

# User Experience Key to LED Adoption

By Jade Sky Technologies, Inc.

One of the biggest challenges facing the lighting industry is how to effectively transition consumers and industry from 130+ year-old Edison incandescent light to more energy-efficient solid-state LED (SSL) lighting choices. The Energy Independence & Security Act of 2007 (EISA 2007) set a then-futuristic deadline for eliminating all 40W and above general-service “Edison screw” incandescent light bulbs by January 1, 2014 in the United States. That future is now! And the looming question for the lighting industry going forward is whether the masses are actually ready to adopt these nascent LED lamps to retrofit over 3.3 billion Edison screw lamp sockets within the U.S. (of which about 97% are residential).

Efforts to transition homes to high-efficiency light sources have been underway since at least 1992, when California utilities launched full-scale CFL rebate programs. California Energy Commission (CEC) estimates that as of 2010, only 21 percent of all residential lamp sockets in California had been refitted with CFLs, with the national residential average being just 11 percent <sup>(1, 2)</sup>.

The lethargic and incomplete market adoption of CFLs in the residential market demonstrates that just because a product produces sufficient light, proves cost effective, saves energy, and is supported by millions of dollars in persuasive marketing, the market adoption of that technology is not ensured.

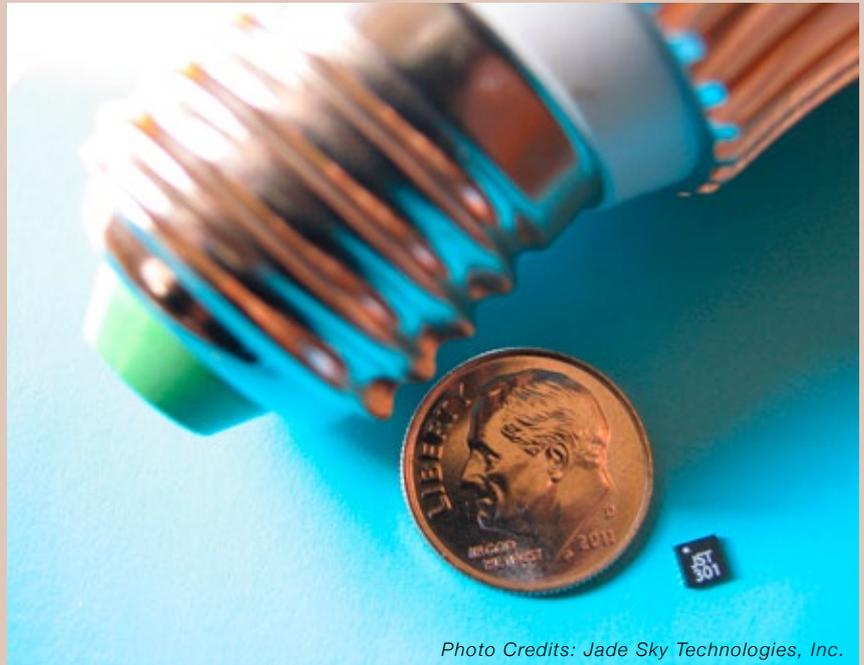


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Similarly, LED lamps on the market thus far have also been falling short on addressing some of the same user-experience issues that deflated the adoption of CFLs. And the world will little tolerate yet another failed ‘energy-efficient lighting’ technology transition campaign. So, how can LED lighting manufacturers persuade a somewhat reluctant public to leave their time-tested incandescents behind and transition to the new LED products?

We, as an industry, must to take user experience seriously, and manufacture LED lamps that will delight the end consumers.

Despite dramatic improvements in color quality, however, most current-generation LED lamps grossly misbehave in the presence of dimmers and energy management sensors, with issues including non-monotonic output, very limited dimming range, visible flicker, strobing, and/or becoming stuck on or off. The color quality of the light quickly becomes rather irrelevant when the LED lamp itself is flashing or otherwise misbehaving.

