

NEC Electronics America Introduces Three New 16-bit All Flash(TM) Microcontrollers with Embedded IEEE802.15.4 Radio Transceiver for ZigBee(R) RF4CE

Enables RF Connectivity with the Lowest Level of Power Consumption in the Industry

SANTA CLARA, Calif., December 3, 2009--NEC Electronics America, Inc. today introduced its three new 16-bit All Flash™ microcontrollers (MCUs) with an embedded IEEE802.15.4-compliant 2.4-gigahertz (GHz) radio frequency (RF) transceiver for ZigBee® RF4CE, an industrial standard for remote control for consumer electronics. Providing the lowest level of power consumption in the industry, the new MCUs are ideal for RF remote control and come in a 56-pin, 8 x 8-millimeter (mm) quad flat no-leads (QFN) package with flash memory sizes of 64 kilobytes (KB), 96 KB and 128 KB.

To support development tasks of the ZigBee RF4CE applications, NEC Electronics America also provides a ZigBee RF4CE software development kit (SDK), which includes a ZigBee RF4CE stack library and a three-channel real-time sniffer, capable of simultaneously monitoring packets from the three RF4CE frequency channels; in addition to an evaluation board with NEC Electronics' 128KB flash version of the MCU.

To align with advanced digital TVs, set-top boxes (STBs), Blu-ray™ disc devices and other audio-visual (AV) home entertainment devices, radio frequency remote controls alleviate several shortcomings of infra-red remote controls, such as unidirectional communication and line-of-sight limitations. The two-way communication in RF4CE remote controls enables advanced home entertainment systems to support sophisticated features. By eliminating line-of-sight problems, AV systems can form networks of their own for command-and-control purpose, thereby enhancing the user's experience. Security features of the RF4CE standard authenticates legitimate devices and protects data exchanges within its network.

In 2004, NEC Electronics Corporation began providing ZigBee-based solutions. To meet market expectations for RF remote control based on ZigBee RF4CE specifications, NEC Electronics developed ultra-low-power MCUs integrated with a low-power IEEE802.15.4-compliant radio transceiver in one package. In addition to the RF4CE application, these MCUs also can be used for 802.14.5 wireless networking.

Primary Features

1) Lowest level of power consumption in the industry

The new MCUs combine NEC Electronics' ultra-low-power 78K0R/Kx3-L 16-bit CPU and an ultra-low-power IEEE802.15.4-compliant 2.4GHz RF transceiver with hardware MAC

functions. Realizing the lowest level of power consumption in the industry, current consumption is 18 milliamps (mA) during reception and 19 mA during transmission.

2) Supply voltage as low as 1.8V

NEC Electronics' new MCUs with radio connectivity can operate down to a supply voltage as low as 1.8V. Network security often requires writing and erasing confidential data, such as frame count values, to protect against possible attack; however, Flash typically requires higher voltages to perform writing and erasing. The new MCUs, with an internal voltage booster, are capable of writing and erasing this data in Flash down to 1.8V, to provide secure support for operation even when supply voltage is limited.

3) Enhanced low-power radio supports RF4CE and other 802.15.4 wireless networking

This IEEE 802.15.4-compliant radio integrates a receiver, transmitter, voltage-controlled oscillator and a phase-locked loop. It uses an advanced radio architecture to minimize the external component count and power consumption, and the architecture provides hardware support for the IEEE802.15.4 MAC layer to reduce the software requirement of the upper layer stack, requiring less memory.

Pricing and Availability

Samples of the new chips are scheduled for availability in early Q1 2010 with mass production expected to begin during the first half of 2010. Suggested distribution resale pricing for 10,000-unit quantities begins at \$4.20 each. More information about NEC Electronics America's extensive MCU product offerings can be found at

http://www.am.necel.com/micro/product/device_overview.php?category=16-bit-RF-AllFlash.

(Pricing and availability are subject to change without notice.)

#1 Supplier Worldwide for 32-bit Microcontrollers

NEC Electronics Corporation has retained the number one supplier ranking for 32-bit microcontrollers (MCUs) worldwide based on revenue in 2007 and 2008 as ranked by Gartner in its April 2009 report. In addition, the company has moved into the number one position for 32-bit automotive MCUs; the number two position for overall MCUs, and the number two position for 8-bit MCUs. More information can be found at

<http://www.am.necel.com/micro>.

About ZigBee

ZigBee: Control your world

ZigBee is the global wireless language connecting dramatically different devices to work together and enhance everyday life. The ZigBee Alliance is a non-profit association of more

than 300 member companies driving development of ZigBee wireless technology. The Alliance promotes worldwide adoption of ZigBee as the leading wirelessly networked, sensing and control standard for use in consumer electronic, energy, home, commercial and industrial areas.

For more information, visit: www.ZigBee.org.

About ZigBee RF4CE

ZigBee RF4CE: More flexibility and control

The ZigBee RF4CE specification is based on IEEE 802.15.4. MAC/PHY radio technology in the 2.4GHz unlicensed frequency band and enables worldwide operation, low power consumption and instantaneous response time. It allows omni-directional and reliable two-way wireless communication, channel agility for enhanced co-existence with other 2.4GHz wireless technologies, simple secure set-up and configuration. For more details, visit www.zigbee.org/rf4ce.

About NEC Electronics America, Inc.

NEC Electronics America, Inc., headquartered in Santa Clara, California, is a wholly owned subsidiary of NEC Electronics Corporation (TSE: 6723), a leading provider of semiconductor products encompassing advanced technology solutions for the broadband and communications markets; system solutions for the mobile, PC, automotive and digital consumer markets; and multi-market solutions for a wide range of consumer applications. NEC Electronics America offers local manufacturing in Roseville, California, and the global manufacturing capabilities of its parent company. In the Americas, NEC Electronics America markets and sells industrial-type active-matrix LCD modules from NEC LCD Technologies, Ltd., a global leader in innovative display technologies. More information about the products offered by NEC Electronics America can be found at <http://www.am.necel.com>.

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