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SiliconBlue Pioneers New FPGA Technology for Handheld, Ultra-Low Power Applications

- *Industry's first non-volatile FPGA on 65nm low-power process*
- *Proprietary technology enables first FPGA optimized for the handheld market*

SUNNYVALE, California--([BUSINESS WIRE](#))--SiliconBlue™ today announced a revolutionary new class of single-chip, ultra low-power FPGA devices, that set a new industry standard for price, power and space along with unprecedented ASIC-like logic capacity for battery-powered, handheld consumer applications. Manufactured on TSMC's 65nm LP (low-power) standard CMOS process, the new single-chip iCE™ family of FPGAs incorporate the company's proprietary NVCM (Non-Volatile Configuration Memory) technology, eliminating external flash PROM costs while making it easy-to-use.

"We are introducing the first new FPGA technology in ten years, allowing us to build from the ground up single-chip, reprogrammable, ultra-low power FPGAs," said Kapil Shankar, CEO of SiliconBlue. "Our two-process generation lead, gives our customers an unprecedented two to five times price advantage over competing non-volatile PLDs. We have delivered all the capabilities and advantages of wall-plugged consumer FPGAs to battery powered handhelds today."

According to Semico Research, handheld applications are a rapidly growing market for programmable logic as sales in these applications are forecasted to be over US\$650 million by 2010. SiliconBlue's products are optimized for smart phones, PMPs (portable media players), DSCs (digital still cameras), MIDs (mobile internet devices), PNDs (personal navigation devices), handheld POS (point of sale) systems, medical instruments, Edu-toys and flash camcorders.

Rich Wawrzyniak, Senior Analyst at Semico, said, "Power and cost have been issues from very early on in the programmable logic industry. Despite efforts to improve in these areas, traditional FPGA solutions, for the most part, do not meet handheld requirements for power or cost. SiliconBlue's technology positions them to deliver an unprecedented combination of power, price and performance to designers who want to use programmable logic but have not because power was too high or performance was too low."

"SiliconBlue has attracted an incredibly skilled team of PLD experts, who have been instrumental in developing and patenting many of the leading programmable logic technologies. Their experience comes from industry-leaders such as Xilinx, Altera, AMD, LSI Logic, and Intel. This skilled team has enabled SiliconBlue to establish ultra low power technology and process leadership, compared to competing FPGAs trapped on lagging process nodes," said Rich Sevcik, former Executive Vice President, Xilinx, Inc. (Nasdaq: XLNX), and current Member of the Board for SiliconBlue.

Technology Benefits

SiliconBlue is the first company to combine low-power, Non-Volatile Configuration Memory (NVCM) and standard SRAM technologies at the 65nm LP process node. Fabricated at Taiwan Semiconductor Manufacturing Company (TSMC), the process is scalable to 40nm and beyond. SiliconBlue's FPGAs carry their own non-volatile configuration memory on-chip for storing configuration data; therefore there is no need for the external flash PROM employed by traditional FPGA solutions. This saves part count, space, cost and removes the threat of

bitstream snooping, resulting in secure designs.

Compared to existing non-volatile FPGAs, which employ embedded flash technology on two generations old 0.18 μ / 0.13 μ processes, the iCE FPGAs on 65LP process offer unprecedented ASIC-like logic capacity and deliver the industry's lowest logic cost.

The 65nm LP process, coupled with SiliconBlue's proprietary low-power design delivers more usable logic per unit of cost, lower standby power and lower active power than competing programmable logic products. SiliconBlue uses the same definitions for power modes as handset designers: Operating (active-fast, ~MHz) and Standby (active-slow, ~kHz). SiliconBlue's FPGAs remain operating, consuming less standby power than other products which require complex power down sleep modes. Active power remains low through a combination of 65LP process, proprietary chip design and operating the logic core as low as 1.0 volt.

iCE Ultra Low Power FPGA Family

SiliconBlue's first family of FPGAs, the iCE65, is comprised of four members that provide ultra-low power in small packages. Configuration is reprogrammable from many sources including secure, on-chip, embedded, NVCM, or external sources such as commodity SPI serial flash PROM or download from processor SPI interface. Operating current as low as 25 micro amp and lowest dynamic current, maximize battery life. Logic capacity ranges from 2k to 16k logic cells with I/O count from 128 to 384. BGA packages range from 3x4 mm to 12x12mm. The iCE family of FPGA devices is offered in both volatile and non-volatile versions.

Complete Design Environment

SiliconBlue's iCEcube™ VHDL and Verilog-based development software is easy-to-use and offers a familiar interface to guide developers from concept to bitstream. Synthesis and placement are provided by Magma Design Automation Inc. (Nasdaq:LAVA), while routing and bitgen were developed by SiliconBlue. The development software increases productivity, shortens design cycles and achieves performance and power requirements quickly and efficiently. The tools include a power estimator spreadsheet for estimating total power of a design.

The iCEman65 evaluation kit provides a complete platform for low-power testing and application development. The board includes an iCE65L04 ultra-low power FPGA with over 3,500 logic cells, 80Kbits of RAM, and 176 programmable I/O pins. Designers can quickly and easily develop applications using the USB-based programming solution integrated on board. The kit also includes extensive I/O expandability, supporting four different I/O banks, and a full line of affordable, third-party accessories. Test points provide easy access to all iCE65 voltage rails for easy power measurements.

Pricing and Availability

The first member of the iCE65 family, the iCE65L04, is sampling now with prices starting at \$2.00 in high volume. Additional devices in the iCE65 family will be available by the end of the year.

About SiliconBlue

Funded in 2006, SiliconBlue has built from ground up, the first single-chip, reprogrammable, ultra-low power FPGA optimized for handheld, mobile applications. While incumbents have focused on speed, density and features, SiliconBlue has set a new standard for price, power and space. Our low cost, non-volatile and reprogrammable FPGAs feature: operating power as low as 25 uW (typical); logic cell gate complexity unparalleled in existing low power PLDs; sizes as small as 3mm by 4mm. Samples, evaluation boards and software tools are available now.

SiliconBlue has the backing of substantial venture capitalists with many years of experience investing in semiconductors. They include Crosslink Capital and BlueRun Ventures (formerly Nokia Venture Partners). For more information, please visit www.siliconbluetech.com.

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Note: Additional press materials, including photos, can be found at:
www.siliconbluetech.com/pressjune2.

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