Arrow LED Lighting Capabilities

Accelerate LED Lighting Product Development with Arrow

ARROW

LED Lighting Trends and Applications

The popularity of LED lighting is growing rapidly. Over the last decade, energy efficiency regulations, user preferences, and falling prices of LED light sources have driven heightened demand. With typical LEDs being 75%[1] more energy efficient than traditional lighting, not surprisingly, there is widespread interest in moving to an LED-based infrastructure across the globe.

Smart and color-tunable LEDs are in demand for the controllability they offer in commercial and hospitality settings. Demand for circadian lighting – lighting that supports human health and well-being – has also increased. Horticultural applications have been an important segment for LED use and the segment continues to show increasing demand. On the healthcare front, Ultraviolet (UV) light has been used to sterilize and disinfect medical equipment for decades. The onset of COVID-19 has triggered the use of ultraviolet LED solutions to disinfect and sterilize hospital beds, floors, and surfaces that could keep the virus active.

Lighting implementations can constitute a set of standalone devices or take the form of a highly integrated smart system that connects various applications and domains through a central gateway. Connected lighting solutions are being particularly favored by government regulations and incentives for sustainable solutions as they are characterized by low-cost sensors and wireless connectivity. These features make connected lighting solutions easy to deploy even in remote locations.
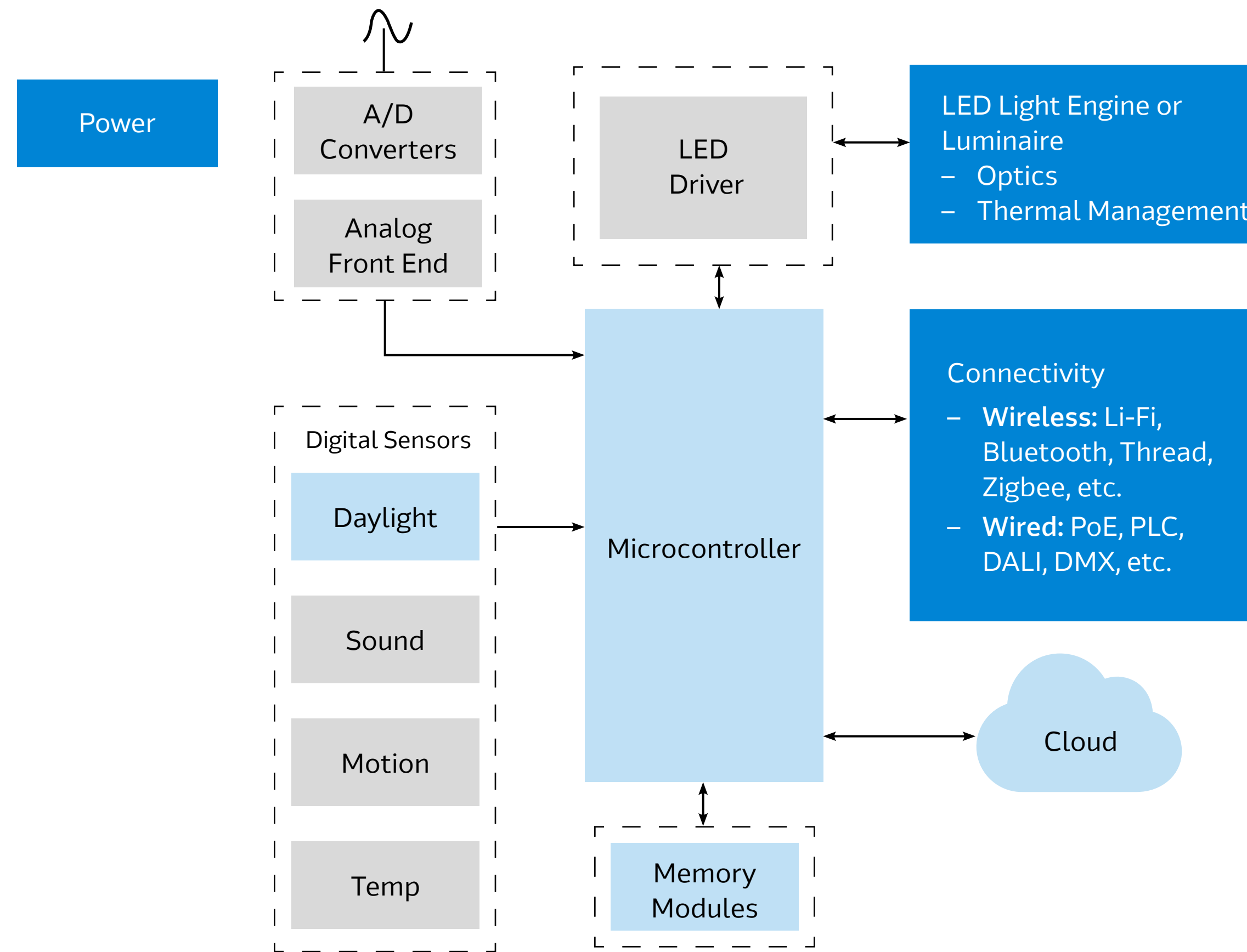
Attractive pricing and sustainability benefits are opening up a wide variety of possibilities for new business models and novel solutions. Yet, complexity, domain expertise, and privacy/security concerns are key barriers that need to be overcome to further accelerate the pace of adoption.

