

EnabLED Licensing Program for LED Luminaires and Retrofit Bulbs

Philips Lighting Intellectual Property
20170801

PHILIPS

Agenda

- Introduction
- Program outline
- Contact info
- Core Technology Examples



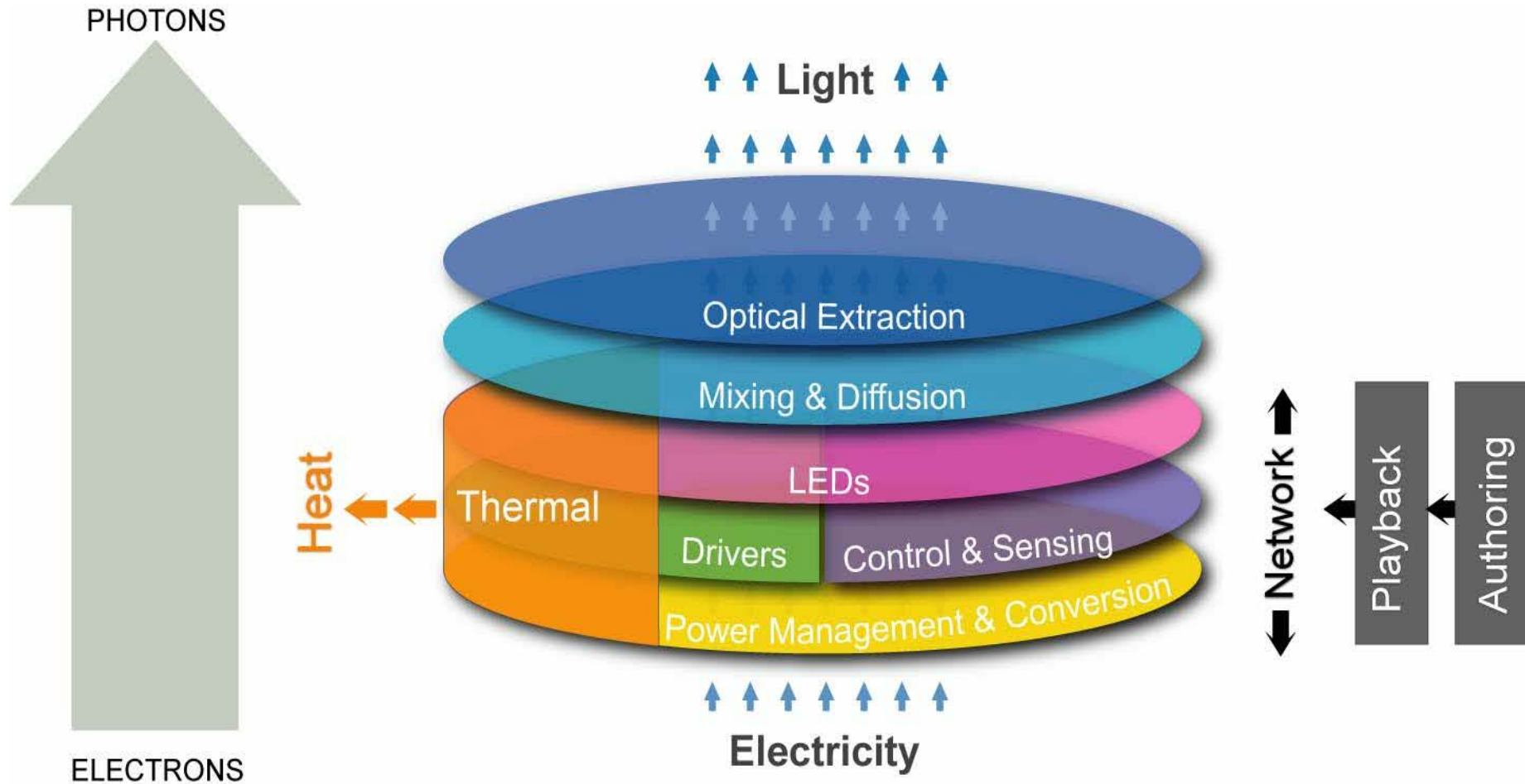
This presentation is for information purposes only. It is not intended to be a contract and shall not be legally binding in any respect on any party. There shall be no contract until a final written contract is signed by authorized representatives of both companies.

Business Drivers

- For Licensee
 - Preferred and more economic solutions
 - More flexibility in component sourcing
 - More freedom for optimal solution
- For Licensee and Philips
 - Accelerate growth of LED luminaires and retrofit bulb markets



