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090-00340B

LIGHTLINK™

LL-105-R

LED Dimmer & 0-10V Bridge
Setup Guide

i2Systems®
ADVANCED LED LIGHTING

WELCOME

Thank you for purchasing an i2Systems LightLink. To get started, we recommend the following:

- Review the entire Setup Guide to learn the full power that your LightLink can provide.
- Carefully follow the step-by-step instructions in the following pages to set up and wire your i2Systems LightLink device.

CONTENTS

Please take note of the following components included in the box:

• (1) LightLink Model LL-105-R

CONTENTS CONTINUED

• (1) 2-position terminal block

• (1) 3-position terminal block

• (1) 6-position terminal block with Jumper

• (1) Orange Selector

• (1) Screwdriver

• (2) Mounting Screws

CAUTION

Make all connections prior to applying power. Wiring the product while power is on may result in personal injury. Damage to this product caused by wiring while power is on voids the warranty. Read all instructions prior to installation.

To reduce the risk of fire, burns, or injury, use lights only in the manner intended by i2Systems. Should you have questions regarding your installation, please contact i2Systems before applying power. Product should be installed by a licensed electrician.

This device has been tested and found to comply with Part 15, Class B, 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.

PLEASE

- When installing or servicing the LightLink, be sure to disconnect the circuit prior to beginning work. Use appropriate care when making connections.
- Wear proper safety equipment, including eye protection and follow proper safety precautions.
- Connect to a properly grounded branch circuit protected by a circuit breaker or fuse.
- Never wire the LightLink directly to a battery or unprotected power source.
- Always use i2Systems and/or i2Systems recommended electrical components.
- Never leave exposed wiring without using a suitable wire nut or connector when making a connection to an electrical circuit.
- Never exceed the maximum voltage ratings. Failure to comply will damage the LightLink.
- For use on systems with voltages greater than the maximum rated voltage, use a safety agency approved, CE marked step down power supply to convert the higher voltage to a voltage within the specified operating range of the fixture.
- Use in dry locations only. Never submerse the LightLink module in any liquid or store where liquid will collect, pool, or puddle.
- Use wiring that is rated for +105°C or higher. Minimum wire size is 18awg (0.75mm2).

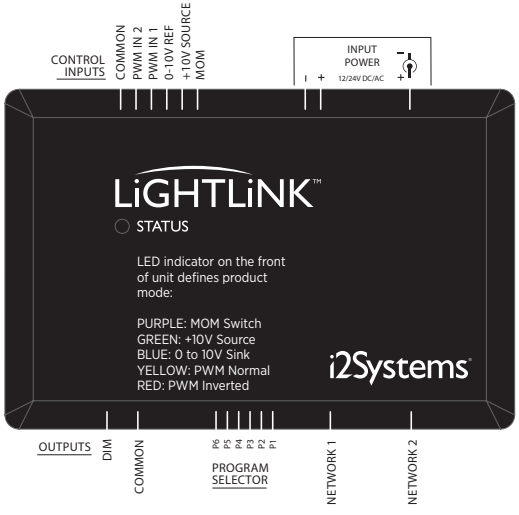
Questions? Contact i2Systems:

Integrated Illumination Systems, Inc. • 355 Bantam Lake Road • Morris, CT • 06763 • USA
tel +1·860·567·0708 • fax +1·860·567·2501 • support@i2Systems.com • www.i2systems.com

TOP DOWN VIEW

If LightLink has been secured and the bottom label is no longer visible, use this chart to locate the proper connection points.

NOTE:
Network 1 & 2 are not used in this version of LightLink.



LIGHTLINK SPECIFICATIONS

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
ABSOLUTE MAXIMUM RATINGS					
MOM Input		-5		12	VDC
PWM Input		-15		20	VDC
+10V Sink / Source		-0.5		15	VDC
Power Supply Voltage (DC)	Continuous	0		40	VDC
Power Supply Voltage (AC, 60 Hz)	Continuous	0		28	VAC
Operating Ambient Temp.		-20		40	°C
Storage Ambient Temp.		-20		40	°C
INPUT CHARACTERISTICS					
Power Supply Voltage (DC)		11	12/24	30	VDC
Power Supply Voltage (AC)		9	12/24	28	VAC
PWM Input, MOM Input		0		5	VDC
+10V Sink / Source		0		10	VDC
No-Load Power Supply Current			25	50	mA AC/DC
OUTPUT CHARACTERISTICS					
DIM Voltage		0		30	VDC
DIM Current		0		2.25	A

CONNECTIONS:

Two (2) methods of connection are provided.

