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Epson to Ship Low-Power 32-bit Flash Microcontrollers Based on the ARM®Cortex®-M0+ Processor

- New S1C31W74 MPU doubles battery life-

- San Jose, California, October 26, 2015

Seiko Epson Corporation (TSE: 6724, "Epson") has developed and recently begun shipping samples of the S1C31W74, Epson's first product in a new series of energy-efficient microcontrollers (MCUs) with integrated 32-bit Flash memory. Epson plans to produce 200,000 units per month when volume production beings in July 2016.

Epson's original 16-bit Flash microcontrollers have proved to be a popular choice for embedding in mobile devices owing to their exceptionally low power consumption. The recent proliferation of wearable products has made balancing the need for performance with the need for power-friendliness an important issue.

To provide exceptional performance while extending battery life, Epson has created the new S1C31 family of MCUs. These are Epson's first MCUs to be based on the ARM® Cortex®-M0+ processor, and the S1C31W74 is the first product in the family. The combination of the very successful ARM® Cortex®-M0+ processor, the most energy efficient processor from U.K.-based ARM Ltd., and Epson's ultra-low leak process and circuit technology helps to enable powerful MCUs with modest power requirements, thus extending battery life.

The S1C31W74, which consumes only 900 nA in RTC mode and 150 µA/MHz in RUN mode, can operate up to two times longer on battery power than an Epson original core 32-bit Flash MCU[1]. This level of energy efficiency will move the world one step closer to realizing smart watches that do not require recharging and Internet of Things (IoT) terminals for environmental monitoring applications, where power consumption is a critical factor.

The S1C31W74 is a single chip housed in a 1-mm thick VFBGA8HX-181 package. The integrated circuit includes an LCD driver that can directly display up to 2,304 dots, a USB 2.0 full-speed device controller, 512 Kbytes of Flash memory, and 128 Kbytes of RAM. Epson also plans to offer the S1C31W74 as a bare chip. The feature-packed S1C31W74 will also help users reduce their bills of materials and save board space.

Epson will also provide an optional evaluation kit including an evaluation board, debug probe and IDE. The IDE is based on IAR Embedded Workbench® for ARM® provided by IAR Systems (Uppsala, Sweden).

Epson is committed to helping its customers improve the performance of their products with solutions that leverage Epson's core compact, energy saving and high-precision technologies.

Notes

1. 1.   ARM and Cortex are registered trademarks of ARM Limited in the EU and other countries. All rights reserved.
2. 2.   See the attachment for key product features and specifications.
3. 3.   Follow the link below for further details about these products.

http://global.epson.com/products/semicon/products/mcu/armcore_index.html

Key Product Features

1. Low-voltage, low-current operation that dramatically extends battery life
-Guaranteed operating range: 1.8 V - 3.6 V
-Power consumption in RUN mode: 150 µA/MHz
2. Interfaces for connecting a variety of sensors
-An R/F converter[2] for temperature and humidity measurement and UART,
 SPI, and I2C serial interfaces
-Universal port multiplexers[3] that increase board layout design flexibility
3. Embedded circuits that help customers reduce total product part counts,
    save board space, and shrink software development times
-LCD driver that can directly drive an LCD with up to 2,304 dots
-Oscillator circuit that is switchable between 20, 16, 12, 8, 2, and 1 MHz
-Supply voltage detector (SVD) circuit that does not require an external
 power supply supervisor
-QSPI that enables high-speed communications with external serial Flash memories
-Sound generator that supports three octaves, seven notes, and seven rests
-IR remote controller[4] that is capable of infrared remote control output

Product Specifications

Product model number	S1C31W74
CPU core	ARM® Cortex®-M0+ 32-bit RISC processor with multiplier
Flash memory	512 kilobytes
RAM	128 kilobytes
Instruction cache memory	512 bytes
Operating voltage	Guaranteed operating range: 1.8 V - 3.6 V Operating voltage during Flash memory rewrite operations: 2.7 V - 3.6 V Operating voltage during LCD driver use: 2.5 V - 3.6 V
Current consumption	SLEEP mode RTC OFF: 0.4 µA (typical) SLEEP mode RTC ON: 0.9 µA (typical)[5] RUN mode: 150 µA/MHz (typical)
LCD driver	2,304 dots max. (72 SEG x 25-32 COM) 1,920 dots max. (80 SEG x 17-24 COM) 1,408 dots max. (88 SEG x 1-16 COM)
I/O ports	71 max.
R/F converter	1 input channels (CR oscillator[6] with 24-bit counters)
Supply voltage detector	1.7 V to 4.3 V, 32 levels
USB	2.0 FS device controller, 1 channel
Serial interfaces	2-channel UART, 1-channel SPI, and 2-channel I²C interfaces QSPI: 1 channel
Package	VFBGA8HX-181 (8 mm x 8 mm with a ball pitch of 0.5 mm) Bare chip with 80 µm (min.) pad pitch

[1] Compared to an S1C33L27 32-bit Flash microcontroller processing the same task
[2] A circuit that converts resistance changes into frequency
[3] A circuit that allows users to flexibly assign I/O functions of peripheral circuits to I/O ports
[4] A control circuit for infrared remote control
[5] A state in which the CPU is in Stop mode and only the RTC calendar circuit is running

About Epson Electronics America, Inc.

Epson Electronics America, Inc. (EEA), is a subsidiary of Japan-based Seiko Epson Corporation (SEC) and is responsible for sales, marketing and engineering of the product lines of SEC's Microelectronics Device Division in the America's. EEA provides a wide array of timing and frequency control products, integrated circuits, sensing device and system solutions for customer products and applications that require high levels of accuracy, reliability, stability, energy efficiency and compact design. Based in San Jose, California, the EEA Group has three regional offices, more than 40 sales offices in the U.S. and a growing network of exclusive distributors.
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About Epson

Epson is a global technology leader dedicated to driving innovations and exceeding customer expectations in printing, visual communications, quality of life and manufacturing. Epson's lineup ranges from inkjet printers, printer systems and 3LCD projectors to industrial robots, smart glasses and sensing systems and is based on original compact, energy-saving, and high-precision technologies.

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