PHILIPS
sense and simplicity

Philips Color Kinetics
LED lighting systems

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LED Lighting Is Here

- LED lighting is in use virtually everywhere:
  - Architectural landmarks, theaters, concerts, restaurants, casinos, sports arenas, and roads and tunnels
  - Offices, schools, stores, hospitals, museums, and homes
- LED lighting is becoming more popular every day

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LED Source Options

- **Fixed white light**
  Produces one shade of cool, neutral, or warm white light

- **Tunable white light**
  Combines cool and warm white LEDs to create a range of shades

- **Fixed color**
  Produces light of a fixed hue — red, green, blue, amber . . .

- **Color-changing (RGB)**
  Combines red, green, and blue LEDs to produce millions
  of colors and color-changing effects

- **Multi-spectrum**
  Combines multiple channels of colored and white LEDs
 to increase the range of colors

Why LED Lighting?

LED lighting fixtures can:

- Equal or surpass the capabilities of conventional lighting fixtures

- Direct abundant light to task areas both indoors and outdoors

- Reliably deliver high-quality colored and white light with virtually no visible color variation between fixtures

- Support almost any lighting application

- Provide a full spectrum of solid colors, and white light in a full range of color temperatures

Avenue of the Arts, Philadelphia, Pennsylvania
Photography: Jim Abbott for the City Center District

Why LED Lighting? continued…
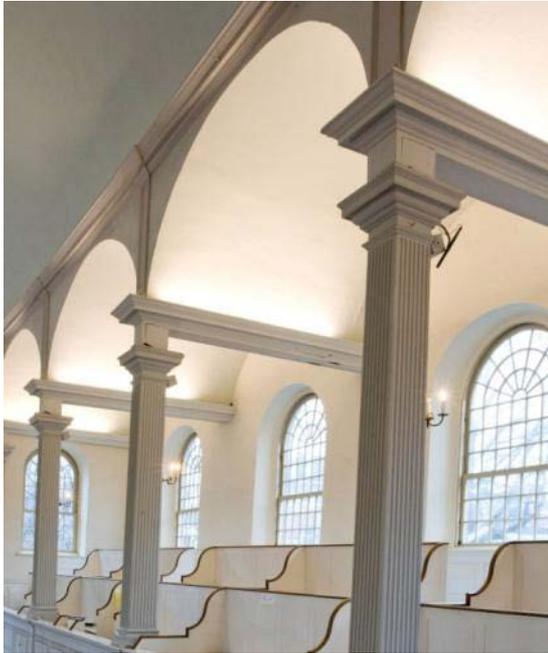
Old North Church, Boston, Massachusetts
Photography: John Brandon Miller

LED lighting fixtures can:

- Offer full-color and tunable white light for dynamic effects and large-scale video displays

- Meet or exceed energy efficiency of comparable conventional lighting fixtures

- Reliably provide useful light for many thousands of hours after fluorescent and incandescent sources fail

- Offer easy installation and operation in new and retrofit applications

- Perform well in extreme environments

A New Kind of Light

LED lighting fixtures are:

- Fundamentally different from conventional lighting fixtures

- Electronic devices that use semiconductor-based light sources:
    - No lamps and filaments
    - No gas-filled glass tubes

- Integrated systems that erase the distinction between lamp (LED sources) and luminaire (lighting fixture)

Fox Theatre, Atlanta, Georgia
Photography: David Grill

A New Kind of Light continued…

Sands Resort Casino, Bethlehem, Pennsylvania
Photography: Alyssa Csük, Csük Photography

LED lighting fixtures are:

- Inherently directional, delivering light only to areas where it's needed

- Digitally controllable for maximum efficiency and flexibility

- The only type of lighting fixtures that increase in efficacy when dimmed

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LED Solutions for the Full Range
of Lighting Applications

LED-based solutions are available today to support virtually any lighting application, including these ten major application areas.
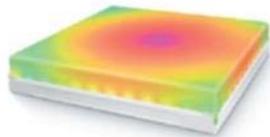

Task Lighting
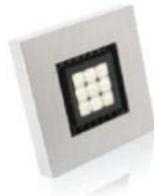
Downlighting

Cove Lighting

Wall Washing

Wall Grazing

Direct View Lighting

Floodlighting

Roadway Lighting

**Safety / Utility Lighting**

Accent Lighting

LED Installations: From Simple to Complex

Installations can be as simple as under-cabinet kitchen lighting:

- LED fixtures plug directly into standard outlets or connect easily to mains power

