Controlling LED Lighting

Transform environments, provide comfort and security, save energy

PHILIPS

COLOR KINETICS

Control LED lighting to change the atmosphere of a space. Intelligent white LED lighting fixtures fill the dining room at Rustic Kitchen, Boston, Massachusetts, USA, with cool or warm light depending on the time of day.

Lighting Fixtures
iW Cove Powercore
eW Cove Powercore

Controller
ColorDial Pro

Control LED lighting to brand spaces for special events. Light walls inside TD Garden in Boston Massachusetts, USA change to match the team colors when the Boston Celtics basketball team or the Boston Bruins hockey team play.

Lighting Fixtures
ColorBlast Powercore

Controller
iPlayer 3

Lighting Fixtures
iColor Cove MX Powercore

Controller
Custom solution

Control LED lighting to create immersive, interactive environments with light.
Left: Dynamic, immersive and interactive environment at the Target Interactive Breezeway, Rockefeller Center, New York, New York, USA.

Control is freedom

As digital light sources, LED lighting fixtures can be precisely controlled with dimmers, push-button devices, wireless touchscreens, intelligent phones, advanced software / hardware solutions, and building management control systems. Philips Color Kinetics offers a full range of lighting control systems that give you the freedom to realize your vision — whether you're lighting a countertop with a single white-light under-cabinet fixture, or mounting a building-covering video display incorporating tens of thousands individually controllable full-color LED nodes.

Beyond Switching and Dimming

Traditionally, *switching* controls the operating time of a lighting fixture to darken spaces, conserve energy, and maximize lamp life. *Dimming* varies the power to a lighting fixture to create mood and atmosphere, provide comfort, and lower energy consumption.

Like traditional light sources, our solid white (eW) and solid color (eColor) LED lighting fixtures can be switched with standard ON / OFF switches and dimmed with selected commercially available reverse-phase ELV-type dimmers.

Our intelligent color and intelligent white (iW) LED lighting fixtures incorporate multiple channels of LED light sources. The output (brightness) of each channel can be independently varied with DMX- or Ethernet-based control systems for purposes and effects that simply cannot be achieved with conventional lighting fixtures.

The Power of Digital Control and Automation

Our intelligent full-color LED lighting fixtures natively produce millions of saturated colors, which you can change automatically or at the touch of a button. You can vary the color temperature of our iW LED lighting fixtures to highlight objects on display, to set the mood in a room, or to change the atmosphere of a space.

Light shows and pre-programmed effects bring all the drama and excitement of stage lighting to interior and exterior architectural lighting. You can change the color output of all light fixtures simultaneously over time, or vary the output of different light fixtures simultaneously to create dynamic and intricate color patterns that appear to move across sequences or grids of fixtures.

Video controllers can coordinate tens of thousands of individually controllable points of color-changing LED light for large-scale video displays. Integration with media servers, audio systems, and advanced control solutions can create interactive and immersive multimedia experiences in interior and exterior spaces.

With full-featured control systems from Philips Color Kinetics, you can create multiple zones to independently control groups of fixtures in different locations for different application needs or to maximize energy efficiency.

Control systems from Philips Color Kinetics can be tightly integrated with building automation systems to increase worker productivity and satisfaction, to create a comfortable and engaging work environment, to add flexibility to multi-purpose spaces, to maximize energy savings, and to comply with energy efficiency codes and legislation.

Potawatomi Bingo Casino Milwaukee, Wisconsin, USA
Lighting Fixtures: ColorBlast Powercore, iColor Accent Powercore
Controller: Light System Manager

Photography: Tom Paiva

Your vision, realized

With the right choices and combinations of LED lighting controllers, media servers, sensors, and push-button controls, you can achieve virtually any effect in virtually any lighting environment. Together, intelligent LED lighting and digital control systems can transform environments, create spectacle, and minimize energy costs.

Freedom

With intelligent LED lighting fixtures and control, you are no longer limited to a single color or effect. You can change fixture brightness, color, color temperature, pre-set scenes and shows, or video content automatically or at the touch of a button. You can brand, alter, or completely transform a space without having to rent, purchase, or install extra equipment.

Flexibility

Intelligent control lets you use spaces for multiple purposes, each with its own lighting intent. Change the mood in hospitality spaces, choose the right type of light to highlight merchandise or artwork on display, brand spaces to bring lighting in line with marketing campaigns, or create custom lighting effects and scenes for special events and important clients.

Comfort

Studies show that giving employees control over the lighting in their workspaces can increase productivity and satisfaction. Dimming and dynamic methods of maintaining light levels can minimize glare and overlighting while providing sufficient illumination for visual comfort in task areas.

Security

Occupancy and proximity sensors combined with intelligent control systems can turn the lights on when needed during off-hours and at night. Automatically maintain minimum light levels in corridors, stairwells, parking areas, and so on. Balance energy efficiency with the need for basic visual recognition of objects, obstacles, and egresses in a space.

Spectacle

LED lighting controllers and media servers can feed pre-programmed and custom color-changing light shows and video to installations incorporating tens of thousands of individually controllable nodes. Flood façades and stages with saturated color-changing or tunable white light. Dramatically highlight landmarks, architectural details, sculptures, trees, and other hardscape and landscape features.

Energy Savings

LED lighting is the only type of lighting that increases in efficacy (lm / W) when dimmed. When integrated with building automation systems such as daylighting controls, occupancy sensors, clocks, and shade control systems, energy efficiency can be increased by an additional 30% – 70%.

Reliability

Putting the scheduling and automation of lighting systems under digital control increases the reliability of lighting systems while relieving the burden on building management and maintenance organizations.

Ease of Use

Professionally designed software components of control solutions afford intuitive and centralized configuration, testing, monitoring, and troubleshooting. Pre-programmed scenes and light shows get your facility up and running quickly and satisfy a wide range of lighting needs right out of the box. Push-button triggering devices put points of control where they're needed. Mobile apps offer remote access to further simplify and streamline lighting control.

Barclays
New York, New York, USA

Lighting Fixtures: ColorReach Powercore, ColorGraze Powercore
Controller: Third-party control solution

Scalable, precise control

Philips Color Kinetics offers a full range of lighting control systems specifically designed to integrate seamlessly with our intelligent LED lighting fixtures. Regardless of the size and intent of your lighting installation, Philips Color Kinetics has a solution for you.

From Perfectly Simple to Staggeringly Advanced

Simple wall-mounted controllers with pre-programmed light shows and dynamic effects, such as ColorDial Pro, can control small installations of intelligent white or color-changing lighting fixtures with no on-site programming required.

DMX- and Ethernet-based control solutions from Philips Color Kinetics, such as iPlayer 3 and Light System Manager, let you design, author, and program custom light show content for installations ranging from a few fixtures to complex facilities with thousands of individually controllable full-color LED nodes.

Video System Manager Pro is an integrated hardware and software solution enabling video playback for large-scale video applications ranging from hundreds to hundreds of thousands of individually controllable LED nodes.

Extending the Range of Control with Pharos

Philips Color Kinetics extends its suite of control products with the complete line of Pharos controllers. Together, Philips Color Kinetics and Pharos offer a full range of control options, from simple playback keypads to sophisticated light show and video / audio playback controllers. Pharos controllers support all of the leading Ethernet communications protocols for lighting, afford native multimedia support, offer advanced if-then-else triggering and timeline scripting, and tightly integrate with motion detectors, light sensors, daylight harvesting photocells, and other building automation devices.

Accessories, Tools, Applications, and Converters for a Complete System

Philips Color Kinetics offers controller accessories, such as wall-mounted keypads for triggering shows, remote triggering devices, and protocol converters to support all of your networking needs.

Commissioning and addressing tools — including QuickPlay Pro addressing and configuration software, downloadable configuration applications, and mobile apps — round out our suite of control solutions.

iColor Player

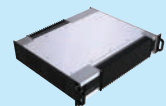iColor Keypad

ColorDial Pro

iPlayer 3

Pharos TPC

Pharos LPC 1 / 2 / 4

Light System Manager

Pharos LPC X

Video System Manager Pro

Controller Keypad

Ethernet Controller Keypad

AuxBox

Multi-Protocol Converter

SmartJack Pro

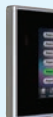Pharos AVC

Peeps & Co.
National Harbor, Maryland, USA

Lighting Fixtures: iColor Flex SLX, iColor
    Cove QLX, iColor Cove MX Powercore,
    ColorGraze Powercore, ColorBlast Powercore
Controller: Light System Manager

Photography: Mark Steele

Philips Color Kinetics
control solutions at a glance

	iColor Player*	iColor Keypad	ColorDial Pro	iPlayer 3	Phar...
Light universes supported	1	1	1	2	
Maximum RGB nodes supported	170	170	170	340	
Basic light show playback	Yes	Yes	Yes	Yes	
Playback multiple shows simultaneously	—	—	—	—	up
Video playback	—	—	—	with Video effect	
Audio / video control	—	—	—	—	
Show authoring / configuration software	ColorPlay 3	Effect Manager	—	ColorPlay 3	De
Show schedule triggering	—	—	—	Yes	
Conditional logic triggering	—	—	—	—	up t
Solid-state	Yes	Yes	Yes	Yes	
Multiple zone control	—	—	—	—	
Integration via serial port	—	—	—	Yes	wit
Integration via contact closures	—	—	—	with AuxBox	wit
DMX in	—	—	—	—	via A
Integrated Remote Data Management (RDM)	Yes	—	—	—	
DALI support	—	—	—	—	wit
eDMX support	—	KiNET (broadcast)	KiNET (broadcast)	—	KiNET, Ar
Web interface / Mobile apps	—	—	Yes	—	
Timecode support	—	—	—	—	wit
MIDI support	—	—	—	—	wit

* Available fall 2011

os TPC*	Pharos LPC 1 / 2 / 4	Light System Manager	Pharos LPC X	Video System Manager Pro	Pharos AVC
1	1 / 2 / 4	88	200	1,470	—
170	170 / 340 / 680	15,000	34,000	250,000	—
Yes	Yes	Yes	Yes	—	—
to 500	up to 500	1 show per zone	up to 500	—	up to 500
Yes	Yes	with Animation effect	Yes	Yes	Yes
—	—	—	—	Video input	Audio / Video
esigner	Designer	Light System Composer	Designer	—	Designer
Yes	Yes	Yes	Yes	—	Yes
o 1,000	up to 1,000	—	up to 1,000	—	up to 1,000
Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	—	Yes
th RIO	Yes	Yes	Yes	—	Yes
th RIO	Yes	with AuxBox	with RIO	—	Yes
Art-Net	Yes	—	Yes	—	Yes
—	Yes	—	—	—	—
th RIO	with RIO	—	with RIO	—	with RIO
rt-Net, sACN	KiNET, Art-Net, sACN	KiNET	KiNET, Art-Net, sACN	KiNET	Art-Net, PathPort
Yes	Yes	Yes	Yes	—	Yes
th RIO	with RIO	—	with RIO	—	with RIO
th RIO	Yes	—	Yes	—	Yes

Philips Color Kinetics is committed to ongoing innovation and improvements. Please visit www.philipscolorkinetics.com for the latest products and product updates.

