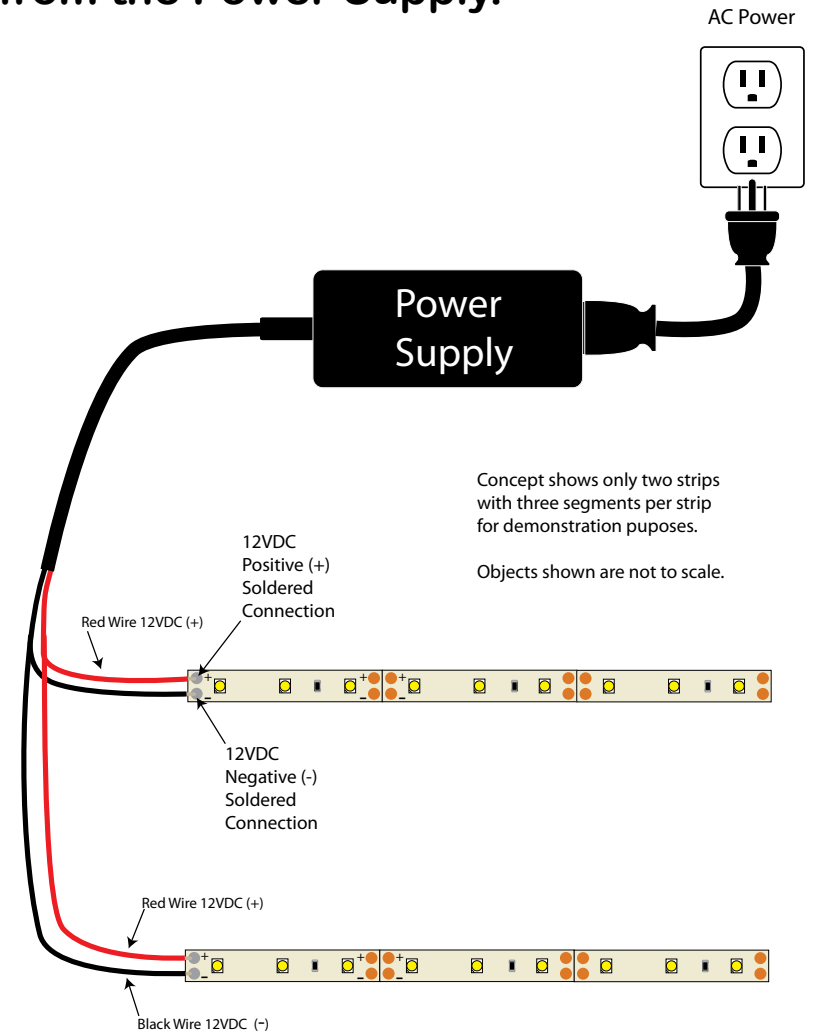
Step 3: System Layout Option - Daisy Chain

Use when one circuit is desired
containing more than one LED strip.



Step 3: System Layout Option - Split Chain

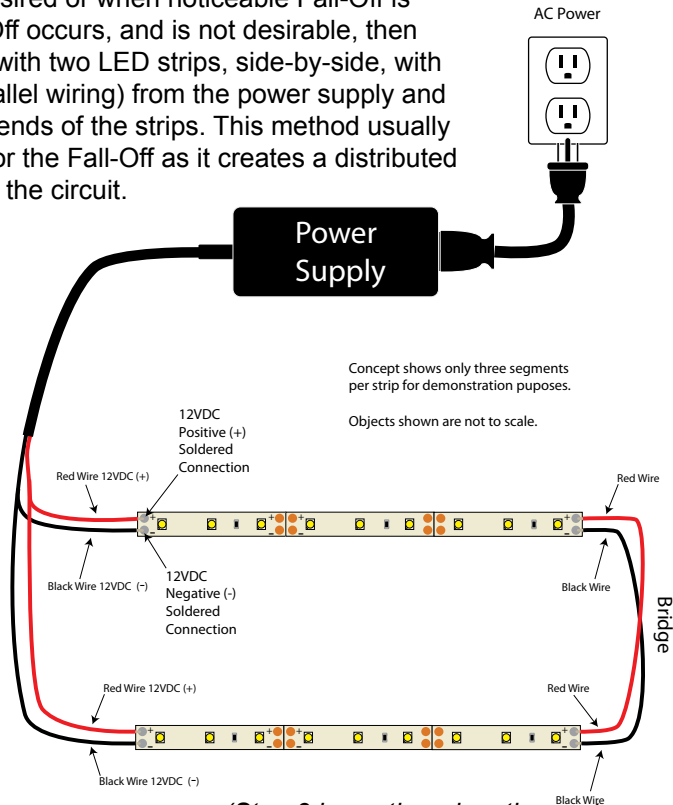
Use for one circuit to contain multiple
strips that are connected by split paths
from the Power Supply.



Step 3: System Layout Option - Split Chain with End-Bridge

Use for one circuit to contain multiple strips that are connected by split paths from the Power Supply, or when LED's further along the run are progressively more dim.

This method is commonly used when a maximum length run is desired or when noticeable Fall-Off is an issue. Fall-Off occurs, and is not desirable, then consider a run with two LED strips, side-by-side, with split leads (parallel wiring) from the power supply and a bridge at the ends of the strips. This method usually compensates for the Fall-Off as it creates a distributed current path for the circuit.

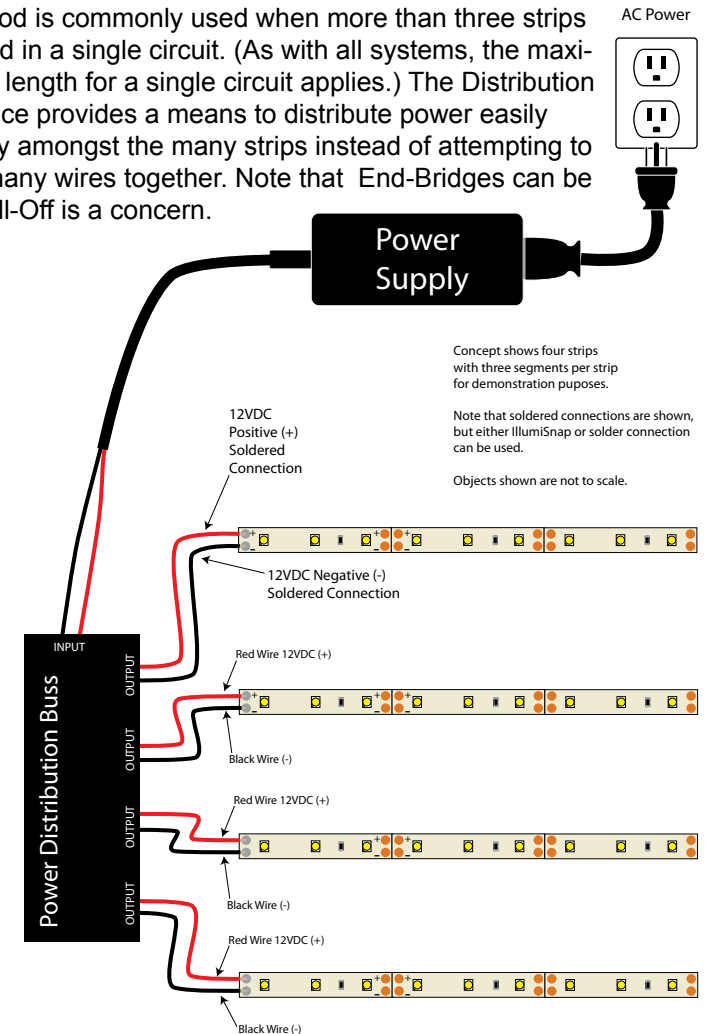


(Step 3 is continued on the next page.)

Step 3: System Layout Option - Distributed Power Buss

Use for one circuit that contains many long strips.

This method is commonly used when more than three strips are desired in a single circuit. (As with all systems, the maximum total length for a single circuit applies.) The Distribution Buss Device provides a means to distribute power easily and evenly amongst the many strips instead of attempting to connect many wires together. Note that End-Bridges can be used if Fall-Off is a concern.