HARDWIRE (preferred)

- **DC Source:**
  Connect +DC to 12/24V +AC
  Connect DC Common to 12/24V –AC
- **AC Source:**
  Same as DC Source, however no polarity requirement.

WALL PLUG POWER SUPPLY (optional)

- Connect a mating connector to the designated Input Jack.
- **DC Source:**
  Connect +DC to Center Pin
  Connect DC Common to Connector Barrel
- **AC Source:**
  Same as DC Source, however no polarity requirement.

Never connect 12/24V +AC, 12/24V –AC, and input jack simultaneously. Damage will occur.

Specification Conditions:

TA = 25°C — Cooling: Convection
Load = Maximum Load — Vin = 24VDC

LIGHTLINK CONTROL INPUTS

LightLink control inputs, where specified, meet controllable ballast standards in IEC 60929:2006 Annex E.

Upon power up, regardless of the available inputs, LightLink will default to the +10V Source Mode.
If this is not the desired input for your setup, then install the supplied jumper connector to +10V Source and Common prior to power up.
This will put LightLink into Input Discovery Mode when it powers up. In this mode, it will cycle through the LED indicator colors searching for inputs. Once it discovers a valid input, it will light the appropriate LED color (see table below).

INPUT MODE CONNECTED	COLOR STATUS OF LED	IEC 60929:2006 COMPLIANT
Momentary Contact (MOM)	Purple	N/A
+10V Source	Green	3
0 to 10V Sink (0-10 Ref)	Blue	3
PWM Normal (PWM In 1)	Yellow	3
PWM Inverted (PWM In 2)	Red	3

NOTE: To reenter ***Input Discovery Mode,*** disconnect power and control inputs from the LightLink, then reconnect and power on.

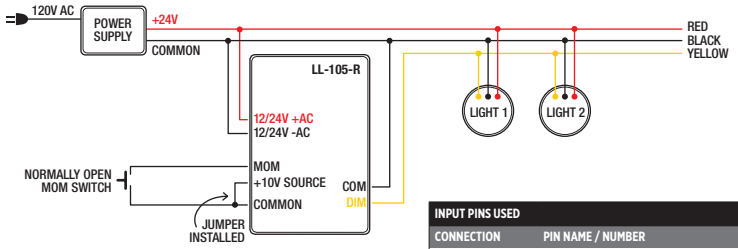
LIGHTLINK CONTROL INPUTS:
MOMENTARY SWITCH DIMMING

STATUS INDICATOR: ●Purple

WIRING: Connect a Normally Open (NO), Momentary (MOM) switch or contact between positions *MOM* (Pin 1) and *Common* (Pin 6). Connect provided Jumper to *+10V Source* (Pin 2) and *Common* (Pin 1).

OPERATION: Press and hold Momentary switch to initiate dimming cycle. Dimming cycle continues to dim as long as switch is engaged, ranging from 100% to approximately 5% intensity, holding 2 seconds at each position before dimming the opposite direction. Briefly press and release Momentary switch for on/off operation. Non-Linear Dimming.

EXAMPLE:



INPUT PINS USED	
CONNECTION	**PIN NAME / NUMBER**
MOM Switch	MOM (Pin 1), Common (Pin 6)
Jumper	+10V Source (Pin 2), Common (Pin 6)

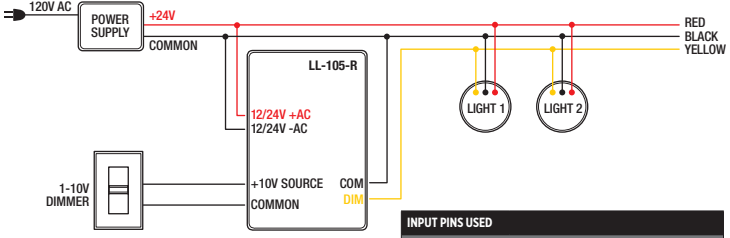
LIGHTLINK CONTROL INPUTS:
+10V SOURCE

STATUS INDICATOR: ● Green

WIRING: Connect only to an IEC 60929 Annex E compatible 1-10V analog dimmer / dimming panel. +10V (typically purple) connects to +10V Source (Pin 2). Common (typically grey) connects to Common (pin 6). Typical LightLink Source current is 500uA or less. In this mode of operation, the LightLink will source current to the dimmer / control unit which will then provide a 0 to 10VDC reference. This function is similar to a traditional fluorescent dimming ballast.

