MCUs Integrate USB and High-Precision Analog

Atmel [1], a leader in microcontroller and touch solutions, announced additional features to the already-successful 8/16-bit AVR XMEGA microcontroller (MCU) family with the industry's lowest power consumption of 100nA with 5µS wake-up time. The new Atmel AVR® XMEGA® family [2] includes full-speed USB, the fastest and highest-precision analog systems, a Direct Memory Access (DMA) controller and the innovative event system that maximize real-time performance and throughput while reducing CPU load. This new family lowers overall system cost through higher integration, capacitive touch support, and ultra-low power consumption. The AVR XMEGA microcontrollers are designed for applications in the industrial, consumer, metering and medical segments.

The new AVR XMEGA MCUs [2] integrate full-speed USB connectivity with unique functions that reduce overhead and provide higher data rates. Using the high-precision internal oscillator in the AVR XMEGA, designers can lower the system cost by eliminating the crystal oscillator traditionally required for full-speed USB. Atmel provides free software for all common USB device classes in the AVR Software Framework [3], which is a complete software package that includes drivers and communication stacks for AVR microcontrollers.

The AVR XMEGA family has unique high-precision analog functions. The family includes two 12-bit analog-to-digital converters (ADCs) with programmable gain stages that remove the need for external amplifiers. The ADCs operate down to 1.6V operating voltage, and have a combined sample rate up to 4MSPS. The two 12-bit digital-to-analog converters (DACs) also support systems that need fast and high-precision analog output. The DACs can drive high loads to reduce external driver component costs, while built-in current outputs enable embedded

applications to remove external resistors or other constant current sources.

“Faster and higher-precision analog are increasingly important requirements in embedded applications, which have traditionally been solved with dedicated and expensive components,” said Ingar Fredriksen, sr. director, AVR products, Atmel Corporation. “The new AVR XMEGA family addresses all these specific needs in a single-chip solution. This new family also offers a unique combination of large flash memory and the market’s lowest power consumption using the Atmel picoPower technology [4]. The introduction of this new family is further testament that Atmel is a leader in microcontroller innovation.”

Atmel AVR XMEGA Family

The Atmel AVR XMEGA family is the only 8/16-bit MCU in the market with DMA, Controller and Event System. Peripherals and communication modules can utilize the DMA system to move data so the AVR XMEGA CPU has more idle time to save power or to perform other tasks. The innovative event system enables direct inter-peripheral signaling for short and 100% predictable response time without interrupt and CPU usage. Designers can now develop a solution with predictable real-time performance and data throughput even under a high system load. Other functions such as hardware AES and DES encryption and decryption ensure fast and low-power secure communication. Cryptography protects important intellectual software property during remote programming and firmware distribution. Atmel AVR XMEGA can also easily realize robust touch sensing interfaces through the Atmel QTouch Library [5], enabling buttons, sliders, wheels or proximity for user interfaces.

Highlights

- **High-precision analog** – 12-bit ADCs with gain stage and combined throughput of 4 MSPS. Fast 12-bit DAC with high drive strength, as well as other functions that reduce the need for external components.
- **Real-time performance** — The event system facilitates inter-peripheral signaling with 100% predictable response time. To offload the CPU, all peripherals can use DMA for data transfer.
- **Atmel picoPower technology** — True 1.6 volt operation, and 500 nA RTC operation with full SRAM retention for fastest possible wake-up time.
- **High Integration** — XMEGA devices integrate AES and DES crypto modules, up to 32 PWM outputs, 8 UART, 4 TWI (I2C) and 4 SPI channels, a CRC generator module, and more.
- **AVR Software Library** – A complete library of device drivers and communication stacks save time and development effort so you can focus on more important design tasks.
- **Atmel QTouch Sensing** – QTouch Library support enables you to easily realize robust capacitive touch sensing interfaces for button, sliders and wheels.
- **USB Connectivity** – Delivers full-speed operation without the need for external crystals, 31 endpoints, and a special multi-packet function that maximizes data transfer rates while minimizing CPU load.

All devices include the Atmel picoPower ultra-low power technology with true 1.6V operation, accurate real time clock (RTC) operation and full data retention at the industry-leading current consumption of 500 nA.

Pricing, Availability and Photo

The new Atmel AVR XMEGA devices with USB are available now. Pricing starts at $ 2.00 each in 10,000-piece quantities.

Links:
[1] http://www2.atmel.com/about/corporate/default.aspx
[2] http://www.atmel.com/dyn/products/devices.asp?category_id=163&family_id=607&subfamily_id=1965&source=pr-xmega-usb
[3] http://www.atmel.com/microsite/avr_studio_5/default.asp?source=pr-xmega-usb
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