1. Department of Energy

Considerations for Smart Lighting Design

Five elements constitute the core of most lighting application development – the LED design itself including optics and thermal elements, embedded software/firmware development, application design, cloud engineering and remote management, and security implementation. All these elements are crucial to implementing energy-efficient systems by automatically turning lights on or off based on occupancy, adjusting lighting levels based on ambient conditions, and by streamlining management capabilities.

Power

A/D Converters

Analog Front End

LED Driver

LED Light Engine or Luminaire
– Optics
– Thermal Management

Digital Sensors

Daylight

Sound

Motion

Temp

Microcontroller

Connectivity
– **Wireless:** Li-Fi, Bluetooth, Thread, Zigbee, etc.
– **Wired:** PoE, PLC, DALI, DMX, etc.

Cloud

Memory Modules

End-to-End Smart Lighting System

Technologies, connectivity, and device ecosystems for lighting continue to evolve at a rapid pace. Security and privacy regulations are becoming key factors for the adoption of smart lighting. In this dynamic environment, engineers must:

– Select the best lighting technology that meets the application's needs. Ensure optics and thermal designs
– Build future-proof systems that can adapt to new technologies while leveraging existing infrastructure
– Create open and interoperable architectures for easy integration of devices, data, and systems
– Incorporate security at all stages in the design
– Keep costs low
– Meet global certifications

Partners with expertise that spans product development to deployment and management are critical for accelerating time-to-market and lowering costs. Navigating the complex supplier landscape is a crucial task that only a competent partner can facilitate. A strong partner can offer a best practice solution portfolio that accounts for security, infrastructure, and scale creating new avenues for growth and optimization.

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Arrow Lighting Capabilities

Arrow is a leading global supplier of electronics for solid-state lighting (SSL) and connected applications with decades of experience partnering with lighting manufacturers and other organizations in designing and building lighting components, assemblies, and fixtures. Arrow has been at the forefront of lighting innovation, partnering with manufacturers and others to transition successfully from analog lighting to SSL.

Lighting solution providers, building managers, and lighting system integrators can procure the entire technology stack from Arrow. With a wide partner ecosystem and service offerings that span product development to deployment, Arrow can help concepts get to market rapidly and cost-effectively.

Our competencies in these areas help you build innovative lighting products:
– LED design including mechanical, thermal and optics
– Connectivity and embedded design
– Cloud-enabled product development
– Monitoring and remote management
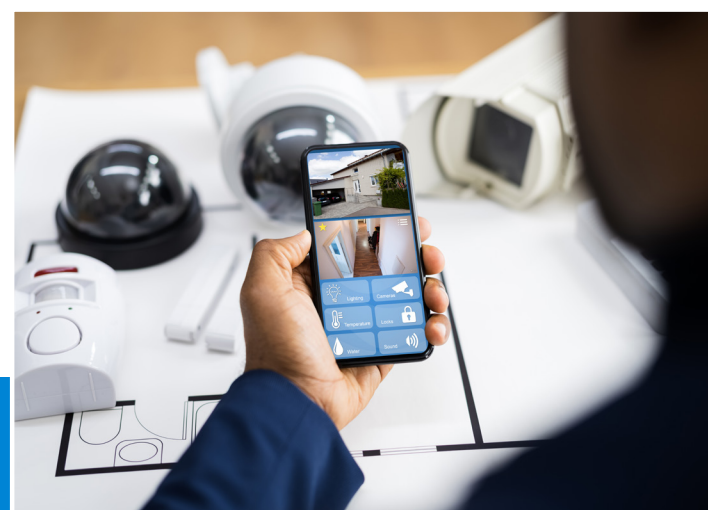– Hardware and software-based security implementation

