

# iColor Flex MX

Flexible strands of high-intensity, full-color LED nodes

**PHILIPS**

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## Flexible strands of high-intensity, full-color LED nodes

iColor® Flex MX is a multi-purpose, high-intensity strand of 50 full-color LED nodes for generating extraordinary effects without the constraints of fixture size or shape. iColor Flex MX enables patterns and video on almost any interior or exterior surface, including ceilings, floors, three-dimensional objects, sculptures, and more. Its small node size allows installation in tighter spaces than the larger iColor Flex SLX and iColor Flex LMX strands.

- Supports cost-effective video displays — Flexible form factor, offering maximum lighting control at 25 W per strand, accommodates unique lighting installations, including two- and three-dimensional video displays.
- Multiple lens options — Clear dome and translucent dome lenses are standard. Clear flat and translucent flat lenses are also available.
- Adaptable mounting — Strands can be mounted directly to a surface, like traditional string lights. Detachable leader cables in multiple lengths allow you to install strings at the appropriate distance from power / data supplies. Optional mounting tracks ensure straight linear runs, while snap-on spacers hide cabling and mounting hardware. Single node mounts can be positioned individually as anchor points for installations with uneven node spacing or complex geometries.
- Standard and custom lengths and node spacing — iColor Flex MX strands are available with standard on-center node spacing of 4 in (102 mm) or 12 in (305 mm) along a three-wire, 18 AWG cable. Custom on-center node spacing from 2 in (51 mm) to 24 in (610 mm) supports virtually any lighting or video design and offers finer pixel pitch than the larger Flex strands. Standard 50-node lengths can be shortened in the field. Custom lengths of 5 to 72 nodes are also available.
- Custom leader cables — Custom Leader Cables lengths are available in addition to standard cables of 25 ft (7.6 m), 50 ft (15.2 m), and 100 ft (30.5 m).
- Industry-leading controls — iColor Flex MX works seamlessly with the complete Philips line of controllers, including Video System Manager Pro, Light System Manager, and iPlayer® 3, as well as third-party DMX controllers.
- Durable and weather-resistant — Fully sealed for maximum fixture life and IP66-rated for outdoor applications.



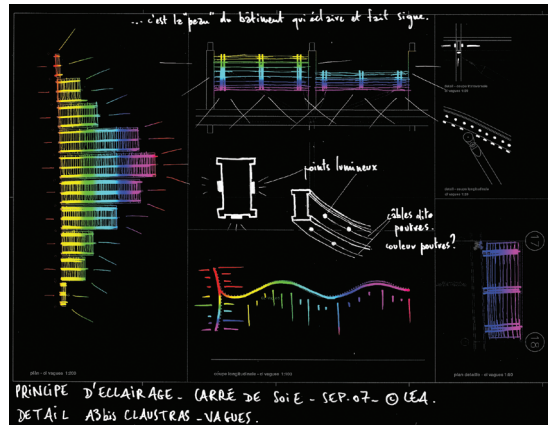
### Superior Light Output

iColor Flex MX strands consist of 50 individually controllable, high-intensity LED nodes. Each node produces full-color light output of up to 1.44 candela.



# An Organic-Electric Hybrid for Carré de Soie

In 2007, Laurent Fachard and Joseph Frey of the lighting studio Les Eclairagistes Associés (LEA) completed the lighting design for a shopping mall covering 180,000 square meters within Carré de Soie, a development devoted to shopping and leisure activities in Vaulx en Velin, France, near Lyon.



To integrate the main shopping mall with its surroundings, the architects created a sinuous latticework canopy extending outward from the cinema entrance toward the avenue. LEA outlined the flowing “arms” of the structure with 16,000 individually addressed full-color iColor Flex nodes in 490 separate strands.

Using Light System Manager controller from Philips Color Kinetics, the iColor Flex system displays dynamic and intricate full-color light shows — shown here and on the cover — which vary according to the seasons and the commercial needs of the development's management. The latticework is fully illuminated with sparkles, bursts, and chasing rainbows of color whenever the cinema is open during the evening and night.

The iColor Flex installation helps make the shopping mall a luminous and inviting destination within Carré de Soie.