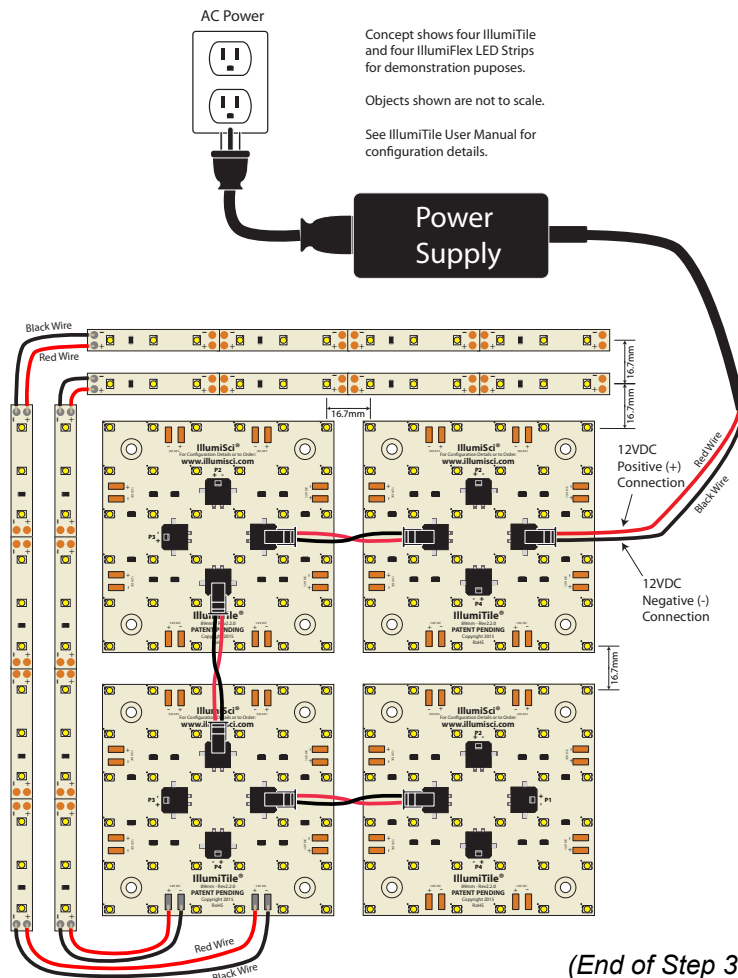


(Step 3 is continued on the next page.)

Step 3: System Layout Option - Using IllumiFlex with IllumiTile

IllumiFlex and IllumiTile are designed to work together so that you can create almost any shape to easily illuminate a 2-D area!

Please see the IllumiTile User Guide or contact IllumiSci for more info.

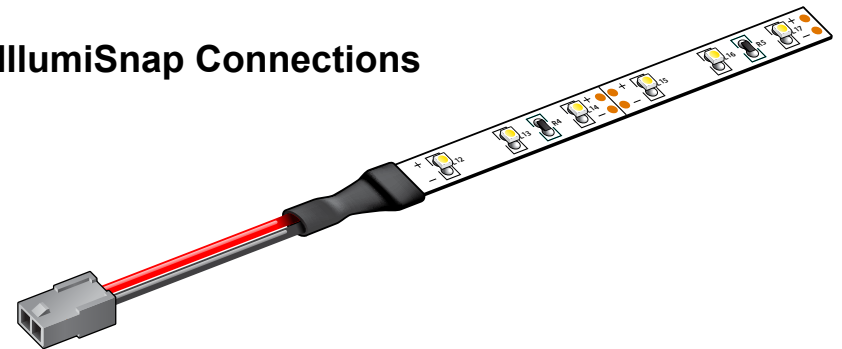


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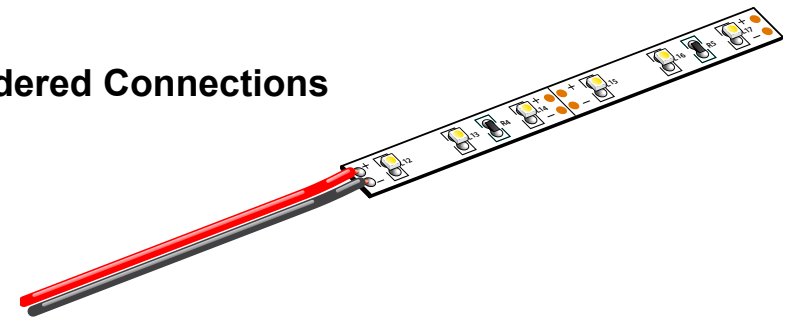
Step 4: Choose System Connection Options - IllumiSnap Connectors or Soldered Connections

There are two connectivity options for IllumiSci Illumination Products. They can be purchased with snap-together IllumiSnap connectors, or they can be soldered. (Note that the soldering option is for more skilled users, and requires special tools and knowledge for a safe and functional system.) Ask your IllumiSci Reseller for the Snap together products as either you or they can order them from IllumiSci.

IllumiSnap Connections



Soldered Connections

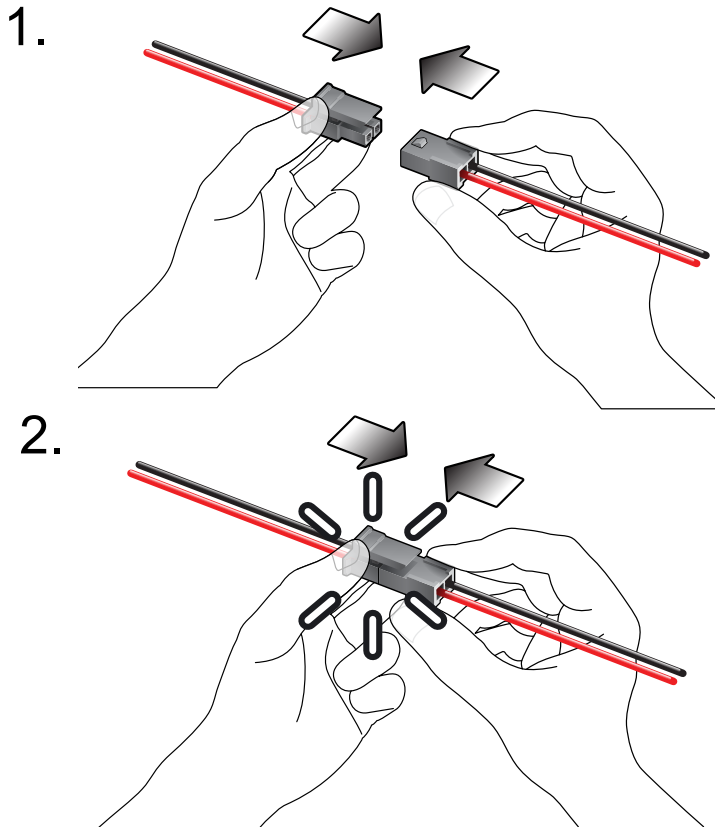


(Step 4 is continued on the next page.)

Step 4: System Connection Option 1 - IllumiSnap Connectors

IllumiSnap Connectors are the simplest way to connect your IllumiSci products to create a system.

IllumiSnap Connectors make connections simple! Just mate the connectors and press them together until they latch on the male connector snaps onto the female connector.



(Step 4 is continued on the next page.)

Step 4: System Connection Option 2 - Soldering

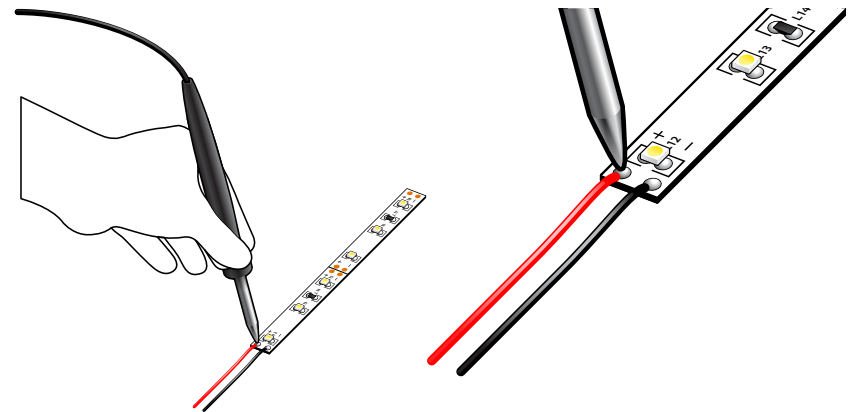
Soldering can be used to connect your IllumiSci products to create a system (for advanced level users)

If you choose not to use IllumiSnap connections as an option, soldering is the other option. However, soldering does require the appropriate skill to do so.

It is recommended to use high quality UL rated wire, either 20ga or 18ga, with black and red jacketing. Red should be used for the positive (+) connection, and Black for negative (-). IllumiFlex, IllumiTile and other IllumiSci products accommodate this color code unless specified otherwise. Not using this color code could cause accidental mis-wiring which could cause a dangerous condition.

1. Solder Wire Connections to Designated Solder Pads

Solder connections with wire leads extending from the insulation as short as possible. Usually, 1/6" of wire lead is sufficient.