OPERATION: Dimming occurs between 1 and 10VDC. 10 VDC provides 100% intensity. 1VDC provides 0% intensity. Linear Dimming.

EXAMPLE:



INPUT PINS USED	
CONNECTION	**PIN NAME / NUMBER**
IEC Compatible 1-10V Dimmer	+10V Source (Pin 2) , Common (Pin 6)

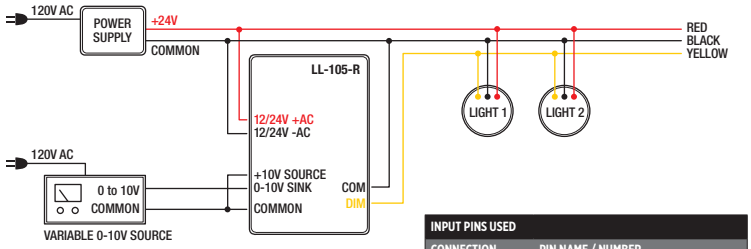
LIGHTLINK CONTROL INPUTS:
+10V SINK

STATUS INDICATOR: ● Blue

WIRING: Connect a 0 to +10V DC control signal to *0-10V Ref* (Pin 3). The associated DC control common connects to *Common* (Pin 6). Typical LightLink sink current is 500uA or less. In this mode of operation, the LightLink will react to the dimmer / control output from 0 to 10VDC. The dimmer / control unit supplies a 0 to 10VDC voltage for the LightLink to reference.

OPERATION: Dimming occurs between 1 and 10VDC. 10 VDC provides 100% intensity. 1VDC provides 0% intensity. Linear Dimming.

EXAMPLE:



NOTE: This dimming mode is less commonly used than the +10V Source mode. Be sure to verify the 0 to 10V dimming method prior to LightLink installation.

INPUT PINS USED	
CONNECTION	**PIN NAME / NUMBER**
0-10V Ref. Voltage	0-10V Ref (Pin3), Common (Pin 6)
Jumper	+10V Source (Pin 2), Common (Pin 6)

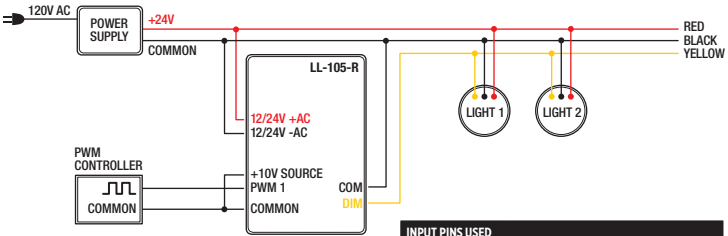
LIGHTLINK CONTROL INPUTS:
PWM NORMAL

STATUS INDICATOR: Yellow

WIRING: Connect only to an IEC 60929 Annex E compatible PWM dimmer / dimming panel. +PWM connects to *PWM 1* (Pin 4) and Common connects to *Common* (Pin 6). Normal Operation PWM input voltage shall not exceed 22VDC.

OPERATION: Dimming is directly related to the PWM duty cycle. 100% duty cycle provides 100% intensity. 0% duty cycle provides 0% intensity. Linear Dimming.