Dedicated lighting field experts
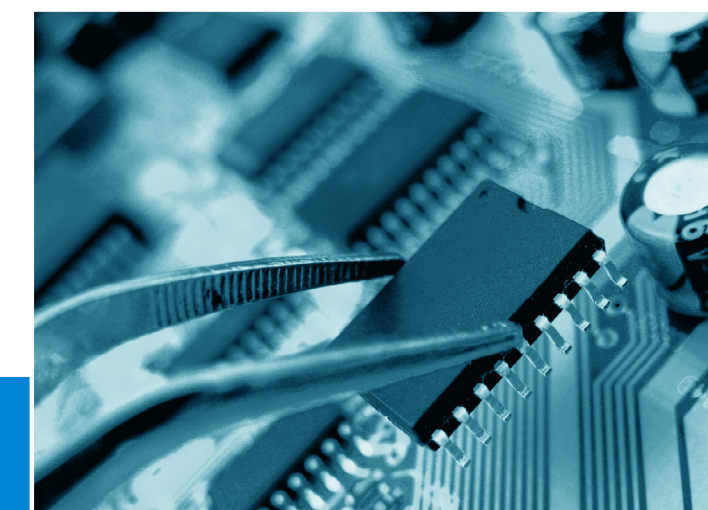
Engineering services and support
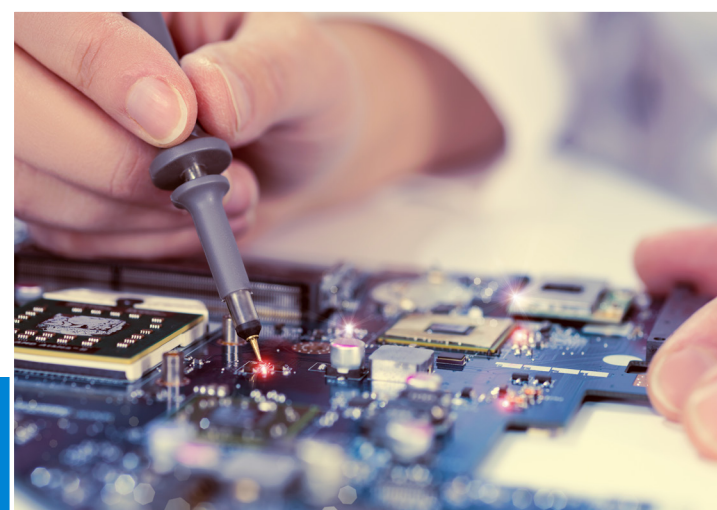
Proven expertise in smart and connected lighting
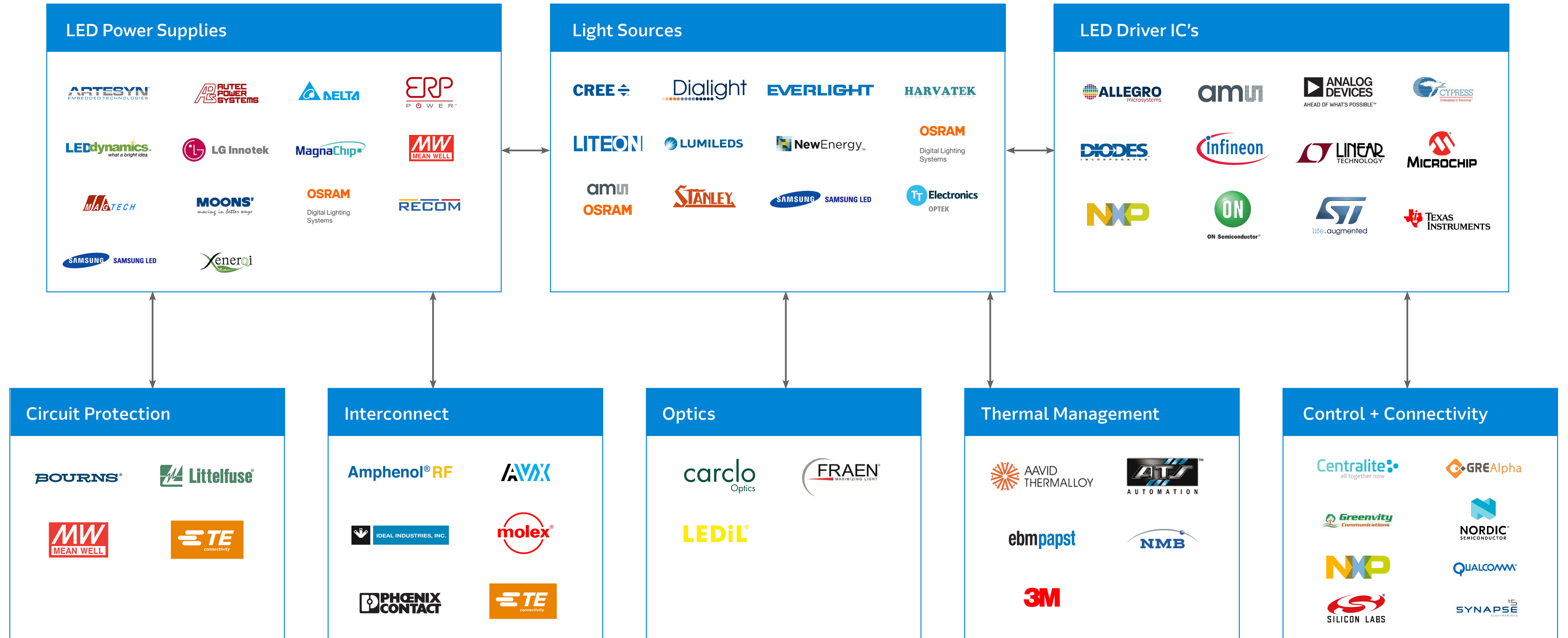
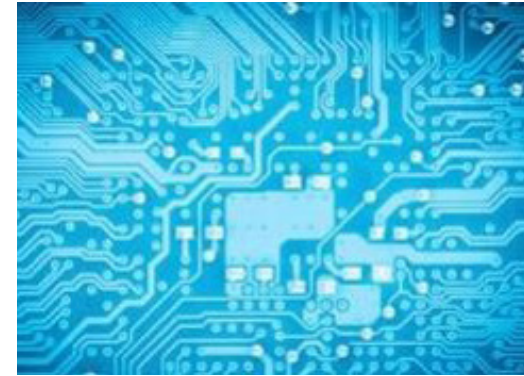**Lighting supply chain competency**