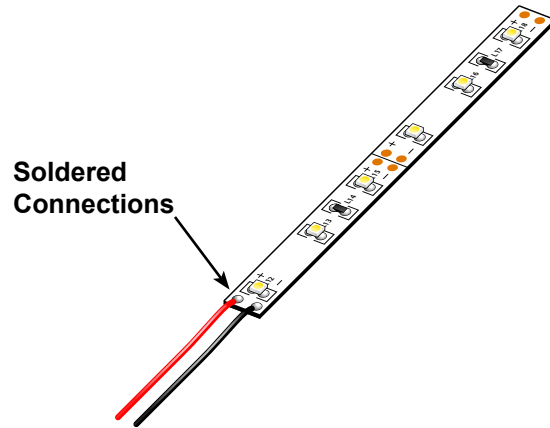


(Step 4 is continued on the next page.)

Step 4: System Connection Option 2 - Soldering (continued)

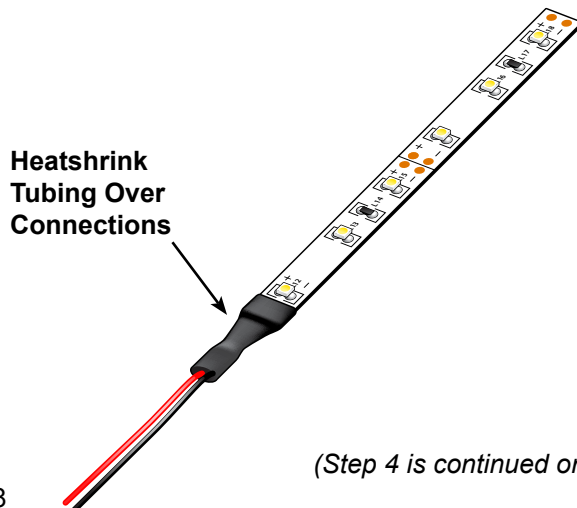
2. Check Connections after Soldering

Check solder connections and verify that there are no solder bridges or exposed wire strands that may cause a short in the circuit. Also verify that the wire's insulation has not been melted or damaged. If any of these issues exist, then trim the affected wire length, prepare and resolder.



3. Use heatshrink Tubing to Cover Soldered Connections

Cover and shrink heat-shrink tubing over the connections. Be sure not to excessively heat the tubing as it may melt the solder on the connections and cause a short circuit or open circuit within the tubing.

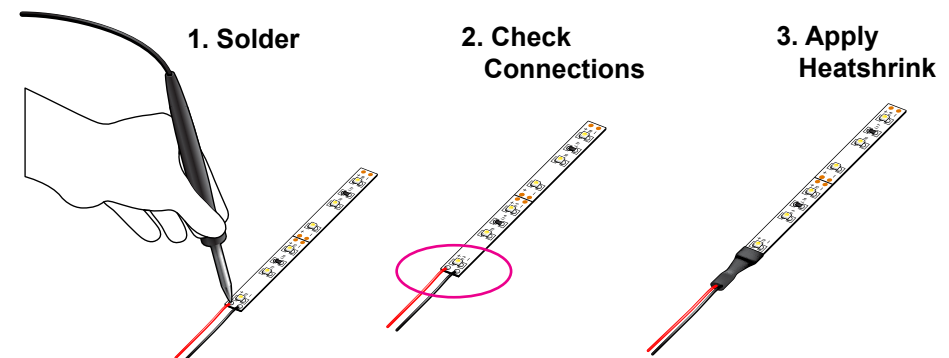


(Step 4 is continued on the next page.)

Step 4: System Connection Option 2 - Soldering (continued)

Here are some guidelines for soldering an IllumiFlex system:

- * Make sure that wiring polarity is consistent and correct.
- * Use solder for electronics. (Usually Tin-Lead with a Rosin core)
- * Use a low wattage soldering iron as high heat soldering irons can damage the contacts and the illumination product.
- * Be sure to disconnect the power supply before touching or attempting to solder any connection.
- * We recommend soldering the components and testing of the system prior to installation since doing so after installation may be difficult.
- * After soldering a connection, connect the power supply to apply power to each new circuit with soldered connections to test and verify that polarity and solder connection is working correctly. Then, disconnect the power supply before continuing soldering.
- * IllumiFlex strip segments should be cut to length prior to soldering since a finished solder joint may make cutting difficult or inaccurate.
- * Apply heatshrink tubing over the end of the soldered contacts (as shown) Do not overheat the tubing as doing so will damage the IllumiFlex strip and may melt, disconnect or short the contacts or wires.



(End of Step 4.)

Step 5: System Connections - Wire Type and Length Requirements (Continued)

Choosing an appropriate wire and length to the power supply assists system performance and safety.

For connectivity, use only high-quality UL Rated wire that is national code (NEC), local code and UL approved for your application. Consult your city's electrical code compliance authority, if you are not sure of what is safe or what type to use.

If your system requires long runs or large arrays of IllumiFlex LED strips, then plan multiple systems (separate circuits) that each use a separate power supply to provide power to each section of the system.

Wire Gauge	Resistance per Foot (Ohms)
14AWG	0.0025
16AWG	0.0041
18AWG	0.0064
20AWG	0.0102
22AWG	0.0162

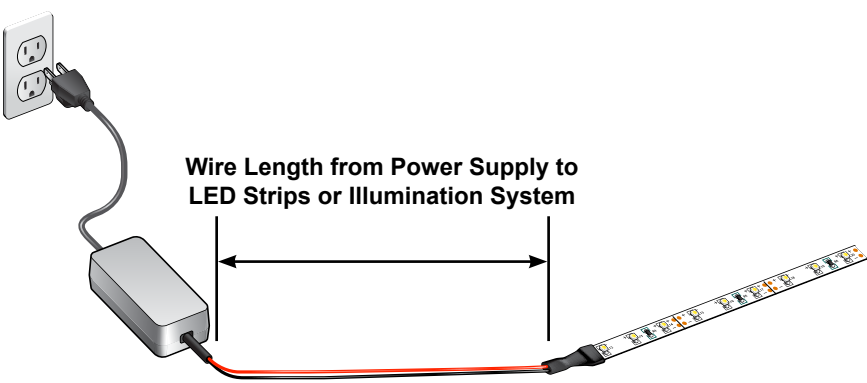
Determining the Proper Wire and Wire Length to the Power Supply
The concern for wire length and gauge to the power supply is due to the natural voltage drop that occurs. A larger gauge wire (for a particular length) will have a lower resistance compared to a smaller gauge wire. That being the case, the larger gauge wire will have less of a voltage drop. Note that it is not always practical or necessary to use a larger gauge of wire to the power supply. Usually longer runs require a larger gauge wire. As the voltage drop increases, the LED in the system will be less bright. Generally, keeping the length of the wire to the power supply as short as is practical, is the best practice. If many separate strips are desired in a system, then consider a power distribution block.

(Step 5 is continued on the next page.)

Step 5: System Connections - Wire Type and Length Requirements (Continued)

Use these tables as references for maximum wire length to the power supply.

* Note that the lengths indicated in the tables do not include the length of wire that may already be attached to the power supply since power supply lead lengths vary. The length of the attached wire on the power supply should be considered in the total length calculation.



20ga Total Wire Length from Power Supply to IllumiFlex LED Strips*

IllumiFlex Total Run Length	Maximum Wire Length
1 Foot (approx. 0.3 Meter)	9
3 Feet (approx. 1 Meter)	6
6 Feet (approx. 2 Meters)	4
9 Feet (approx. 3 Meters)	4
16 Feet (approx. 5 Meters/Reel)	3

(Step 5 is continued on the next page.)

Step 5: System Connections - Wire Type and Length Requirements (Continued)

18ga Total Wire Length from Power Supply to IllumiFlex LED Strips*

IllumiFlex Total Run Length	Maximum Wire Length
1 Foot (approx. 0.3 Meter)	14
3 Feet (approx. 1 Meter)	9
6 Feet (approx. 2 Meters)	5
9 Feet (approx. 3 Meters)	5
16 Feet (approx. 5 Meters/Reel)	4

Power Supply Rating and Maximum System Wire Length Chart

These figures indicate the maximum sum of wire lengths from the power supply to the system, bridges or any wire in the system. Note that if other components are in the system such as IllumiTile products, then their load must be considered too. This chart is to assist in the assessment for the wire in the system.