EXAMPLE:



INPUT PINS USED	
CONNECTION	**PIN NAME / NUMBER**
PWM Controller	PWM 1 (Pin 4), Common (Pin 6)
Jumper	+10V Source (Pin 2), Common (Pin 6)

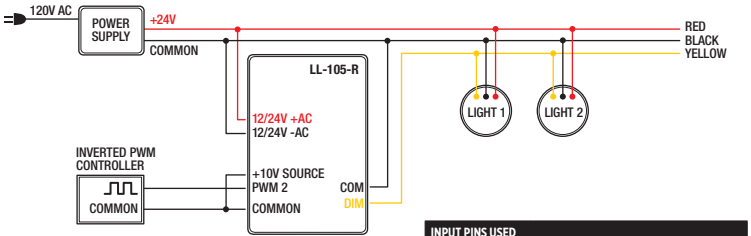
LIGHTLINK CONTROL INPUTS:
PWM INVERT

STATUS INDICATOR: Red

WIRING: Connect only to an IEC 60929 Annex E compatible PWM dimmer / control unit. +PWM connects to *PWM 2* (Pin 5) and Common connects to *Common* (Pin 6). Normal Operation PWM input voltage shall not exceed 22VDC.

OPERATION: Dimming is directly related to the PWM duty cycle. 0% duty cycle provides 100% intensity. 100% duty cycle provides 0% intensity. Linear Dimming.

EXAMPLE:



INPUT PINS USED	
CONNECTION	**PIN NAME / NUMBER**
Inverted PWM Cont.	PWM 2 (Pin 5), Common (Pin 6)
Jumper	+10V Source (Pin 2), Common (Pin 6)

LIGHTLINK OUTPUTS

LightLink provides simple dimming integration to i2Systems products. Two modes of operation are available: Control Dim and Power Dim.

DEFINITION OF PINS:

DIM: Dim (Pin 1) output provides a dimming control signal and current path to COMMON (Pin 3) and is for use with dimmable i2systems products.

COMMON: Common (Pin 3) provides a common reference to DIM (Pin 1).

TYPES OF DIMMING:

Control Dim: Control Dimming is the most common configuration whereby i2Systems LED based fixtures receive voltage and current from an independent power source. In this case the DIM (Pin 1) output provides a dimming control signal to the i2Systems fixture.

Power Dim: Power Dimming occurs where the i2Systems LED based fixture does not include control wiring; rather the LightLink LL-105-R is configured to interrupt the DC Power Ground connected to the LED fixture. For normal Power Dim operation, install the Orange Selector Jumper included with your LightLink.

Absolute Maximum Current Sink is 2.25 Amps.

Note: In Power Dim installations, failure to connect the COMMON (Pin 3) directly to the LED Fixture Ground will result in damage to the LL-105-R.

INSTALLATION RECOMMENDATIONS

POWER SUPPLY SELECTION

When not connecting to a DC battery system, i2Systems recommends the use of UL Class 2, isolated power supplies and transformers for powering i2Systems LED light fixtures and LightLink dimming modules. Power supplies and transformers used should be properly sized based on power load and ambient operating temperature ratings.

POWERING LIGHTLINK

When not connecting to a DC battery system, i2Systems recommends powering the LightLink from a non-switched, isolated power supply to ensure that the LightLink remains powered under all lighting conditions (on, off, or dimmed). In either case, switching the LightLink on and off with the lighting load may result in undesirable visual effects, including light flashing with power on and power off.

USING MORE THAN 1 LIGHTLINK

When using more than 1 LightLink, please adhere to the following guidelines:

- One LightLink should be used per power supply / transformer. Do not use one LightLink to dim products connected to multiple power sources.
- Multiple LightLinks may be used on one power supply / transformer.
- When using multiple LightLinks and multiple power supplies connected to the same dimming control, please consult i2Systems for application support.

LIGHTLINK PLACEMENT

i2Systems recommends installing LightLink products in close proximity to the i2Systems products connected to the LightLink output (maximum wire run length is 100 feet). The LightLink should be installed such that it is serviceable and accessible for system troubleshooting as required.