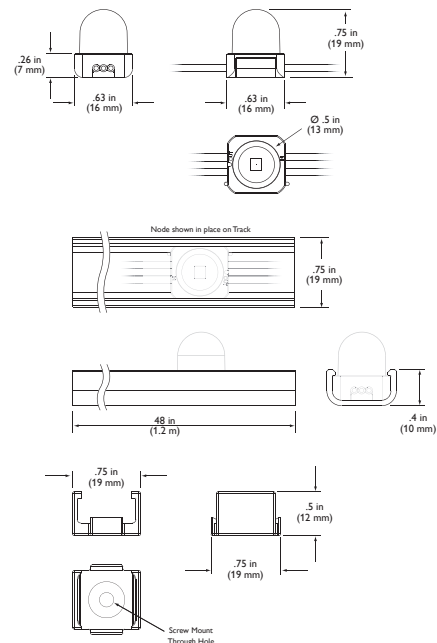
Lighting Design: Laurent Fachard and Joseph Frey  
Photography: Joseph Frey, LEA

# Specifications

Due to continuous improvements and innovations, specifications may change without notice.

Item	Specification	Details
Electrical	Lumen Maintenance*	50,000+ hours L50 @ 50° C (full output)
	LED Channels	Red / Green / Blue
	Input Voltage	7.5 VDC via PDS-60ca or sPDS-480ca
	Power Consumption	.5 W max. per node at full output, steady state
Control	Power Factor	.98 @ 120 VAC
	Interface	sPDS-480ca 7.5V (Ethernet) PDS-60ca 7.5V (Pre-programmed or DMX / Ethernet)
	Control System	Philips full range of controllers, including Video System Manager Pro, Light System Manager, and iPlayer 3, or third-party DMX controllers
Physical	Node Dimensions (Height x Width x Depth)	.63 x .63 x .75 in (16 x 16 x 19 mm)
	Weight	13.4 oz (381 g) 50-node strand, 4 in on-center node spacing
	Housing	White or black polycarbonate
	Lens	Clear or translucent plastic
	Fixture Connections	Integrated watertight 3-pin connector
	Temperature Ranges	-4° – 122° F (-20° – 50° C) Operating ≥ 32° F (≥ 0° C) Handling -4° – 122° F (-20° – 50° C) Startup -22° – 185° F (-30° – 85° C) Storage
	Humidity	0 – 95%, non-condensing
Certification and Safety	Maximum Fixtures Per Power / Data Supply	sPDS-480ca 7.5V: 16 strands PDS-60ca 7.5V: 2 strands
	Certification	UL / cUL, CE
	Environment	Dry / Damp / Wet Location, IP66

\* L50 = 50% maintenance of lumen output (when light output drops below 50% of initial output). Ambient temperature specified.



**\*** To calculate the number of strands your specific installation can support, download the Configuration Calculator from [www.colorkinetics.com/support/install\\_tool/](http://www.colorkinetics.com/support/install_tool/)

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## Photometrics

### Brightness Per Node

Lensing	On-Axis Candela	Viewing Angle
Clear flat lens	1.44	104°
Clear dome lens	1.23	110°
Translucent flat lens	0.81	109°
Translucent dome lens	0.52	149°

### Luminance of 1 m² Grid

All figures in nits (cd / m²)	On-Center Node Spacing		
Lensing	2 in	4 in	12 in
Clear flat lens	520	144	23
Clear dome lens	444	123	20
Translucent flat lens	292	81	13
Translucent dome lens	188	52	8



## Included in the box

iColor Flex MX strand (50 nodes)

Extra termination cap

Installation Instructions

## Build-to-Order Configurations

In addition to the standard configurations listed here, build-to-order configurations are also available. See the iColor Flex MX Ordering Information sheet at [www.colorkinetics.com/ls/rgb/flexmx/](http://www.colorkinetics.com/ls/rgb/flexmx/) for complete information.

