

NEC Electronics Introduces 12 New 16-bit All Flash Microcontrollers with LCD Controller/Driver Circuit

Optimized for Healthcare Diagnostic Instruments, Building Utility Meters, and Industrial Automation

KAWASAKI, Japan, DUSSELDORF, Germany, SANTA CLARA, Calif. (U.S.A.), January 16 2009—NEC Electronics Corporation today announced that it has developed 12 new 16-bit All Flash™ microcontrollers (MCUs) with on-chip liquid crystal display (LCD) driver circuits, optimized especially for the fields of handheld healthcare diagnostic instruments such as blood glucose meters, building utility meters for the gas/water/electricity markets, and industrial automation.

The new All Flash MCUs are equipped with NEC Electronics' 16-bit 78K0R CPU core, integrating in one chip all the necessary functions to construct systems using LCD segmented displays, while implementing a high-performance analog front end, having 12-bit A/D and 12-bit D/A converters, and operational amplifiers. In addition, the new products reduce standby power consumption to 1.2 microamperes (µA) with the LCD enabled, which is one-tenth the level of the company's previous products. Users have a choice of 12 varieties of products depending on their systems: six types of 80-pin 78K0R/LF3 MCUs, three types of 100-pin 78K0R/LG3 MCUs, and three types of 128-pin 78K0R/LH3 MCUs.

These new products allow system manufacturers to produce smaller, more reliable, and low-cost battery-operated equipment, such as blood glucose meters with LCD display functions, gas/water/electricity meters, and factory automation instruments.

Due to a worldwide increase in awareness of healthcare issues in recent years, the market for home healthcare equipment such as scales, thermometers, and blood glucose meters has been expanding remarkably. In particular, blood glucose meters have become increasingly popular as a convenient home diagnostic test kit to measure blood sugar levels. Measured blood glucose level results are generally shown on the LCD, and the glucose meter consists of a central processing unit (CPU), LCD panel driver, and data converter functions (A/D and D/A).

Conventionally, these functions required three or more integrated circuits, but to meet users' needs for smaller form factors and lower system costs, NEC Electronics' K0R/Lx3 MCUs integrate all necessary functions on one chip, with maximized battery life and faster processing speed, an increasing end-market demand.

All devices in the line-up have the following features:

(1) Reduced number of components required for high-performance analog features integrated with the LCD panel driver

All the new MCUs have an LCD controller/driver circuit, 12-bit A/D and 12-bit D/A converter, operational amplifiers, and voltage reference that produces metrical voltage when using analog circuit, all integrated into one chip. As a result, the number of components including the CPU core decreased from six to one, making it possible to reduce the cost of components and to shrink the PCB layout area.

(2) Reduced standby operating power by 90 percent compared to the company's existing products

(standby mode in which only the LCD display is activated)

NEC Electronics' 16-bit K0R/Lx3 All Flash MCUs employ a capacitor split technique that produces LCD drive voltages by a capacitor splitting VDD. Differing from the conventional system using an LCD resistive bias

network, this system produces LCD bias voltages without a wasted DC bias current, thereby dramatically cutting LCD drive current losses. Through these improvements, when the LCD display is enabled but the CPU is de-activated, standby operating current is reduced by 90 percent, to 1.2 μ A as compared to conventional products.

(3) Wide selection of products

The lineup includes a total of 12 MCUs -- six 80-pin 78K0R/LF3 MCUs, three 100-pin 78K0R/LG3 MCUs, and three 128-pin 78K0R/LH3 MCUs. Designers can choose the optimum configuration appropriate for their applications.

NEC Electronics believes these new products are optimized for healthcare equipment such as blood glucose meters with LCD functions, utility meters, and FA equipment, and plans to actively market them.

Pricing and Availability

Sample prices of these new products vary depending on memory capacity and package type. Mass production of these new products is scheduled to begin in October 2009 and is expected to reach 1,000,000 units per month in 2010. (Pricing and availability is subject to change without notice.)

About NEC Electronics Corporation

NEC Electronics Corporation (TSE: 6723) specializes in semiconductor products encompassing advanced technology solutions for the high-end computing and broadband networking markets; system solutions for the mobile handset, PC peripheral, automotive and digital consumer markets; and multi-market solutions for a wide range of customer applications. NEC Electronics Corporation has subsidiaries worldwide including [NEC Electronics America, Inc.](#) and [NEC Electronics \(Europe\) GmbH](#). More information about NEC Electronics worldwide can be found at www.necel.com.

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The new MCU products use SuperFlash technology from Silicon Storage Technology, Inc. SuperFlash is registered in the United States, Japan, and other countries as a trademark of Silicon Storage Technology.