Photography: Fred Charles

Lighting Fixtures: eW Cove Powercore, eColor Cove Powercore   Controller: Standard dimmers

Photography: James Field Photography
www.jame.com.au

Lighting Fixtures: ColorGraze Powercore
Controller: Light System Manager, Dynalite

Finding the right control solution

With an extensive range of DMX- and Ethernet-based controllers, intuitive light show authoring software, keypads, triggering devices, converters, and commissioning tools, Philips Color Kinetics has the right control solution for you.

Finding the right control solution depends on a number of factors. Control solutions for a white-light LED lighting installation in an office space, an immersive retail experience integrating full-color dynamic lighting effects with sound and movement, and LED stage lighting for a touring rock band have very little in common.

What is the design intent of your lighting system?

One of the most important decision points is the design intent of your lighting installation, which can determine not only your control solution but also the type(s) of fixtures you plan to use:

- If you're using solid white or solid color fixtures only, you likely need switching and dimming only.

- If you're using intelligent white or color-changing fixtures in an architectural or decorative installation, you need a DMX- or Ethernet-based LED lighting controller.

- If you're using theatrical fixtures in a stage or entertainment environment, you likely need a professional lighting console and control accessories for connecting the lighting console to your LED lighting fixtures.

- If you're integrating an LED lighting system with a building automation system, you likely need a lighting controller with contact closures or other interfaces to occupancy sensors, light sensors, security systems, schedule-based automation systems, and other control equipment.

Lighting Fixtures: ColorBlaze   Controller: Third-party theatrical controls

Different lighting applications require different control solutions. Left: W Hotel, New York, New York, USA. Guests control the ambience in the luxury suites by dimming and switching solid white and solid color LED cove lighting fixtures. Center: Adelaide Entertainment Centre, Adelaide, South Australia. A Light System Manager controller, integrated with a Philips Dynalite control system, manages over 800 ColorGraze Powercore fixtures in the centre's iconic entry structure. Right: Rush produces a spectacular show with coordinated sound, animatronic, and lighting systems, including dozens of ColorBlaze LED wash lights mounted high above the stage.

What protocol should you use for an intelligent lighting system?

Whether DMX or Ethernet is appropriate for your intelligent lighting installation depends in part on the number of fixtures and the complexity of the light shows and dynamic effects you intend to display. Because of wiring infrastructure and addressing limitations, DMX is appropriate for smaller installations, or for light shows in which large groups of fixtures operate in unison. On the other hand, Ethernet is the preferred environment for larger cable plans that support intricate, color-changing light shows and video displays calling for hundreds or thousands of individually controllable lighting nodes.

How much automation do you need?

You need to consider what degree of automation you require. Do you want a set-and-forget system that runs according to a pre-defined timeline or astronomical clock? Do you require local control through wall-mounted keypads and other triggering devices, centralized control, or both? Are there electrical, building, or energy codes to which your lighting system must comply, or building automation systems with which your system must integrate?

What are you forgetting?

The details of your control system are also influenced by physical concerns, such as the characteristics of the space(s) you're lighting, the availability and rating of power and networking systems, the total system load, and security requirements.

Keep in mind that the lighting fixtures, controllers, and control accessories are only part of a complete system which may also include any combination of power supplies, networking switches and cabling, server or hardware racks, watertight enclosures, protocol converters, and other accessories.

How much does your control solution cost?

Finding the right control solution means striking the right balance between performance and cost. Once you've determined what kind of solution you need to support the goals of your lighting system, you must perform a cost-benefit analysis to achieve the right target value level.

Controlling intelligent LED lighting fixtures

The most common communications networks for controlling intelligent LED lighting systems are DMX, Ethernet, and DALI. Ethernet is now the most widely used and effective network infrastructure for medium to large architectural lighting installations, while DMX continues to be the standard for entertainment and stage lighting. DALI is a popular control protocol for lighting systems in buildings and homes, especially in Europe. While DALI is primarily used for fluorescent ballast switching and dimming, LED lighting installations can be triggered by DALI systems using controllers with native DALI support, integration devices, or protocol converters.

DMX

Until recently, the most generally accepted control format for intelligent architectural lighting was DMX512-A, or DMX for short. DMX was originally developed by the Engineering Commission of the United States Institute for Theatre Technology (USITT), beginning in 1986, for controlling stage and theatrical lighting.

Many theatrical lighting boards are DMX-based, but they tend to offer a wide array of manual control interfaces specialized for live performances, making them too expensive for architectural use. Like other manufacturers of LED lighting fixtures, Philips Color Kinetics develops and markets its own DMX-based controllers for architectural lighting applications. These controllers are far more compact and less expensive than full-fledged theatrical lighting boards, and they offer special features — such as pre-defined light shows and built-in effects — designed to simplify and automate LED lighting control for architectural applications.

DMX-based controllers communicate with LED lighting fixtures using DMX *addresses*. Each lighting fixture or lighting *node* — an individually controllable segment of a lighting fixture — is assigned a set of addresses. These addresses allow individual lighting fixtures within the installation to identify the specific control signals intended for them so that the fixtures can display the correct light output.

Uniquely addressing and controlling color-changing LED lighting nodes lets you display different light output — different colors and different brightnesses — on multiple nodes simultaneously. This level of control enables an infinite variety and combination of dynamic effects, from colors that fade one into another or that seem to chase each other from node to node, to intricate light shows that mimic the appearance of natural phenomena or that display abstract patterns for subtle or dramatic effect.

DMX Controllers from Philips Color Kinetics

iColor Player
A highly compact DMX generator, iColor Player is a simple, affordable solution for controlling multiple light fixtures simultaneously. iColor Player can control a full universe of DMX addresses and can play a single show authored in ColorPlay 3, our timeline-based light show authoring software.

iPlayer 3
iPlayer 3 controller is a compact yet powerful show storage and playback device capable of delivering light shows to installations with up to 1024 DMX addresses. iPlayer 3 is designed to add new levels of sophistication to your installations while eliminating the need for expensive lighting boards and technical programming expertise.

A DMX universe consists of 512 addresses. The majority of intelligent LED fixtures use three addresses, one for each LED channel used in the fixture — red, green, and blue in a color-changing fixture, or 2700 K, 4000 K, and 6500 K in an intelligent white fixture, for example. In practice, a single-universe DMX controller, such as iColor Player, can manage a maximum of 170 uniquely addressed three-channel fixtures (512 divided by 3 = 170, with two channels left over), while a two-universe DMX controller, such as iPlayer 3 or Pharos LPC 2, can manage up to 340.

LED lighting fixtures can consume more than three addresses each. Five-channel RGBAW (red / green / blue / amber / white) fixtures, such as ColorBlaze TRX and ColorBlast TRX, consume five DMX addresses. Fixtures that operate in 16-bit mode for smoother dimming and more precise color control require two DMX addresses per channel, doubling the number of addresses consumed. Fixtures with multiple nodes, such as iColor Flex LMX, iColor Accent MX Powercore, and iW Graze Powercore, can consume multiples of three or six DMX channels depending on configuration. For example, a 4 ft iColor Accent MX Powercore fixture set to the maximum resolution of 40 1.2 in nodes consumes 120 DMX addresses, while an iColor Flex LMX strand with 50 individually controllable RGB nodes consumes 150 DMX addresses.

For light shows in which multiple light nodes act in unison, you can limit the number of DMX addresses required by assigning the same set of addresses to multiple nodes. If your lighting installation requires more than a few hundred individually controllable nodes, however — and lighting designs with video or expansive and intricate dynamic effects almost certainly will — you should consider using an Ethernet control solution.

RDM: Two-Way DMX

Remote Data Management (RDM) is an enhancement to the DMX protocol that allows two-way communication between controllers and RDM-enabled devices in your lighting network. With RDM, you can perform automated discovery, configuration, and addressing of RDM-enabled lighting fixtures and power / data supplies, much as you do over Ethernet. Pharos LPC 1 / 2 / 4 and both iColor Player and SmartJack Pro from Philips Color Kinetics offer RDM. Pharos also offers an RDM-compatible DMX repeater.

Photography: Alyssha Csük

Sands Resort Casino, Bethlehem, Pennsylvania, USA. Because many of its 350 color-changing ColorReach Powercore and ColorBlast Powercore fixtures are programmed with the same DMX addresses to operate in unison, the Sands Resort Casino can control the nightly lighting display at the historic Bethlehem Steel plant with a single iPlayer 3 DMX controller.
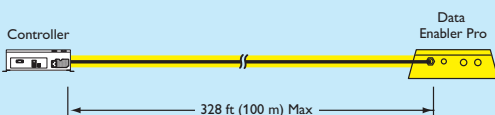
Ethernet

Ethernet is the most popular computer communications protocol standard and is used in most local area networks around the world. Because they are inherently digital devices, intelligent LED lighting fixtures lend themselves to Ethernet-based control.

As a control solution for larger intelligent LED lighting systems in architectural environments, Ethernet offers a number of advantages:

- Ethernet structured cable plans are standardized IT systems well understood by today's electrical contractors. With an Ethernet-based lighting solution, you can leverage this installation knowledge, avoiding the need to install specialized cabling and affording the ability to integrate the LED control system into the existing structure of the building's IT cable plan.

- Ethernet control solutions overcome the physical limitations of DMX. In an Ethernet lighting network, lighting controllers can communicate with each Ethernet device in the network individually, allowing simultaneous transmission of multiple DMX universes over a single Ethernet cable. For instance, Light System Manager can manage up to about 88 universes, while Video System Manager Pro can control almost 1,500 universes for large-scale video displays.

Ethernet devices in a Philips Color Kinetics lighting network

Ethernet devices in a Philips Color Kinetics network include Ethernet switches, controllers, and a wide range of power / data supplies for LED lighting fixtures. Some of our network-aware products, such as the Data Enabler Pro data integration device and iColor Accent MX Powercore linear LED lighting fixture, contain an integrated Ethernet switch. You can connect these devices in series on an Ethernet horizontal cable plan using CAT 5e cable or higher. Ethernet rules require a maximum of 328 ft (100 m) between any of these devices, affording great flexibility and expansion options in lighting network layouts.