Component	Available Non-Standard Options
Node Spacing	2 in (51 mm) – 24 in (610 mm) on-center
Strand Length	5 – 72 nodes
Node / Cable Color	Clear
Lens	Clear flat, translucent flat

iColor Flex MX fixtures

Item	Type		Item Number	Philips 12NC
iColor Flex MX 4 in on-center node spacing	White	Clear Dome Lens	101-000068-04	910503700712
		Translucent Dome Lens	101-000068-00	910503700708
	Black	Clear Dome Lens	101-000068-06	910503700714
		Translucent Dome Lens	101-000068-02	910503700710
iColor Flex MX 12 in on-center node spacing	White	Clear Dome Lens	101-000068-05	910503700713
		Translucent Dome Lens	101-000068-01	910503700709
	Black	Clear Dome Lens	101-000068-07	910503700715
		Translucent Dome Lens	101-000068-03	910503700711

Leader Cables	Black	25 ft (7.6 m)	108-000045-00	910503700696
		50 ft (15.2 m)	108-000045-01	910503700697
		100 ft (30.5 m)	108-000045-02	910503700698

Mounting accessories

Mounting Track Qty 1	White	4 ft (1.2 m)	101-000024-00	910503700015
	Black		101-000024-01	910503700016
Spacers Qty 50	White	4 in (102 mm)	101-000047-00	910503700030
	Black		101-000047-01	910503700031
	White	12 in (305 mm)	101-000048-00	910503700032
	Black		101-000048-01	910503700033
Single Node Mounts Qty 50	White		101-000039-00	910503700025
	Black		101-000039-01	910503700026

Power / data supplies

PDS-60ca 7.5V	Pre-programmed	109-000015-00	910503700093
	DMX / Ethernet	109-000015-03	910503700094
sPDS-480ca 7.5V	Ethernet	109-000022-00	910503700107

Use Item Number when ordering in North America.

## Fixtures and Power / Data Supplies

iColor Flex MX is part of a complete system which includes fixtures and:

- One or more power / data supplies.
- One Leader Cable to attach each strand of iColor Flex MX fixtures to a power / data supply port
- Optional mounting tracks, spacers, or single node mounts.
- Any Philips controller, including Video System Manager, Light System Manager, and iPlayer 3, or a third-party DMX controller.

# Installation

iColor Flex MX can be used in a wide range of two-dimensional and three-dimensional configurations, including portable video screens and permanent building-covering displays. iColor Flex MX installations are not constrained by fixture size, shape, or architectural space.

Because of their potential complexity, iColor Flex MX installations require upfront planning for configuring, positioning, and mounting the fixture strands. Planning includes understanding how to position strands in relation to power / data supplies and the number of strands each power / data supply can support. Planning for video displays involves additional considerations, such as how to space iColor Flex MX nodes to achieve the desired pixel pitch, minimum and maximum viewing distances, sampling, and display resolution.

All installations involve three main steps:

1. Create a lighting design plan and layout grid
2. Mount fixture strands
3. Address, configure, and test fixtures

## Owner / User Responsibilities

It is the responsibility of the contractor, installer, purchaser, owner, and user to install, maintain, and operate iColor Flex MX fixtures in such a manner as to comply with all applicable codes, state and local laws, ordinances, and regulations. Consult with the appropriate electrical inspector to ensure compliance.

## Installing in Wet or Damp Locations

When installing in wet or damp locations, seal all fixture connections, power / data supplies, and junction boxes with electronics-grade RTV silicone sealant so that water or moisture cannot enter or accumulate in wiring compartments, cables, or other electrical parts. Use suitable outdoor-rated junction boxes when installing in wet or damp locations. Additionally, use gaskets, clamps, and other parts required for installation to comply with all applicable local and national codes.

# DMX or Ethernet Control?

iColor Flex MX installations can be controlled via either DMX or Ethernet. DMX is appropriate for relatively simple installations, or for installations where all lights operate in unison — for example, for accenting, perimeter lighting, or cove lighting applications.

Each node in a strand of iColor Flex MX is identified by a *light number*. A light number corresponds to three sequential DMX addresses, one for red, one for green, and one for blue. A DMX universe consists of 512 addresses, so the maximum number of light numbers available in a DMX universe is 170 ( $170 \times 3 = 510$ ).

Because it is not subject to the DMX addressing limitations, Ethernet is the preferred environment for dynamic, color-changing light shows and video displays, both of which require large numbers of unique light numbers. In an Ethernet environment, each power / data supply effectively acts as its own universe.

DMX installations require the use of a PDS-60ca 7.5V power / data supply, while the sPDS-480ca 7.5V power / data supply is Ethernet only.

✱ Clean lenses with water and mild detergent using a soft cleaning cloth. Wipe lenses dry. Do not use paper towels, abrasive cleaning products, or window cleaners. Abrasive cleaning products will scratch lenses, and window cleaners will soften and mar the polycarbonate. Do not use cleaning solutions that contain ammonia, sodium hydroxide, or isopropyl alcohol, which can scratch, pit, haze, yellow, or crack lenses.

