Hitachi Releases Low-Pin-Count, Small-Package and On-Chip Flash Memory 16-Bit Single-Chip Microcontrollers Supporting the CAN In-Vehicle LAN Standard

—Suitable for vehicle-body control and safety control in-vehicle devices, and making possible smaller, lower-priced products and shorter development times —

Tokyo, September 5, 2002— Hitachi, Ltd. (TSE: 6501) today announced low-pin-count, small-package 16-bit single-chip microcontrollers with an on-chip CAN interface, for use in in-vehicle equipment such as door modules and airbags, as additions to the lineup of microcontrollers supporting the CAN*[1] in-vehicle network standard. A total of 16 models are being released, eight in the H8/36057 Series and eight in the H8/36037 Series. Sample shipments of the four F-ZTAT™*[2] models with on-chip flash memory will begin in January 2003 in Japan, with volume production of the 12 mask ROM models scheduled to start in August 2003 in Japan.

The trend in communications between devices in the equipment control field, including in-vehicle devices and FA and similar industrial products, is away from serial communication between directly connected devices to network communication via a high-speed, high-reliability CAN. Hitachi has previously released a range of sophisticated CAN-oriented products in the SuperH™*[3] 32-bit RISC microcomputer family and the H8S Series of high-end 16-bit microcontroller models. However, there is strong demand in small-scale-function systems such as door modules and air-pressure sensors for low-pin-count, small-package, CAN-oriented microcontrollers that will make it possible to use a smaller mounting area and achieve a major reduction in system cost.

In response to this market need, Hitachi has developed the H8/36057 Series and H8/36037 Series with an on-chip CAN interface in the H8/300H Tiny Series*[4] of low-pin-count (maximum 64-pin), small-package, 16-bit single-chip microcontrollers that comprises products for use in a variety of fields. These series feature an H8/300H 16-bit CPU core and a 0.35-micron process, together with two serial communication interface channels in the H8/36057 Series and a single channel in the H8/36037 Series. Major features of these series are summarized below.

< Features >

1. Enhanced in-vehicle network oriented functions, including CAN interface and LIN*[5] supportting, making these microcontrollers ideal for use in in-vehicle equipment and enabling excellent cost-performance to be achieved
   The CAN interface incorporates a Tiny HCAN*[6] with a 1 Mbps (bit per second) maximum transfer speed and a small-scale-function system oriented 4-buffer configuration for the message buffer. A LIN low-speed in-vehicle network for switching and similar operational control of can also be available to support, enabling a H8/36057 Series or H8/36037 Series model to be used as a LIN master microcontroller. These features make these new models suitable for use in safety systems such as airbags and air-pressure sensors, vehicle-body control systems including light control, and security systems such as antitheft devices, and make it possible to implement systems offering excellent cost-performance.

2. Lower system-power-consumption achieved through the use of an RC oscillation circuit and subtimer
   In addition to the system clock oscillation circuit, these models include an RC oscillation circuit for low-speed operation subclock use and a subtimer that operates on this clock. This facility is useful in a system such as keyless entry, for example, in which the system clock, CPU, and peripheral modules are halted and only the subtimer operates, activating the CPU periodically. Current dissipation in this mode is an ultra-low 50 µA (typ.). These features make it possible to reduce parts costs and achieve lower system-power-consumption.

3. Range of memory sizes offering a selection of models to suit various systems.
   A variety of memory sizes are offered in each series, with F-ZTAT versions incorporating flash memory available in two models--32 and 16 Kbytes--and mask ROM versions in six models--56, 48, 40, 32, 24, and 16 Kbytes--offering a selection of memory capacities to suit systems of various sizes. F-ZTAT version flash memory can be programmed and erased using a single power supply, enabling control programs, system adjustment data, and so forth to be rewritten on-board, for shorter system development times. The user can select the ideal model for a particular application system from this varied product lineup.

4. Comprehensive peripheral functions that help to lower system cost
   These series include a variety of on-chip peripheral functions. In addition to sophisticated timers, a 10-bit A/D converter, an asynchronous/synchronous serial interface, and large-current pins, a 4-wire synchronous serial communication unit (SSU) is included as a new module, simplifying communication with an external device such as EEPROM or a sensor. A power-on reset function and low-voltage detection function are also available as options. These new models can thus be used in products susceptible to fluctuation of the supplied voltage, such as battery-powered systems, and products requiring protection in such cases, enabling the number of external parts to be decreased and system cost to be reduced.