LED Lighting Systems - What's Involved

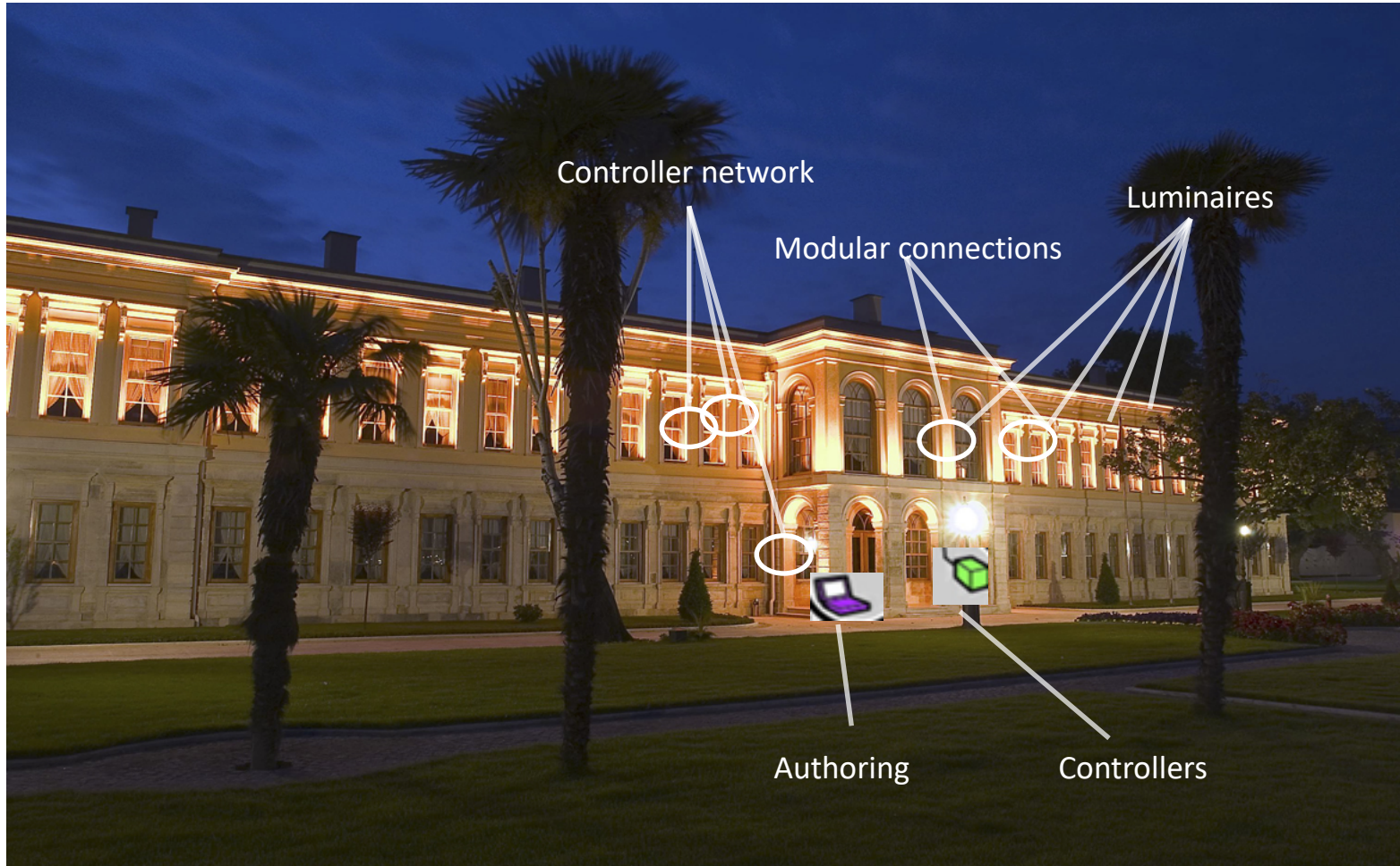


Philips Licensing Program Outline

- Product scope:
 - Finished, branded, LED Luminaires and Retrofits
- Field of use
 - General Illumination (Professional and Residential),
 - Architectural, Theatrical and Entertainment fields
- Scope licensed patents:
 - Basic LED control and system-level technologies
 - Includes patents (and patent applications) with priority date prior to 2008
 - Covers IP from Philips and former Color Kinetics and TIR



IP Coverage on a System



Licensed Patent Portfolio

- More than 252 patent families
- More than 1719 issued patents
- More than 169 patents pending
- **Worldwide**
(e.g. US, Europe, China, Japan, Korea, Canada, Australia, Taiwan, Hong Kong)



Expected Relevance

Technology	Single Color	Tunable White	Color Change	Retrofit Bulb
AC dimming using intelligent circuitry to enable dimming of the LEDs based on input current	X	X	X	X
Creation of a specific color temperature using a combination of phosphor conversion and colored LEDs	X	X		X
Light distribution management by creating a luminaire with a lighting module comprising a set of lighting units each comprising an optical system with a primary and secondary optical system	X	X	X	
Combination of red, green and blue LEDs in order to create and tune colored light output			X	X
Etc...				

Royalties for LED Luminaires

- **Royalties based on Net Revenues**
 - 3% for Single Color Luminaires (fixed color temperature white or color)
 - 4% for Tunable White Luminaires (color temperature controllable)
 - 5% for Color Changing Luminaires (Charged only for manufacturing or sales in countries where Philips has at least one issued patent covering a feature of the licensed product)
- Net Revenue is the price actually charged to a customer to purchase a licensed product, excluding freight, insurances, and taxes



Royalties for LED Retrofit Bulbs

- **Royalty based on Net Revenues:**
 - 5%
 - Minimum 0.25 Euro per unit*
(Charged only for manufacturing or sales in countries where Philips has at least one issued patent covering a feature of the licensed product)
- **“LED-based Retrofit Bulb” means:**
a LED-based light bulb designed and intended to be installed in an existing luminaire that previously utilized a conventional (non-LED) light bulb

*For Licensees who are in full compliance with their royalty payment obligations under the Agreement, Philips will waive the minimum royalty of EUR 0.25 applicable to sales of Retrofit Bulbs after 1 January 2015.



Luminaires using qualified components (1/2)

No royalties due provided that the following are from a qualified supplier:

- **all LED light-engine modules** (LEDs placed on one or more common circuit board(s)); and
- **all LED drivers**; and
- **all components, if any, for controlling** the light output of the LEDs used in the luminaire

The trademark of the respective qualified supplier(s) is **identifiable** on each of the above components assembled in the luminaire.



Luminaires using qualified components (2/2)

- Qualified Suppliers are Philips Lighting, Lumileds (only for light engine modules), Osram and Zumtobel Group
- Luminaire company still needs to enter into a license agreement with Philips (even if all luminaires only include components from qualified suppliers)



Key steps to Agreement



1. **Meet with Philips IP Licensing representative**

One of our licensing specialists will be assigned to your company so you have a personal contact with Philips. This contact person will explain the Program in detail and answer any questions you may have.

2. **Portfolio Analysis**

We work with you to determine which of your products are relevant and require a license.

3. Choose between the **Flat Rate** and **Itemized** approach for the payment of royalties (the fees for use of Philips patented technologies) and conclude the agreement

In order to protect the confidential information that are exchanged between the parties prior to concluding the license agreement, a mutual, two-sided Non-Disclosure Agreement (NDA) will be signed.