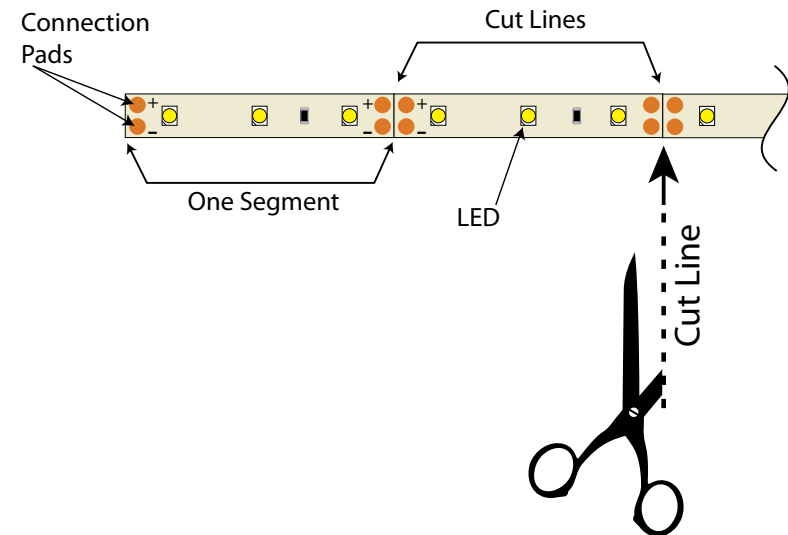
Power Supply Rating (Watts)	Wire Length (feet)	Wire Gauge (AWG)
15	12	20ga
30	15	20ga
60	19	20ga
15	17	18ga
30	19	18ga
60	24	18ga

(End of Step 5.)

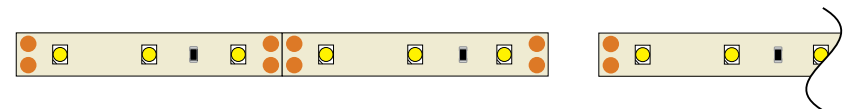
Step 6: How and Where to Cut IllumiFlex LED Strips

IllumiFlex LED strips can be cut very easily with common scissors.

- * Be sure that the strip is completely disconnected from any power source before attempting the cut it.
- * Cut only on the designated cut lines.
- * Be careful not to cut the Connection Pads.
- * Be sure that the scissors are sharp as dull ones can cause damage to the strip conductors which could result in a fire hazard or short-circuit.



Separated Segments After Cut



Step 7: Determine an Appropriate Power Supply

The quality of the power supply used in an LED lighting system is very important, and quality varies greatly across the industry. This is why IllumiSci has power supplies custom manufactured to our specifications for quality, reliability, performance and safety. There are some power supplies and constant voltage LED drivers from third-party manufacturers that are approved by IllumiSci for use with IllumiSci products. Please check with IllumiSci for details.

IllumiFlex Flexible LED strip is designed to work with a constant voltage 12 Volt DC power supply only. Do NOT connect IllumiFlex Flexible LED strip to an AC power source as it will cause damage to IllumiFlex LED strips and create a fire hazard. Use only Class 2 UL rated power supplies. IllumiSci offers a variety of quality regulated 120V AC to 12VDC power supplies to suit your lighting system needs. (See “IllumiSci Accessories” section or www.illumisci.com.) IllumiSci offers a variety of power supply options including a pre-wired harness and switch.

The rating of “Watts” of the power supply is determined by the total load of the system which includes various factors including the wire used in the system, the power required by the LED devices such as IllumiFlex or IllumiTile, power requirements of any control devices, etc. Each of these should first be assessed separately then added together to determine the approximate total load of the system. Ultimately, after approximate the requirements are determined, then the system power should be measured to verify that the approximate assessments are very close to the actual measured values. Doing so is necessary to create a safe and lasting system. If you need any assistance, please contact IllumiSci.

Use One Power Supply per System

It is strongly recommended that a single power supply be used for each circuit/system since most power supplies contain critical protection circuitry. (All of IllumiSci power supplies do contain protection circuitry.) Doing so and choosing a power supply that has a current rating slightly above the current draw of the system will optimize protection in case of a short circuit. Note that multiple systems can be placed next to each other to create a larger array of LED's for more illumination, although each system is not connected electrically. If multiple systems are used, be sure that one systems components are installed so that they do not risk touching/shorting another systems components.

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

General Power Supply Guidelines

IllumiFlex and other IllumiSci products are designed to work ONLY with the power supplies, connectors and accessories made by IllumiSci. Using other power supplies or accessories will be at your own risk as they may damage parts of your circuit, connectors or system, and may void the warranty of any IllumiSci products used in the system with devices that are not an IllumiSci product.

The AC input of the power supply should 100-240 Volts AC. Any AC voltage input other than what is specified on the power supply will create a hazardous situation either immediately or sometime during the operation of the system. Check with your power company, if you are unsure. This hazard may include fire, electric shock, damage to the components in the system or inconsistent operation of the system. If you are not sure of any aspect of the system, do not attempt to use any of the IllumiSci products or a system using them. You should consult a qualified electrician or service professional.



(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

General Power Supply Guidelines

- * Connect the AC line only after your system is assembled, and check for proper configuration.
- * Secure the power supply in a location that is free from moisture and that is not likely to be exposed to moisture such as with floods, spills, etc. Do not allow a power supply or any other IllumiSci device to rest on the ground or floor. Moisture or water touching the power supply or wire will put you or others at risk of electric shock.
- * Connect the AC line only after the power supply has been mounted securely.
- * DO NOT drill through or attempt to open or modify a power supply or any IllumiSci products as they are not user serviceable. All mounting methods should be external to the IllumiSci device and should allow ample ambient air for cooling.
- * DO NOT connect an IllumiFlex strip when it is on the reel as it will overheat and cause damage to it, and can be a fire hazard.
- * DO NOT flex an IllumiFlex LED strip with a radius smaller than four inches.
- * DO NOT repeatedly flex an IllumiFlex LED strip as doing so will cause damage to it.
- * If you do not plan to use your system for longer periods of time, then the power supply should be unplugged to avoid damage.
- * Your power supply should be unplugged during electrical storms, brown-out or unstable power conditions to prevent damage to the power supply or system.

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Power Supply Grounding

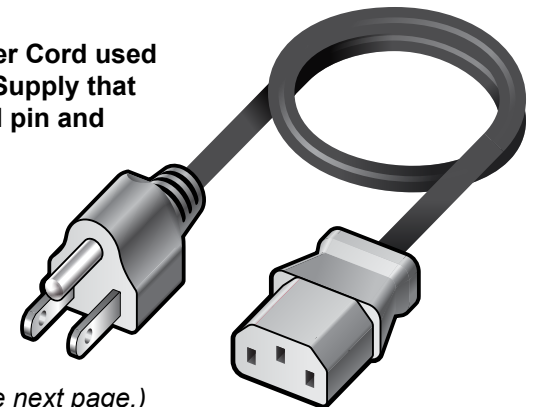
WARNING: RISK OF ELECTRICAL SHOCK - The power supply for the system must be grounded. Proper connection of the ground conductor to the AC line/receptacle is critical for safety. IllumiSci power supplies have a grounding conductor in the AC input cable and the associated prongs on the plug. If you are not sure of proper grounding, check with a licensed electrician to verify such.

If your AC outlet has only a two prong plug, then have a licensed electrician install a local electrical code compliant three pronged plug that has a proper safety ground. DO NOT use a ground-lift adapter that converts from a three prong plug to a two prong as these adapters are very dangerous in general. DO NOT remove any prongs or modify the provided cable or plug. DO NOT USE any damaged cable or plug.

In the case of a malfunction, the safety ground provides a first layer of protection to reduce risk of electrical shock and possibly a fire hazard.

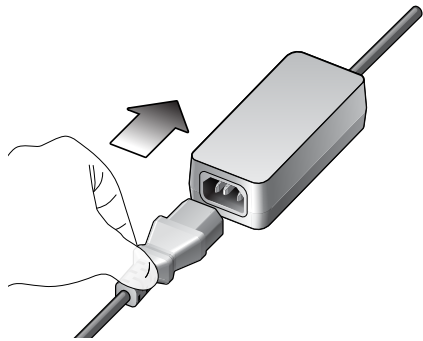
IllumiSci products are intended for indoor use. Although not required, the use of a Ground Fault Circuit Interrupter (GFCI) is a better option for safety. If your AC outlet to be used for your illumination system does not already have one, have a licensed electrician install a GFCI for use with the power supply for added safety.

This is a typical AC Power Cord used with an IllumiSci Power Supply that contains a safety ground pin and conductor.

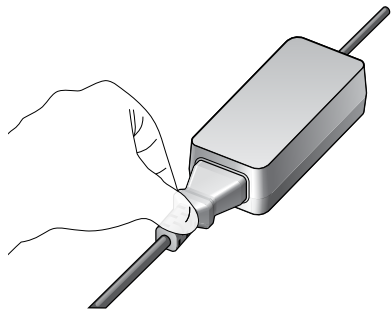


(Step 7 is continued on the next page.)