The small size E10T on-chip debugger emulator is available as a development environment, allowing program debugging to be carried out with the H8/36057 Series or H8/36037 Series chip mounted on a board.

Two package types are offered: a small LQFP-64 (10 mm × 10 mm) and a QFP-64 (14 mm × 14 mm). The H8/36057 Series and H8/36037 Series feature similar pin arrangement with other H8/300H Tiny Series products, facilitating a switch to models in these series.

Future plans call for further enhance of the product lineup to meet evolving market needs, with the development of models offering increased memory capacity and models featuring enhanced peripheral functions and interface functions.

Notes: 1. CAN: Controller Area Network. A network specification for use in vehicles, proposed by Robert Bosch Gmbh of Germany.

2. F-ZTAT (Flexible Zero Turn-Around Time) is a trademark of Hitachi, Ltd.

3. SuperH is a trademark of Hitachi, Ltd.

4. H8/300H Tiny Series: A low-pin-count (maximum 64-pin), small-package microcontroller product series incorporating a Hitachi H8/300H high-performance 16-bit CPU core. These devices have capabilities that enable them to be used as a sub-microcontroller in a large-scale-function product or the main microcontroller in a small-scale-function product, and feature excellent cost-performance.

   - H8/300H Tiny Series Home Page URL
     (Japanese) http://www.hitachisemiconductor.com/jp/tiny
     (English)
     http://www.hitachisemiconductor.com/sic/jsp/japan/eng/products/mpumcu/816bit/tiny/index.html

5. LIN: Local Interconnect Network. An in-vehicle low-speed network for switching or operating systems, with a maximum transfer speed of 20 kbps (bits per second). The maximum number of connections in one network is 16, and a single-master/multi-slave system is used, comprising one master that controls the network and up to 15 slaves.

6. Tiny HCAN: Tiny Hitachi Controller Area Network. A FULL CAN compatible/4-message-buffer network compliant with the Bosch CAN Ver. 2.0B active specification.

< Typical Applications >

- Automotive electrical equipment (door modules, air bags, passenger detection, air-pressure sensors, light control, keyless entry systems, antitheft devices, etc.), motorcycle engine control, etc.
- Industrial equipment and FA equipment (device networks, etc.)

< Prices in Japan >(For Reference)

- H8/36057 Series

(1) F-ZTAT™ Versions

Product Code		ROM Size (Bytes)	Package	Sample Unit Price (Yen)
H8/36057F	HD64F36057H	56K	QFP-64 (14 mm × 14 mm)	830
	HD64F36057FP		LQFP-64 (10 mm × 10 mm)	830
H8/36054F	HD64F36054H	32K	QFP-64 (14 mm × 14 mm)	780
	HD64F36054FP		LQFP-64 (10 mm × 10 mm)	780

(2) Mask ROM Versions

Product Code		ROM Size (Bytes)	Package	Unit Price for 10,000-Unit Lot (Yen)
H8/36057	HD64336057H	56K	QFP-64 (14 mm × 14 mm)	500
	HD64336057FP		LQFP-64 (10 mm × 10 mm)	500
H8/36056	HD64336056H	48K	QFP-64 (14 mm × 14 mm)	480
	HD64336056FP		LQFP-64 (10 mm × 10 mm)	480
H8/36055	HD64336055H	40K	QFP-64 (14 mm × 14 mm)	470
	HD64336055FP		LQFP-64 (10 mm × 10 mm)	470
H8/36054	HD64336054H	32K	QFP-64 (14 mm × 14 mm)	450
	HD64336054FP		LQFP-64 (10 mm × 10 mm)	450
H8/36053	HD64336053H	24K	QFP-64 (14 mm × 14 mm)	430
	HD64336053FP		LQFP-64 (10 mm × 10 mm)	430
H8/36052	HD64336052H	16K	QFP-64 (14 mm × 14 mm)	410
	HD64336052FP		LQFP-64 (10 mm × 10 mm)	410