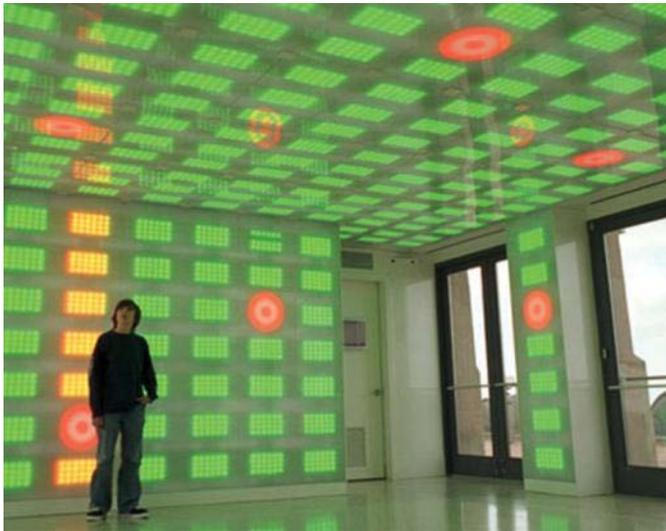- Installation simplified by integrated end-to-end connectors and pre-configured cables

Kitchen, Private Residence, Cambridge, Massachusetts
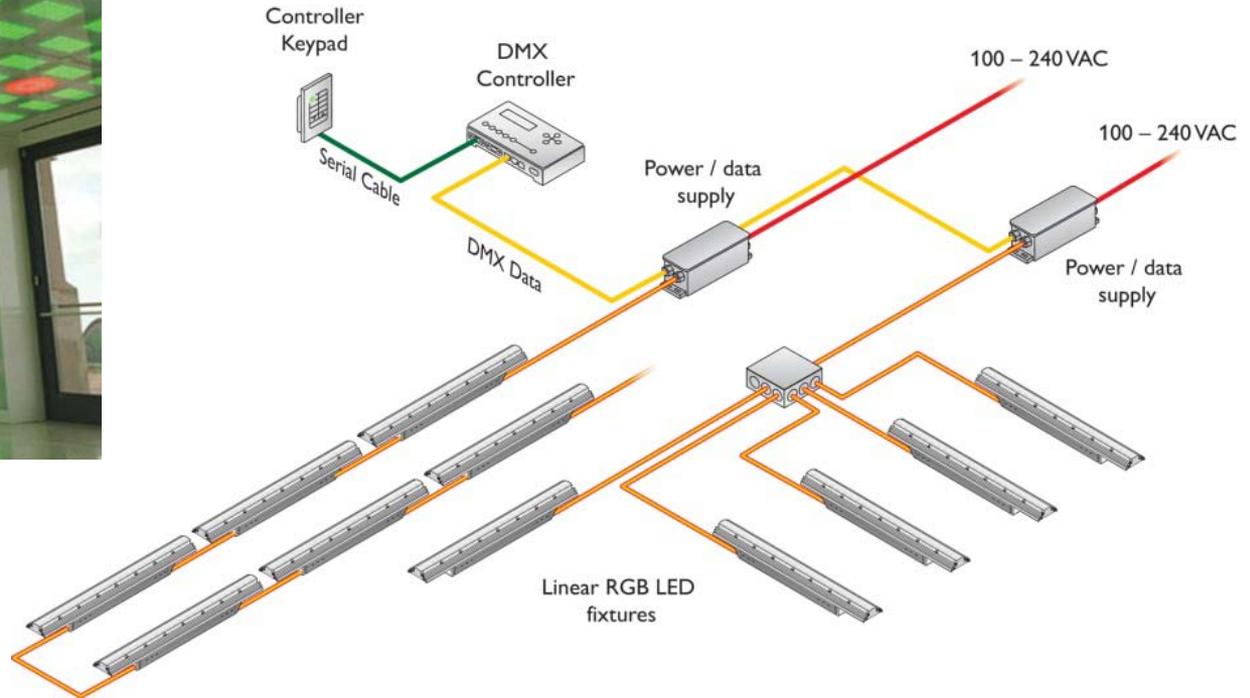Photography: Testa Lighting Design, Inc.
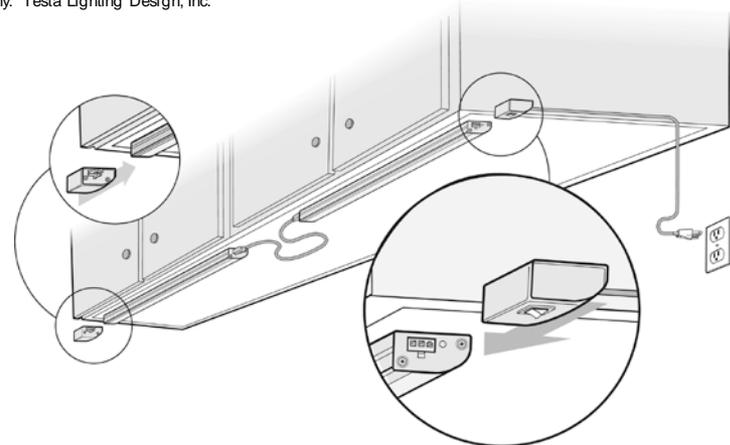
LED Installations: From Simple to Complex continued...