Controller   Data
                                               Enabler Pro

|————————— 328 ft (100 m) Max —————————|

Ethernet Lighting Communications Protocols

Ethernet lighting communications protocols are standardized methods of delivering lighting data over a network, and it is critical that the lighting controller and lighting fixture speak the same language. KiNET is the Ethernet lighting protocol from Philips Color Kinetics. Other Ethernet lighting protocols include Art-Net, ACN, Streaming ACN (sACN), Philips Strand ShowNet, Pathway Pathport, and many others. Pharos controllers offer native support of Art-Net, sACN, and KiNET.

Pharos LPC X can manage up to 200 universes of Ethernet DMX, and can be scaled for even larger lighting systems.

- DMX communications are one-way only: controller to lights. Ethernet, on the other hand, offers two-way communications to simplify and automate many aspects of fixture configuration, addressing, and commissioning.

- Ethernet supports wireless communications today. You can manage your lighting network from a wi-fi device, such as in Apple iPad or Apple iPhone, providing superior flexibility and convenience, especially in installations with multiple zones in different locations.

- Ethernet structured cable plans afford more flexibility than DMX cable plans in lighting system layouts. They support longer cable runs, offer more installation convenience in network layouts, and are extremely cost-effective in medium and large installations. DMX cable plans, in contrast, support shorter cable runs and are extremely cost-effective in smaller installations.

- Ethernet network hardware, such as multi-port switches and routers, are much less expensive than DMX multi-port opto-splitters required to join multiple building wiring segments together.

- Power over Ethernet (PoE), used in a number of Ethernet controllers and triggering devices from Philips Color Kinetics, increases flexibility by transmitting electrical power and data over a single twisted-pair CAT 5e or better cable. PoE reduces controller installation costs, decreases wiring costs, and affords freedom of placement by eliminating line-voltage wiring for controllers.

Condé Nast Cafeteria, New York, New York, USA
The 12,000 square foot (1,115 square meter) corporate cafeteria within Condé Nast's New York headquarters uses approximately 90,000 individual nodes of iColor Flex, which line the ceiling and walls behind monolithic glass for a smooth, diffused effect. Video System Manager Pro manages the mapping of each node in the installation.

Ethernet Controllers from Philips Color Kinetics and Pharos

Video System Manager Pro

Integrated hardware / software solution that streams video playback and visual effects output to Philips intelligent LED lighting systems. Can process output for up to 250,000 individually controllable LED nodes.

Light System Manager

Versatile show authoring and control for large-scale lighting installations. Supports up to 15,000 individually controllable LED nodes depending on system configuration.

ColorDial Pro

Ethernet-based, stand-alone lighting controller and interface for color-changing LED lighting fixtures from Philips Color Kinetics. Features enhanced LCD screen for configuring effects and simple dial-and-button controls.

iColor Keypad

Power-over-Ethernet keypad stores eight pre-programmed light shows and controls a full universe of DMX addresses. You can change light shows using the simple push-button interface. Fits a standard US single-gang wall box.

Pharos Controllers

Versatile, scalable solutions featuring advanced playback and show control engines, built-in astronomical and realtime clocks, and third-party integration. TPC and LPC 1 / 2 / 4 for small projects requiring combinations of one and two DMX universes. LPC X for systems needing control of tens and hundreds of eDMX universes.

DALI

DALI (Digital Addressable Lighting Interface) is designed especially for dimming and controlling fluorescent lamps in homes and office buildings. DALI is popular in Europe, where it's often used for integrating with building management systems.

Compared to DMX and Ethernet, the DALI data transfer rate is very slow: 1,200 bits per second, compared with 256 kilobits per second (kbps) for DMX, and 10 / 100 / 1000 megabits per second (Mbps) for Ethernet. A DALI "universe" consists of 64 addresses, as compared with 512 for DMX and virtually unlimited multiples of 512 in Ethernet networks. Unlike DMX, which streams data continuously, DALI is command-driven (sends commands only).

DALI is not appropriate for directly controlling LED lighting fixtures or delivering dynamic effects and light show content to connected fixtures. However, controllers with DALI support,

such as the Pharos LPC family, as well as DALI-to-DMX and DALI-to-Ethernet converters, allow you to bridge the gap between the simple ON / OFF and dimming functions of DALI and the more sophisticated control of decorative lighting effects offered by DMX and Ethernet controllers.

For example, a DALI controller in an integrated building management system receives information from motion detectors, light sensors, and automated scheduling systems to switch or dim fluorescent lights in offices, hallways, and meeting rooms as appropriate. The DALI controller in turn sends commands to a DMX or Ethernet LED controller to trigger pre-set scenes or light shows on intelligent LED lighting fixtures installed in the building's lobby.

Photography: Chris Gascoigne

GHD Headquarters, Leeds, UK   Lighting Fixtures: iW Cove Powercore   Controller: ColorDial Pro

Other control options from Philips Color Kinetics

In addition to DMX and Ethernet controllers, Philips Color Kinetics offers low-voltage power / data supplies and LED stage lights with pre-programmed lighting effects and onboard controls.

ColorBlaze TRX and ColorBlast TRX RGBAW stage lights offer convenient onboard menus that give you fingertip control of all fixture functions, including a standalone mode offering configurable effects. ColorBlast TRX offers a Fixed Color effect with the ability to individually set the brightness of each of the fixture's five channels. ColorBlaze TRX offers configurable Color Wash and Chasing Rainbow effects in addition to Fixed Color.

For simple and convenient control of intelligent low-voltage LED lighting fixtures, Philips Color Kinetics offers DMX-based power / data supplies with configurable pre-programmed effects. These devices offer fixed color, random color, rainbow, color wash, burst, spiral, sparkle, and chasing effects, which you can set and configure using on-board toggle switches.

Pre-Programmed Effects for Low-Voltage Fixtures

Power / Data Supplies	Low-Voltage Fixtures
PDS-60 24 V	ColorBlast 6
	ColorBlast 12
	ColorBurst 6
	C-Splash 2
PDS-60ca 24 V	eW Flex SLX
	iColor Cove EC
	iColor Cove QLX
	iColor Flex LMX
PDS-60ca 7.5 V	iColor Flex MX
	iColor Tile MX

Everett Residence, Everett, Massachusetts, USA   Lighting Fixtures: iColor Cove QLX, ColorBurst 6   Controller: iPlayer 3

Photography: Joey Nicotera

Triggering and integration

In order to function properly, a lighting system must have an appropriate set of triggers to display the light output when and how it's needed. Triggering methods are determined by such concerns as the type of lighting system, the level of automation required, how much local or user control the system needs, security, and the physical layout of the space in which the lighting system is installed.

Small, stand-alone, or special-purpose lighting systems often need only a single location and method of triggering. A system for illuminating and accenting the bar area in a restaurant, consisting of a few dozen color-changing linear and wall-washing LED lighting fixtures, can be controlled by a wall-mounted keypad that triggers a set of pre-set scenes or light shows. A system for façade illumination, consisting of several runs of LED floodlights, can be automatically turned on and off at set times of day on a schedule managed by a single controller.

Medium to large lighting systems, especially those that perform several different functions in different zones or locations, can use a mixture of different triggering strategies and devices. Complex architectural and entertainment lighting systems often require the services of a systems integrator or value added reseller to create a unified, functioning system that meets all of your needs.

For example, a color touchscreen located in a secure area can serve as a primary controller to manage and communicate with the entire system. The touchscreen integrates with other controllers on the network to combine and coordinate sound, video, interactivity features, and special effects, or to integrate with building automation systems.

Triggering devices offer varying degrees of automation and control in different rooms or zones. Triggering strategies include:

- Controller-managed timelines or schedules tailored to the specific requirements of a zone
- Astronomical clocks that trigger lights based on astronomical events, such as sunrise and sunset

- Occupancy sensors that dim or switch lights depending on the occupancy of an area
- Daylight harvesting sensors that dim or switch lights depending on the amount of daylight in an area
- Shade control systems that maximize energy efficiency by automatically adjusting the brightness of lights in coordination with motorized window shades
- Manual triggering using wall-mounted keypads installed in accessible and convenient locations, or mobile applications running on wireless hand-held devices, for dimming lights, turning lights on and off, or triggering pre-set scenes and light shows
- Manual triggering with the color touchscreen incorporated into the Pharos Touch Panel Controller (TPC), or touchscreen systems from companies such as Philips Strand Lighting, Philips Dynalite, Crestron, and AMX

DMX and Ethernet controllers from Philips Color Kinetics and Pharos offer a variety of triggering strategies. The software components of iPlayer 3, and Pharos LPC controllers offer automated control through time-based triggers and astronomical clocks. You can schedule one-time events at a specific date and time, or recurring events every second, minute, hour, day, week, month, or year.

Pharos controllers offer advanced conditional logic for triggers and events through extensions to the Lua embeddable scripting language.

Philips Color Kinetics and Pharos offer a range of lighting system accessories, including keypads, contact-closure devices, button panels, and mobile applications.

Photography: John Brandon Miller

Lighting System Accessories from Philips Color Kinetics and Pharos

Ethernet Controller Keypad
Trigger up to eight Light System Manager or ColorDial Pro light shows. The ideal solution for installations with multiple shows in multiple zones or locations.

Controller Keypad
Push-button playback of up to eight iPlayer 3 light shows. Adjust the brightness of light fixtures during playback. Master switch turns all show lights off.

AuxBox
Trigger up to eight iPlayer 3 or Light System Manager light shows using any remote device with a dry-contact closure, such as motion sensors, time clocks, and pressure sensors.

Multi-Protocol Converter
Convert KiNET to DMX, DMX to KiNET, and RS232 to KiNET. Lets you use DMX-based power / data supplies with any KiNET-based device, or trigger KiNET-based devices with third-party controllers.

Pharos BPS / RIOs
Flexible and stylish Button Panel Stations and RIOs — remote input output devices — offer a host of networked interfaces for integrated buttons, serial ports, DALI, and audio integration.

Pharos TPC
Advanced lighting controller with an integrated, customizable touch screen interface, incorporating the same playback and show control engine as the Pharos LPCs.

Philips Color Kinetics Headquarters, Burlington, Massachusetts, USA

Light System Manager (LSM) manages multiple LED lighting zones in the Philips Color Kinetics offices, including the lobby, conference rooms, work spaces, exterior signage, and product demonstration areas.

The lobby features subtly animated light shows displayed on both RGB and white-light LED lighting systems. Twenty shows ranging in duration from ten minutes to 12 hours gently scroll across the ceiling, wall surfaces, and alcoves. The fixtures directly above the reception desk are controlled as a separate region, allowing for warm white illumination focused on the receptionist work space and visitor seating area, as needed.