H8/36037 Series

(1) F-ZTAT™ Versions

Product Code		ROM Size (Bytes)	Package	Sample Unit Price (Yen)
H8/36037F	HD64F36037H	56K	QFP-64 (14 mm × 14 mm)	750
	HD64F36037FP		LQFP-64 (10 mm × 10 mm)	750
H8/36034F	HD64F36034H	32K	QFP-64 (14 mm × 14 mm)	700
	HD64F36034FP		LQFP-64 (10 mm × 10 mm)	700

(2) Mask ROM Versions

Product Code		ROM Size (Bytes)	Package	Unit Price for 10,000-Unit Lot (Yen)
H8/36037	HD64336037H	56K	QFP-64 (14 mm × 14 mm)	470
	HD64336037FP		LQFP-64 (10 mm × 10 mm)	470
H8/36036	HD64336036H	48K	QFP-64 (14 mm × 14 mm)	450
	HD64336036FP		LQFP-64 (10 mm × 10 mm)	450
H8/36035	HD64336035H	40K	QFP-64 (14 mm × 14 mm)	440
	HD64336035FP		LQFP-64 (10 mm × 10 mm)	440
H8/36034	HD64336034H	32K	QFP-64 (14 mm × 14 mm)	420
	HD64336034FP		LQFP-64 (10 mm × 10 mm)	420
H8/36033	HD64336033H	24K	QFP-64 (14 mm × 14 mm)	400
	HD64336033FP		LQFP-64 (10 mm × 10 mm)	400
H8/36032	HD64336032H	16K	QFP-64 (14 mm × 14 mm)	380
	HD64336032FP		LQFP-64 (10 mm × 10 mm)	380

< Specifications >

Item		Specifications			
Product Type Names		H8/36057 Series		H8/36037 Series	
		F-ZTAT™ Versions	Mask ROM Versions	F-ZTAT™ Versions	Mask ROM Versions
		HD64F36057,	HD64336057/6/5,	HD64F36037,	HD64336037/6/5,
		HD64F36054	HD64336054/3/2	HD64F36034	HD64336034/3/2
Memory	ROM (bytes)	56K,	56K/48K/40K,	56K,	56K/48/K40K,
		32K	32K/24K/16K	32K	32K/24K/16K
	RAM (bytes)	3K,	2K/2K/2K,	3K,	2K/2K/2K,
		2K	1K/1K/1K	2K	1K/1K/1K
Process		0.35 µm CMOS			
Oscillation frequency/power supply voltage		2 MHz to 10 MHz/2.7 V to 5.5 V, 2 MHz to 20 MHz/4.0 V to 5.5 V			
Operating temperature		-40°C to +85°C			
CPU core		H8/300H CPU • General registers: 8 bits × 16, 16 bits × 8 • Minimum instruction execution time: 100 ns (20 MHz operation)			
Timers		8-bit interval timer/real-time clock time base x 1 channel			
		8-bit free-running/external event counter/compare match x 1 channel			
		16-bit input capture/output compare x 2 channels			
		RC oscillator dedicated 8-bit interval timer x 1 channel			
		8-bit independent-type watchdog timer x 1 channel			
Serial communication interface		8-bit synchronous/asynchronous			
		2 channels		1 channel	
4-wire synchronous serial communication unit (SSU)		1 channel			
Tiny HCAN*		1 channel (Bosch CAN Ver. 2.0B active specification compliant FULL CAN support/4-message buffer)			
A/D converter		10-bit resolution × 8 channels			
Address break		Address/data × 1 channel			
I/O ports	Input/output	45, including 8 large-current ports (20 mA)			
	Input	8			
Clocks		System clock oscillator (2 MHz to 20 MHz crystal resonator, ceramic resonator) External clock (1 MHz to 20 MHz)			
		On-chip RC oscillator			
Interrupts	External sources	11		11	
	Internal sources	49		46	
Power-down functions		Four modes: Sleep mode, standby mode, subsleep mode, subactive mode Other power-down functions: • Module standby mode, system clock division function			
Packages		Two types: QFP-64 (14 mm × 14 mm), LQFP-64 (10 mm × 10 mm)			

Note: * Tiny HCAN: Tiny Hitachi Controller Area Network

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Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