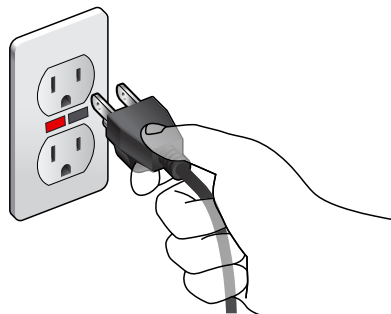
Step 7: Determine an Appropriate Power Supply (continued)



When your illumination system is ready to have power applied to it, insert the matching plug on the AC power cord into the receptacle in the Power Supply.



Be sure that the plug is fully inserted into the receptacle in the Power Supply.



The Power Supply for a system should contain a safety ground, and be used with a GFCI (Ground-Fault Circuit Interrupter) AC receptacle.

After confirming that the safety ground is present within the AC outlet, fully insert the plug into the AC receptacle.

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Vehicle or Battery Powered Applications

For vehicle installations, an IllumiSci Vehicle Adapter/Regulator is required to stabilize power to your system, especially since “12VDC” vehicle systems are not actually 12VDC, they are nominally 13.8VDC and often have extreme transient spikes. An IllumiSci regulator helps to stabilize the power to the LED illumination system and protect the system from a current over the acceptable threshold.

How to Choose and Derate an Appropriate Power Supply

For safety and proper functionality, it is necessary to choose a power supply with an appropriate power and current rating.

First you should determine (calculate) a theoretical total current draw to determine and adjust a proper system layout. (Doing so, is defined by the steps in this User Guide.) Then, in the Test and evaluation step, you should measure the actual voltage and current of the system when it is operating.

You should not operate a power supply at its rated power/current threshold. The actual load should be less than the rating, which is known as “Derating.” (Note that the total load can be determined as described in other sections of this User Guide.) A standard derating of 10% should be used when choosing a power supply for a system to allow for typical variances. However, there are several factors that affect the performance of an LED illumination system. Temperature is a major factor. If the LED system is to be placed in a room where the temperature may be higher than 100 degrees Fahrenheit or lower than 40 degrees Fahrenheit, then an derating factor of 20% is appropriate. This is necessary since more extreme temperatures will cause the LED system to draw more current.

Example:

Power Supply Rating = 5.00 Amperes

Derating = 20% = 0.20 (for somewhat more extreme temperatures)

Derating Formula:

5.00 Amperes x 0.20 Derating = 1.00 Ampere

5.00 Amperes - 1.00 Ampere = 4 Amperes (Target current rating)

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Determine the Total Load of the System

First, the theoretical load of the entire system should be calculated, then it is a good practice to actually measure the load that the system will create for the power supply.

Calculate the Total Load of the System

The Total Load and performance of an LED illumination system is determined by several factors.

Here are the major devices and factors in most systems:

- * LED strip resistance
- * Wire length from the power supply to the LED devices (such as IllumiFlex, IllumiTile, etc.)
- * Wire Bridges resistance between strips (dependent on wire gauge)
- * Dimming or Control Devices
- * Temperature

Single Density IllumiFlex 8lm/LED = 1 Watt/Foot

Here we will give an example of how to calculate the power consumption. Typically larger or more complex systems require calculations, whereas simpler systems can assess the approximate load with some simple calculations.

Simple System Calculation

If you desire to have a simple system, that is fewer than 10 segments of strip and the total sum of the strip lengths is less than 16.4 feet, then just use the Section#1 example to calculate the total power consumed by the LED strips to be used. Then take the result and multiply it by 1.1 to determine the minimum power rating (in Watts) for the power supply.

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Determine the Total Load of the System

Calculation of Approximate Load for a System

To illustrate how to calculate the approximate load for a system, here is an example broken into three sections with steps and formulas indicated. Note that section three is intended for more precise calculations or more systems with more than 10 wire bridges, or the sum of the wire bridges is more than 10 feet. This is because wire bridges become more significant as the system complexity grows.

Example System is proposed to contain:

- 14 feet of IllumiFlex strip
- 3 wire bridges that are 20ga, 4ft, 5ft and 5ft
- 1 wire from the power supply that is 18ga., 14 feet long

Section #1

IllumiFlex Power (Watts) Consumed per Length Table

Length of IllumiFlex Strip	1 to 5 Feet	5 to 10 Feet	11-16.4ft (5 Meters)
Watts per Foot	1.4W	1.2 W	1.0 W

(A) Add the lengths of IllumiFlex strips segments used.

Three segments used = 4ft + 5ft + 5ft = 14ft

(B) Calculate the power consumed (load) of the strip segments.

IllumiFlex Single Density (60 LED per meter) strips consume power of approximately 1 Watt per foot.

Power consumed by the illumination components:

14ft x 1 Watt = 14 Watts

Calculate the current required for the LED devices:

Expected Current for IllumiFlex = 14 Watts/12 Volts = 1.17Amps

(Step 7 is continued on the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Determine the Total Load of the System

Section #2

Wire Size Resistance per Foot Table

Wire Gauge	Resistance per foot
14AWG	0.0025
16AWG	0.0041
18AWG	0.0064
20AWG	0.0102
22AWG	0.0162

(A) Calculate voltage drop of the wire from the power supply to the system.

Wire length from the power supply: 4 feet, 18ga.

(Resistance of 18ga wire is 0.0064 per foot)

Total resistance of wire from power supply:

$$4\text{ft.} \times 0.0064\Omega = 0.0256\Omega$$

Formula:

$$\text{Voltage Drop} = 2 \times \text{System Current} \times \text{Wire Resistance}$$

$$\text{Voltage Drop} = 2 \times 1.17\text{A} \times 0.0256\Omega = 0.030\text{V}$$

(B) Calculate the power consumed by the wire.

$$\text{Power consumed by the wire} = 2 \times 0.030\text{V} \times 1.17\text{Amps} = 0.07 \text{ Watts}$$

$$18\text{ga Wire, Four Feet} = 4\text{ft.} \times 0.0064\Omega = 0.0256$$

$$0.0256\Omega \times 12\text{V} = 0.31 \text{ Watts}$$

(Stop Step 7 here for a simple system, otherwise continue to the next page.)

Step 7: Determine an Appropriate Power Supply (continued)

Determine the Total Load of the System

Section #3

For more complex systems with more than 10 wire bridges, or the sum of the wire bridges is more than 10 feet, continue calculations to determine the power consumption of the wire bridges. This is because wire bridges become much more significant as the system size increases.

(A) Calculate the load of the wire bridges used in the system.

Wire Bridge 1: 20ga Wire, 4 Feet

Wire Bridge 2: 20ga Wire, 5 Feet

Wire Bridge 3: 20ga Wire, 5 Feet

(Resistance of 20ga wire is 0.0102 per foot)

$$\text{Total length of wire bridge} = 4 \text{ feet} + 5 \text{ feet} + 5 \text{ feet} = 14 \text{ feet}$$

$$\text{Total resistance of wire bridges is } 14\text{ft.} \times 0.0102\Omega = 0.1428\Omega$$

$$\text{Formula: Voltage Drop} = 2 \times \text{System Current} \times \text{Wire Resistance}$$

$$\text{Voltage Drop} = 2 \times 1.17\text{A} \times 0.1428\Omega = 0.33\text{V}$$

(B) Calculate the power consumed by the wire.

$$\text{Power consumed by the wire bridges} = 0.33\text{V} \times 1.17\text{Amps} = 0.39 \text{ Watts}$$

Section #3

Add the totals of each section to determine the total approximate load of the system:

$$\text{Approximate Total System Power Requirement (Watts)} =$$

$$14 \text{ Watts} + 0.31 \text{ Watts} + 0.39 \text{ Watts} = 14.7 \text{ Watts}$$

$$\text{Closest derated power supply rating to use} = 20 \text{ Watt}$$

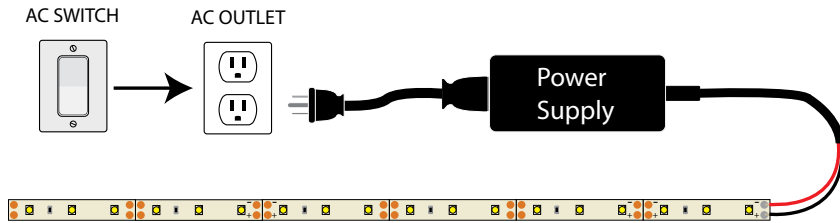
If the calculated load is beyond the maximum rating of the chosen power supply, consider separating the components of the systems into separate systems with separate power supplies.