LSM uses two-dimensional maps to control the lighting components in each lighting zone. The lobby map contains four rectangular clusters of fixtures corresponding to the main ceiling, the wall adjacent to the elevator, the ceiling adjacent to the elevator, and the wall behind the reception desk. The lobby map allows LSM to accurately display light shows according to the position of each fixture.

LSM functions as a main control station that automatically displays one or more scheduled light shows in each lighting zone. The lobby schedule calls for unique shows each weekday and on certain holidays. Ethernet Controller Keypads and Crestron color touchscreens installed in multiple locations allow users to override scheduled shows at the touch of a button and select from eight pre-set scenes.

Mobile Apps
Mobile apps that run on Apple iPhone, iPad, or iPod Touch include LSM Remote, a show controller for Light System Manager, and Remote Keypad, a mobile version of Ethernet Controller Keypad. (LSM Remote also runs on Android.) Pharos controllers can serve custom web apps to suit any installation on any platform.

Light shows and light maps

A light show is a set of digital instructions that a controller uses to determine how and when a system of installed LED lighting fixtures produces illumination. Whether a light show is a simple color fade on a single fixture or a complex presentation encompassing dozens of fixtures each displaying unique effects or layers of effects, the goal is the same: to create mood, interest, and impact.

Light shows include or use *light maps* or plans. A light map is a virtual representation of your physical lighting installation, including light node addressing and relative light fixture positioning. The light show author explicitly assigns effects to groups of nodes on the light map and customizes them.

For video content, a light map is often maintained by a video controller that accepts video input from a separate media server. The video controller scales and samples the video content, and manages the lighting nodes in the installation as pixels in a display. Because

configuration and authoring of video displays using thousands of LED lighting nodes can be extremely complex, you may need the services of a media content creation professional, or applications engineering services offered by the controller maker.

The software components of iPlayer 3, Light System Manager, and Pharos Designer offer fully featured graphical interfaces for creating light maps, assigning effects to lighting nodes, customizing effects and deploying them along a timeline, simulating shows online or on the lighting network itself, and playback configuration.
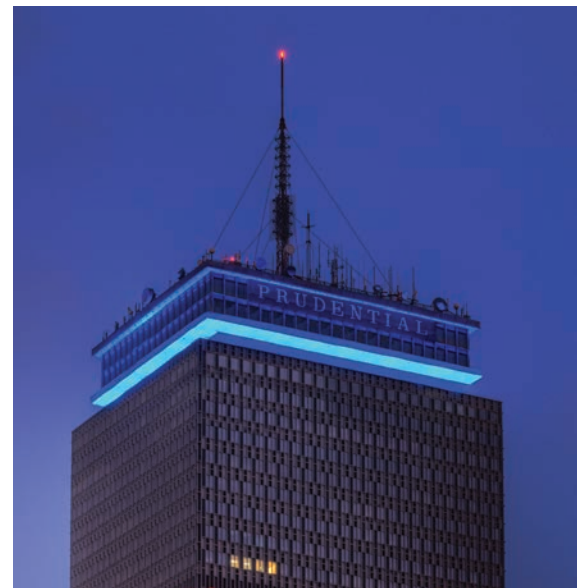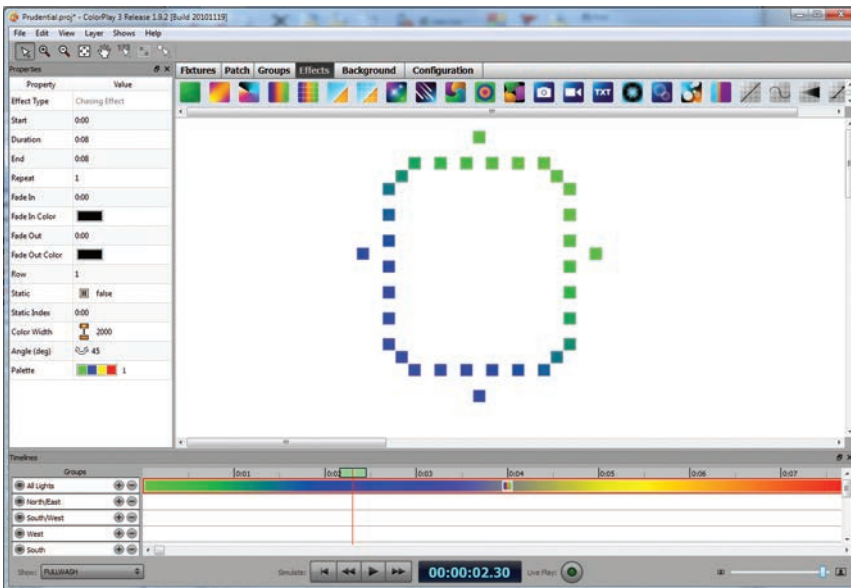
Photography: Steve Marsel

A graphical representation of your lighting installation

A light map or light plan is a virtual representation of your physical lighting installation. (Above) The light map within ColorPlay 3 light show authoring software provides a graphical representation of the top of the Prudential Tower, Boston, Massachusetts, USA, for convenient addressing, effect creation, and realistic simulation of the shows designed to run on the 34 ColorReach Powercore LED floodlights installed beneath the observation deck. (Right and far right) The lighting plan within Pharos Designer provides a graphical representation of the 640 linear LED fixtures installed around the east and west circumferences of the 450-foot-high London Eye, London, England. Control is provided by three Pharos LPC 2 controllers.

Lighting Show Authoring and Light Mapping Software from Philips Color Kinetics and Pharos

ColorPlay 3

ColorPlay 3, the light show authoring software component of iPlayer 3, gives you the ability to create and manage light shows using fully customizable effects, multi-track editing, effect stacking, and custom transition styles.

ColorPlay 3 provides 24 customizable effects, and offers multiple techniques for editing the appearance and behavior of effects. Timeline, simulation, and live play features streamline light show authoring and debugging.

Light System Composer

Light System Composer, the light show authoring and light mapping software component of Light System Manager, allows you to automatically discover and map all lighting system components and group fixtures to simplify playback control, author and refine light shows using 12 customizable lighting effects, and simulate light shows on the fixtures in your installation.

You can also use Light System Composer to program playback zones, schedule show playback, trigger light shows from a computer on the lighting network, set triggers for triggering devices, schedule events, and more.

Video Management Tool 2

Video Management Tool 2, the software component of Video System Manager Pro, provides built-in node-mapping and light discovery features, eliminating the need for additional tools and reducing installation time. Video maps associate source video pixels with up to 250,000 destination nodes in an LED lighting system.

Features include node-level mapping and individual node masking, automatic node distribution, merging of multiple maps, and background image display.

Pharos Designer

Powerful software for programming all Pharos controllers and remote devices with an intuitive, graphical drag-and-drop interface, timeline-based programming and powerful show control including conditions and scripting.
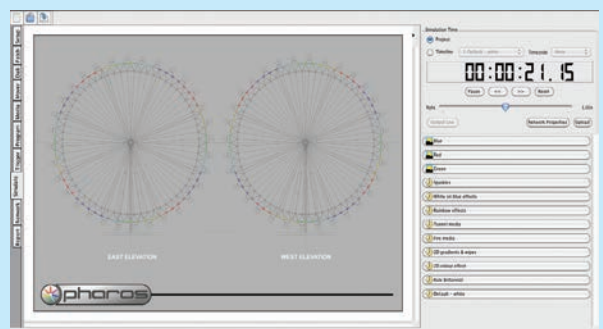
Dimming eW Powercore and eColor Powercore Fixtures

Solid white and solid color LED lighting fixtures in the eW Powercore and eColor Powercore families from Philips Color Kinetics can be switched (turned on and off) or dimmed. Switching is straightforward with standard wall switches. Since eW Powercore and eColor Powercore lighting fixtures are compatible only with certain dimmer types, you must take some care when selecting dimmers.

In general, eW Powercore and eColor Powercore fixtures should be dimmed using reverse-phase control (trailing-edge) dimmers. These dimmers are made for use with electronic low voltage (ELV) transformers, which are used in Philips Color Kinetics LED lighting fixtures. You should never use forward-phase ELV-type dimmers, as they can damage fixtures.

Selected dimming manufacturers, including Philips Strand and Philips Dynalite, offer specification-grade reverse-phase dimming solutions for 100 V, 110 V, 120 V, 220 V, 240 V, and 277 V loads which work well with Philips Color Kinetics products. Some leading makers of lighting controls test specific dimmers with integrated LED lighting fixtures, and post a list of tested and approved dimmer / fixture combinations on their websites.

While such information can help you to make an informed purchasing decision, continuous improvements and innovations to both dimmers and LED lighting fixtures may introduce incompatibilities and unexpected behaviors. Such behaviors include reduced range (top and bottom), pop-on, drop-out, flicker, dead travel, and audible noise.

For these reasons, you should always test dimmers with your specific Philips Color Kinetics LED lighting solution prior to permanent installation. (Most leading makers of lighting controls accommodate customer requests for dimmer / fixture compatibility testing at their facilities.)

Follow the dimmer manufacturer's instructions for calculating minimum dimmer wattage for your specific lighting installation, and for proper installation and configuration.

eW Powercore and eColor Powercore fixtures

eW Powercore and eColor Powercore fixtures from Philips Color Kinetics can be reliably and smoothly dimmed with compatible ELV-type reverse phase dimmers. Left: eW Cove QLX Powercore. Center: eW Blast Powercore. Right: eW Burst Powercore, Architectural version.

W Hotel, New York, New York, USA

To enhance the soothing, nature-inspired décor, New York-based architectural lighting designers G2J Design concealed over 3,000 linear feet of low-profile LED cove fixtures throughout the luxury suites at W Hotel. Because of their energy-efficiency, minimal maintenance requirements, long useful source life, and cool beam of light, LED fixtures can be integrated into architectural details where conventional lighting fixtures cannot. The designers concealed fixtures above the bed canopies, within the graphic acrylic art panels above the headboards, above the minibar to provide task lighting, and within the window pockets to highlight the curtains and fill the room with soft ambient light. Guests can dim and switch the lights to set the exact mood and level of light they desire.

Installation, configuration, and commissioning

Philips Color Kinetics provides devices, applications, and services to help you successfully install, configure, and commission LED lighting systems. Although it's only one aspect of a complete lighting system, lighting control systems present specific challenges and concerns to designers, installers, and commissioning specialists.

## Streamlining LED lighting system installation and configuration

For most medium to large lighting systems, installers work from a layout or a lighting design plan that shows the physical layout of the installation and identifies the locations of all lighting fixtures, power / data supplies, controllers, switches, and cables.