✱ Refer to the iColor Flex MX Installation Instructions for specific warning and caution statements.



# Considerations for Video Displays

In addition to the planning required for all iColor Flex MX installations, planning for video displays involves special considerations such as pixel pitch, minimum and maximum viewing distances, sampling, and display resolution.

## Determining Pixel Pitch and Viewing Distances for Video Displays

When using iColor Flex MX strands to display video, each node acts as a pixel in the display. Images on an LED video display appear to be sharper to the human eye as the distance to the display increases. Likewise, images appear less visible as the distance decreases. The spacing between pixels, known as the *pixel pitch*, determines the minimum and maximum viewing distances for discernible video output. Pixel pitch is measured center-to-center. For an iColor Flex MX strand, you determine pixel pitch by measuring from the center of one node to the center of the next.

Designing a layout with overlapping strands is a common technique for increasing pixel pitch. For example, to create a dense line of nodes, place multiple runs close to each other vertically, with a slight horizontal offset between the nodes. Philips offers iColor Flex MX with both 4 in (102 mm) and 12 in (305 mm) spacing between nodes. Using strands with made-to-order node spacing is another method for adjusting pixel pitch.

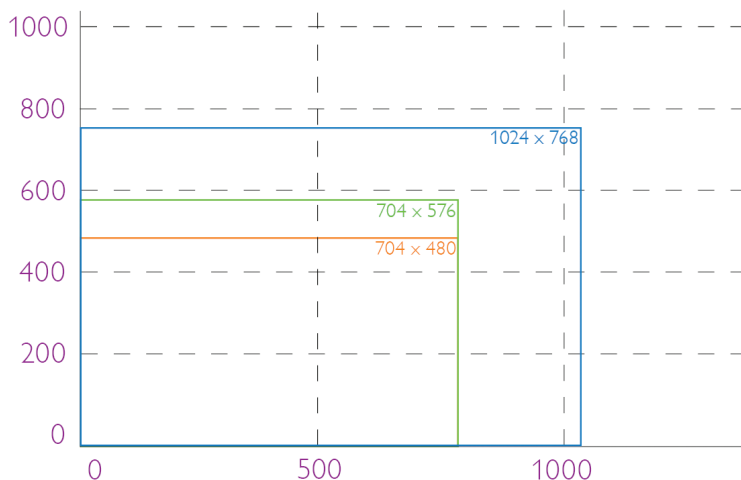
The following calculations and examples are general guidelines for determining minimum and maximum viewing distances, based on video displays using grids of evenly spaced pixels:

- To determine minimum viewing distance, multiply pixel pitch by 100 distance units. For example, if the pixel pitch is 2 in (50 mm), the minimum viewing distance is 16.4 ft (5 m).
- To determine the maximum viewing distance for discernible video, multiply the screen height by 20 distance units. For example, if the screen height is 65.6 ft (20 m), then the maximum viewing distance for recognizable video is 1312.3 ft (400 m).
- LED screens are visible beyond the maximum viewing distance for discernible video. To determine the maximum viewing distance that still creates visual impact, multiply the screen height by 50 units. For example, a screen 65.6 ft (20 m) high will continue to create visual impact at 3280.8 ft (1000 m).

## Working with Video Display Resolutions

The resolution of an LED video display equals the total number of vertical and horizontal pixels — the greater the pixel count, the greater the resolution.

- The resolution of VSE digital video is 1024 x 768
- The resolution of PAL video is 704 x 576
- The resolution of NTSC video is 704 x 480



Reproducing a video signal with 1:1 pixel mapping on an LED display requires a substantial pixel count. For example, true NTSC video output requires 337,920 pixels, PAL output requires 405,504 pixels, and digital video output requires 786,432 pixels.

However, you can use a controller such as Philips Video System Manager Pro to reduce the required pixel count for any video format by sampling and distributing pixels from the source video to match your installation.

For example, if you retain the horizontal resolution of a digital video source (1024 lines wide), but sample every tenth line of pixels vertically (76 lines high instead of 768 lines), you can retain the correct aspect ratio while exponentially reducing the pixel count. From a distance, even with only 76 lines of vertical output, the human eye can still discern video images because the horizontal resolution is dense.

