

# LUMILEDS™

LIGHT FROM SILICON VALLEY

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**LEDs Light the Way for New Car Headlamp Designs**

*Audi, Ford & Concept Car Stylists Utilize Lumileds' Luxeon LEDs To Deliver Sleek, Long-Lasting Headlamps; First LEDs Bright Enough for Forward Lighting*

SAN JOSE, CA (April 28, 2003) - Automotive designers at Audi, Ford and leading styling studios are adding headlamps to the growing list of automotive lighting components powered by LEDs, reflecting technology advances that have made light-emitting diodes bright enough to be incorporated in headlights for the first time.

The new headlamps are being built with Luxeon LEDs from Lumileds Lighting, the world's brightest LED light source. Each Luxeon emitter delivers up to 60 times more light than conventional 5mm LEDs. Luxeon technology is making it possible to produce innovative new headlight designs that not only capitalize on the small size of LEDs but also consume less energy than standard lamps, have no environmentally undesirable mercury, and do not need to be replaced for the life of the vehicle.

In recent auto shows, the Ford Model U and Audi Nuvolari concept vehicles, the latest Fioravanti concept car, and two custom-body productions from one-off designer Carrozzeria Castagna have featured headlamps utilizing Luxeon LEDs. Designs have ranged from the sharply angled front lighting on the Ford Model U and the slim horizontal headlamps on the Audi Nuvolari to the "insect eyes" on the Fioravanti Yak.

Luxeon-based forward lighting also is contributing to the radical look of the Viper-powered Dodge Tomahawk four-wheel concept motorcycle, a brawny 500-horsepower machine with extreme styling and engineering that have celebrities like Jay Leno waiting in line for production models. The Tomahawk's headlamp resides

between the two front wheels in a striking double strip of lights formed by a series of single white Luxeon emitters, each fitted with a custom lens. The rear lighting system consists of an identical double strip of lights created with red Luxeon LEDs.

"LEDs are the only technology that combine the small footprint and low voltage required to execute the lighting design that Chrysler envisioned for the Tomahawk, but conventional LEDs are too weak to deliver the necessary light output," said Rob Miller, Senior Partner and Managing Director of Canton, Michigan-based BrightLights Technologies, which engineered the Tomahawk's forward and rear lighting systems in collaboration with RM Motorsports of Wixom, Michigan.

"Without Lumileds' Luxeon V product, which pumps out 120 lumens per emitter, the forward lighting system in the Tomahawk as you see it today would not have been possible," Miller said.

"LEDs have been used in automotive signal lighting applications for a number of years, but until recently it would have required too many emitters to produce sufficient illumination for forward lighting," said Jeff Raggio, Automotive Business Development Manager for Lumileds Lighting. "Our Luxeon technology makes LED-powered headlamps practical for the first time, and the presence of these headlamps in today's concept vehicles indicates that consumers will be driving cars with Luxeon headlights within a couple of years."

At the 2003 North American International Auto Show in Detroit, Ford's Model U concept vehicle featured Luxeon-based headlamps with low-beam and high-beam functions as well as dynamic corner lighting capability. The car's adaptive lighting system included the ability to produce different beam patterns to suit different situations such as highway, in-town or curve driving.

At the 2003 Geneva Motor Show, the headlamps on Audi's Nuvolari used Luxeon LEDs to allow the light source to be located much closer to the lamp cover for more harmonious styling with the front end of the car. This is possible because LEDs do not produce the heat associated with conventional bulbs, creating a cool beam that cannot harm the headlight housing.

Headlamps built with Luxeon lighting also appeared in Geneva on the Yak from Fioravanti and the Rossellini and the G.C. from Carrozzeria Castagna. The Yak featured a headlamp style dividing the source of light into many units that can be modulated according to the luminous intensity desired, the vehicle speed or the angle of illumination, while the two Carrozzeria Castagna vehicles took advantage of the small LED footprint to create dramatic new line cuts on the vehicle.

In addition, leading automotive lighting suppliers have been exhibiting headlamp concepts utilizing Luxeon LEDs to demonstrate the feasibility of solid-state forward lighting to automotive manufacturers. Guide Corporation demonstrated a Luxeon-based headlamp concept at the SAE show in Detroit, and Koito showed its own Luxeon-based version at the Tokyo Lighting Show in Tokyo.

### **About Lumileds Lighting**

Lumileds Lighting is the world's leading manufacturer of high-power LEDs and a pioneer in the use of solid-state lighting solutions for everyday purposes including general lighting, automotive lighting, traffic signaling, signage and LCD backlighting. The company's patented Luxeon Power Light Sources are the first to combine the brightness of conventional lighting with the small footprint, long life and other advantages of LEDs. Lumileds also supplies core LED material and LED packaging, and manufactures billions of LEDs annually. A joint venture between Agilent Technologies and Philips Lighting, Lumileds is headquartered in San Jose, California, with operations in the Netherlands and Malaysia and sales offices throughout the world. For more information, call Lumileds at 408-435-6111 or visit [www.lumileds.com](http://www.lumileds.com).

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