

# INVENTIONS & INNOVATION

## Success Story



## ELECTRONIC STARTER DEVICE FOR FLUORESCENT LAMPS

### New Quick Start Module Improves the Quality of Fluorescent Lamps

#### Benefits

- ◆ Can double the life of a fluorescent lamp
- ◆ Reduces recycling costs or toxic chemicals in landfills from used fluorescent lamps and glow bottle starters
- ◆ Has saved 0.4 trillion Btu through 2000, resulting in \$5 million in electricity savings
- ◆ Has reduced CO<sub>2</sub> emissions by 27,000 tons through 2000 because of reduced electric usage

#### Applications

Low-cost, high-performance fluorescent lamp starter for a wide range of lighting applications from 5 to 40 watts.

#### Capabilities

- ◆ Easily inserts into a conventional glow bottle canister or a compact fluorescent lamp socket
- ◆ Replaces glow bottle starters for fluorescent lamps
- ◆ Increases lighting quality and reduces the operating cost of fluorescent technology

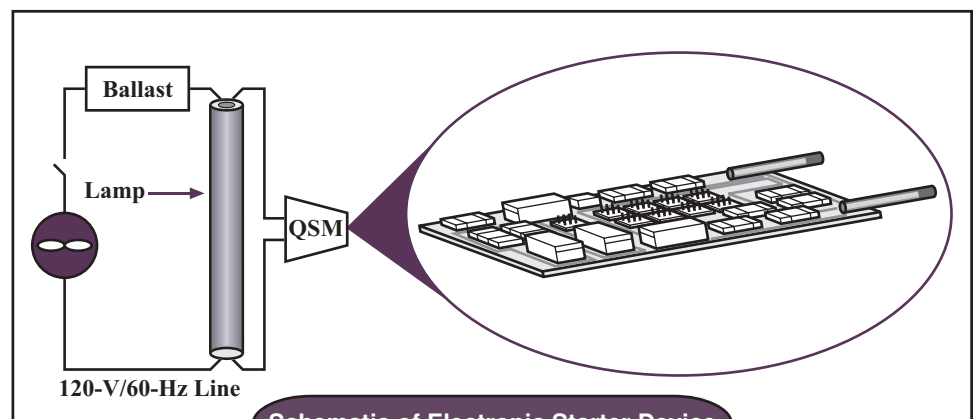
“The Inventions and Innovation grant allowed Beacon engineers to manufacture the QSM prototype.”

– Ron Porter  
Beacon Light Products, Inc.

Fluorescent lighting is about 3 to 4 times more efficient than incandescent lighting, and fluorescent lamps last about 10 times longer than incandescent bulbs. However for many applications, the quality of incandescent lighting is considered more desirable than fluorescent lighting. Many fluorescent lamps require a starter device to preheat the electrodes and to provide the high-voltage “kick” needed for starting. Several iterations are sometimes needed to get the tube to light. The starter may keep cycling indefinitely (i.e., causing flickering) if either it or one of the tubes is faulty. This flickering during starts and after lamps are burned out is annoying and may create safety hazards.

Beacon Light Products, Inc., designs, develops, and manufactures miniature electronic controls for lighting and other power applications. Through a grant from the U.S. Department of Energy’s Inventions and Innovation Program, Beacon Light Products developed a quick and reliable electronic lamp starter for small fluorescent applications. Beacon’s Quick Start Module (QSM™) represents state-of-the-art performance, reliability, and miniaturization for fluorescent lamp starters.

The QSM consists of sophisticated micro-controller chips and custom high-voltage thyristor technology that are assembled on ceramic hybrid chip and wire substrates for extended-temperature, high-reliability applications. The technology provides superior performance to other electronic starters because QSM’s application-specific integrated circuit (ASIC) can sense the current and accurately control the ignition pulse. The ASIC makes the QSM a very fast and reliable starting device. Other features include a broad voltage operating range and safe shutdown of burned-out fluorescent lamps without flickering.



Schematic of Electronic Starter Device





## Energy Savings and Pollution Prevention

Over 450,000 QSM units have been sold through 2000 with a total annual energy saving of 0.3 trillion Btu. Cumulative energy savings for all installations is over 0.4 trillion Btu compared with incandescent lighting for the same purpose.<sup>1</sup> The associated reduction in CO<sub>2</sub> emissions is estimated to be 27,000 tons and avoided energy purchases total \$5 million through 2000. Because the QSM extends fluorescent bulb life, the QSM also reduces mercury-laden phosphor powder entering the environment when fluorescent lamps must be disposed of or recycled.

## System Economics and Market Potential

The QSM is more reliable than the conventional glow-tube starters and has a faster ignition and a longer life. The QSM can double the life of a fluorescent lamp. Longer lamp life means reduced maintenance and associated downtime to replace burned-out lamps. For industrial and commercial users, the labor savings could range from dollars to hundreds of dollars per bulb, depending on how difficult they are to replace.

<sup>1</sup> It was assumed that 40 watts are saved per unit over an incandescent light. Energy saved for a light operating 5,000 hours per year is 200 kWh or 680,000 Btu per year.

### **INVENTIONS AND INNOVATION PROGRAM**

*The Inventions and Innovation Program provides financial assistance for establishing technical performance and conducting early development of innovative ideas and inventions. Ideas that have a significant energy-savings impact and future commercial market potential are chosen for financial support through a competitive solicitation process. Inventions funded by the program have saved enough energy to light 10 million homes per year. In addition, the program offers technical guidance and commercialization support to successful applicants. Ideas that benefit the Industries of the Future, designated by the Office of Industrial Technologies as the most energy-intensive industries in the United States, are especially encouraged.*

#### **Project Partners**

- ◆ Inventions and Innovation Program  
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- ◆ Beacon Light Products, Inc.  
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- ◆ Arizona State University  
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- ◆ Northern Arizona University  
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