Contact



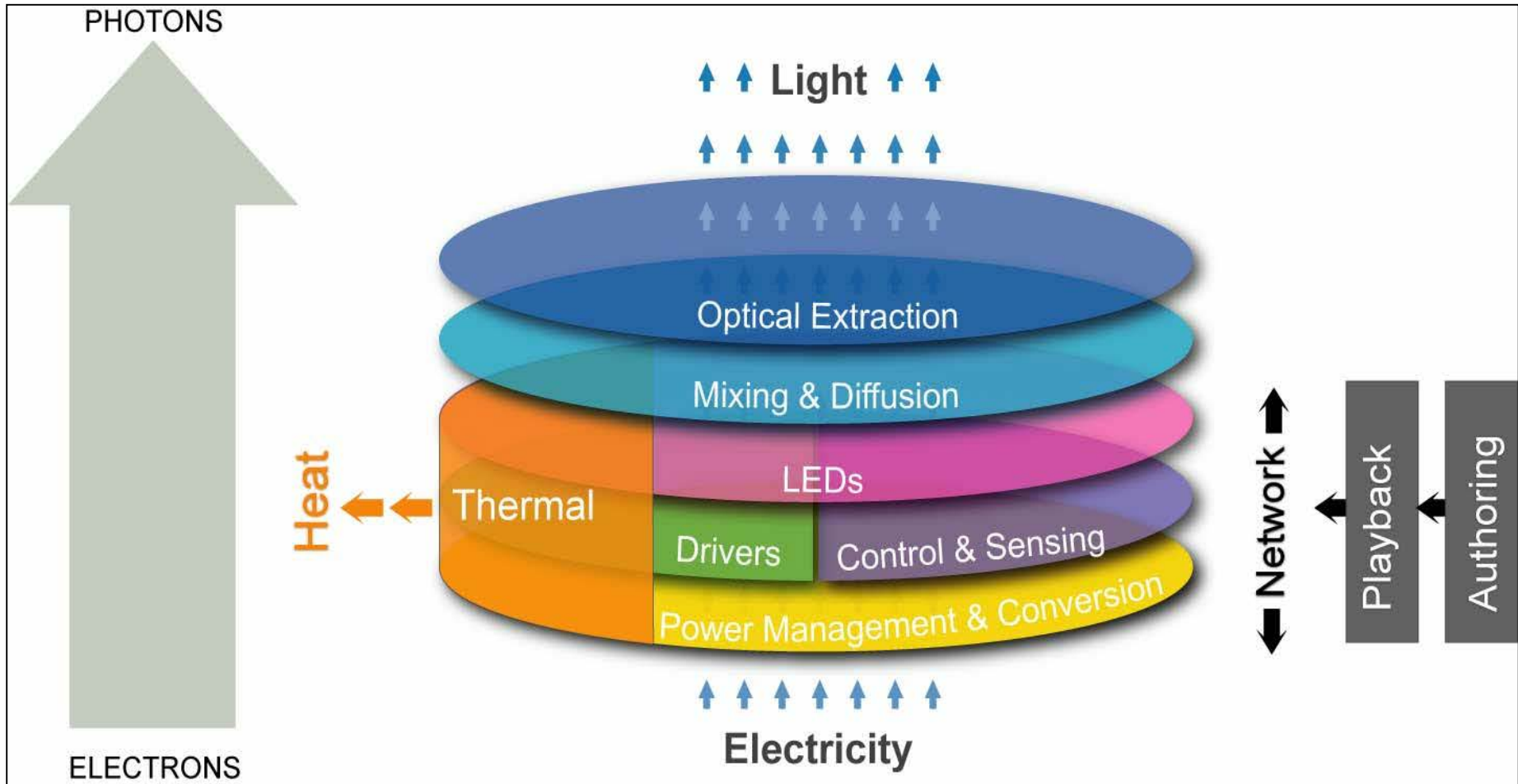
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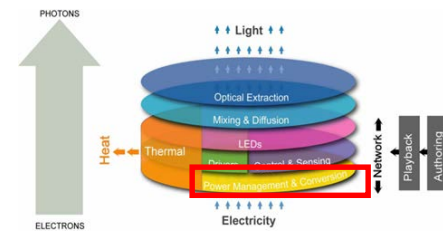
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Examples of what could be involved

