Renesas Technology Expands its Flagship RX Flash MCU Family, Adding Broad Capabilities: Ethernet, USB OTG, CAN, and TFT-LCD Control

Renesas

San Jose, CA, March 2, 2010 – Renesas Technology America, Inc., the world's number one microcontroller (MCU) supplier, today introduced two new groups, the RX62N and RX621 Flash 32-bit MCUs that combine extreme high performance and low power consumption with diverse connectivity functions. These MCUs provide true single-chip solutions for demanding applications such as building and factory automation, medical monitoring and therapy equipment, security and fire alarm systems, climate control, home appliances, communication gateways and point-of-sale devices.

RX62N and RX621 Group MCUs have up to 512KB Flash memory, 96KB SRAM, and 32KB of data Flash, and provide extensive communication capabilities with options for Ethernet, CAN, and up to two USB-FS 2.0 channels, each operating as USB Host, USB Device, or USB OTG (On the Go). A Floating Point Unit (FPU) and a Multiply-Accumulate (MAC) unit are included to enhance math and signal processing capabilities. At a top operating frequency of 100MHz, these MCUs achieve a performance of 165 DMIPS, executing code directly from no-wait Flash memory while consuming only 53 mA of current (all peripherals active, typical conditions). To manage power, all clocks can be scaled, peripherals can be gated off individually, and four low-power modes can be employed. Standby options include maintaining SRAM contents or keeping time-of-day using the Real Time Clock (RTC).

These new MCUs are architected for both high computational performance, as well as high data throughput. The 32-bit CISC RX core has Harvard architecture and a 5-stage instruction pipeline which achieves a RISC-like rate of one clock per instruction. The embedded 90 nano-meter Flash memory, among the fastest in the industry, can be read at 10 nsec, feeding instructions to the CPU with no delays all the way up to 100MHz operation, maintaining peak performance and maximizing determinism. Both of these critical attributes for real-time embedded control are achieved without the complicated memory acceleration or caching techniques that must be used by many competing Flash MCUs.

Ritesh Tyagi, Director, Microcontroller Group, System LSI Business Unit, Renesas Technology America, Inc., said, "Connectivity plays an important role in many embedded systems today, and networking is being applied more often as control systems grow in complexity. But now more than ever before, multiple communication channels are being used simultaneously on the MCU, and sometimes even for driving a color TFT-LCD panel, which is very demanding in terms of CPU performance and memory size. Our customers will enjoy the unique advantages provided by the RX62N and RX621 compared to competing MCUs. For example, superior CPU performance enabled by the world's fastest embedded Flash

in production on the market today; multiple internal high speed busses and DMA for streaming data; large Flash memory to store the programs for many different communication protocols such as Ethernet TCP/IP, USB Host, and CAN; and large SRAM to ensure there are no bottlenecks. Thus, we expect these MCUs to be winners from the start. By employing new design techniques, Renesas will be able to release new devices every six months to expand coverage."

RX62N and RX621 MCUs will be supported by a comprehensive hardware/software tool set from Renesas and third parties. Renesas offers the popular High-Performance Embedded Workshop (HEW) integrated development environment (IDE). HEW includes the RX optimizing C/C++ compiler with integrated support for the low-cost E1 JTAG on-chip debugging tool, as well as the comprehensive E20 high-speed trace on-chip debugging tool. Renesas will also provide a full firmware library for all peripherals and hardware development kits with sample code and protocol stacks.

Third-party support for RTOS, middleware, communication protocol stacks, and color graphics will be available from the global community of Renesas Technology's partner vendors.

Pricing and availability:

100MHz RX62N and RX621 devices are currently sampling to lead customers and are priced in 10K quantities starting from $3.90, with USB-FS 2.0 Host/Device/OTG and CAN with 256KB main Flash, 32KB data Flash, and 64KB SRAM (R5F5621BDLD).

Additional product details:

Renesas launched the RX product line last year with the RX610 series, which introduced the revolutionary new RX 32-bit CISC CPU core capable of 1.65 DMIPS/MHz performance — an unprecedented level for Flash MCUs. The new RX62N and RX621 chips in this second wave of many more products to come will give customers a compatible migration path up and down in function, memory, and package size, thereby accommodating a wide variety of system applications that can leverage software, tools and design familiarity. RX MCUs enjoy heritage from the popular Renesas H8 and M16C MCU families to ease upgrades from those existing platforms.

