8051-based MCU touts integrated non-vol FRAM

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Colorado Springs, Co.— Ramtron International Corp. is offering what it believes is the industry's first 8051-based microcontroller with integrated nonvolatile ferroelectric random access memory (FRAM).

The new VRS51L3074 is the first in a series of planned products leading to a microcontroller based entirely on FRAM, where FRAM will be used for program, data and register memory, eliminating the need for Flash and SRAM altogether, said Irv Lustigman, General Manager of Ramtron Canada.

The device maps 8 KB of true non-volatile RAM into the VRS51L3074's XRAM memory for easy access, fast writes and essentially unlimited endurance. No battery/super cap is required to maintain data. FRAM simplifies the design cycle by eliminating the code overhead accompanying flash data storage, and the limited endurance and drawn out write cycles of Flash/EEPROM. Unlike Flash, FRAM bytes can be modified without first erasing an entire sector, rendering it easier to use. And unlike Flash/EEPROM, FRAM provides virtually unlimited read/write cycles and fast data writes, Lustigman noted.

The MCU features a 40-MIPS, single-cycle 8051-core, 64KB flash with In-System/In-Application Programming, 4KB SRAM, a JTAG program/debug interface, digital signal processing (DSP) extensions and a robust digital peripheral set. Operating at 3.3 volts over the entire industrial temperature range, the VRS51L3074 offers the ideal embedded data acquisition solution, targeting a wide array of applications from sensors and metering to industrial control, instrumentation and medical devices.

The MULT/ACCU/DIV Unit with 32-bit Barrel Shifter significantly outperforms 8-bit processors when executing DSP operations (FIR filtering, sensor output linearization, multiple-byte arithmetic operations, etc). It performs 16-bit signed multiplication and 32-bit addition in one cycle (at 40 MHz) and 16-bit signed division in 5 cycles (at 40 MHz). The barrel shifter enables logic/arithmetic shift operations.

The VRS51L3074's 40MHz precision internal oscillator provides better than 2% accuracy and cuts system costs by eliminating the need for an external crystal oscillator. The universal asynchronous receiver/transmitters operate at up to 1.25 Mbps. Each UART incorporates a dedicated baud rate generator with 16-bit resolution and 4-bit micro baud rate adjustment. The communication speed on the serial peripheral interface can be configured up to 20 Mbps and transactions are adjustable from 1 to 32 bits.

Two pulse width counter modules provide advanced timer control, simplifying event duration measurement. The VRS51L3074 incorporates eight pulse width modulators with up to 16-bit adjustable resolution. Each PWM includes its own timer, which can also be used as general purpose timers. Other support peripherals include an IC interface, three 16-bit general purpose timers/counters with three timer capture inputs, a watchdog timer, and 49 interrupts that share 16 interrupt vectors. The VRS51L3074 is available in a QFP-64 package.

The VRS51L3074 is currently sampling and costs under $5 in volume.

For more information about the VRS51L3074, please visit www.ramtron.com/vrs3xxx.

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