LED Lighting Systems – Examples what could be involved

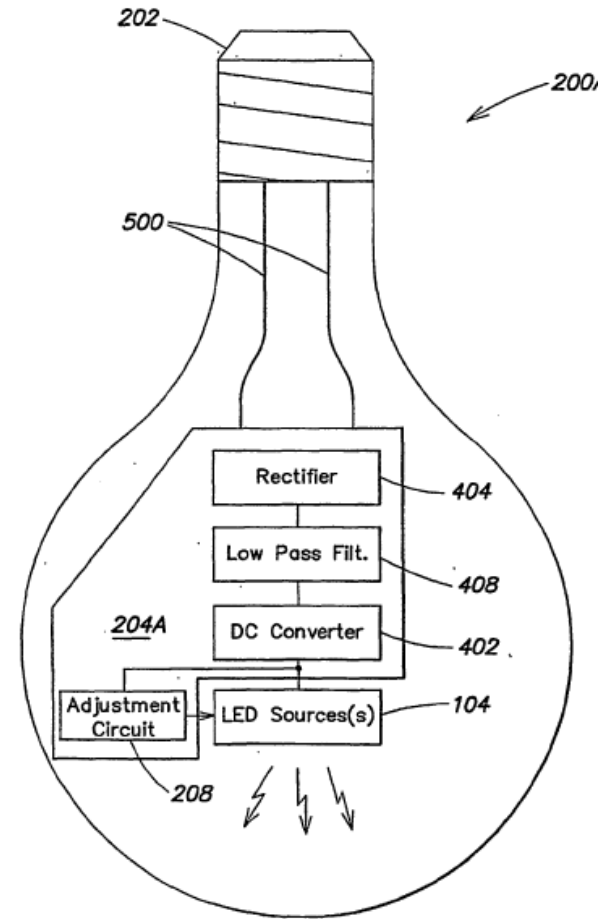


Core Technologies for LED Lighting Systems

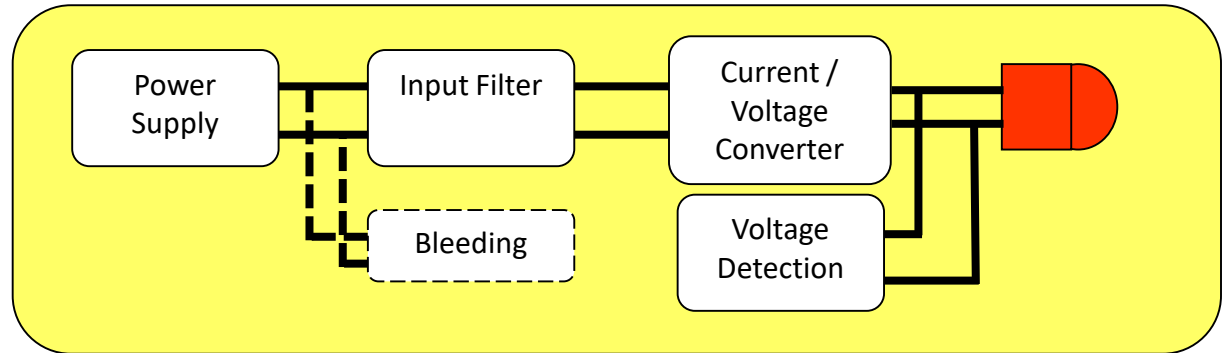
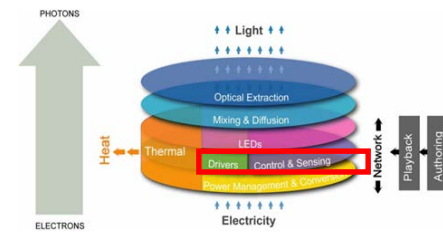


Dimming

- Application: Power control
- Advantage: Re-use existing dimmers (e.g., phase-cut, 1-10V); mimic existing incandescent look; dim without changing color temp
- Example Patents/Applications:
 - North America: US6384545, 6975079, 7038399, 7071762, 7135824, 7352138, 7358679, 7719209, 8203284
 - Europe: EP0929993, 0929994, 1459600, 1479270, 1502483, 1576858, 1887836, 2143303; GB2421367
 - Asia: CN100477868, 101107885, 101663919, 1143602, 1192682, 1729722; JP4159119, 4240546, 4347794, 4633363, 4901104, 5285912, 5460940; HK1111856, 1112153; KR10-0960825, 10-0978019



Core Technologies for LED Lighting Systems

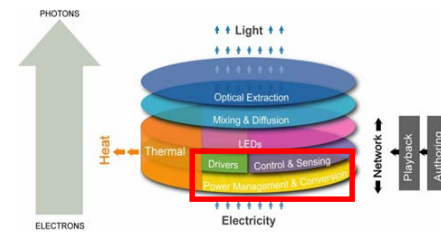


Control / Protection when changes in LEDs occur

Driving LEDs

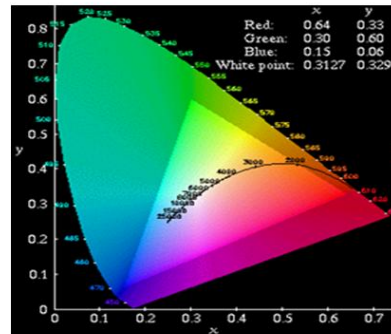
- Application: Safe conventional light source replacement
- Advantage: Allows accurate control and protection of driver circuitry in case of changes in the LEDs at the output, such as overvoltage, short circuits or malfunctioning of an individual LED in a string
- Example Patents/Applications:
 - North America: US6094014, 6147458, 6577512, 7262559, 7511436
 - Europe: EP0929992, 1034690, 1623604
 - Asia: JP4260226, 4657579, 4959325, 5426807; CN100381018, 100531486, 100558203, 1139307, 1287637

Core Technologies for LED Lighting Systems

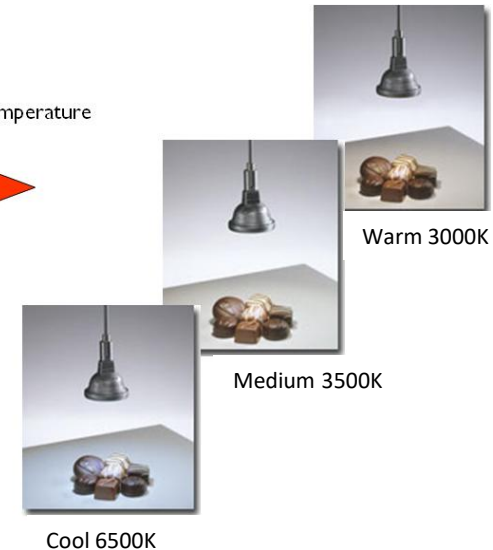


Intelligent White Light Illumination

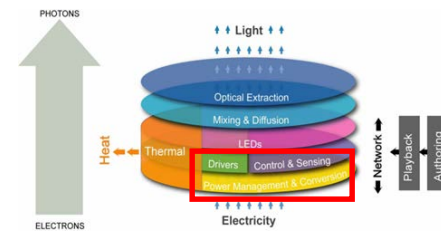
- Application: White color temperature control
- Advantage: Produce high quality tunable white light
- Example Patents/Applications:
 - North America: US6234645, 6234648, 6513949, 6636003, 7014336
 - Europe: EP1016062, 1046196, 1047904, 1234140, 1459600
 - Asia: JP4366016, 4376464; CN1124426, 1227749; IN210549; KR10-0702273, 10-0776837