(End of Step 7.)

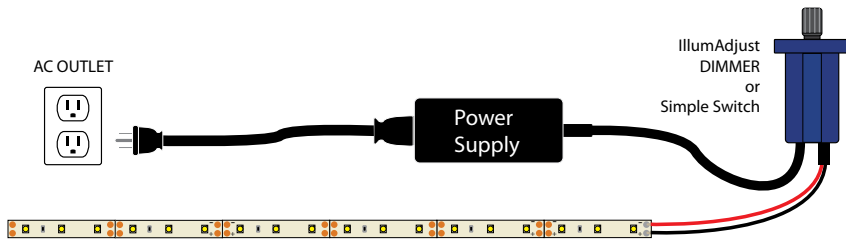
Step 8: Choose a Control Option

There are many common methods to control a system. Some are a simple ON/OFF, and some include manual, wired or wireless dimming options.

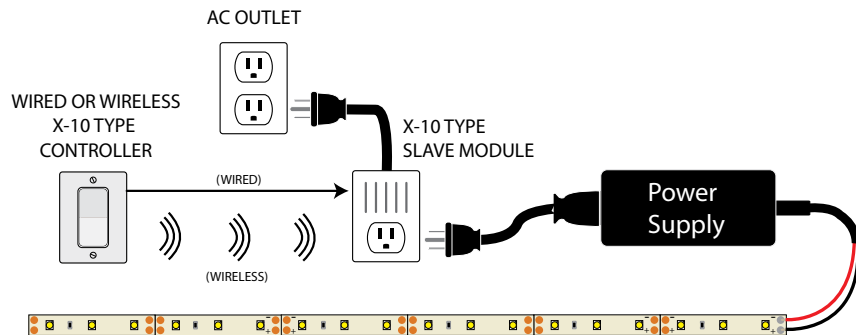
Option #1: ON/OFF Control by a Switched AC Outlet



Option #2: ON/OFF/Dimming Control by an IllumAdjust Dimmer

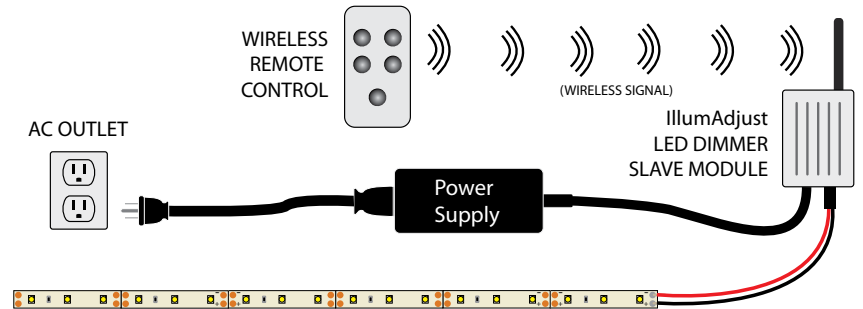


Option #3: ON/OFF Control by an X-10 Type Controller and Slave Module (No Dimming)

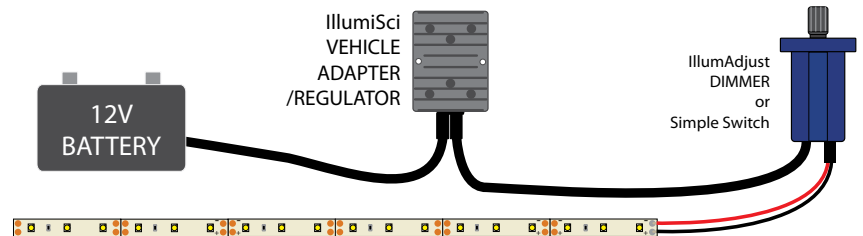


Step 8: Choose a Control Option (continued)

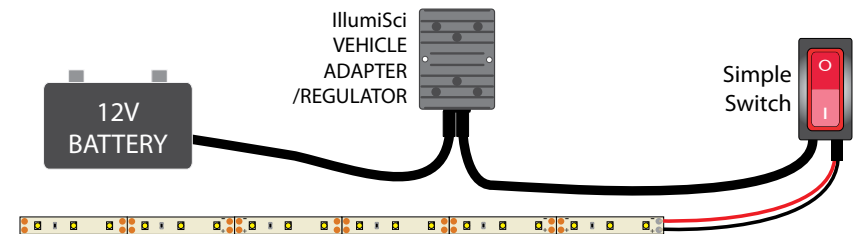
Option #4: ON/OFF/Dimming Control by an IllumAdjust Wireless Remote Control and Slave Dimmer Module



Option #5: ON/OFF/Dimming Control by an IllumAdjust Dimmer with a Battery Power Source



Option #6: ON/OFF Control by a Simple Switch with a Battery Power Source



(Step 8 is continued on the next page.)

(End of Step 8.)

Step 9: Examine, Connect and Test the System

Be sure to complete this critical step to assist with the safety and reliability of your system.

For safety and practicality, it is always best to examine and test an illumination system prior to installation. Doing so allows identification of a potentially significant issue when the components are more easily accessible and adjustments can more easily be made. Of course, examination and testing of the system, once it is installed, is necessary as well.

Be familiar with all safety precautions and proper system configuration criteria indicated throughout this User Guide. If any issue or concern arises during examination or testing, first see the Troubleshooting section. If the issue does not appear to be resolved, then consult a qualified professional before operating the system beyond testing.

- * Be sure to have determined the electrical load and that the power supply is capable of safely powering the system.
- * Test heating at various points along each LED strip, wires and cabling with an infra-Red thermometer. (You may need to blacken the areas at which you test with a permanent marker since testing on the white surface of the LED strip will not produce a proper reading.) Be sure that any LED strips is not encapsulated where it does not have the ability to convection cool with the room air. Note that small ports in enclosures are not sufficient for cooling. The LED strips or other illumination devices must have full exposure to room air for cooling.
- * Check the that no wires or conductive elements are touching or are close enough on a metal surface to potentially create short-circuit.
- * Make sure all LED's are illuminating. If not, replace the entire strip with one that you have verified to be completely working.
- * Verify all other safety issues indicated in this User Guide have been considered and implemented.

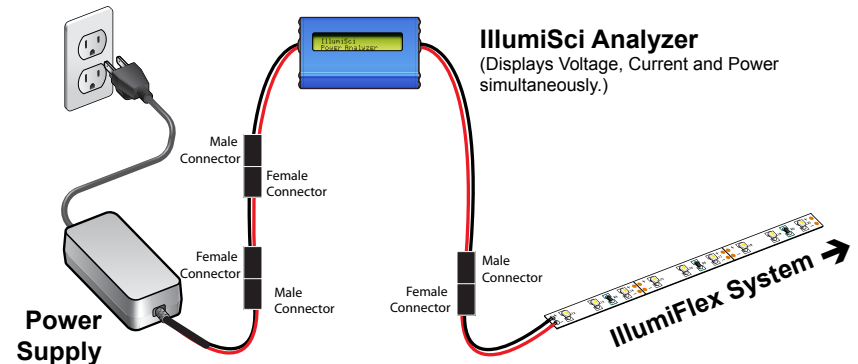
(Step 9 is continued on the next page.)

Step 9: Examine, Connect and Test the System - Measure the Total Load (continued)

There are two common methods to assess voltage, current and power of a system.

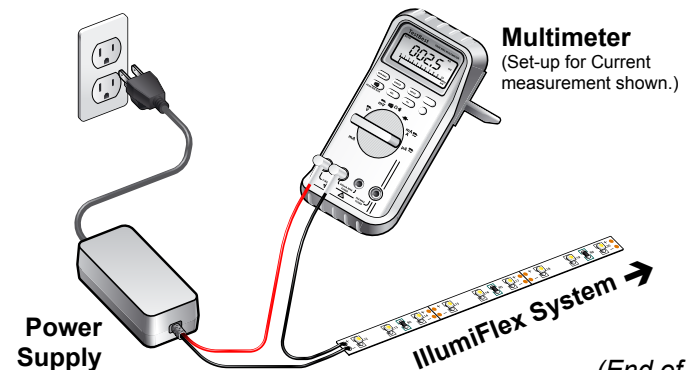
Option 1: IllumiSci System Analyzer

IllumiSci offers a very easy to use System Analyzer device that can temporarily be placed in the circuit at the DC output of the power supply to determine the Voltage, Current and Power of a system. This is the easiest method of measuring the characteristics of your system.



Option 2: Multimeter

Knowledge of measuring voltage and current with a multimeter is necessary. Please contact IllumiSci with any questions.