Value-added services

Wide Supplier Ecosystem

LEDs & Modules, LED drivers, Power supplies, Optics, Thermal management, Circuit protection, Connectivity, & Controls

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Arrow Lighting Ecosystem

# Arrow Engineering Services for Lighting

Electrical Engineering

– PCB design and layout
– System definition
– LED boards/light engines
– AC/DC and DC/DC power
– Connectivity and smart
  lighting systems
– Software and cloud expertise
– Application-level support

Prototyping and Manufacturing

– 3D printing
– PCB assembly
– CNC and sheet metal parts
– Quick proof of concepts
– Quality control
– Production manufacturing
– First article inspection
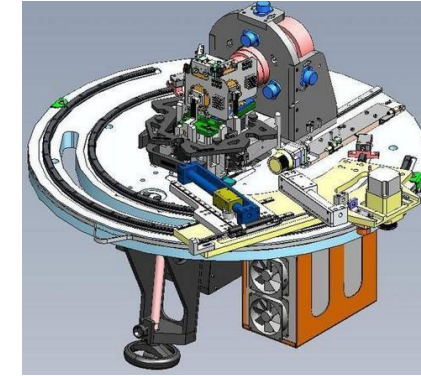
Mechanical Engineering

– Heatsink/thermal design
  housings/enclosures
– Optics/lenses
– Cable assemblies
– Injection molding
– Castings and extrusions
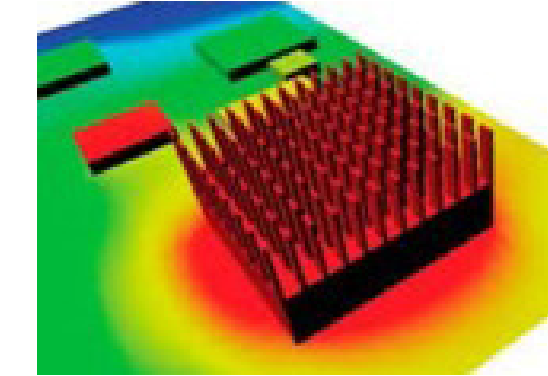
Test and Analysis

– Photometric testing
– Electrical testing
– Thermal simulations
– Electrical simulations