White Light Temperature Control

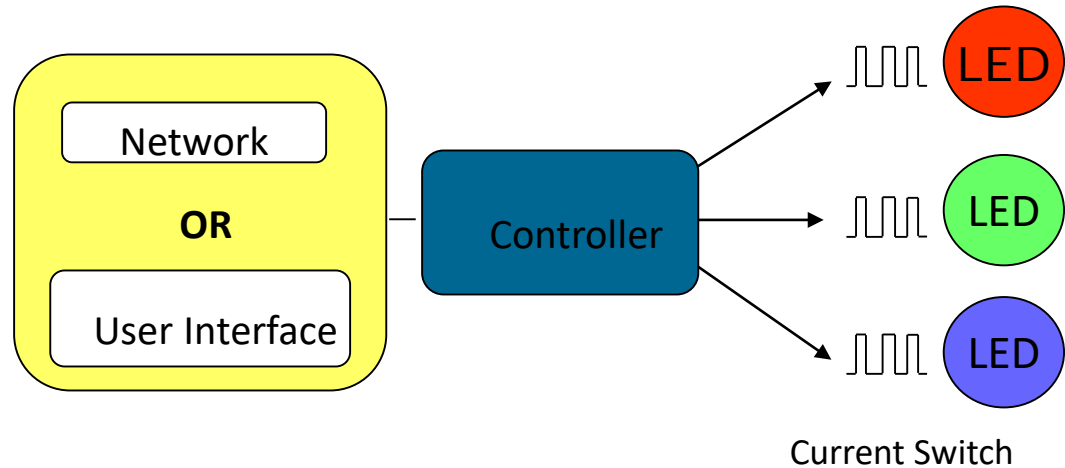


Core Technologies for LED Lighting Systems

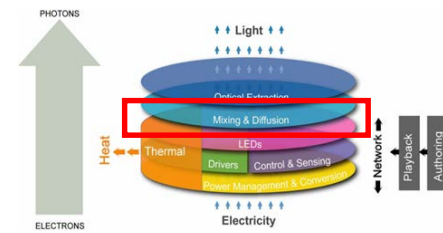


Intelligent Color Illumination

- Application: Intelligent RGB color control
- Advantage: Allows creating simple to sophisticated illumination effects
- Example Patents/Applications:
 - North America: US6016038, 6150774, 6234645, 6788011, 6806659, 7064498, 7161311, 7274160, 7462997; CA2302227, 2466717
 - Europe: EP1016062, 1047904, 1422975
 - Asia: CN1289397; HK1025416; JP4230236, 4376464
 - AU757000, 2003203584, 2006202217

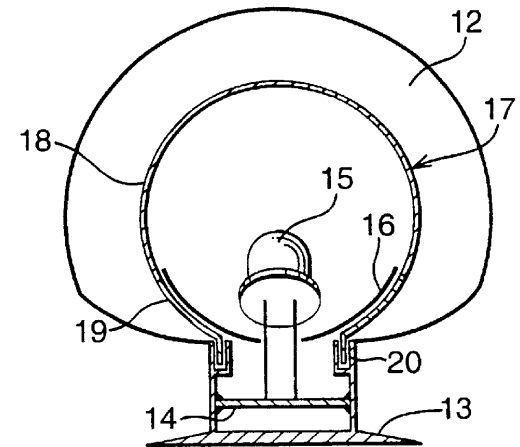


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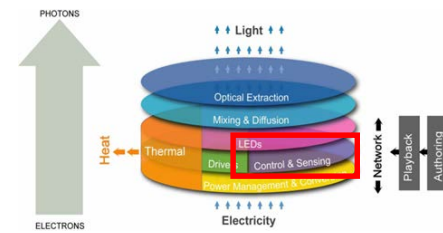


Direct View Color or White only Mixing Tube

- Application: direct view architectural and theatrical fixtures
- Advantage: create smooth, non-pixelated dimmable or color-changing effects visible on diffuser tube
- Example Patents/Applications:
 - North America: US6676284, 7064498, 7118248, 7161311
 - Europe: EP1110198, 1391650

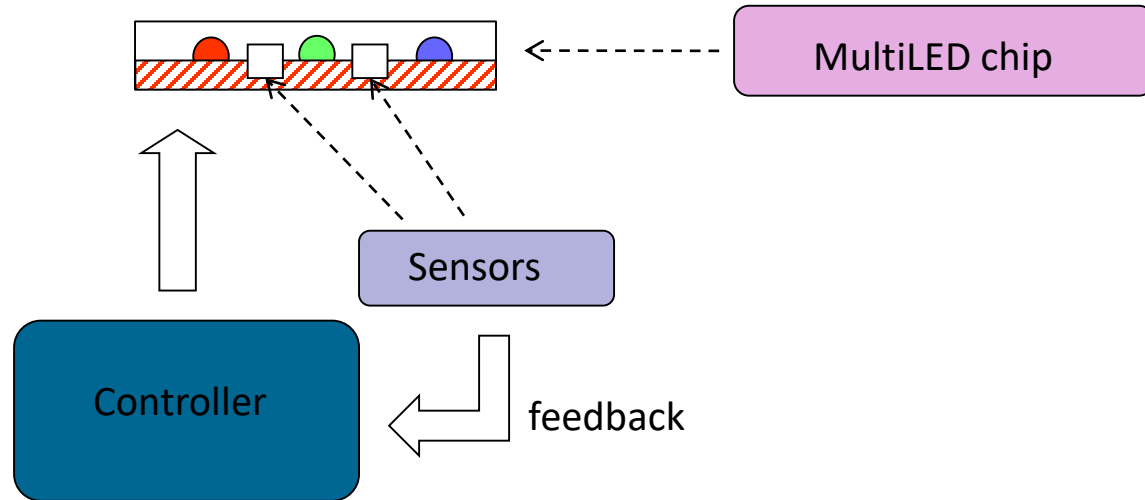


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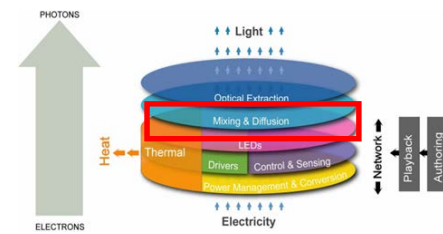