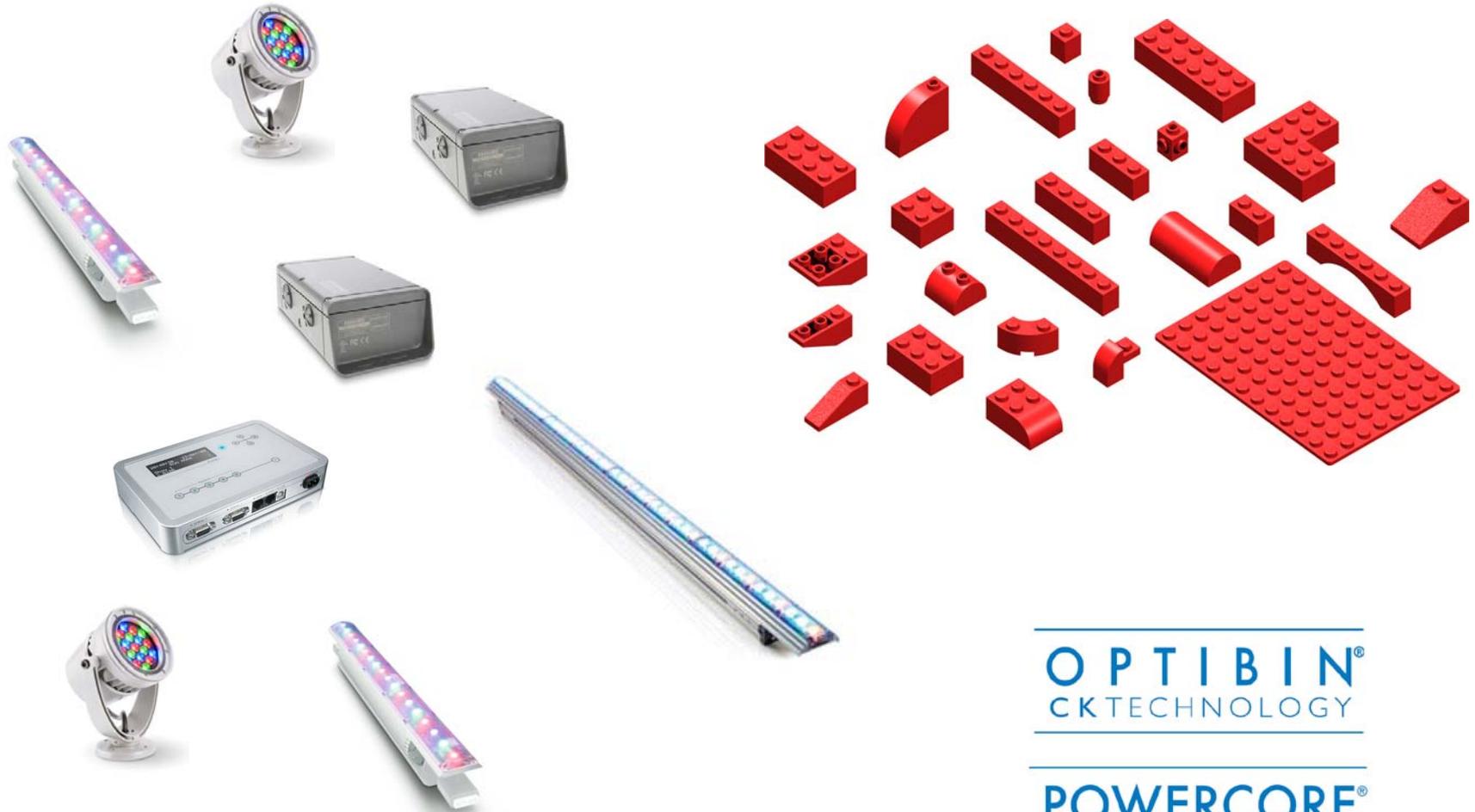Installations can be intricate, dynamic, and complex

Target Interactive Breezeway at Rockefeller Center, New York, New York
Photography: Courtesy of Electroland
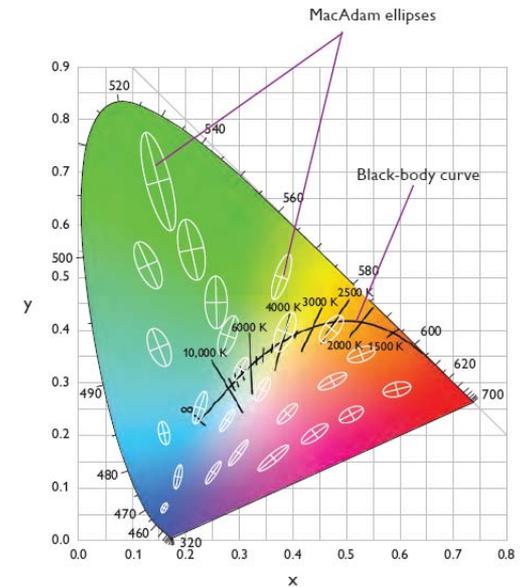
Philips Color Kinetics generic USP's
The "Lego' approach for LED lighting solutions ….

