News Release

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OKI Semiconductor refurbishes full-featured emulator for low power microcontroller
– Realized miniaturization while enhancing the real-time monitoring functions –

OKI Semiconductor, a subsidiary of ROHM Group, has developed a program development tool "Dr.U8ICE" corresponding to a CPU core "U8 Core" mounted on the original 8-bit low power microcontroller. The "Dr.U8ICE" is a full-featured emulator (*1) equipped with "U8 Core" chip, although as compact as a quarter size of a conventional product, has enhanced functions including real-time RAM monitoring function and real-time LCD monitoring function. The most appropriate environment for program development of the microcontroller equipped with "U8 Core" can be built by combining with OKI Semiconductor's original IDEU8 integrated development environment. Since July the products compatible to ML610Q439 have been provided and the ones compliant to "ML610400/ML610300" series will be supported in sequence hereafter.

In recent years, on-chip debug emulators using microcontroller, loaded with flash memory ROM as program memory having built-in program debug facility, predominant the mainstream of program development tools. However, program development shall be executed by using a full-featured emulator that can operate same as in a microcontroller, in case of a product loaded with Mask-ROM where an on-chip debug emulator cannot be used or at an early stage of development of a custom product where no actual device exists.
On the other hand, although a full-featured emulator can increase debug efficiency, because it provides various program debug facilities that an on-chip debug emulator does not possess, results in increase of implementation costs.

OKI Semiconductor, focusing these situations, has developed a miniaturized, inexpensive and full-featured function emulator "Dr.U8ICE". Size of the "Dr.U8ICE" is miniaturized to one-fourth of the existing OKI Semiconductor made full-featured emulator by loading newly developed "U8 Core" chip and analogue chip combined with FPGA (*2) implementing digital circuit of timer and UART. In order to increase efficiency of program development, the real-time RAM monitor function, that enables to confirm data changes in the whole RAM area without stopping condition setting of trace start trigger and/or program execution, has been added to the existing technologies. Moreover, it is made possible to evaluate LCD control program and to verify the system using the target system even at the time-stage before obtaining a LCD panel, by installation of real-time LCD monitor that oversees the LCD terminal situation in real time and displays an LCD panel as imagined.

OKI Semiconductor will continue enhancement of program development environment using microcontroller to support customers' program development.

Dr.U8ICE appearance — System configuration
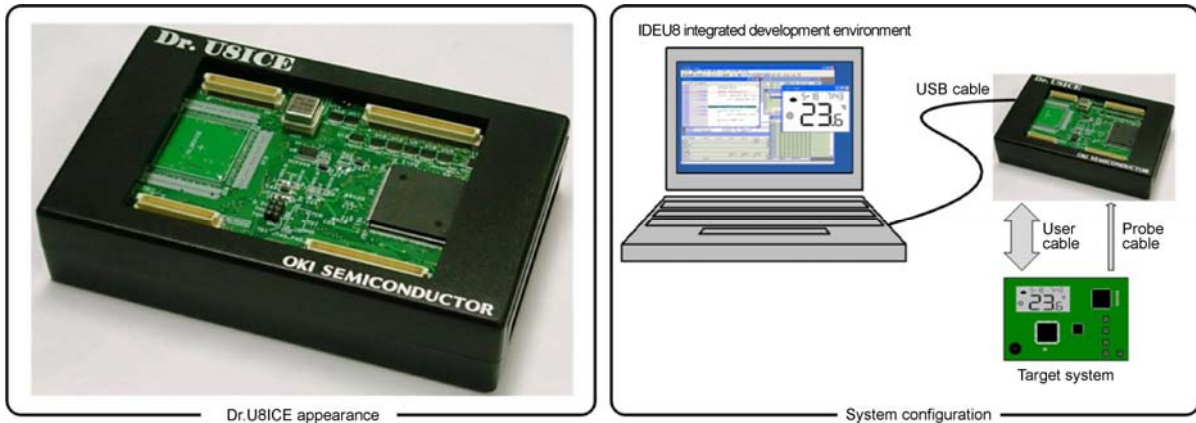
[Features]
• Analogue characteristics equivalent to microcontroller
  - It realizes the analogue characteristics equivalent to microcontroller by mounting an analogue chip wherein analogue circuits such as A/D convertor and battery level detecting circuit is mounted.
• Enhanced debug facilities
  − RAM monitoring/watching capacity and LCD monitoring capacity both enable to verify in real time are mounted
  − Trace capacity attached with start condition possible to store up-to 256k
  − Multiple brake conditions
  − USB cable can be plugged/unplugged under program execution conditions (Aging capacity)
• Common user interface
  − In order to control DrU8ICE a DTU8 debugger will be used because it is common to OKI Semiconductor made existing emulator and simulator (*3). Program debugging can be executed efficiently by the graphical user interface with high operability mounted on DTU8 debugger and migration from the existing emulator and simulator can be easily made.

[Major specifications of Dr.U8ICE]
• Debug functions:

Emulation function:	Real-time emulation	
	Step emulation	
Break function:	Break point	No limit
	Address path count	1 point (Path count setting)
	RAM data matching	2 points
		(Address/Data mask, Access conditions, Path count setting)
	Access to external area	Program/Data
	External synchronization	Two inputs
Real-time monitoring function:	RAM monitors	All data RAM area
	Watch	8 points
	LCD monitor	
Tracing function:	262,144 steps	
	Contents; PC, Instructions, RAM address/data, PSW, Interrupt	

cycle, External probe

Conditions; Free run, Trigger start (Data matching/PC matching, Path count)

Operation voltage: 1.65 to 5.5V (Operative at the level of power supply by user cable）

• System specifications:

Memory capacity: Program memory 256K word ([32K×16bit] × 8)

Data memory 512K Byte ([64K×8bit] × 8)

Power supply: +5V, 2A

Size: 160(W) × 100(D) × 38(H) [mm]

[Glossary]

*1: Full-featured emulator

An equipment to simulate a microcontroller, having functions to execute or terminate a program, and tracing functions recordable execution history of a program, enables to debug software and hardware.

*2: FPGA (Field Programmable Gate Array)

A rewritable logic device.

*3: Simulator

Software executes instructions of microcontroller on PC.

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