Assuring optimal performance through commissioning

Commissioning is a formal process that "ensures that all elements of the lighting control system perform interactively and continuously according to documented design intent and the needs of the building owner" (*The IES Lighting Handbook, Ninth Edition*).

For large, complex installations, commissioning is a formal quality assurance process that begins with a clearly expressed design intent and proceeds through system activation and installation verification; calibration and testing of occupancy, light, and other sensors that may be included in the system; control and schedule programming; and end-user training on how to use the controls and triggering devices, and how to maintain the system in good working order.

Commissioning lighting control systems that integrate with building automation systems is an important aspect of achieving energy-efficiency targets, and is required by green building certification systems such as LEED. According to the U.S. Green Building Council, proper commissioning yields "reduced energy use, lower operating costs, reduced contractor callbacks, better building documentation, improved occupancy productivity and verification that the systems perform in accordance with the owner's project requirements."
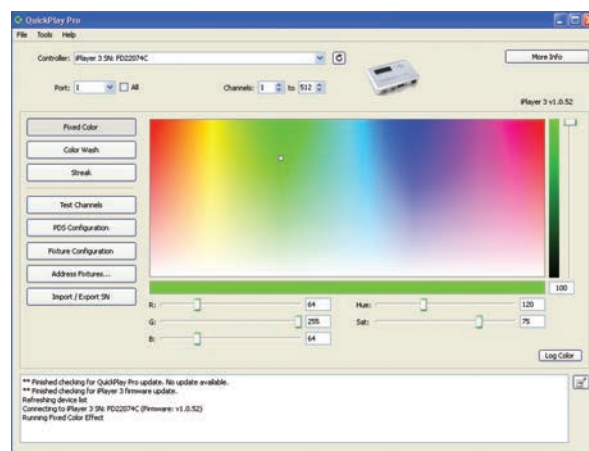
QuickPlay Pro addressing and configuration software lets you configure, test, and demonstrate Philips Color Kinetics lighting systems via a Mac or PC computer.

Some utility rebate and energy incentive programs require commissioning by a qualified third-party professional, as do the recent LEED guidelines for new construction and renovations of over 50,000 square ft. Third-party commissioning is a good idea for all large projects, even if it isn't explicitly required by regulations. For small installations, commissioning can be handled relatively informally by the lighting or control system designer, the installer, or the end user.

Philips Color Kinetics provides devices, applications, and services to help you successfully install, configure, and commission LED lighting systems. Pharos controllers can be accessed by the project team from anywhere in the world, providing immediate troubleshooting and maintenance solutions without even leaving the office.

Configuration and Commissioning Tools from Philips Color Kinetics and Pharos

Controller Software Tools

The software components of iPlayer 3, Light System Manager, Video System Manager Pro, and Pharos controllers offer simulation and playback tools that you can use to test light shows and effects and troubleshoot the addressing and configuration of intelligent LED lighting fixtures in an installation.

Configuration Calculator

To ensure that control runs do not exceed the limits for data integrity and circuit load, we offer installation and configuration tools that you can download for free from the Philips Color Kinetics website, including Configuration Calculator.

QuickPlay Pro and SmartJack Pro

QuickPlay Pro addressing and configuration software lets you configure, test, and demonstrate lighting systems via computer. In Ethernet (KiNET) lighting networks, you can use QuickPlay Pro to discover all connected devices (fixtures, controllers, power supplies, Data Enabler Pro devices), program IP addresses, set starting DMX addresses, adjust fixture resolution, and test DMX channels. Use SmartJack Pro, a compact USB-to-DMX converter, to connect a computer running QuickPlay Pro to a DMX lighting network.

Pharos Installation Manager

Part of a suite of utility applications for managing multiple lighting and AV installations remotely over the Internet. From managing retail chains to updating content on one site, with scheduled updating and guaranteed delivery.

QuickConfig Mobile App

The QuickConfig app for Apple iPhone, iPad, and iPod Touch is a convenient mobile alternative to QuickPlay Pro in Ethernet (KiNET) networks. You can use the QuickConfig app to discover all connected devices (fixtures, controllers, power supplies, Data Enabler Pro devices), program IP addresses, set starting DMX addresses, adjust fixture resolution, and test DMX channels.

Vegas Mall
Moscow, Russia

Lighting Fixtures: iColor Accent Powercore, ColorGraze 10Powercore, iColor Cove MX Powercore, iW Cove Powercore, ColorBlast Powercore, iColor Flex MX
Controllers: Pharos LPC X, Pharos LPC 1

Example control systems

Smith Campus Center, Pomona College, Claremont, California, USA

As part of a major renovation of the Smith Campus Center at Pomona College, SmithGroup design principal Mark McVay selected iColor Cove fixtures from Philips Color Kinetics to dynamically illuminate an 8 ft x 23 ft light wall. According to McVay, the goal of the project was "to transform a windowless basement-level room into a nighttime social space for students to dance and enjoy music. We'd found a translucent polypropylene material that was attractive by itself, but we wanted to go a step further and experiment with backlighting it. The result was stunning — almost biomorphic in its transformation."

A total of 290 iColor Cove fixtures were installed behind the translucent wall for a smooth, diffused effect. "We used LEDs in this application for their programmability, color range, low power consumption and ease of installation," said McVay.

The installation is controlled by a single iPlayer 3, a compact DMX controller from Philips Color Kinetics. The design team used ColorPlay 3, the light show authoring software component of iPlayer 3, to create a set of effects that bring the wall to life. They created five dynamic lighting sequences, including complex cross fades, vertically oriented columns of changing light, concentric circles that move from the center of the light wall to its edges, and one

Stand-alone DMX network

In the example control system pictured on the facing page, a single iPlayer 3 DMX controller from Philips Color Kinetics controls two runs of 12 ColorBlast Powercore fixtures, which display a set of eight color-changing light shows on a schedule stored on the iPlayer 3 controller.

The iPlayer 3 controller is wall-mounted in a secure location to ensure that only trained users can access the controller's on-board scheduling and triggering functions. The show designer can easily connect her laptop computer to the
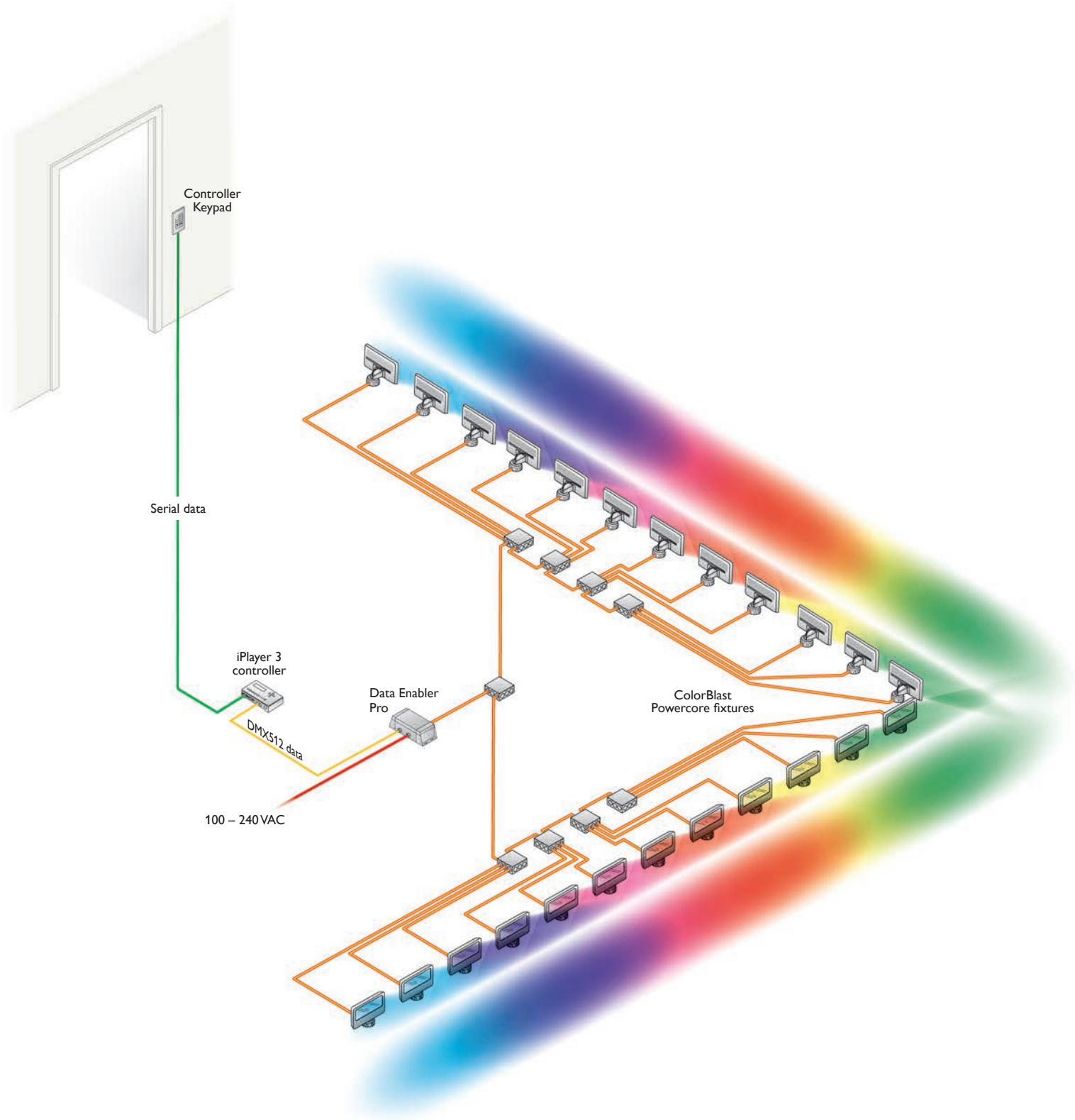
iPlayer 3, using the included USB 2.0 cable, to download new light shows and triggers.

While the eight light shows run continuously according to the schedule managed by the controller, users can override the sequence by manually selecting light shows with a Controller Keypad triggering device mounted on the wall at the entrance to the space. Users can also use the Controller Keypad to adjust the brightness of the ColorBlast Powercore fixtures, and to turn them on and off.

fixed color effect. Students can trigger the light shows using a Controller Keypad device mounted in the room. Students can also design their own

ColorPlay 3 light shows, upload them to the controller, and trigger them with the two remaining Controller Keypad buttons.