An installation using 1024 x 76 nodes would have a pixel count of 77,824 yet still display high-quality digital video output. This method is especially effective when creating an installation that covers a building which, by necessity, already has spacing between lines of video due to windows and other architectural features.

✳ For designs where the acceptable level of discernible video may be more or less demanding, or for help with your specific installation, contact Philips Color Kinetics Application Engineering Services for assistance.

## Create a Lighting Design Plan and Layout Grid

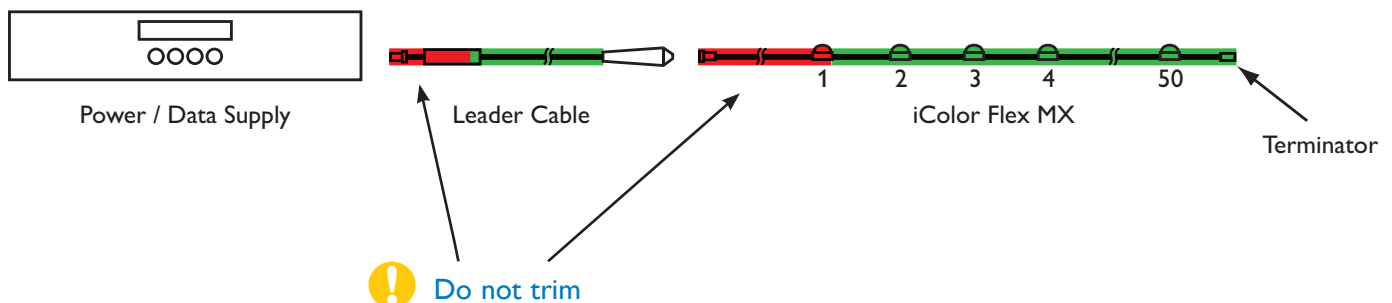
Even for relatively simple installations, it's good practice to create a lighting design plan. For complex installations displaying light shows with dynamic effects, and especially for Ethernet-based video displays, such a plan is essential. A lighting design plan is typically an architectural diagram or other diagram that shows the physical layout of the installation, including the appropriate positioning and spacing of all fixtures, power / data supplies, power sources, controllers, cables, and other required hardware. For DMX installations, the plan should record the DMX base number and node count for each iColor Flex MX strand. For Ethernet installations, the plan should record the IP address of each power / data supply and the number of nodes per power / data supply port.

Keep the following considerations in mind when creating a lighting design plan and layout grid:

- Determine the appropriate location of each power / data supply in relation to the fixtures, and of the fixtures in relation to each other. You connect a strand of iColor Flex MX fixtures to an available power / data supply port using a Leader Cable of 25 ft (7.6 m), 50 ft (15.2 m), or 100 ft (30.5 m).
- iColor Flex MX Leader Cables can be shortened, and strands can be cut to any node length. An extra termination cap is included for sealing the cut end of the strand.

✳ Refer to the Installation Instructions or Specification Sheet of your power / data supply for guidelines on configuring and positioning the power / data supply in relation to a controller or Ethernet switch.

Do not trim the Leader Cable between the power / data supply connector and the PCA transmitter junction box. Do not trim strands between the connector and the first node.





- On an architectural diagram or other diagram that shows the physical layout of the installation, identify the locations of all switches, controllers, power supplies, and fixtures.
- Nodes in each strand are sequentially addressed beginning with the node closest to the Leader Cable. Orientation of the power / data supply is therefore especially critical when using dynamic effects.
- In Ethernet environments, each power / data supply is identified with a unique IP address. We recommend recording the IP address of each power / data supply on a layout grid. For complex installations with many power / data supplies, we recommend assigning meaningful IP addresses to each power / data supply so that their locations are easy to identify.

## Start the Installation

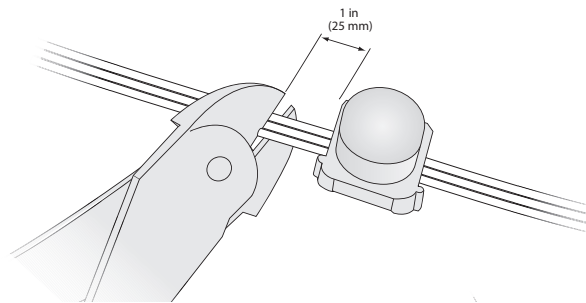
1. Install all power / data supplies, including any interfaces with controllers. Power / data supplies send power and control signals to fixtures over the Leader Cable.
2. Verify that all additional supporting equipment (switches, controllers) is in place.
3. Ensure that all additional parts (for example, optional single node mounts, spacers, mounting track, and mounting hardware) and tools are available.