Feedback Control

- Application: Quality control
- Advantage: Produce and maintain high quality light output with less dependency on quality of discrete light source
- Example Patents/Applications:
 - North America: US6304464, 6617795, 7802902
 - Europe: EP1415345, 1459600
 - Asia: CN100383986, 101554087; JP5341517; KR10-0916178; TW-1289339, I391600

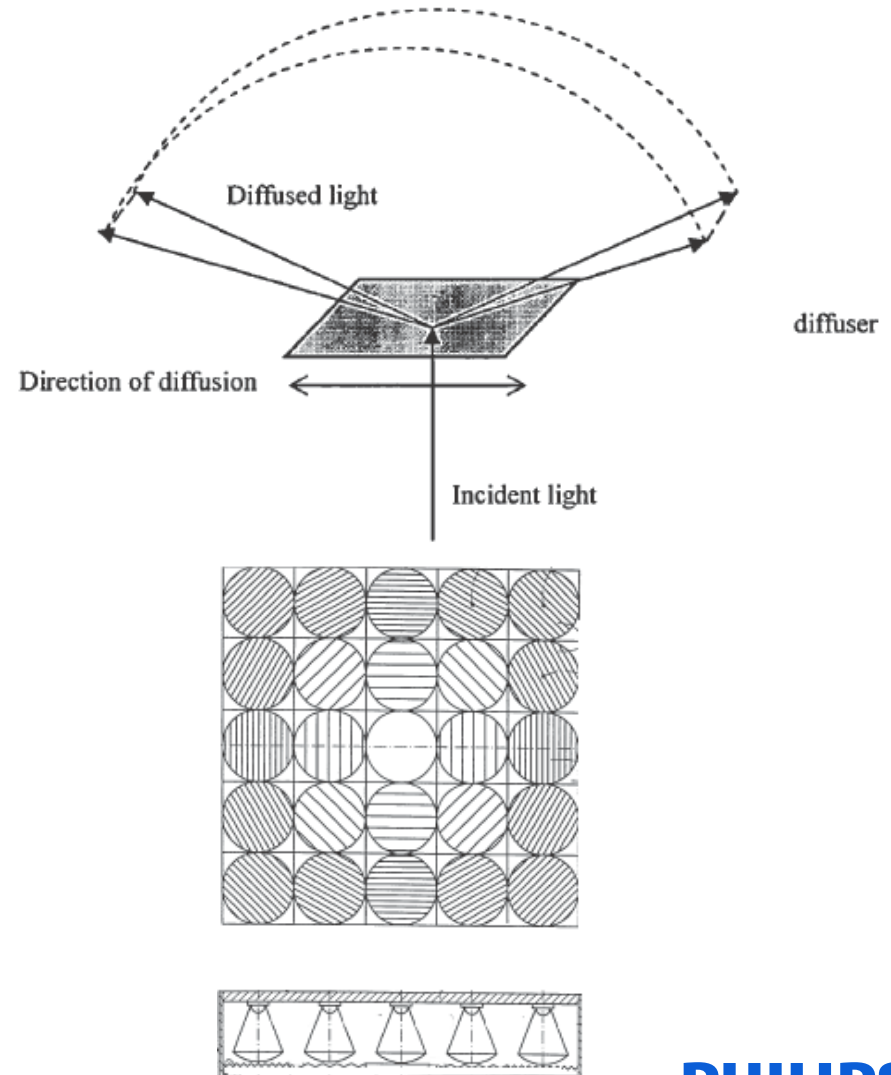


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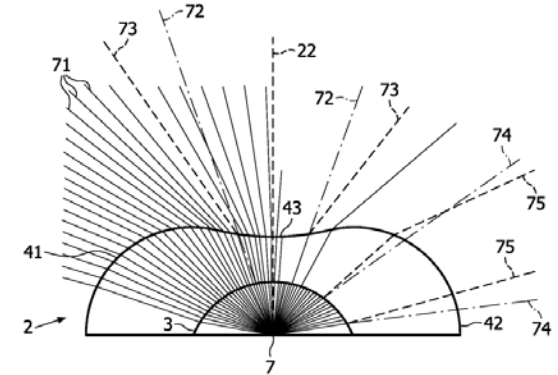
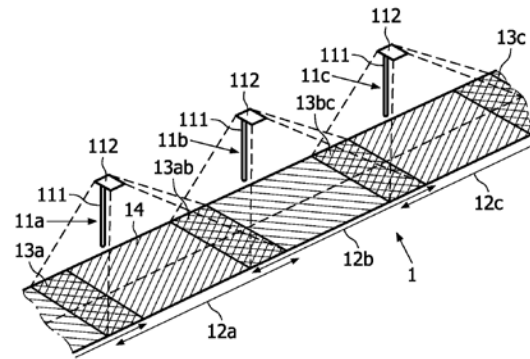
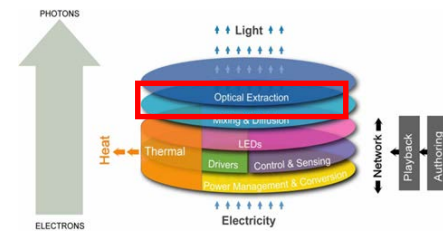


Light Mixing and Distribution

- Application: Light output control
- Advantage: Effective and efficient blending and directing of LED light output
- Example Patents/Applications:
 - North America: US6250774, 6561690, 7255458; CA2249423, 2533195
 - Europe: EP0890059, 1182396
 - Asia: JP4014227, 4749623; TW093750; CN1107193, 1211602, KR0471705