– Design verification/validation

Arrow Lighting Lab

Our lighting lab services are a unique offering within the industry and are provided to assist our customers through the product development process and augment their internal testing and engineering capabilities. The Arrow lighting lab uses state-of-the-art equipment and software to provide a suite of photometric, electrical, and thermal capabilities and production-level design services.

– Integrating spheres
– Luxmeter
– Spectrometer

– AC and DC benchtop power supplies
– Soldering stations
– Hot air and hot plate SMT reflow soldering

– Misc. multimeters, scopes, and analyzers
– Machine shop

Arrow Value-Added Services

Production Services
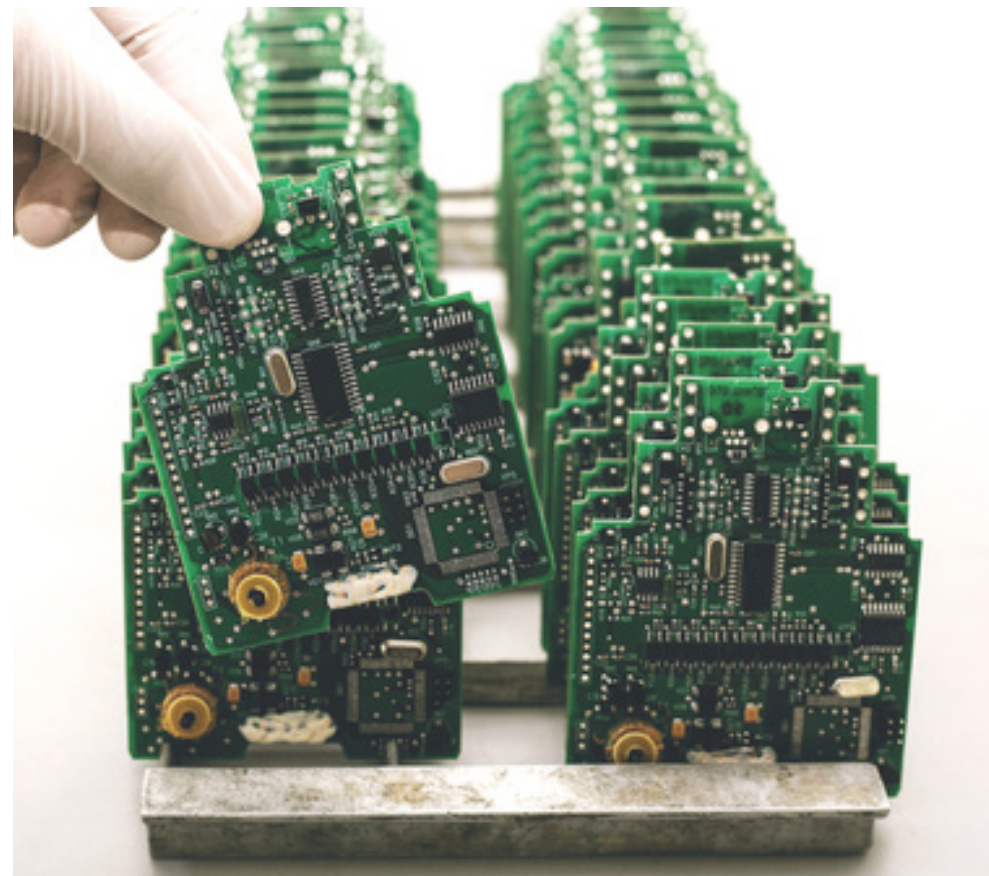
– Kitting for PCB assembly
– Device programming
– Tape & reel
– Component preparation
– Custom kitting & packaging
– Shrink tubing cutting & marking
– Power supply modification & modular assembly
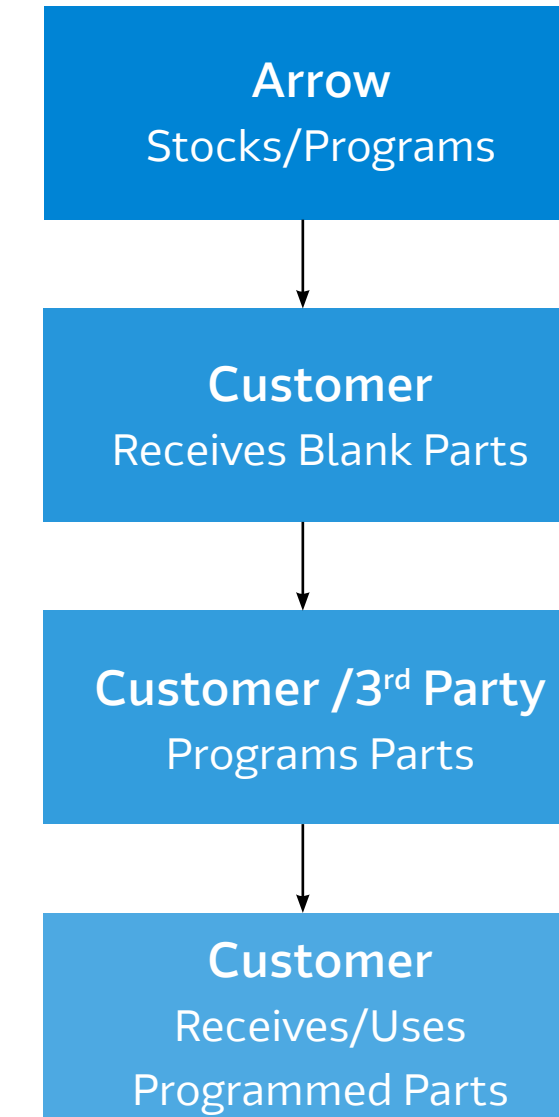– Fan termination & assembly
– Cable assembly