## Cut and Seal iColor Flex MX Strands (Optional)

You can cut iColor Flex MX strands to any desired node length. We recommend cutting and sealing the strands before mounting them.

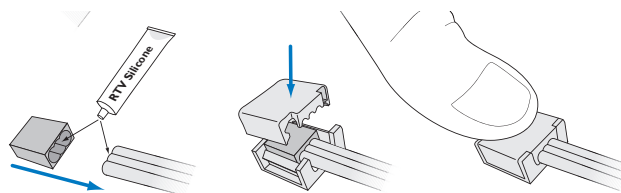
✳ *Never cut a strand between the three-pin connector and the first node.*

1. Using a wire cutter, cut the cable to the desired length, leaving at least 1 in (25 mm) of cable after the last node. Ensure that the cut is clean and that there are no frayed wires touching other wires.



2. Apply a liberal amount of electronics-grade RTV silicone to the cable ends and to the opening of the rubber seal boot included with the extra termination cap. Insert the boot onto the cable.
3. Sit the sealed cable boot into the base of the provided termination cap.
4. Firmly press the termination cap onto the base until the top snaps into place. If using pliers, be careful not to crack the housing.

✳ *Never reuse a termination cap.*



# Mount the Fixtures

You can mount iColor Flex MX strands directly to a mounting surface, or you can mount them using iColor Flex MX mounting accessories (available separately):

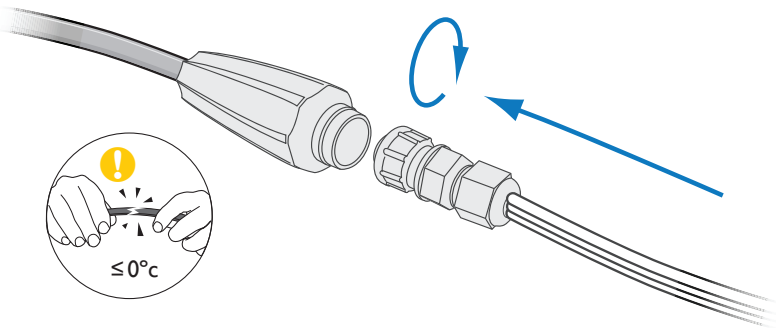
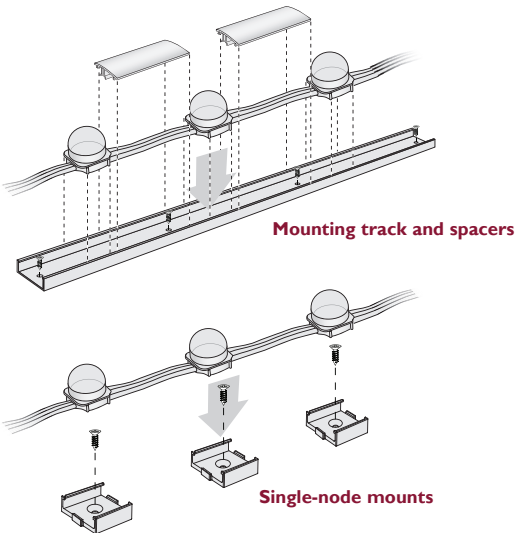
- Optional mounting tracks ensure straight runs in linear applications. Spacers snap to the mounting tracks for a clean, finished look that hides cables and mounting hardware between nodes.
- Single node mounts can be positioned individually to provide anchor points for nodes in installations with uneven node spacing or complex geometries.

Make sure the power is OFF before mounting and connecting iColor Flex MX fixtures.