The RX CPU core includes tightly-coupled computational assistance with a single-precision Floating Point Unit (FPU), a 32-bit Multiply-Accumulate unit (MAC), and 32-bit multiply and divide units, almost all of which are capable of producing single-cycle results. This integrated math capability greatly enhances motion-control and DSP applications such as factory and process automation, image and sound processing, and motor control.

Data movement is also streamlined. In addition to the Harvard-type architecture's CPU busses, there are two high-speed internal data busses which can be mastered by one of four DMA Controllers (DMACs), a Data Transfer Controller (DTC), an External DMA Controller (ExDMA), or the CPU itself. As a result, data can move

rapidly between peripherals, internal memory, and external memory with minimum interference on CPU core operation. This allows streaming traffic to and from Ethernet, USB, CAN, or other communication channels simultaneously with full CPU operation, as well as driving a color TFT-LCD panel.

Due to optimization of both the RX CPU architecture and compiler technology, application code size is typically smaller than many popular 32-bit MCU architectures in the market because of the RX CPU's variable-length CISC instruction set and optimized addressing modes. Data size is also very compact because data can be manipulated on odd address boundaries, leaving no gaps between data structures in SRAM. Bottom line, RX devices can commonly be used with smaller on-chip memory and no off-chip memory, reducing system cost and boosting performance.

RX621 Group MCUs have options for USB and CAN, whereas the RX62N Group MCUs additionally support Ethernet. All devices offer many more connectivity options including up to six SCI, two SPI, and two I2C channels. Analog interfaces include up to eight channels of fast 12-bit ADCs at 1 µsec conversion, or eight channels of 10-bit ADCs with dual conversion units, each with 1 µsec conversion time. Up to two 10-bit DAC outputs are also available.

Many timer options are available: up to 12 channels of 16-bit multifunction timers (MTU) with specific motor-control capabilities, four channels of 16-bit compare-match timers (CMT), four channels of 8-bit general purpose timers (TMR), and two channels of 16-bit pattern generators (PPG). There are also two watchdog timers; one is driven by an internal RC clock for ultimate reliability. The RTC has full calendar functions with Binary Coded Decimal (BCD) format for easy use. Full system supervisor capability is present with on-chip Power-On Reset (POR) and a selectable Low-Voltage Detect (LVD).

Other on-chip functions include a Cyclic Redundancy Check (CRC) generator, a PLL and flexible clock tree to support all on-chip clocks, support for direct drive of a color TFT-LCD panel up to WQVGA resolution, and an on-chip debug capability through a JTAG interface with a high-speed tracing option.

Physical Specifications:

RX62N and RX621 Group MCUs operate from 8MHz to 100MHz at 2.7V to 3.6V with a single voltage supply input over an operating temperature of -40oC to +85oC. Package options include LGA85 (7x7mm), LQFP100 (14x14mm), LQFP144 (20x20mm), LGA145 (9x9mm), and BGA176 (13x13mm). Memory combinations include (Flash/SRAM/Data Flash): 256KB/64KB/32KB, 384KB/64KB/32KB, and 512KB/96KB/32KB.

Expanding and enhancing the RX product line

Renesas Technology will continue to add products to the RX600 Family and will also introduce the RX200 Family, a line of energy-efficient 50MHz MCUs with the same RX CPU core designed for low-voltage, ultra low-power operation and advanced

analog capabilities. Peripheral compatibility will be maintained so migration between RX600 and RX200 families will be simple.

About Renesas Technology Corp.
Renesas Technology Corp. is the world's No.1 supplier of microcontrollers and one of the world's leading semiconductor system solutions providers for mobile, automotive and PC/AV (Audio Visual) markets. It is also a leading provider of Power MOSFETs, Smart Card microcontrollers, RF-ICs, High Power Amplifiers, Mixed Signal ICs, System-on-Chip (SoC), System-in-Package (SiP) and more. Established in 2003 as a joint venture between Hitachi, Ltd. (TSE:6501, NYSE:HIT) and Mitsubishi Electric Corporation (TSE:6503), Renesas Technology achieved consolidated revenue of 702.7 billion JPY in FY2008 (end of March 2009). Renesas Technology is based in Tokyo, Japan and has a global network of manufacturing, design and sales operations in 16 countries with 25,000 employees worldwide. For further information, please visit http://www.renesas.com [1]

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