O P T I B I N®
CK TECHNOLOGY

POWERCORE®
CK TECHNOLOGY

PHILIPS

OPTIBIN®
CK TECHNOLOGY

Optibin:
Color Consistency for Color and White-Light LEDs

Color consistency is an index of light quality for both color and white-light LEDs. Where white light is concerned, *correlated color temperature, or CCT*, describes whether white light appears warm (reddish), neutral, or cool (bluish). The standard definitions of CCT allow a range of variation in chromaticity that can be readily discerned by viewers even when the CCT value is the same. Ensuring color consistency, therefore, is a major concern of LED manufacturers, who devise methods to keep color variations under tight control.

OPTIBIN®
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Optibin® is a proprietary binning optimization process developed by Philips Color Kinetics. Optibin uses an advanced bin selection formula that exceeds industry standards for chromaticity to guarantee uniformity and consistency of hue and color temperature for Philips lighting products.

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Optibin – Summary

Key learning's:

- The standards define that a manufacturer is allowed to call a product e.g. a 2700K product when the CCT tollerances are not exceeding 8 Mc Adam ellipses

- 8 Mc Adam ellipses spread in CCT will be very visible

- We limit the CCT tollerance to a maximum of 4 Mc Adam ellipses

- This is valid for both LED to LED as for Fixture to Fixture

POWERCORE®
CK TECHNOLOGY

Inboard Power Integration for Color-Changing Fixture (Powercore)
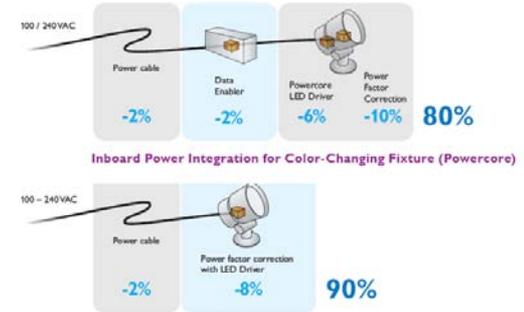
Powercore:
### Integrated Power Management for LED Lighting Systems

Patented Powercore® digital power processing technology represents a completely new, holistic approach to digital power processing that surpasses traditional power supply technology. Powercore integrates a microprocessor-controlled power conversion and regulation stage into LED lighting fixtures, efficiently and accurately controlling output directly from line voltage. Powercore increases the operating efficiency, lowers the overall cost, and simplifies the installation of LED lighting systems.

POWERCORE®
CK TECHNOLOGY

Powercore, an advanced power management system patented by Philips Color Kinetics, integrates the power supply directly into a fixture's circuitry. By consolidating line voltage conversion and LED current regulation, Powercore limits power losses, maximizes operational efficiency, and lowers the cost of installation, operation, and maintenance.

Inboard Power Integration continued…

- Inboard power integration significantly eliminates power losses associated with low-voltage power distribution systems
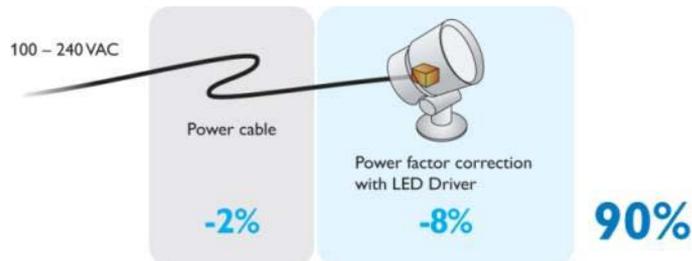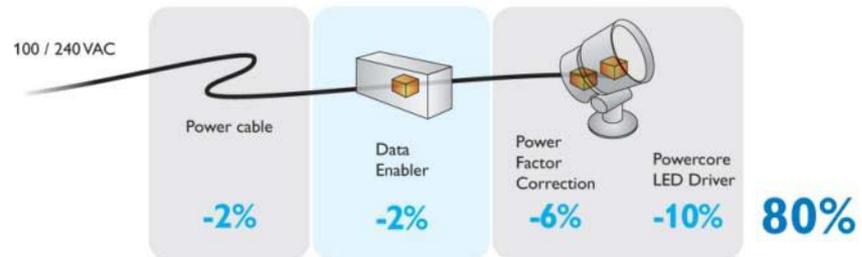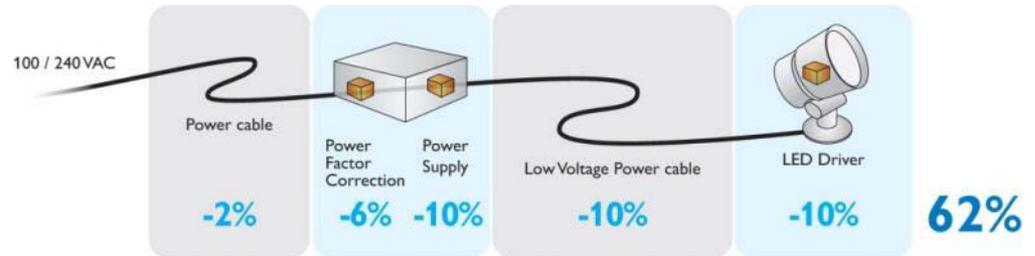
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Powercore - Summary