Controller
Keypad

Serial data

iPlayer 3
controller

DMXS12 data

Data Enabler
Pro

100 – 240 VAC

ColorBlast
Powercore fixtures

Phoenix Children's Hospital, Phoenix, Arizona, USA
Lighting designer Scott Oldner helped architectural firm HKS
turn the 2010 expansion of Phoenix Children's Hospital into an
oasis in the desert with colorful and innovative lighting. Oldner's
design uses a mixture of theatrical, fluorescent, and LED lighting
fixtures in multiple zones throughout the hospital to create an
immersive experience for hospital patients and their families.

Oldner used LED lighting fixtures from Philips Color Kinetics
both inside and outside the building. Long ribbons of iColor
Accent Powercore direct-view LED lighting fixtures outline the
building's distinctive architectural fins and serve as a canvas for
artistic, animated color displays. These fixtures descend the
front of the building and merge into runs of iColor Cove MX
Powercore linear LED lighting fixtures uplighting the lobby area
and main corridor, visually connecting the building's exterior and
interior. iColor Cove MX Powercore fixtures are also embedded
in the ceiling domes to line the hallway with bright, vivid colors.

All interior and exterior LED lighting fixtures are controlled
by a single Light System Manager (LSM), an Ethernet lighting
controller from Philips Color Kinetics. By organizing the fixtures
into multiple zones, the LSM can play different shows on
different fixtures in multiple locations throughout the building
simultaneously.

Ethernet network with multiple zones

In this example, a multi-zone, Ethernet-based
lighting system integrates with an office
building's IT infrastructure through a fiber optic
backbone and switch. A single Light System
Manager (LSM) Ethernet controller from Philips
Color Kinetics controls three LED lighting zones
in the building, two interior and one exterior.

Zone 1 contains 24 ColorBlast Powercore LED
wash lights, which display dynamic, color-
changing effects in the main lobby.

Zone 2 contains a run of iW Cove MX
Powercore LED fixtures, installed end-to-end
in perimeter coves to fill a large conference
room with warm ambient light. A Multi-
Protocol Converter, installed inline, performs
a KiNET-to-Ethernet conversion so that the
LSM can send scheduled dimming and switching
commands to single-channel DMX dimmers
installed at the entrances to the conference
room. Conference room occupants can use the
wall-mounted dimmers to manually adjust the
brightness of the light in the room as needed.

Zone 3 controls the exterior lighting. Three
ColorReach Powercore LED floodlights drench
the façade of the office building with washes of
intense, saturated color. A color wash effect,
triggered by a timeline managed by the LSM,
runs from sunset to sunrise every day.

In this example, zoning decisions are based on
application tasks only. Zoning may also be based
on energy code requirements. Energy codes
for commercial buildings often require separate
control zones for each interior space, and may
also define a maximum area per zone.

Zoning plans may also be influenced by cost
considerations. While more zones afford
greater flexibility, the cost of control typically
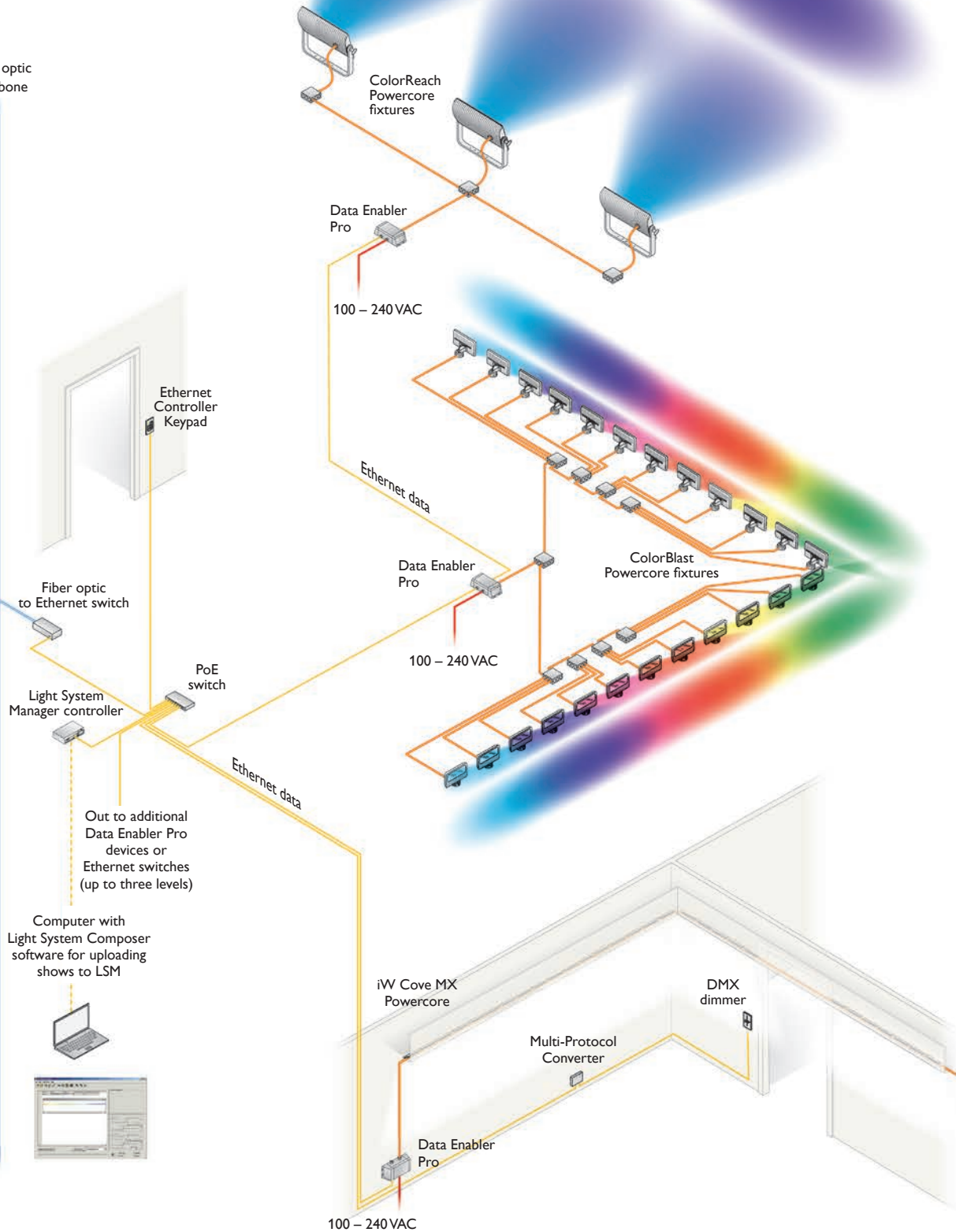increases with the number of control zones.

Fiber optic
backbone

Zone 3

ColorReach
Powercore
fixtures

Data Enabler
Pro

100 – 240 VAC

Ethernet
Controller
Keypad

Ethernet data

Fiber optic
to Ethernet switch

Data Enabler
Pro

ColorBlast
Powercore fixtures

Zone 1

PoE
switch

Light System
Manager controller

100 – 240 VAC

Ethernet data

Out to additional
Data Enabler Pro
devices or
Ethernet switches
(up to three levels)

Computer with
Light System Composer
software for uploading
shows to LSM

iW Cove MX
Powercore

DMX
dimmer

Zone 2

Multi-Protocol
Converter

Data Enabler
Pro

100 – 240 VAC

Control system for large-scale multi-dimensional façade

The Prada store in the Crystals retail and dining district at CityCenter Las Vegas encompasses 23,000 square feet of ready-to-wear, bags, accessories, and footwear collections on three levels. Architect Roberto Baciocchi was commissioned to design a stylish and dramatic façade to complement the cutting-edge Prada brand.

The black aluminum façade, fashioned by Aliva UK, measures over 4,300 square feet (400 m²). The façade consists of over 200 luminaire panels, each containing up to nine holes of various sizes. A semi-opaque polymer cone is installed in each hole. A reflector is mounted in the apex of each cone, a strand of eW Flex SLX white-light LED nodes is mounted in a ring at the base of each cone, and the mouth of each cone is covered with a specially fabricated clear glass dome. The light from the eW Flex SLX nodes shines through the opaque cones and bounces off the reflectors to create unusual lighting effects within each dome.

eW Flex SLX strands consist of multiple individually controllable white-light LED nodes. Strands with varying node counts of six, nine, 12, or 20 nodes, carefully deployed across the irregularly shaped façade, produce a subtle slanting effect and gradation of apparent size from the shopper's viewpoint upward toward the top edge of the façade.

Rotating and other dynamic effects within each glass dome, and coordinated effects across the façade, are managed by a single Pharos LPC 30 Ethernet controller, installed in a master control rack in the Prada offices on the store's top level. Additional equipment racks contain Ethernet switches and 90 low-voltage power / data supplies for powering and sending control data to the eW Flex SLX strands.

Altogether, the installation consists of more than 22,000 individually controllable eW Flex SLX nodes, requiring the creation of an extremely complex lighting design plan that individually identifies each node. Philips lighting designers and programmers used Pharos Designer, the software component of the Pharos LPC controllers, to create a set of stunning light-and-shadow effects that slowly change or sweep across the façade throughout the day and night.