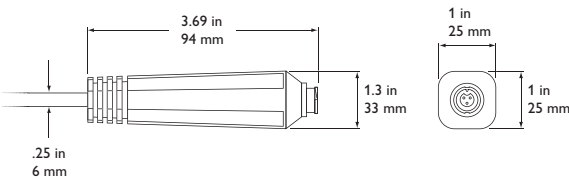
1. Using a pencil or chalk line, mark a center-line path for the nodes to follow.
2. (Optional) To install mounting track, cut the track to the desired length with a saw or snips. Using flathead screws suitable for the mounting surface, drive screws through the plastic track into the attaching surface. Recommended maximum spacing between screws is 16 in (406 mm). Snap optional spacers into the track to hide mounting hardware and wires.
3. (Optional) Ensure that the spacing between single node mounts is sufficient to accommodate cable length between nodes and to allow for cable bending as necessary.

Using double-sided tape on the base of the mounts, adhere the mounts to the attaching surface. Reinforce installation with #6 flathead screws suitable for the mounting surface.

4. If using mounting track or single node mounts, push the fixture nodes into the mounts.
5. If mounting directly to a mounting surface, install iColor Flex MX strands using a suitable mounting method. For example, you can mount strands to a pipe or cable using plastic cable ties.
6. Connect a Leader Cable to the three-pin connector on the end of each iColor Flex MX strand by turning the fixture strand's grommet clockwise. In wet or damp environments, tighten the grommet on the male connector sufficiently to ensure a watertight seal. Use caution when handling the Leader Cable or iColor Flex MX strand in sub-freezing temperatures, as the wiring can become brittle and break.



Leader Cable connector dimensions



# Make Power and Data Connections

iColor Flex MX fixtures are designed to work with 7.5VDC power / data supplies from Philips Color Kinetics. Power / data supplies send power and data to iColor Flex MX strands over a Leader Cable. Each sPDS-480ca 7.5V can power up to 16 fixture strands in Ethernet installation, while each PDS-60ca 7.5V can power up to two fixture strands in either Ethernet or DMX installations.

Maximum strands per power / data supply

PDS-60ca 7.5V	2
sPDS-480ca 7.5V	16



PDS-60ca 7.5V is an IP66-rated power / data supply, suitable for use in damp and wet locations. Although sPDS-480ca 7.5V is rated for use in dry locations only, you can install it in a watertight enclosure for outdoor applications.

Make sure the power is OFF before connecting iColor Flex MX fixtures.

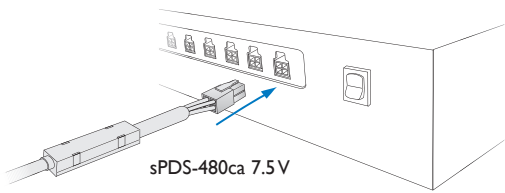
### Connecting to the sPDS-480ca 7.5V Power / Data Supply

- Connect a Leader Cable to an available power port on the back of the power / data supply housing.

### Connecting to the PDS-60ca 7.5V Power / Data Supply

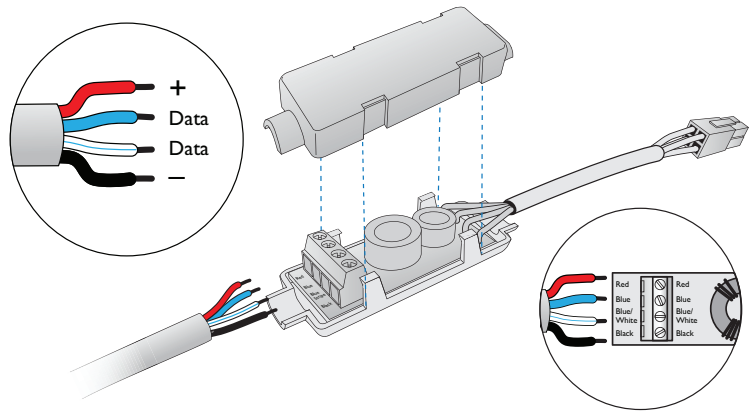
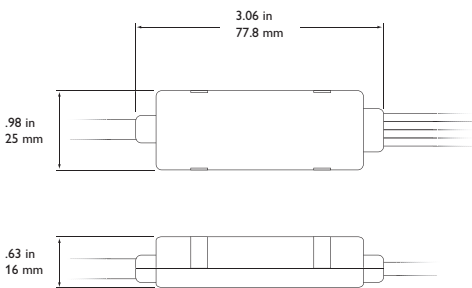
The PDS-60ca 7.5V is an IP66-rated power / data supply, suitable for use in damp and wet locations. The following procedure describes how to connect and seal a PDS-60ca 7.5V power / data supply for outdoor applications.