Key learning's:

- An advanced inboard power integration technology from Philips Color Kinetics

- Eliminates 18–30% of power losses associated with low-voltage power systems

- Integrates active power factor correction to lower operating costs and maximize operational efficiency

- Enables auto-sensing or auto-switching power input directly from line voltage

- Lowers installation and maintenance costs

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Philips Color Kinetics – portfolio overview
Intelligent lighting systems, networked LED fixtures

LED Lighting Systems

Specifier-class intelligent LED lighting systems in a multitude of sizes and shapes, from wall washing lighting fixtures to cove accents to submersible lighting solutions. LED outdoor lighting products and indoor applications include controller and power supply options. View the latest version of the Philips Color Kinetics LED Lighting Product Portfolio.

Color-Changing LED Fixtures   Intelliwhite LED Lighting Fixtures   EssentialWhite LED Lighting Fixtures

Lighting Controllers   LED Lighting Power Supplies   Lighting Fixture Accessories

Linear lighting systems for lighting accent spaces

iColor Cove / iW Cove / eW Cove / (eColor Cove) / Profile

Linear Lighting Systems light alcoves and other tight architectural/accent spaces.

iColor Cove EC

iColor Cove QLX

iColor Cove MX
Powercore

Color Temperature Controllable LED Fixtures

iW Cove
Powercore

EssentialWhite LED Lighting Series

eW Cove
Powercore

New
eW Cove EC
Powercore

New
eW Cove QLX
Powercore

New
eW Cove MX
Powercore

eW Profile
Powercore

iColor Cove MX Powercore (gen 2)

Second generation Cove MX with 3x more light output

Key benefits:
- High RGB light output (300 lumens/ft)
- Powercore technology - easy wiring
- Works on the industry leading DMX controls of PCK (Data Enabler Pro)
- Easy and flexible installation
- Two beam angles for a wide range of decorative applications
- White housing and white cables

iW Cove MX Powercore (gen 2)

Tunable white light with constant high output

OPTIBIN | POWERCORE
CK TECHNOLOGY | CK TECHNOLOGY

Key benefits:
- High tuneable white light output (600 lumens/ft) from 2700K to 6500K
- 3-channels (warm, neutral, cool) for wide range of color temperatures
- Powercore technology - easy wiring
- Works on the industry leading DMX controls of PCK
- Easy and flexible installation
- White housing

Design Intent
Branding

LACOSTE
Multiple U.S. Locations

12" (30.5 cm)

1.37 (3.5 cm)

1.0 (2.5 cm)

6.6" (16.8 cm)

8.1" (20.6 cm)
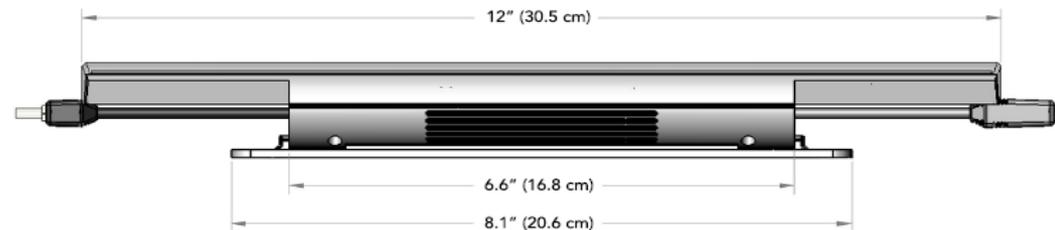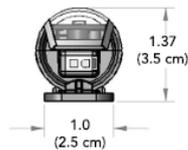
Design Intent

Branding

Sony Towers Digital Steps

Design Intent
Affecting Physiological Response

Rustic Kitchen
Boston, Massachusetts

Rustic Kitchen DINING ROOM
Boston, MA

System
iW Cove Powercore, iW Data Enabler,
iW Scene Controller

Result
A dynamically accentuated ceiling that allows variable atmosphere with the push of a button

