

Hitachi Releases HD64404 SuperH™ Companion Chip Ideal for Next-Generation Car Information Systems such as Car Navigation Systems

- Enables implementation of high-performance, high-functionality car information systems at low cost -

Tokyo, December 10, 2001 — Hitachi, Ltd. (TSE: 6501) today announced the HD64404 integrating functions necessary for Car Information Systems (CISs), for use in next-generation CISs such as car navigation systems. Sample shipments will begin in February 2002 in Japan.

The HD64404 is a companion chip for the SuperH™*¹ family SH-4 high-performance CPU core. Combining the HD64404 with an SH-4 makes it possible to create sophisticated, high-performance Car Information Systems, while the integration of various kind of interfaces, such as in-vehicle LAN or audio etc, and functions necessary for next-generation Car Information Systems makes it possible to reduce the number of system component parts and reduce system costs. In addition, a development platform is available for user system development, enabling users to achieve efficient system development in a short timeframe.

Car navigation systems are becoming increasingly sophisticated in order to handle not only display of road map information, but also real-time road traffic information and new traffic information services provided via the Internet. And next-generation CISs will incorporate various kinds of car navigation system based service information through connection to the Internet or a Traffic Information Center, as well as drive system information covering the engine and transmission and various kinds of sensor data through connection to a CAN*² or similar in-vehicle network, to provide centralized display and control functions. Thus, CIS equipment will be able to offer centralized control of previously isolated equipment such as air conditioning and audio units, safety checks through the display of vehicle status while running, as well as automotive multimedia functions such as movie distribution via rear-seat displays. The CIS market is expected to show rapid growth as future CISs provide an integrated system combining various kinds of information from entertainment to control and communications, and a car navigation system will be the central item of equipment in a future CIS.

However, incorporating various kinds of information requires a variety of interfaces and peripheral circuits. Previously, a system has been configured from individual devices, but this presents a problem as regards achieving lower costs in the higher-performance, higher-functionality systems of the future. There is thus a strong demand for CIS component devices to incorporate a variety of interfaces and peripheral circuits to enable fewer parts to be used and system costs to be reduced, as well as offering the high processing capability necessary for handling large volumes of information.

Hitachi has previously released the SuperH Family and the Q Series of graphics processing LSIs, which have established a good reputation in the field of car navigation systems. Now, in response to the market needs described above, Hitachi has developed the HD64404 enhanced graphics processing chip for next-generation CIS applications as a SuperH companion chip. Major features of the HD64404 are summarized below.

[Features]

(1) Incorporates various suitable interfaces for next-generation CISs

The HD64404 incorporates a variety of interfaces for capturing various kinds of information, including an HCAN2*³ in-vehicle network interface, an I²C interface for connecting audio equipment and so forth, an audio CODEC interface and a Hitachi S/PDIF (Sony/Philips Digital Interface) for connecting an audio LSI, and a Hitachi SPI interface for connecting a DSP or similar LSI. In addition, a MOST (Media Oriented Systems Transport) interface is included as an extension bus function, providing support for next-generation fiber-optic cable based in-vehicle networks.

(2) High-performance graphics engine and display functions

An LSI equivalent to the Q Series top-end Q2SD*4 model--a Hitachi graphics processing LSI ideal for map drawing and similar operations--is built-in, offering high-speed operation of 100 MHz. Upward compatibility with the Q2SD's instruction set allows Q2SD programs to be used. Moreover Bit BLT (Bit Block Transfer) and Raster Operation is supported, and an 854 × 480 WVGA screen resolution is supported.

(3) Flexible and efficient bus architecture

Two kinds of external bus--a PC standard PCI bus and a dedicated SH-4 bus--are provided for connecting the SH-4, offering a choice of buses to suit the system configuration. For the HD64404's internal bus, a two-bus-type structure is employed that comprises a register bus for various interfaces and peripheral functions and a high-speed pixel bus for transferring large volumes of data. This enables efficient data processing to be achieved. In addition, a Unified Memory Architecture configuration is employed that allows the HD64404's graphics memory to be used as system memory, enabling the number of external memory parts to be reduced.

As described above, the HD64404 incorporates functions suited to next-generation CISs, and use of the HD64404 with an SH-4 makes it possible to implement a high-performance, high-functionality system while reducing the number of parts, thus enabling lower system costs to be achieved.