WIRE SELECTION

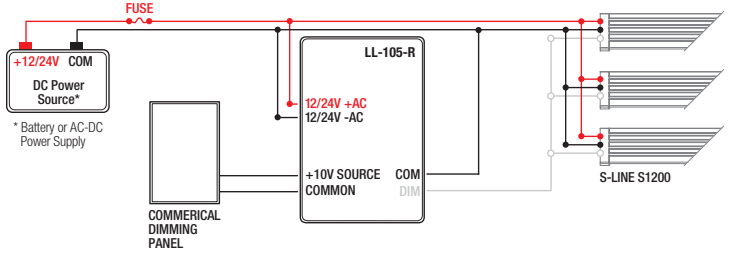
- **Input Power:** recommended wire type is stranded, 18awg, 105°C rating
- **Control Input:** recommended wire type is stranded, 18awg, 105°C rating
- **Control Output:** recommended wire type is stranded, 18awg, 105°C rating,

Wire should be Twisted Pair or Shielded to prevent possible interference on the Dim Line.

The above wire specifications are for reference purposes only. Be sure to consult local building and electrical codes and/or officials prior to installing wiring to ensure full compliance with local and national requirements.

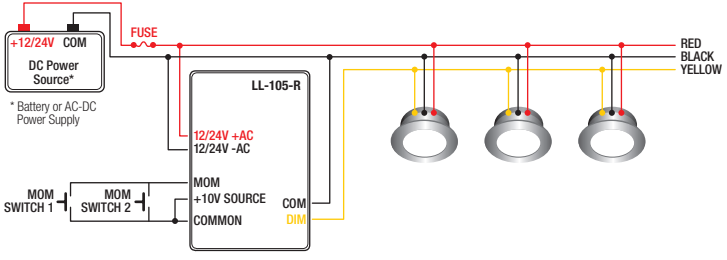
INSTALLATION EXAMPLE:

1-10V Dimming Control



INSTALLATION EXAMPLE:

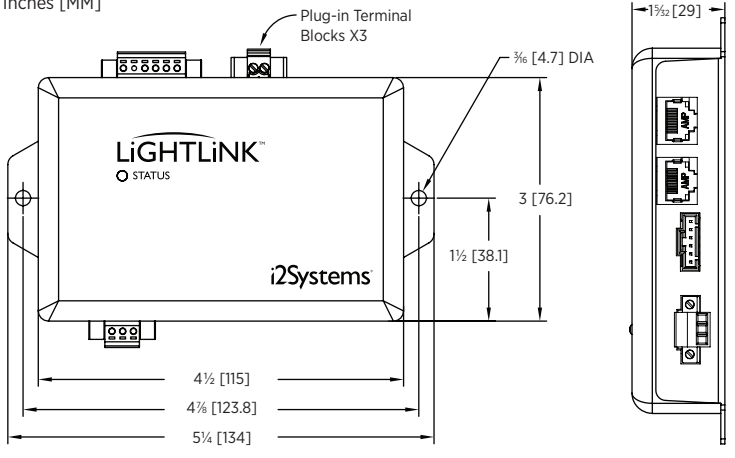
Apeiron Series, Momentary Switch Dimming



NOTE: MOM Switch 2 is optional. Add switches in parallel to increase the number of user interfaces for 1 LightLink.

DIMENSIONS

Inches [MM]



WARRANTY

i2Systems warrants that the product is free from defects in material or workmanship under normal operation. i2Systems standard warranty is 12 months from the date of shipment to the customer.

Any replacement parts furnished at no cost to the customer in fulfillment of this warranty are warranted only for the unexpired portion of the original warranty. Any services or repair outside the scope of this limited warranty shall be at i2Systems rates and terms then in effect.

i2SYSTEMS WILL NOT BE LIABLE FOR ANY DAMAGE, LOSS, COST OR EXPENSE FOR BREACH OF WARRANTY EXCEPT AS DESCRIBED ABOVE. i2SYSTEMS LIABILITY SHALL BE LIMITED TO REPAIRING OR REPLACING DEFECTIVE PRODUCTS ONLY AND SHALL NOT BE LIABLE FOR COSTS ASSOCIATED WITH REPLACING DEFECTIVE PRODUCT.

Normal "Wear and Tear" as determined by i2Systems is NOT covered by this warranty. For units returned in warranty and determined to be customer responsibility, i2Systems customer service will notify the customer. i2Systems is not responsible for damages outside our control including, but not limited to, physical damage, modifications to the product, or improper packaging. If product to be repaired was purchased from a dealer, distributor, or reseller, the product must be returned to the seller.

Additional warranty and returns information is available at i2Systems.com

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PROJECT NOTES