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Although you do not often hear about growth in domestic manufacturing here in the United States, the solid-state lighting industry is steadily growing and establishing a manufacturing presence here at home. Solid-state lighting was not only born of U.S. ingenuity and R&D, but is riding the crest of a worldwide trend toward greater energy efficiency. This offers a golden opportunity for U.S. manufacturing to take a significant role in SSL. From time to time, these Postings will focus on SSL companies manufacturing here in the U.S., a series we call "SSL in America." This is not intended to endorse or promote any of the companies, but rather to describe advances in energy-efficient solid-state lighting. The activities you'll read about here are consistent with the [U.S. Department of Energy \(DOE\) white paper](#) "Keeping Manufacturing in the United States," which grew out of DOE's 2010 SSL Manufacturing R&D Workshop.

Spotlight on Rambus Inc.

Founded in 1990, Rambus Inc. has made a name for itself licensing memory technology to semiconductor makers, but today the company also offers products and services in mobile media, security, LED lighting, and LED displays. According to director of global supply chain management Joe Hornung, Rambus's entry into SSL began in late 2009, when it acquired the R&D team and intellectual-property assets of Global Lighting Technologies, which specialized in edge-lighting technology that was used primarily for backlighting notebook computers, handheld devices, and TVs. Rambus licenses this technology to LED luminaire manufacturers and also uses it in its own line of LED replacement lamps, the first product of which (an A19 lamp) is already in production and is expected to hit store shelves this year. In addition, Rambus manufactures the light guides that transfer the light from the LEDs to the viewing area.

Unlike direct lighting, where the LEDs sit behind a diffuser panel, with edge-lighting the LEDs are coupled into the edge of the light guide, which results in less glare and no "birthday cake" bright spots and also allows for the use of much thinner form factors. Joe explains that Rambus's edge-lighting technology uses micron-level optics that manipulate how the light is emitted out of the light guide

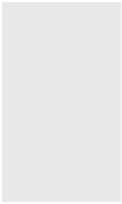
and optimize the efficiency of the interface between it and the LEDs. The company also licenses and uses manufacturing techniques that allow these technologies to be implemented in high volume at low cost. And Rambus provides engineering support to its licensees, to help them manufacture fixtures that use this edge-lighting technology.

Headquartered in Sunnyvale, CA, Rambus – a participant at DOE's annual SSL workshops – currently does nearly half of its SSL manufacturing here in the U.S., with the rest done in Taiwan and China. Joe says that while some of that U.S. manufacturing will eventually be moved to Asia to service the company's growing overseas customer base, Rambus plans to always have a significant manufacturing presence in the U.S. Its U.S. SSL manufacturing is done at a facility in Brecksville, OH, a suburb of Cleveland that's located midway between the Pro Football Hall of Fame and the Rock and Roll Hall of Fame. Rambus's Brecksville facility, which was completed last summer, was originally set up to make prototype fixtures that use Rambus's light guides but has now been expanded to manufacture the light guides, most of which are injection-molded. That manufacturing began production this spring. The Brecksville facility also houses most of Rambus's solid-state lighting R&D team and, all told, is home to about 70 employees that range from PhD researchers, to tool and die makers, to line operators, to quality-control folks – all of them working with SSL.

Joe explains that the company wanted to have a U.S. manufacturing presence because its customers, most of which are located here, have a need to accelerate the product development process and get to market as quickly as possible, and the fastest way to do that is to manufacture domestically instead of relying on overseas supply chains. Domestic manufacturing allows for faster development time and shrinks customers' time to market. What's more, Joe says, Rambus's SSL manufacturing is highly automated, which negates the value of low overseas labor rates.

One issue the company has faced as a result of manufacturing domestically is the difficulty of finding appropriate manufacturing equipment. Joe notes that Rambus uses equipment designed for the display industry, which is centered in Asia, so the company has had to go outside the U.S. to get a good portion of its equipment. On the flip side, he says, the proximity of Brecksville to Cleveland and Detroit, which are centers of the auto industry, has made it easy to find employees with the needed technical skills.

Rambus Inc. is among a number of companies that are working to create and strengthen a solid-state lighting manufacturing base here in the U.S. This will not only help bring significant energy savings through more efficient lighting products, but will benefit our economy by adding jobs at multiple levels of the supply chain.



As always, if you have questions or comments, you can reach us at postings@lightingfacts.com.