Programming Services

Arrow Programming

Arrow
Stocks/Programs Parts

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Customer
Receives
Programmed Parts
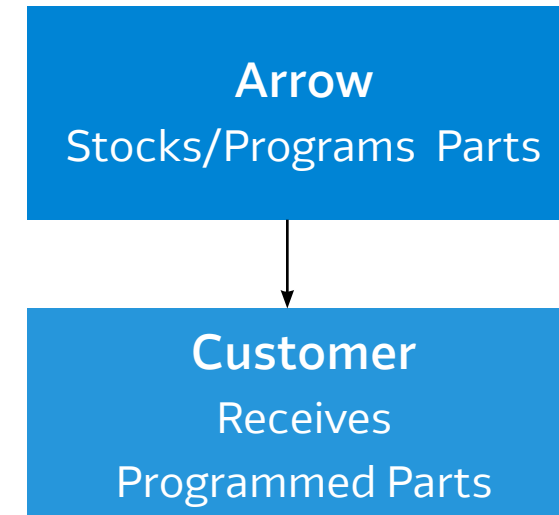
– NO Extra days of inventory
– NO Fall-out costs
– NO Extra order management costs
– NO Extra material handling costs
– NO Equipment or tooling investment
– NO Fixed staff costs
– NO Supply costs

In-house/3rd Party Programming

Arrow
Stocks/Programs

↓

Customer
Receives Blank Parts

↓

Customer /3rd Party
Programs Parts

↓

Customer
Receives/Uses
Programmed Parts

– + 7 Days of inventory
– + Fall-out costs
– + Order management costs
– + Material handling costs
– + Capital equipment & Other costs

Financing/funding

Arrow Capital Solutions

– 0% and low-rate financing options
– First payment deferrals of 30, 60, 90 days
– 12 to 60 month terms
– Monthly, quarterly, annual payments

Markets we Serve

General Lighting (Commercial Lighting)

Architectural

Street Lighting

Horticulture

UV Lighting

Medical

Arrow provides you with a single point of contact that is backed by a team of industry experts that can help you leverage new technologies and build innovative future-proof lighting solutions. Contact us now at **www.arrow.com**

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Contact Information

Email:
Online:

ARROW
Five Years Out