Prada, Las Vegas, Nevada, USA

14 sPDS-480ca 24V
power / data supplies
in each rack with Ethernet switch
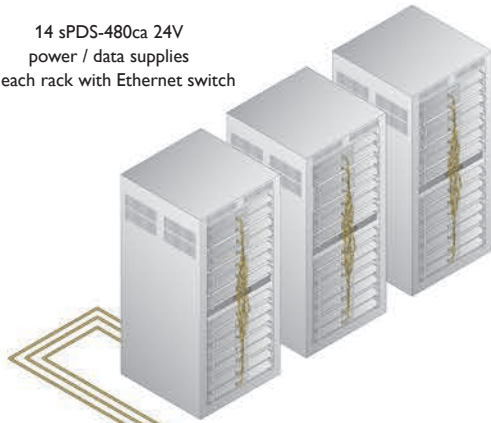
To sPDS-480ca 24V
power / data supply
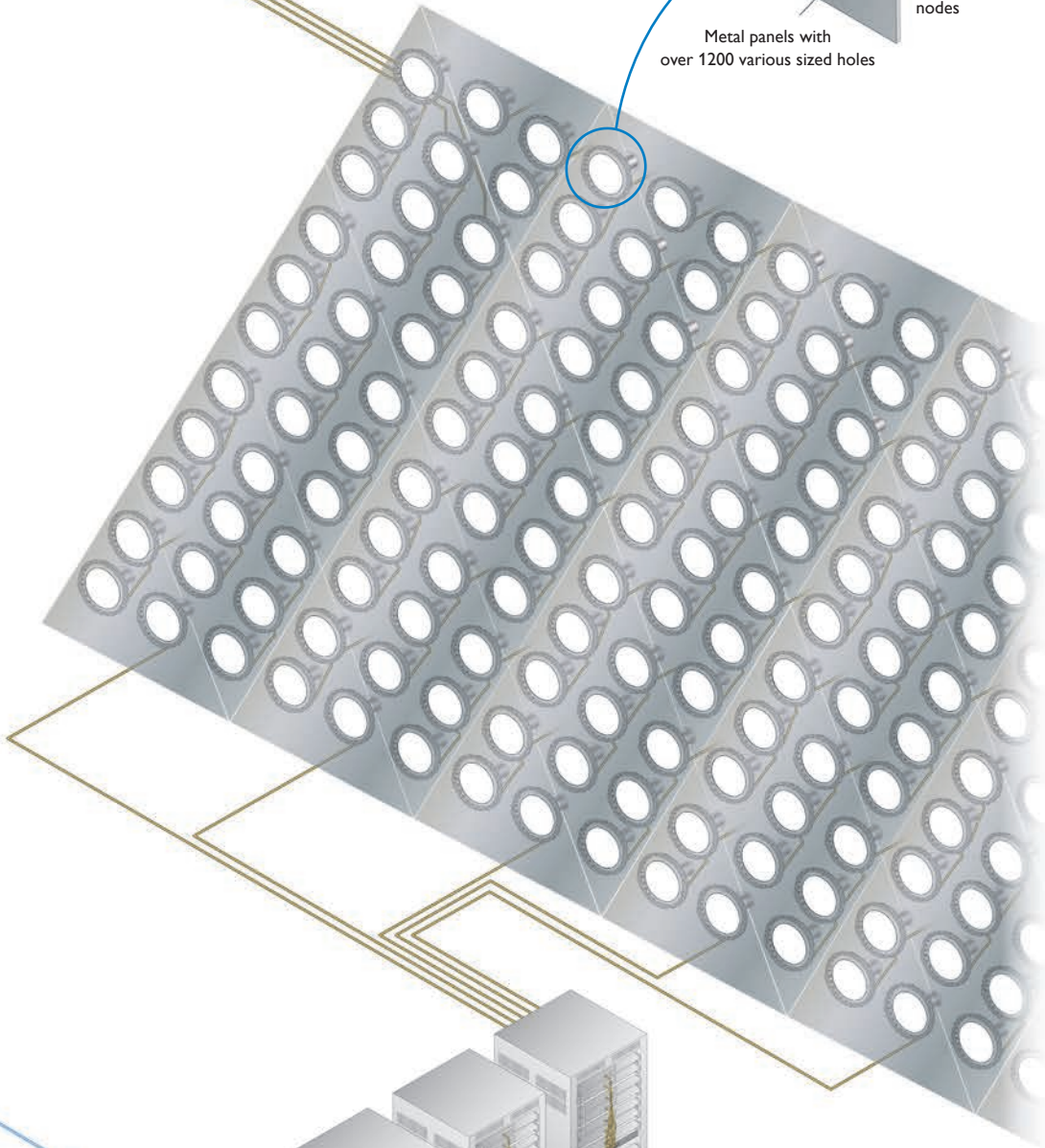
Semi-opaque
polymer cone

Reflector

Cone

Custom length
string of
eW Flex SLX
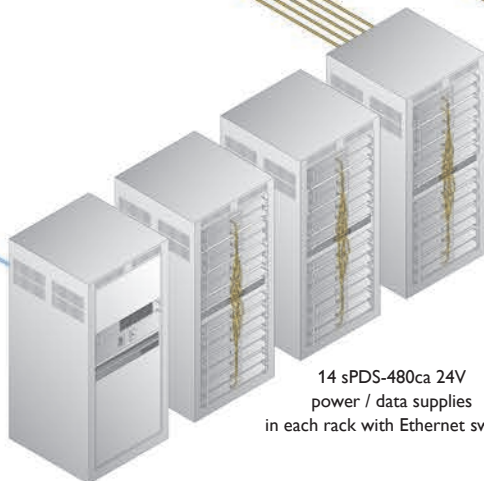nodes

Metal panels with
over 1200 various sized holes

Fiber optic
backbone

Façade

Pharos LPC 30 and BPS
in rack with PoE switch

14 sPDS-480ca 24V
power / data supplies
in each rack with Ethernet switch

Integrated multi-purpose control solution

The award-winning Philips Color Kinetics booth at Lightfair 2011 in Philadelphia, Pennsylvania, USA, demonstrated the extensive capabilities of the line of LED lighting fixtures and controllers from Philips Color Kinetics. A multi-protocol Ethernet-based system produced an extraordinary range of functions and effects through tight integration among controllers, triggering devices, and media servers from Philips Color Kinetics, Pharos, and third-party suppliers.

The Philips Color Kinetics booth required different styles of control for its main components: product kiosks for showcasing a wide range of Philips Color Kinetics LED lighting fixtures, a video curtain and theatrical chandeliers for displaying spectacular full-color video and effects across the ceiling and rear wall, a pair of 42-inch LCD monitors for presenting interactive slide shows highlighting Philips Color Kinetics products and installations, and an innovative reception wall displaying artistic color-changing effects. The control system also managed a system of truss warmers, a color-changing installation at the bar, and the booth's general lighting. An Apple AirPort Extreme access point in the network provided a gateway for control via a set of mobile apps from Philips Color Kinetics and Pharos.
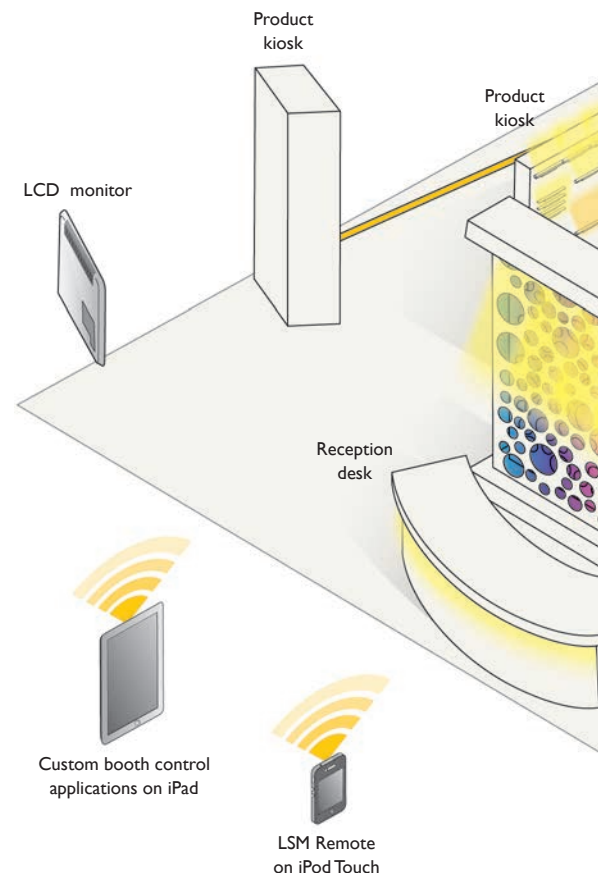
The booth's control network consisted of a series of Ethernet switches, a Pharos LPC 2 unit which served as a master controller, and an LPC X controller providing additional Ethernet outputs. The LPC 2 unit performed minimal lighting controls while synchronizing outlying systems, using different Ethernet protocols as required. To trigger shows for the product kiosks, the LPC 2 sent KiNET commands via RS232 to a Light System Manager (LSM) controller, which managed a set of nine shows in multiple zones, one for each set of Philips Color Kinetics fixtures on display. To trigger shows and effects on the video curtain, the LPC X sent Art-Net commands to a media server, which served video content to the video wall and synchronized audio to the booth's sound system.
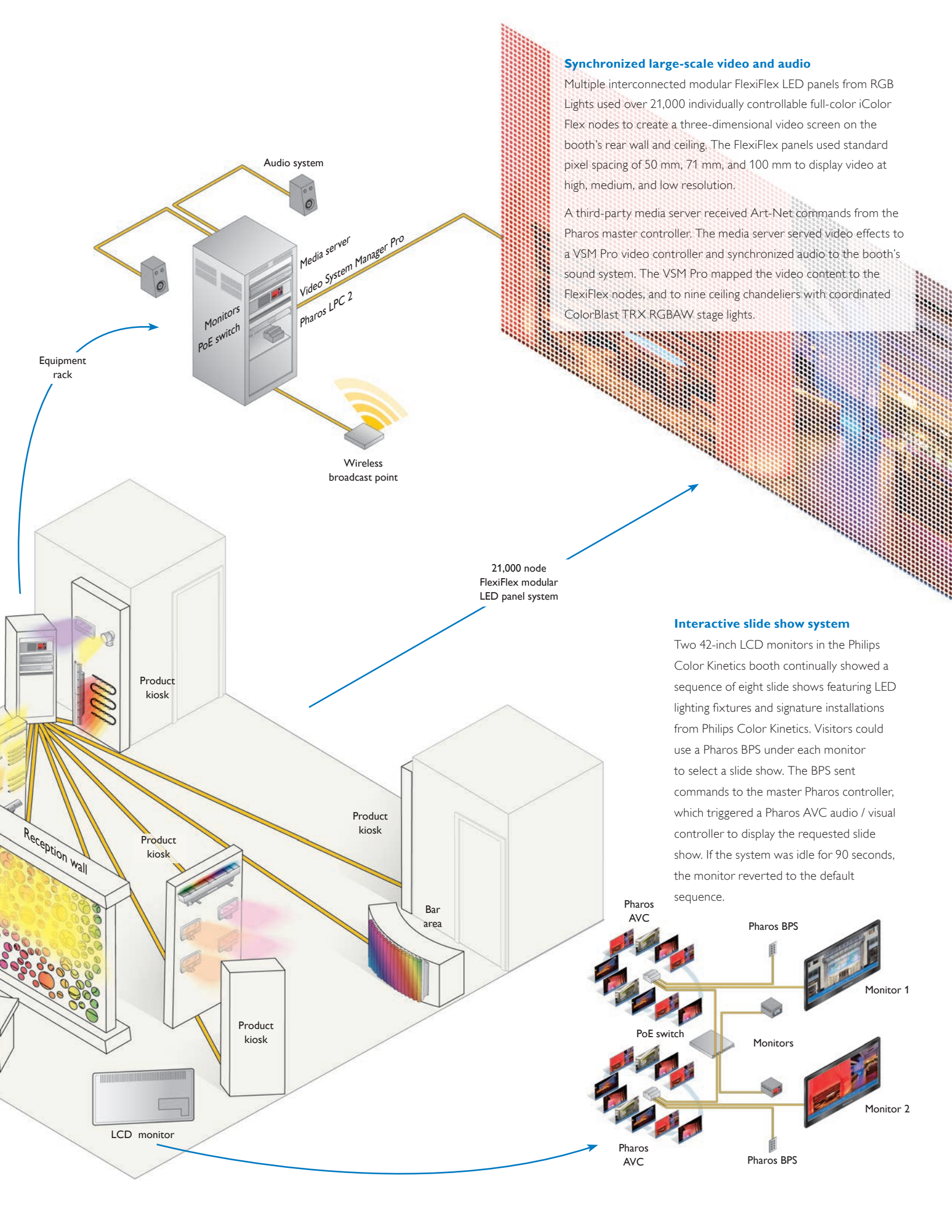
A combination of manual and automated control strategies gave presenters and visitors the ability to interact with the fixtures and installations while ensuring that the booth displays were always changing and fresh. The LPC 2 ran a master script with nested conditional logic that managed the morning startup routine, the schedule for video events on the video wall, and the default dynamic behavior for each booth component. Pharos Button Panel Stations (BPSs) let visitors choose from a set of slide shows to display on the flatscreen monitors, while booth personnel could control individual sets of fixtures on the product kiosks and select from a library of video effects using Apple iPhone, iPad, or iPod Touch mobile applications.

