

By Lawrence Kren

Intelligent charging systems

Previous intelligent automotive charging systems used two-line analog communication to set regulator setpoint voltage. But a local-interconnect-network (LIN) controlled alternator-regulator from **International Rectifier**, El Segundo, Calif., relies on a more-sophisticated serial connection for greater dynamic control.

The vehicle's engine-control unit uses the LIN to transmit charging voltage setpoint from 10.7 to 16 Vdc, load response control-ramp and cutoff speed, and field-excitation limit. Transmitted fault codes indicate mechanical, electrical, temperature, communication, and time-out errors. The regulator consumes under 200 μ A in standby mode and includes short-circuit protection and EMI and ESD suppression.

The use of thick-film hybrid assembly technology gives reliable operation at elevated temperatures as well as parametric stability over the operating temperature range of -40 to 150°C . The hybrid circuit is customizable and can be assembled into a housing with an insert-molded lead frame for either flame soldering or heavy wirebonding. ■



Ring around the photon switch

Data traveling through optical fiber eventually be converted into electrical signals and processed by conventional electronic circuits. In many cases signals are converted back into optical signals for retransmission, an extremely slow process.

But an all-optical switch developed by Cornell University researchers allows one low-powered light beam to switch another on and off, making it possible to route optical signals without conversion. Photonics

switches have been suggested since the 1960s, though previous devices were large by microchip standards or required high-power light beams to work.

The Cornell approach confines the beam to be similar to a silicon ring resonator, 10 μm in diameter. Resonance frequency determines resonant wavelength, which in this case is 1,555.5 nm (near

Linux for cars

Linux, the ubiquitous and free operating system that by some estimates runs half of Internet servers, is targeting automobiles. Special automotive-grade Linux technology from **Metrowerks Corp.**, Austin, addresses automotive OEM demands for determinism, fast boot time, and low power consumption, as evidenced by a sub-40-msec response time, real-time capabilities, and optimized operation of MPC5200 microprocessors.

The MPC5200 from **Freescale Semiconductor Inc.**, Austin, delivers 760 Mips of computing power and consumes just 1 W. It is based on a 400-MHz MPC603e core with an integrated double-precision Floating Point Unit. A BestComm DMA controller offloads the core from I/O-intensive data transfers, while a Double Data Rate (DDR) memory controller accelerates data access with an effective memory bus speed of 266 MHz. Together, the DMA and DDR support a high-speed PCI interface, making the processor well suited for automotive telematics applications. ■

infrared). Light resonating in the ring turns the device "on." The introduction of a second light beam of the same wavelength switches the ring "off." This second beam is directed at the silicon to absorb light in a process called two-photon absorption. In turn, changes the refractive index and adequately shifts resonance frequency so that the ring no longer resonates at 1,555.5 nm, a process that, in theory, takes place in tens of picoseconds. Ring resonators will first find use in fiber-based signal routers, predictors, and searchers, but could also be used as tunable filters to separate different lengths of light in multiplexed communications systems. ■

BLUE LEDs FOR LESS GREEN

Blue LEDs have myriad applications in consumer, wireless, household, personal-care, automotive, and industrial markets. Blue was long considered the "holy grail" of LED colors, the missing color in the red-green-blue triad used to create full-color pixels in computer monitors and TVs.

Earlier blue-LED fab processes were slow and complex and about 10 \times more costly than those used to make red and green LEDs. But **The Fox Group Inc.**, Piedmont, Calif., has adapted a hydride vapor-phase epitaxy process used in low-cost semiconductor fab, to the manufacture of blue LEDs. The process makes blue LEDs of a quality suitable for many standard-brightness applications and at a price on par with red and green ones.

The process also raises the bar on manufacturing repeatability and consistency, says the company. Color spread is reduced by a factor of 10 to ± 1 nm, and voltage range, by a factor of five to ± 0.1 Vdc. Blue LEDs come in wafers, dies, and lamps in customer-specified packages. They output up to 2,000 millicandela at a dominant wavelength of 460 ± 1 nm at a forward voltage of 3.5 ± 0.1 Vdc. ■

MAKE CONTACT

The Fox Group, thefoxgroupinc.com

Freescale Semiconductor Inc.,
freescale.com

International Rectifier, irf.com

Metrowerks Corp., metrowerks.com