(End of Step 9.)
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Step 10: Install the System

Installation Considerations and Procedure

Once the system has been fully configured and tested for your application, installation may begin.

Positioning Guidelines

- * Mounted in a location where it will not be touched by anyone.
- * Mount so that the light emanating from the IllumiFlex strips is not oriented so that it will not be viewed directly into someone's eyes, and is either reflected from a surface or is through a diffusion material.
- * Do Not mount close to water or steam where moisture will accumulate on the IllumiFlex strips.
- * Consider the location of the connectors and at which end they should be installed so that the power supply can be mounted near the connector.
- * Plan a routing for the power cord that is safe and compliant with the national/local electrical code.

Mounting Guidelines

- * Clean LED strips with a dry cloth when not electrically connected. Be sure they are free of dust, debris (Do not use liquid cleaners.)
- * The surface for mounting IllumiFlex strips should be smooth and able to accept an adhesive that will not on a surface that will be damaged by doing so.
- * The surface to which IllumiFlex strips are mounted should not move or flex.
- * All of the IllumiFlex strip should be mounted securely to a surface. No part of the LED strip or any other component in the system should be left suspended, hanging or moving.
- * When using strips longer than five feet in areas that have limited ventilation such as in a cove, IllumiFlex should be mounted to aluminum "C" or "L" channel for heatsink/heat dissipation. (Please inquire with IllumiSci for details.)
- * BE SURE to know that the position of the LED strip to be applied will be correct before adhering to a surface. The adhesive on the back of IllumiFlex LED strips is for a single application only. If the IllumiFlex strip is removed from adhesion to a surface, then re-adhered, the adhesive strength will be compromised and could cause a hazard. If a strip must be removed from a surface, use a new strip with adhesive that has not been adhered yet.
- * Be sure that ample room-temperature airflow is available in the location where the IllumiFlex LED strips, Power supply and other components are planned to be installed. If not, then reconsider the planned installation location and/or mounting methods.
- * DO NOT allow IllumiFlex to be crimped, clamped or severed or any or circumstance that would damage IllumiFlex strip or compromise its function.
- * IllumiFlex may only be bent on its flat side with no less than a three inch radius bend.

Handling Guidelines

- * DO NOT look directly at an IllumiFlex LED strip when it is illuminated. If it is necessary to look at an IllumiFlex LED strip when it is illuminated, do so through an appropriate diffusion material or reflected from a non-mirrored surface.
- * DO NOT handle, cut, solder, move, or any other activity when power is applied to the circuit. Always disconnect IllumiFlex strips or components.
- * DO NOT allow IllumiFlex strips or other systems components to be exposed to moisture, liquids or steam.

(Step 10 is continued on the next page.)

Step 10: Install the System (continued)

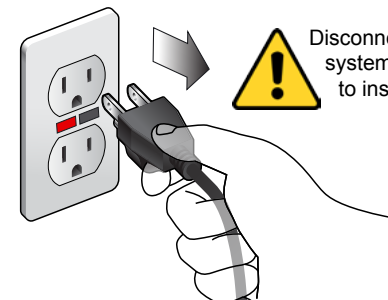
After completing all of the previous steps in this User Guide, you are ready to install the system.

Installation Procedure

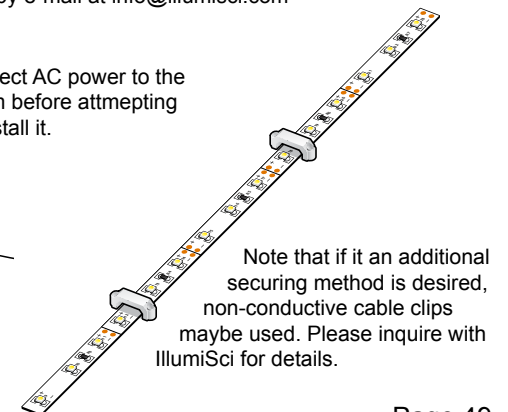
1. BE SURE the power supply is disconnected from the AC power source for installation or maintenance. (See Diagram below.)
2. BE SURE that the desired strip lengths are the appropriate length prior to the installation. Cut strips to length as described in the "How and Where to Cut IllumiFlex LED Strips" section. Test fit each LED strip before removing adhesive or mounting.
3. BE SURE to have completed all the previous steps indicated in this User Guide, including the "Examine, Connect and Test the System" step, before attempting to install the system.
4. Remove the white protective tape from back of the IllumiFlex strip to expose the adhesive.
5. Press the IllumiFlex strip into place.
6. Connect the first strip with either IllumiSnap connectors, or by wires that is closest to the power supply. (If you plan to use only one strip, then connect it.). Be sure that the IllumiSnap connector is fully locked into its mating connector. (See Diagram XX)
7. Verify that all electrical connections are correct and that there are no shorts or hazards.
8. Connect your AC power supply.
9. Verify that the one connected strip is illuminating as it should.
10. Repeat this Steps 1 through 6 for each strip to verify that each is illuminating properly, i.e. disconnect power supply, connect the next strip, verify its functioning as it should, then repeat for the next one in the system's circuit.

Product Support

If you have any questions or need to return product for any reason, please contact IllumiSci directly by phone at (310) 953-8807 or by e-mail at info@illumisci.com



(End of Step 10.)



System Maintenance

Maintenance & Cleaning

Generally, IllumiFlex strips require little maintenance. Once installed, tested and safely functional, your system should be inspected every several months to check for damage or contaminants that may have inadvertently been deposited on or come in contact with the IllumiFlex system. Regularly check to verify that the illumination system's components are installed in an environment that is virtually free from airborne liquids or contaminants since environments may change over time. Keeping the IllumiFlex strips free from dust, debris and liquids is important. If excessive dust or other element is present on IllumiFlex strips, damage or excessive heating may occur.

For maintenance or cleaning, be sure that the entire system is completely disconnected from AC power and only use a dry cloth. Do not clean with liquids or expose any part of the system to liquids. Liquids may not only cause an electrical shock hazard, they may damage the components of an IllumiSci product even if they were present, then removed.

DO NOT allow any part of a person's body or any other object (excluding the mounting surface, of course) to touch any part of the system when the AC power is connected and system power is applied to the circuit. (Be sure to always disconnect the AC main power before touching, cleaning, inspecting or changing components in the system.)

If a component appears that it is not working, or it appears that a component needs to be replaced, safely disconnect the AC main power immediately. Then, contact a licensed electrician or an IllumiSci representative for guidance to assess if the system is safe to operate.

Use only IllumiSci products in a system unless expressly indicated to do so otherwise by this User Manual or by an IllumiSci representative.

If any conductive objects inadvertently touch any part of the system, safely disconnect the AC main power immediately and contact a licensed electrician or IllumiSci representative for guidance to assess if the system is safe to operate.

Troubleshooting

Symptom: The entire system does not illuminate

Possible Solutions:

- * Check that the Power supply is plugged into the AC power outlet correctly. (If the power supply has a power indicator, check to see that it is on indicating that it is connected to the AC power outlet correctly.)
- * If the power supply has a power switch, check to be sure that it is in the "On" position.
- * Check that the AC Power cord is fully seated in its receptacle in the power supply.
- * Check to see if there is a short-circuit in the system.
- * Check to see that no part of the system has an accidentally reversed polarity connection. (This means + connected to +, and - connected to - throughout the components of the system.)
- * Check any dimmer or control devices to verify that they are working. Safely bypass the control device to determine if it is defective and causing the system to not illuminate.
- * Use the probes of a multimeter set to "Volts DC" to check each (+ and -) point throughout the system.
- * Use an IllumiSci Analyzer to determine if the system is getting the proper Voltage and Current, and if the load is appropriate.

Symptom: A single strip or part of the system does not illuminate

Possible Solutions:

- * Use the probes of a multimeter set to "Volts DC" to check each (+ and -) connection immediately before the strip that does not illuminate to verify that the proper voltage is being conducted through each connection point. If not, remove the component from the system to test it alone.
- * Check to see that connection immediately before the strip that does not illuminate has an accidentally reversed polarity connection. (This means + connected to +, and - connected to - throughout the components of the system.)

Troubleshooting (Continued)

Symptom: A single LED does not illuminate.

Possible Solution:

DO NOT attempt to fix, resolder or replace the LED, and components on the strip or any part of the strip. Safely remove the entire strip or section of strip and replace it with a fully working strip.

Symptom: The plastic casing of the wire from the power supply feels very warm or hot to the touch.

Possible Solution:

This is a dangerous situation. DO NOT use the system. Immediately disconnect the power cord from the AC power source and contact either a licensed electrician or IllumiSci.

The power supply may be overloaded, the wire gauge being used is too small, the length of wire is too long or the system is not configured properly.