Timers on all zones and effects monitored how recently a change was made with a BPS or mobile app, and reverted to the default light show or scene for that system component when the timer expired.

Philips Color Kinetics booth at Lightfair 2011, Philadelphia, Pennsylvania, USA. Lightfair International awarded Philips Color Kinetics the 2011 Best Booth Award for booths of 900 square feet and larger.

Product kiosk

Product kiosk

LCD monitor

Reception desk

Custom booth control applications on iPad

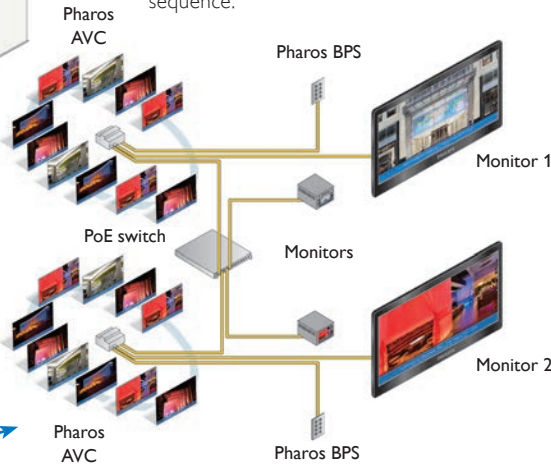LSM Remote on iPod Touch

Synchronized large-scale video and audio

Multiple interconnected modular FlexiFlex LED panels from RGB Lights used over 21,000 individually controllable full-color iColor Flex nodes to create a three-dimensional video screen on the booth's rear wall and ceiling. The FlexiFlex panels used standard pixel spacing of 50 mm, 71 mm, and 100 mm to display video at high, medium, and low resolution.

A third-party media server received Art-Net commands from the Pharos master controller. The media server served video effects to a VSM Pro video controller and synchronized audio to the booth's sound system. The VSM Pro mapped the video content to the FlexiFlex nodes, and to nine ceiling chandeliers with coordinated ColorBlast TRX RGBAW stage lights.

Interactive slide show system

Two 42-inch LCD monitors in the Philips Color Kinetics booth continually showed a sequence of eight slide shows featuring LED lighting fixtures and signature installations from Philips Color Kinetics. Visitors could use a Pharos BPS under each monitor to select a slide show. The BPS sent commands to the master Pharos controller, which triggered a Pharos AVC audio / visual controller to display the requested slide show. If the system was idle for 90 seconds, the monitor reverted to the default sequence.

Audio system

Media server

Video System Manager Pro

Pharos LPC 2

Monitors
PoE switch

Equipment rack

Wireless broadcast point

21,000 node FlexiFlex modular LED panel system

Product kiosk

Product kiosk

Product kiosk

Reception wall

Bar area

Product kiosk

LCD monitor

Pharos AVC

Pharos BPS

Monitor 1

PoE switch

Monitors

Pharos AVC

Pharos BPS

Monitor 2

Control solutions for any LED lighting system

Philips Color Kinetics offers a full range of lighting control systems specifically designed to integrate seamlessly with our LED lighting fixtures.

As summarized on the facing page, our portfolio of control solutions ranges from simple wall-mounted controllers with pre-programmed light effects to advanced Ethernet-based control solutions that can control massive lighting installations and large-scale video displays requiring hundreds of thousands of individually controllable full-color LED nodes.

For an overview of all Philips Color Kinetics LED lighting fixtures, controllers, and power / data supplies, see the latest Philips Color Kinetics Product Portfolio. For stunning photographs and case studies that showcase our LED lighting solutions in signature installations around the world, see the latest volume of our Illumination Gallery.

Visit Philips Color Kinetics Online

You can always visit us online at **www.philipscolorkinetics.com** for complete product information, including installation instructions, user guides, and other product documentation, and sales and ordering information.

A complete portfolio of LED lighting fixtures

Philips Color Kinetics offers industry-leading, high-performance LED lighting solutions for the full range of theatrical, presentation, and portable lighting applications, as well as for architectural applications both indoors and outdoors.

Intelligent color-changing LED lighting fixtures offer intensely saturated, controllable light for interior and exterior architectural applications, intricate light shows, large-scale video, and dynamic accent lighting.

IntelliWhite (iW) lighting fixtures combine channels of cool, neutral, and warm white LEDs to offer a range of color temperatures that you can adjust with a simple wall-mounted device.

Solid white (eW) LED lighting fixtures are available in a range of color temperatures, while solid color (eColor) LED lighting fixtures offer all of the advantages of LED lighting — including long useful source life, energy efficiency, simplicity of installation, and low-maintenance operation — in solid red, green, blue, or amber.

iColor Player

iColor Player is a simple, affordable solution for controlling multiple light fixtures simultaneously. iColor Player can control a full universe of DMX addresses and can play a single show authored in ColorPlay 3, the light show authoring software component of iPlayer 3.

iColor Keypad

Power-over-Ethernet keypad stores eight pre-programmed light shows and controls a full universe of DMX addresses. You can change light shows using the simple push-button interface. Fits a standard US single-gang wall box.

ColorDial Pro

Ethernet-based, stand-alone lighting controller and interface for color-changing LED lighting fixtures from Philips Color Kinetics. Features enhanced LCD screen for configuring effects and simple dial-and-button controls.

iPlayer 3

Compact DMX control solution with powerful light show authoring, storage, and playback capabilities with on-board controls for superior ease of use. Supports two complete DMX universes.

Pharos TPC

Advanced lighting controller with an integrated, customizable touch screen interface, incorporating the same playback and show control engine as the Pharos LPCs.
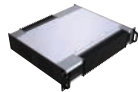
Pharos LPC 1 / 2 / 4

The versatile control solution for entertainment and LED lighting installations, featuring advanced playback and show control engines, built-in astronomical and real time clocks and third-party integration options.

Light System Manager

Versatile show authoring and control for large-scale lighting installations. Supports up to 15,000 individually controllable LED nodes depending on system configuration.

Pharos LPC X

An unprecedented level of power and integration for landmark lighting installations, with a channel capacity of up to 200 universes from a single unit.

Video System Manager Pro

Integrated hardware / software solution that streams video playback and visual effects output to Philips intelligent LED lighting systems. Can process output for up to 250,000 individually controllable LED nodes.

Pharos AVC

A single controller combining the functionality of two DVD players and a vision mixer with additional live input, all under seamless show control. Award-winning audio / visual control solution for themed, retail, and entertainment installations.

Controller Keypad

Provide push-button playback of up to eight iPlayer 3 light shows. Onboard indicator lamps identify the current show. Dimmer controls adjust the brightness of light fixtures during playback, and a master OFF switch turns all show lights off.

Ethernet Controller Keypad

Power-over-Ethernet keypad that triggers up to eight light Light System Manager or ColorDial Pro light shows. The ideal solution for lighting installations that include multiple shows in multiple zones or locations.

Pharos BPS / RIOs

Flexible and stylish Button Panel Stations and RIOs — remote input output devices — offer a host of networked interfaces for integrated buttons, serial ports, DALI and audio integration with a single Power-over-Ethernet connection.

AuxBox

Instantly activate up to eight iPlayer 3 or Light System Manager light shows using any remote triggering device with a dry-contact closure, such as motion sensors, time clocks, wind speed monitors, and pressure sensors.

Multi-Protocol Converter

Power-over-Ethernet device converts KiNET to DMX, DMX to KiNET, and RS232 to KiNET. Lets you use DMX-based power / data supplies with any KiNET-based device, or trigger KiNET-based devices with third-party controllers..

SmartJack Pro

Use SmartJack Pro, a compact USB-to-DMX converter, to connect a computer running QuickPlay Pro addressing and configuration software to a DMX lighting network.

Graze / Wash

Interior and exterior-rated LED wall-washing and linear grazing fixtures, including the groundbreaking Blast family of color-changing, intelligent white, solid white, and solid color wash lights.

Flood / Spot

A full range of exterior floodlights and spotlights for illuminating landmarks, signature façades, landscapes, architectural details, and signage. Includes the submersible C-Splash 2 spotlight.

Cove

Linear white-light cove fixtures exceed industry standards for uniformity and quality of light. Color-changing and intelligent white cove lights afford unprecedented flexibility inside and outside the cove.

Direct View

Precisely controllable strand lights, linear lighting fixtures, and tiles support stunning effects and large-scale video in two- and three-dimensional interior and exterior displays.

Theatrical / Touring

Rugged, industry-leading RGB, RGBAW, and intelligent white LED wash lights and flood lights, specifically designed to withstand the rigors of taxing stage and rental environments.

Task / Downlight

Under-cabinet lighting and downlighting fixtures offer high-quality, energy-efficient white light in business, retail, hospitality, and healthcare applications.

PHILIPS

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The LED lighting systems that are featured were, with minor exceptions, supplied by Philips Solid-State Lighting Solutions. Lighting products of other companies may be included in photos of installations featured in this brochure.

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

Cover Photo: Waterfront Tower, Harrah's Resort and Casino,
Atlantic City, New Jersey, USA, by Tim Hunter Design
Left Inset: Natural History Museum, London, UK, by David Thrower
Right Inset: GHD, Leeds, UK, by Chris Gascoigne   BRO-000057-00 R00 08-11