ARCHITECTURAL COVE DETAIL

iW Cove Powercore

PLAN VIEW

Jumper Cable

iW Cove Powercore

iW Data Enabler

Power Cable to 120v AC

4 Conductor Cable to Controller

Warm for Dinning   **Cool for Functions**

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eW Fuse PowerCore

New
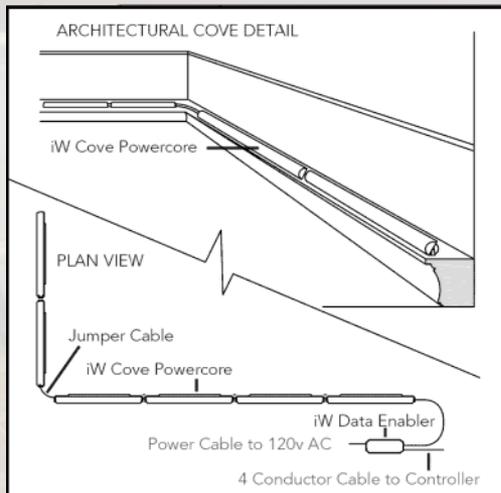
Key benefits:

- High performance indoor grazing light
- Multiple white and colored light output options
- Narrow and Medium beam options
- 4 CCT's available (2700K, 3000K, 3500K, 4000K)
- CCT tolerance exceeds ANSI C78.377-2008 standard
- Smooth dimming increases efficacy & useful life

Performance:

- 500+ lumens !!!
- 12W Power Consumption
- 40+ LPW
- 80+ CRI

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Lighting Application
Architectural

- ## Indoor Wall grazing
  - Provides drama
  - Accentuates textures
  - Dramatic highlight and shadow effects
  - "the wall as a slab of architecture itself"

- ## Indoor Wall washing
  - Smooth, even level of illumination
  - Emphasis on vertical plane
  - Minimizes/reduces texture of the surface
  - "offers more uniform overall glow"

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Architectural fixtures for wall washing and projection of light

Graze, Reach, Blast, Burst, C-Splash and Burst PowerCore

Wall Washing Lighting Systems project light against surfaces.

New
ColorGraze
Powercore

New
ColorReach
Powercore

ColorBlast
Powercore

New
ColorBlast 12

New
ColorBlast 6

ColorBurst 6

C-Splash 2

New
ColorBurst
Powercore

LED upgrades in flood fixtures

Dramatic performance improvement, increased efficacy

ColorBlast 6: 70% - 99% (!) increase
- 583 lumens (clear)
- 534 lumens (frosted)

ColorBlast 12: 82-88% (!) increase
- 1207 lumens (clear),
- 1089 lumens (frosted)

- **ColorBurst 6: 64% - 72% increase!!!**
  - Output: 517 lumens (clear), 563 lumens (frosted)

- **C-Splash 2: 68-93% increase**
  - Output: 583 lumens (10° clear), 515 lumens (22° frosted)

- **ColorBlast Powercore (released soon)**

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LED Flood Lighting Portfolio
RGB and EssentialWhite 230V