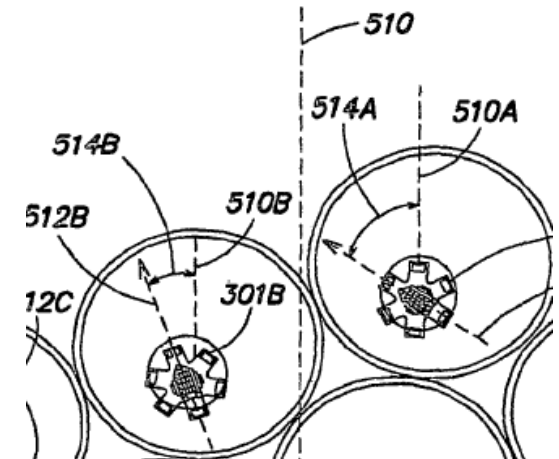


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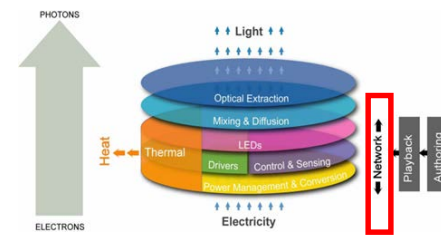


Light Mixing and Distribution

- Application: Light output control
- Advantage: homogeneous illumination of an area without dazzling the user
- Example Patents/Applications:
 - North America: US7806558, 8220958
 - Europe: EP2089656, 2135005; RU2456503
 - Asia: CN101627253, 101657678; JP5349453, 5396278

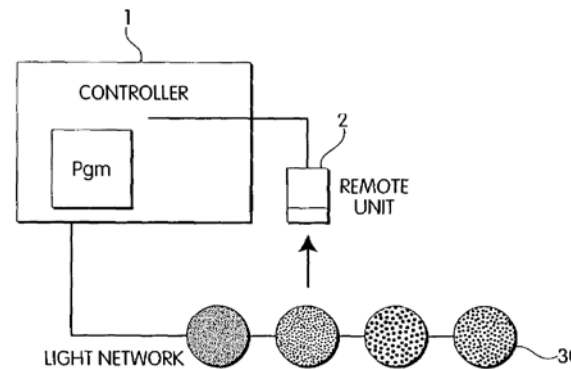
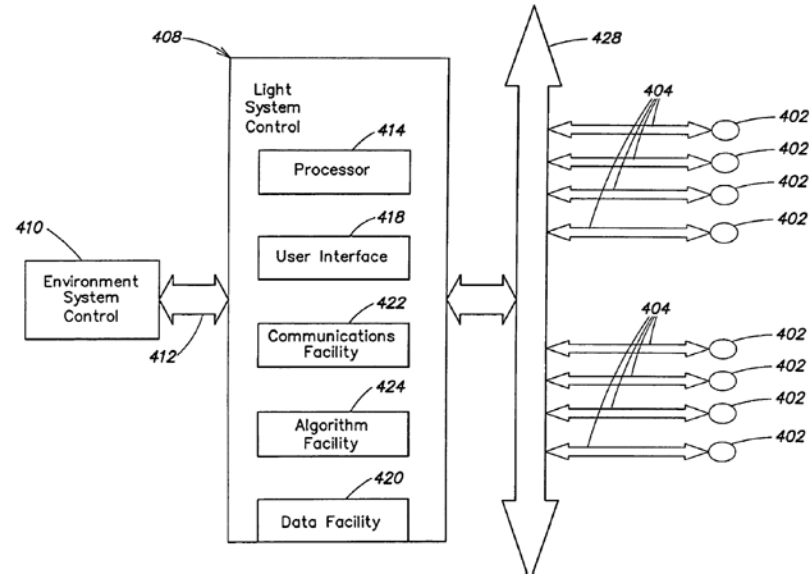


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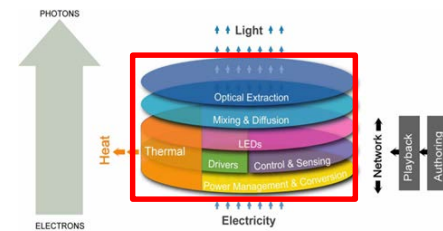


Lighting Systems

- Application: Network control
- Advantage: Effective and efficient operation, communication and/or interaction by or between multiple devices
- Example Patents/Applications:
 - North America: US5909429, 6150774, 6831569, 6969954, 7204622, 7233831; CA2236569
 - Europe: EP0870384, 0890059, 1371211, 1535495
 - Asia: JP3892909, 4141840, 4625697; CN100414943, 1119888; TW112395

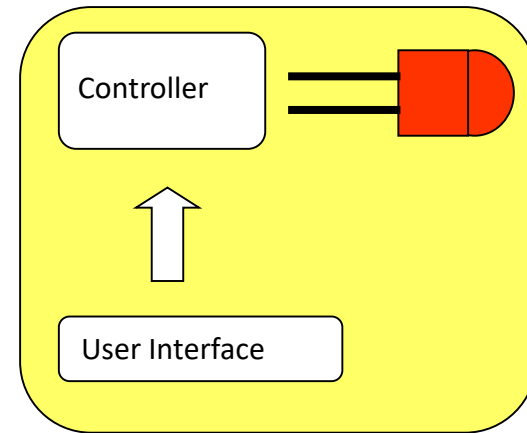


Core Technologies for LED Lighting Systems



Retrofit

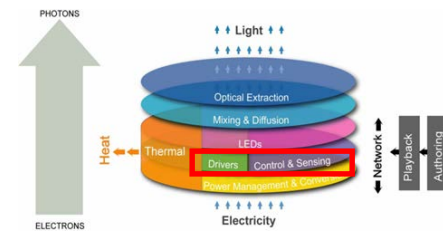
- Application: Conventional light source replacement
- Advantage: Leverage the benefits associated with LED (e.g., efficiency) without losing value add of existing infrastructure
- Example Patents/Applications:
 - North America: US6013988, 6147458, 6150774, 6250774, 6528954, 6969954, 7038399, 7064498, 7161311; CA2249423
 - Europe: EP0890059, 0929993, 1034690, 1422975, 1502483, 1887836
 - Asia: JP4014227, 4159119, 4347794; CN1107193, 1192682, 1287637; HK1112153; KR0471705; TW093750