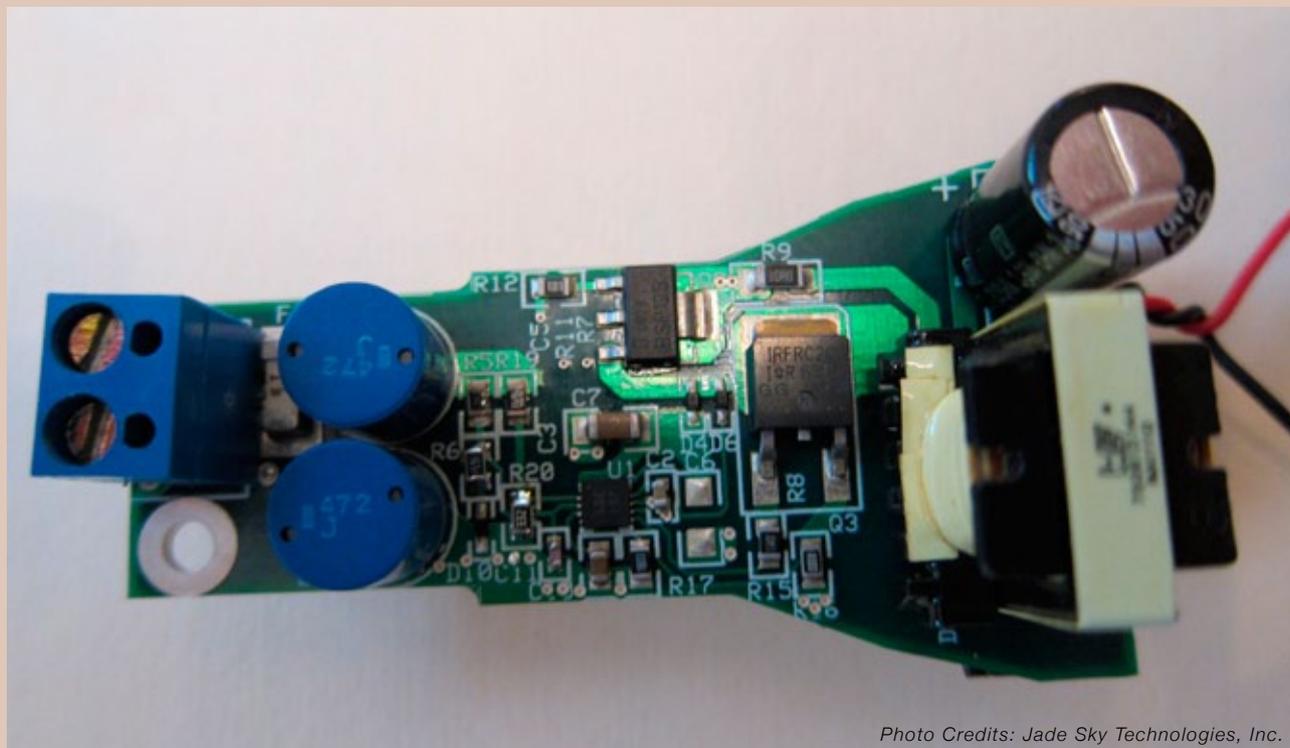


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For LED lighting manufacturers, there is now a solution. The JST301 chip, using patented RetroBulb™ technology, delivers the experience expected by users familiar with the incandescent lamp along with the energy efficiency and reliability of solid-state lighting, making it possible for OEMs to create LED lighting products that have:

- Lower BOM cost, resulting in better consumer pricing
- Smaller physical area requirements
- Guaranteed-by-design universal compatibility with all previously-installed dimmers and sensors
- Smooth, flicker-free deep-dimming with 100% down to 0% range
- Very high efficiency
- Close-to-unity power factor

Now, for the very first time, LED lighting OEMs can say NO to dimmer-compatibility charts, dimmer-testing overhead, customer dissatisfaction, purchase difficulties and returns.

#### Features of the JST301 chip

- Smooth monotonic 0 to 100% dimming range with no flicker
- Compatibility with all TRIAC dimmers: leading-edge, trailing-edge, digital, and with occupancy sensors
- Near-unity power factor without external PFC circuitry

and independent of driver topology

- Support for isolated and non-isolated designs
- Adjustable switching frequency (50KHz-500KHz) for space constrained designs
- Spread-spectrum modulation for reduced EMI, typ 6dB reduction
- Low quiescent current, 500uA
- Protection features for over-voltage, over-current, and over-temperature conditions
- Patented PFC architecture and dimming technology
- Higher system efficiency with improved system cost and reliability

#### Typical Applications

- Dimmable Retrofit LED Lamps and Luminaires, up to 30W
- Industrial and Commercial Lighting, T-lamps
- LED Driver Modules and Bricks
- Solid-state Signage

Jade Sky Technologies' mission is to bring simplicity back to lighting for the end consumer by making a true retrofit LED bulb possible. Holding many patents, JST manufactures innovative power ICs that help ensure a smooth and comprehensive transition from incandescent to LED lighting. For more information, please visit [www.jadeskytech.com](http://www.jadeskytech.com).

#### References

1. The Cadmus Group and Quantec, "Compact Fluorescent Lamps Market Effects Final Report" (California Public Utilities Commission, Energy Division, April 12, 2010), [http://www.calmac.org/publications/CFL\\_ME\\_Final\\_Report\\_04-12-10\\_3.pdf](http://www.calmac.org/publications/CFL_ME_Final_Report_04-12-10_3.pdf).
2. U.S. Department of Energy, "CFL Market Profile 2009", March 2009, [http://www.energystar.gov/ia/products/downloads/CFL\\_Market\\_Profile.pdf](http://www.energystar.gov/ia/products/downloads/CFL_Market_Profile.pdf).