Performance

Price

eWReach Powercore
3700-11400lm, 290W

ColorReach Powercore
2400 - 5200lm, 290W

eWBlast12 Powercore
~2390lm, 50W

eWBurst Powercore
1000-1500lm, 30W

ColorBlast12 Powercore
~900-1200lm, 50W

eWBurst Compact
Powercore
~600m, 20W

ColorBurst Powercore
550-650lm, 30W

ColorBurst Compact
Powercore
~400m, 20W
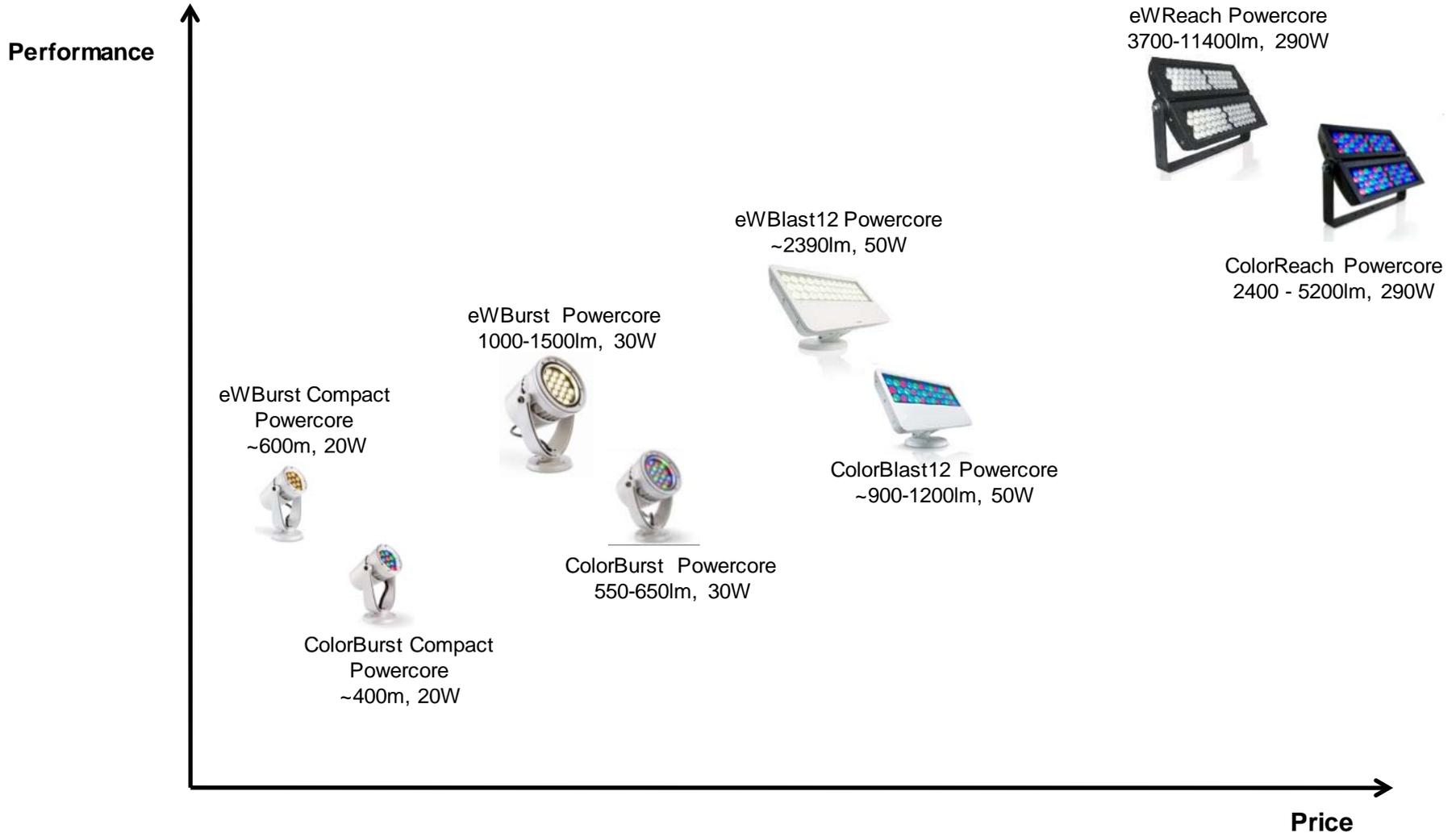
Direct view lighting systems for stunning effects

Accent, Flex, Tile

Direct View Lighting Systems are designed to be looked at, not to illuminate surfaces.
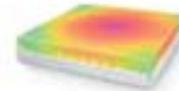

iColor Accent Powercore

iColor Flex LMX

iColor Flex MX

iColor Flex SLX

iColor Tile MX

EssentialWhite LED Lighting Series

eW Flex SLX

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Product Application *– Direct view solutions*

[Resolution]