Symptom: The plastic casing of the power supply feels very warm or hot to the touch.

Possible Solution:

The power supply is being overloaded or is a low quality power supply. This is a dangerous situation. DO NOT use the system. Immediately disconnect the power cord from the AC power source and contact either a licensed electrician or IllumiSci.

Symptom: The LED's illuminate briefly, then go off, or continually flash.

Possible Solution:

The power supply is being overloaded or does not have the appropriate power rating for the load (the LED Strips and system). Either consider removing some of the strips from the system, or use a power supply that has a higher current rating (up to 5 Amperes per system). Also, you may consider dividing your system into separate systems (separate circuits) with separate power supplies so that a single power supply is not pushed to its limit. See the various sections of this user guide for instructions to do so, or contact IllumiSci.

Symptom: When the room temperature is high or low, the LED's illuminate briefly, then go off, continually flash, or are dim.

Possible Solution:

The power supply is being overloaded or does not have the appropriate power rating for the load (the LED Strips and system). The power supply needs to be Derated to compensate for the additional current that becomes necessary in more extreme temperatures. See the "How to Choose and Derate an Appropriate Power Supply" section of this User Guide.

FAQ

Frequently Asked Questions

Q: What is the difference between IllumiSci products and other products in the market, since some products such as IllumiFlex products appear to look the same as other LED strips?

A: *IllumiSci strives to offer products that surpass most others in the market for quality, innovation and ease of use. Plus, our goal is to offer excellent customer service and technical help.*

Q: Can IllumiFlex and IllumiTile products be used together?

A: *Yes! They are designed to be used together. We recommend that if color temperature (bin) of the LED's is critical, then place a special order to have a matched set of components manufactured for both the IllumiFlex and IllumiTile products.*

Q: Can IllumiSci products be used in vehicles or run with a battery as a power source?

A: Yes. IllumiSci products can be used in vehicles as long as an IllumiSci Vehicle Power Regulator is used in the system. Doing so adjusts the power supplied to the IllumiSci system to the proper voltage and protects the components of the system from very common transient voltage spikes.

Q: What kind of power supply is appropriate to run a system with IllumiFlex LED strips and/or IllumiTile components?

A: *Power supply requirements vary, depending on the system requirements. However, it is important to note that IllumiSci strongly recommends the use of IllumiSci components.*

Q: Can components from other manufacturers be used in a system with IllumiSci components?

A: *IllumiSci offers products that can create a complete system to satisfy most needs or applications. It is strongly recommended that only IllumiSci products be used. IllumiSci has tested an approved some third-party components for use with IllumiSci products. Please inquire with IllumiSci for details. If components that are not approved by IllumiSci are used in a system, the warranty will be void. This is because many products in the market are sub-standard and can likely cause damage to the other components in the system or create dangerous hazards, either immediately or over time.*

(Continued on the next page.)

FAQ

Frequently Asked Questions (continued)

Q: Should IllumiSci products be used behind a diffusion material?

A: Yes. It is common to use IllumiSci products behind a diffusion material, especially acrylics and glass for a variety of applications. Note that color shifts may be observed, depending on the light-transmissive materials used. Proper thermal management and cooling and/or heat-sinking of components should be implemented when configuring the installation.

Q: Can IllumiSci products be dimmed on the AC input line of the power supply?

A: No. Dimming must be done on the low voltage line output of the power supply.

Q: What factors affect the life-span of the LED's, the power supply of a system?

A: Heat, Moisture or excessive voltage/current. LED's, power supplies, dimmers and other components do radiate heat, especially with larger arrays or systems. Improper installation of components where they cannot exchange heat with the environment or be in an environment with too high of an ambient temperature will greatly affect the life-span, and can cause a fire hazard. Installations must have appropriate ventilation or cooling systems. Unless a component is specifically designated as weather-resistant by IllumiSci, exposure to significant moisture or any liquids will cause rapid deterioration of components and will cause an electrical shock hazard. If a system does not have a regulated power supply that maintains the specified voltage and current, the components will be damaged and can cause a fire or electrical shock hazard.

Q: What is the maximum length of IllumiFlex LED strips that can be used in a single circuit?

A: The recommended maximum length (all segments combined) for a single circuit is five meters. This is due to the Fall-Off (voltage-drop) from added resistance that causes the LED's to be progressively more dim toward the end of the IllumiFlex strip. (There are some techniques to mitigate this phenomenon as described in this documentation.) Also, beyond five meters, the added resistance causes more heat, which can become a fire-hazard.

Q: What is the expected life-span of an IllumiSci system?

A: *System components such as IllumiFlex LED strips are rated at approximately 40,000 hours, depending on the type of use. IllumiSci strives to be an industry leader and offer quality components. This equates to several years of continuous use. However, occasionally components fail, and will be covered if within the IllumiSci warranty period and terms.*

Glossary of Terms

Fall-Off a.k.a. noticeable "Fall-Off" - A natural physical phenomena occurs with longer runs or runs with bridges between strips. This occurs with all LED strips of any brand with the common type of three LED and ballast resistor circuitry. Fall-Off occurs due to a voltage drop as the resistance adds down the length of the circuit. Fall-Off may or may not be significant for some applications, and compensation methods can be applied to compensate. See "System Layout Option: Split Chain with End-Bridge" section.

Single Density Strips - Indicates 120 LED per meter IllumiFlex LED strip.

Double Density Strips - Indicates 120 LED per meter IllumiFlex LED strip.

Run (of LED Strip) - A single continuous circuit/continuous segment (not-cut) LED strip, or one with bridges between strip segments (referred to as a Daisy Chain"). Note that there is a limit to a run length based on total current drawn by the circuit. See document ion for run length details.

Daisy Chain - A single continuous circuit of more than one segment of IllumiFlex LED strips with bridges between strips. Note that there is a limit to a run length. See documentation for run length details.

Parallel Wiring/Parallel Connection - A closed circuit in which the current divides into two or more paths before being recombined to complete the circuit. Each load (LED strips) connected in a separate path receives the full circuit voltage (usually 12 Volts DC), and the total circuit current is equal to the sum of the individual branch currents. Simply put, this means that a Positive (+) connection is connected to another Positive (+) connection, and a Negative (-) connection is connected to another Negative (-) connection. This is the only connectivity method that should be used with IllumiSci products.

Specifications

Specification	60 LED/Meter IllumiFlex Strips (aka "Single Density")	120 LED/Meter IllumiFlex Strips (aka "Double Density")
Operating Voltage	12VDC (+/- 0.5V)	12VDC (+/- 0.5V)
Current	1200mA (nominal) per 5M (16.4ft) Reel	2300mA (nominal) per 5M (16.4ft) Reel
Power	14.4 Watts/5M (16.4ft) Reel (0.9Watts/Foot)	27.6 Watts/5M (16.4ft) Reel (1.68 Watts/Foot)
Reel Length	16.4 Feet (5 Meters)	16.4 Feet (5 Meters)
LED Spacing	0.66 Inches (16.7mm) (center to center)	0.33 Inches (8.33mm) (center to center)
Segment Length	1.97 Inches (50mm) 3 LED's/Segment	0.99" Inches (25mm) 6 LED's/Segment
Maximum Run Length (from the power source)	16.4 Feet (5 Meters)	16.4 Feet (5 Meters)
Light Output	2400 Lumens/5M (16.4ft) Reel (480 Lumens/Foot)	4800 Lumens/5M (16.4ft) Reel (960 Lumens/Foot)
Beam Angle	120 Degrees	120 Degrees
Available Color Temperatures (CRI) (+/- 1000k per designation)	3000k Warm White 4500k Neutral White 6000k Daylight White	3000k Warm White 4500k Neutral White 6000k Daylight White
Lifespan	40,000 (nominal)*	40,000 (nominal)*

* (Estimated Average) of 40,000 Hours (nominal) at room temperature 77 degrees Fahrenheit (25 degrees Celsius) with proper thermal management in a consistently dry environment. Lifespan can be 10,000 Hours or much less, if stressed due to improper conditions.

Diffusion Material Distance from LED's:

Sufficiently diffused at one Inch (26mm) from the top of LED's with a minimum 0.25in diffusion material.

Thermal Management:

Small Arrays (< 16.4ft. qty.) per channel may use convection cooling /open to ambient air at approximately 77 degrees Fahrenheit (25 degrees Celsius). Large Arrays (>16.4ft.) in one cavity/enclosure may require a forced air cooling (fans) depending on encapsulation or orientation.

*Specifications are subject to change without notice since products are often updated.
Always test products to verify performance requirements prior to installation.*



High Quality Flexible LED Strip User Guide

Revision 1.4.0



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