The package used is a small 352-pin TBGA that allows system size to be minimized.

A development platform is also planned for systems using the HD64404. The platform includes an SH7751R SH-4 CPU core and an HD64404, and is provided with a variety of interfaces including USB and ATAPI as well as an SH extension bus connector and PCI bus connector, simplifying the addition of extended functions by the user. OSs (operating systems) for which support is planned include Windows® CE*5, VxWorks®*6, and QNX® RTOS v6 *7. Use of this development platform will enable fast and efficient development of systems using the HD64404.

Along with the incorporation of the HD64404 as a standard device in CISs, Hitachi will also proceed with the development of products incorporating even higher performance and new peripheral functions to support increasingly sophisticated CISs.

Notes: 1. SuperH is a trademark of Hitachi, Ltd.

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

3. HCAN2: Hitachi Controller Area Network. Compliant with the Bosch CAN Ver. 2.0B active specification, and featuring full CAN support and a 32-message buffer.

4. Q2SD: Quick 2D Graphics Renderer with Synchronous DRAM interface

5. Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.

6. VxWorks is a registered trademark of Wind River Systems, Inc. of the United States.

7. QNX is a registered trademark of QNX Software Systems Ltd. of Canada.

< Typical Applications >

- Car navigation and similar in-vehicle information terminal systems

< Prices in Japan >(For Reference)

Product Code	Operating Frequency	Package	Unit Price for 10,000 Unit Lot (Yen)
HD64404	100MHz	TBGA-352	4,000

< Specifications >		
Item	Specification	
Product code	HD64404	
Operating voltage	Internal: 1.5 V, peripheral I/O: 3.3 V	
Operating temperature	-40°C to +85°C	
Operating frequency	100 MHz (100 MHz bus)	
Interface to SuperH microcomputer	<ul style="list-style-type: none"> • PCI interface or SH-4 MPX interface 	
Internal bus	<ul style="list-style-type: none"> • Pixel bus (high-speed bus): 32 bits, max. 100 MHz operation possible • Register bus (peripheral module bus): 32 bits, max. 50 MHz operation possible 	
Extension bus function	<ul style="list-style-type: none"> • MOST interface or SRAM type product protocol possible 	
Graphics functions	<ul style="list-style-type: none"> • Graphics engine (Q2SD equivalent, plus additional functions such as Bit BLT (Bit Block Transfer)) 	
Display functions	<ul style="list-style-type: none"> • RGB digital interface maximum 854 × 480 WVGA size possible Dual planes with additional PIP (Picture in Picture) function • Video input function (Input via ITU-R BT.666 interface: 27 MHz video input clock) 	
On-chip peripheral functions	<ul style="list-style-type: none"> • DMAC × 16 channels • USB Host × 2 ports, USB Function × 1 port (USB standard Rev.1.1 supported) <p>Timer/counter functions</p> <ul style="list-style-type: none"> • 32-bit free-running counter × 1 channel • Input capture × 4 channels • PWM × 4 channels 	
Interfaces	<ul style="list-style-type: none"> • SDRAM interface • ATAPI interface supported • I²C interface × 2 channels • Hitachi Controller Area Network (HCAN2) × 2 channels (Bosch CAN Ver. 2.0B active specification, 32-message buffer) • Hitachi SPI Interface (HSPI) × 3 channels • Hitachi S/PDIF (Sony/Philips Digital Interface) (Supports IEC 60958. Automatic detection of IEC 61937 in reception) • Audio CODEC interface • Asynchronous serial interface × 4 channels (One channel also used as IrDA interface) • Hitachi Serial Sound Interface (SSI) × 4 channels 	
Interrupts	External sources	<ul style="list-style-type: none"> • 8 (level or edge detection switchable)
	Internal sources	<ul style="list-style-type: none"> • 30 kinds (priority level control possible, built-in standby return function)
Oscillation circuits	<ul style="list-style-type: none"> • Audio crystal oscillator circuit (24.576 MHz or 22.5792MHz) • USB crystal oscillator circuit (48 MHz) 	
PLL circuits	<ul style="list-style-type: none"> • SH-4 clock or PCI clock multiplication operation • Display dot clock multiplication operation 	
Power-down modes	<ul style="list-style-type: none"> • Various module standby modes (software control) 	
Package	<ul style="list-style-type: none"> • TBGA-352 	