FLEX MX	Video content — *120 lines up*
FLEX LMX	Animations — *32 lines up*
FLEX MX	Logo's — *20 lines up*
FLEX LMX	Accent lines — *Direct view lighting*
iColor Accent	
RGB Fixtures	Scrolling text — *10 lines up*
	Lighting effects — *Direct view lighting*
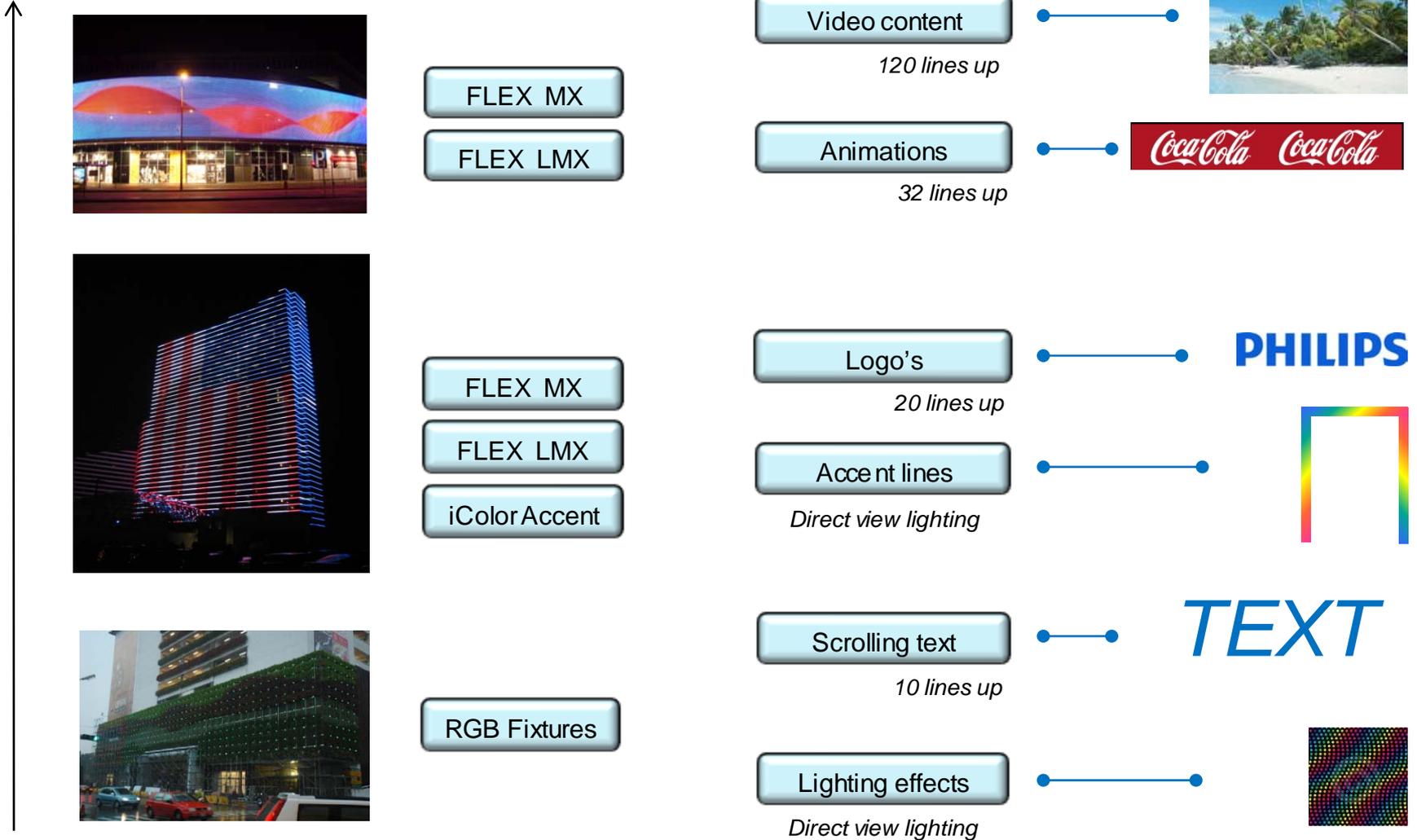
iColor Flex MX, iColor Flex LMX, eW Flex SLX

Key benefits:

- Flexible to create any 2D or 3D shape
- Outdoor rated, proven technology
- Individual controllable nodes by Chromasic technology
- Easy to customize (pitch, pixel count, lens option, grouping)

USP's:

- Scalability
- Industry leading controls (IP)
- Low weight
- Small form factor
- DMX & DVI compatible
- Pricing

Media Wall Frits Philips Music Venue

project example Color Tile MX

- Flex MX nodes behind 2 layers of translucent material
- 45.000 nodes
- 15 meter wide "magic wall" at the lobby of the music venue
- Follow the progres on www.muziekgebouweindhoven.nl

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National Gallery of Art Washington

project example eW Flex SLX

"Multiverse was generously funded by Victoria and Roger Sant and by Sharon P. and Jay Rockefeller. Victoria Sant, president of the National Gallery of Art, and Sharon P. Rockefeller, president and CEO of WETA, are Gallery trustees and members of the Collectors Committee, a group of leading collectors from across the country who support the Gallery's acquisition of modern and contemporary art"

- eW Flex SLX
- 41.000 nodes
- 60 meter hallway
- Youtube keywords: Multiverse, Leo Villareal

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iColor Accent PowerCore

Key benefits:

- Create long ribbons of color changing effects
- Simple wiring scheme allows for versatile installation
- Exceptional viewing angles
- Outdoor rated, proven technology
- Allows for long runs without new data/power feeds

USP's:

- PowerCore technology
- Industry leading controls (IP)
- DMX & DVI compatible
- Resolution up to 30 mm
- Configurable segmentation

Harris Atlantic City

project example

The project was installed to generate bands of light that perform a wide variety of specialized lighting effects, including intricate color chases, sunburst patterns, rainbow effects, dramatic color wipes, and a large scale simulation of the American flag for special occasions.

According to Dave Jonas, president and general manager of Harrah's Atlantic City, the bold, new lighting effects "have forever changed the skyline of Atlantic City."

- 1230 meter of iColor Accent 4"
- > 1M budget project
- Custom DMX show controller, Stone Mountain Lighting Group
- http://colorkinetics.com/showcase/installs/harrahs/

But there are more opportunities for 'Accent'

project examples