1. Remove the power / data supply cover.
2. Remove the cover of the transmitter PCA junction box on the Leader Cable by expanding the four tabs on the side and sliding the cover from the base.
3. Connect line, common, ground, and data to the provided terminal block, then replace the cover of the transmitter PCA junction box.

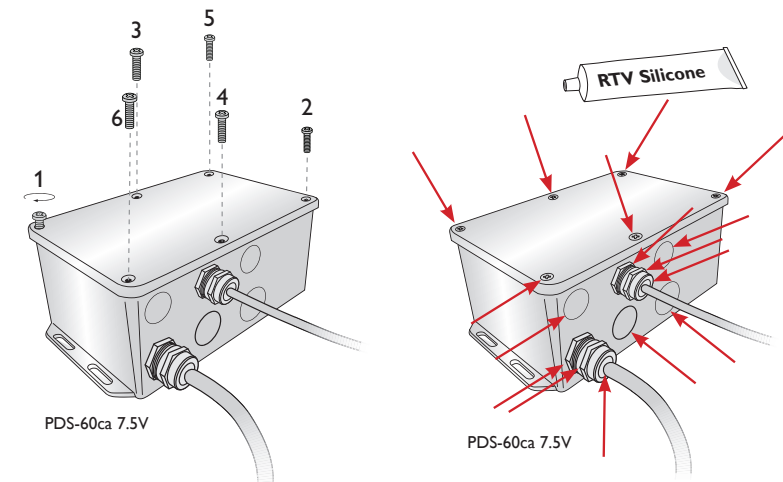


**\*** If using conduit, remove the transmitter PCA junction box cover from the Leader Cable, as described here, before pulling the cable through the conduit, then replace the junction box cover.

### Transmitter PCA junction box dimensions



4. Connect the Leader Cable connector to an available port inside the power / data supply housing.
5. Secure the power / data supply cover. If installing in a wet or damp location, seal the power / data supply with electronics-grade RTV silicone sealant.



6. Repeat steps 1 – 5 for each power / data supply in the installation.

# Address and Configure the Fixtures

Make sure the power is ON before addressing and configuring fixtures.

Power / data supplies and controllers work together to stream data to the iColor Flex MX strands in your installation.

- Each individual iColor Flex MX node is assigned three sequential DMX addresses, one for red, one for green, and one for blue. A DMX universe consists of 512 addresses, so the maximum number of iColor Flex MX nodes that can be individually addressed in a DMX universe is 170 ( $170 \times 3 = 510$ ).

When using a PDS-60ca 7.5V power / data supply with DMX control, you program the power / data supply rather than addressing the iColor Flex MX strings directly. You use SmartJack Pro (or iPlayer 3) with QuickPlay Pro addressing software to set a base DMX address for the power / data supply, and to specify the node quantity of each attached iColor Flex MX strand.


For lighting designs where nodes work in unison, all nodes should be set to the same DMX addresses. For dynamic light show designs that show different colors on different nodes simultaneously, you must assign unique DMX addresses to each node. Starting with its base DMX address, PDS-60ca automatically assigns addresses to each iColor Flex MX node in sequence, from the first node on output port 1 through the last node on output port 2.

- Because you are limited to 170 uniquely addressed nodes per DMX universe (less than four strands of 50 nodes each), Ethernet is the preferred environment for video displays and dynamic light shows with intricate effects.

Each Ethernet-based power / data supply comes pre-programmed with a unique IP address, so the power / data supply effectively functions as its own universe. When creating a light map with a controller or media server such as Light System Manager or Video System Manager Pro, each iColor Flex MX node automatically receives a unique identifier.

You can discover all power / data supplies by IP address using QuickPlay Pro, Light System Manager, or Video System Manager Pro. For large installations, and especially for video displays, we recommend giving power / data supplies meaningful IP addresses to streamline installation, mapping, testing, and troubleshooting. When readdressing power / data supplies, you will need the layout grid you created when you recorded each power / data supply's IP address during installation planning.

For complete details on addressing and configuring fixtures, controllers, and power / data supplies, refer to the *Addressing and Configuration Guide* or the *User Guide* or *Specification Sheet* for your controller or power / data supply.

 You can download the QuickPlay Pro software and the Addressing and Configuration Guide from [www.colorkinetics.com/support/addressing/](http://www.colorkinetics.com/support/addressing/).



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