RF, IR, Power Cycle

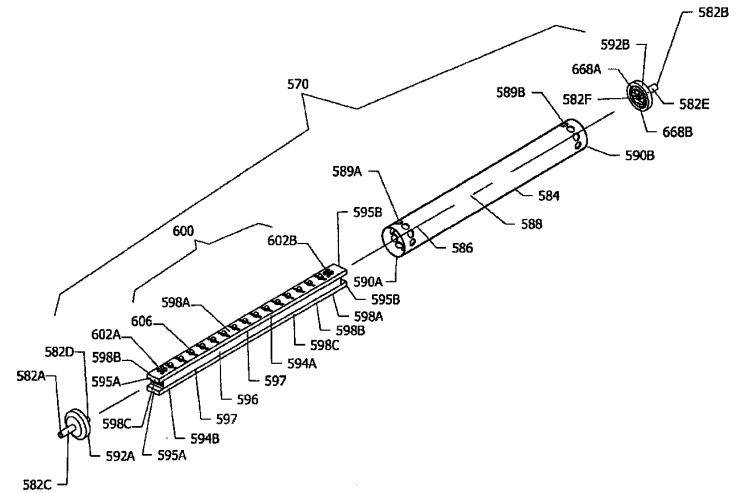


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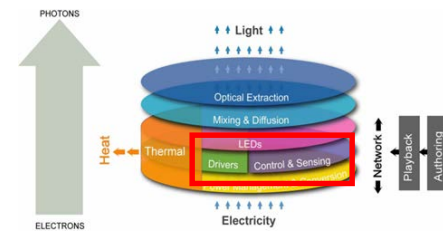


LED-based Lamp for Replacing TL Fluorescent Lamp

- Application: general illumination and specialty applications
- Advantage: energy-efficient, long-life and mercury-free alternative to fluorescent tubes
- Example Patents/Applications:
 - North America: US6528954, 6676284, 6762562, 6853151, 7014336, 7067992, 7350936, 7490957, 7507001
 - Europe: EP1391650



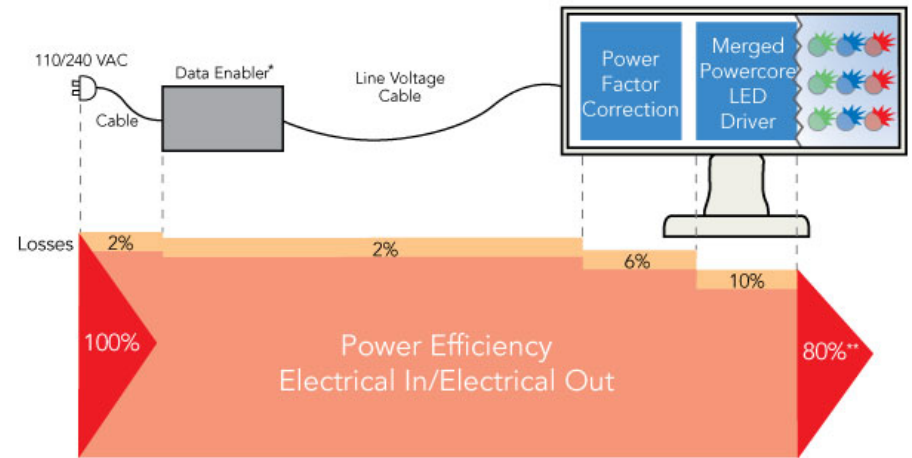
Core Technologies for LED Lighting Systems



Powercore

- Application: power control (for single color or white, tunable white and color-changing)
- Advantage: increase power efficiencies; easier system installations and lower system costs by eliminating stand-alone power supplies
- Example Patents/Applications:
 - North America: US7233115, 7256554, 7358706, 7459864, 7557521, 7659673, 7737643; CA2559718
 - Asia: JP5198057, 5419918; KR10-1182674
 - AU2005222987

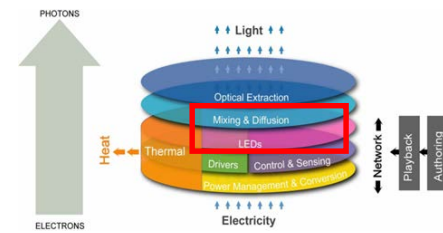
Powercore[®] System



**Minimum communications electronics fixed overhead not included.

Powercore[®] is a patented breakthrough in digital power processing technology that surpasses traditional power supply technology by streamlining multiple conversion and regulation stages into a single, flexible, microprocessor-controlled power stage that rapidly, efficiently and accurately controls power output to LED-based systems directly from line voltage, eliminating the need for an external power supply.

Core Technologies for LED Lighting Systems



Mixing Light from Different LEDs

- Application: Using two or more different LEDs to generate light (for single color or white, tunable white and color-changing)
- Advantage: achieve desired color of light or color temperature of white light, for both static and dynamic (e.g., color-changing) applications
- Example Patents/Applications:
 - North America: US6234645, 6234648, 6513949, 6692136, 7014336, 7719209, 8203284
 - Europe: EP1046196, 1047904, 1234140, 1502483, 1887836, 2143303; GB2421367
 - Asia: CN101107885, 101663919, 1124426, 1227738, 1227749; HK1112153; IN210549; JP4366016, 4376464; KR10-0702273, KR10-0776837, TW167039

