Hitachi Releases SuperH Mobile Application Processor 'SH-Mobile' for optimum processing of multimedia applications for next-generation mobile phone

⸺ Enables smooth processing of multimedia applications for the sophisticated, high performance next-generation mobile phone ⸺

Tokyo, April 15, 2002 ⸺ Hitachi, Ltd. (TSE: 6501) today announced the SH-Mobile (SuperH Mobile Application Processor) series that will allow high speed processing of multimedia applications for next-generation mobile phone systems. As the first product, SH7290 is developed. Volume production will begin from May 2002 in Japan.

This product, connecting with the baseband LSI of the mobile phone system, is a processor thatprocesses the multimedia applications such as audio and moving pictures. For the CPU core, it has SH3-DSP ,with a DSP function for multimedia portable devices, of the 32 bit RISC microcomputer Super H*[1] family. In addition, peripheral functions and interfaces are provided that are necessary to the various multimedia applications. By using this product, it is possible to achieve high speed processing of applications without processing load on the baseband LSI. In addition, since the applications can be developed independently of the communication processing of the baseband LSI, next-generation mobile phone systems with variegated multimedia applications installed can be easily developed in a short time. Further, platform as well as middleware is available for application development, so that software development can be done efficiently and in a short period.

Mobile phone systems of recent years go beyond simply the talk function, and have multifunction with e-mail and Internet browser functions installed. Next-generation mobile phone systems are witnessing even higher multifunction with variegated applications installed starting with games and motion picture transmission. Up to now, each application processing has been executed on baseband LSI for the communication processing. So, the baseband LSI had to provide the necessary performance for communication processing as well as the performance necessary for application processing. In order to run the sophisticated multimedia applications of the future smoothly, there were problems such as how to ensure the great leap in improvement of the LSI performance. Further, the baseband LSI programs would have to be able to process both next-generation communications and applications for multimedia, making the programs very large in content and complex. So, system development would become complexly, and development time, including time for program debugging, would increase causing an increase in development costs. Also, in Japanese market mobile phones are seeing a reduction in model-change cycle to about half-year. Thus, it can be expected that an extension in development lead time would lead to problems such as difficulty in timely introduction of products in the market.

To counter this problem, Hitachi has prepared a processor dedicated to application processing separate from the baseband LSI. HItachi sees this as a solution to make system development easy and to realize performance improvement and has developed the SH-Mobile series. SH7290 as a first product includes the SH3-DSP core, suitable for multimedia portable devices such as digital still camera, of the SuperH family and runs at 133MHz frequency.   Its features are explained below.

[Features]

(1) It can connect to any baseband LSI through a dedicated interface and can be applied to mobile phones with different communication method.
Through the dedicated interface this product can easily connect to various kinds of baseband LSI. Due to this, the application-processing portion can be separated as part of the system structure, and it becomes possible to independently develop complicating multimedia applications.
The baseband LSI will recognize this product to be equivalent to SRAM rather than as a processor. So, control from the baseband LSI is simple and it is possible that the total system is developed rapidly and easily. And, since the communication processing is executed by baseband LSI it can be used with mobile phone systems with different telecommunications systems such as PDC (Personal Digital Cellular) in Japan or t GSM (Global System for Mobile Communications) in Europe and also in next-generation mobile phones such as CDMA2000 1x*[2] or W-CDMA*[3]

(2) Realization of high-speed application processing due to built-in large capacity memory.
For application processing, a 128 KB large capacity RAM is in-built, which can be accessed in 1 cycle. In addition, 32KB CPU cache memory, which is the maximum capacity in the SuperH family, is installed. Due to installation of these large capacity memories, it is enable high-speed execution of applications such as Java*[4] programs, moving picture processing with MPEG-4*[5] and audio processing with MP3*[6] etc.

(3) Realization of low power consumption so that increase of power consumption in system by addition of this product is deterrent.
In order to increase the standby time of the mobile phone system, a standby mode function is installed so that power can be shut-off for each module separately. With this function, powers of those circuits that need not be activated are shut off while standing-by; thus low standby current can be achieved of approximately 5 µA (typ.). Due to this, addition of this product does not lead to increase in mobile phone system power consumption.

(4) Various peripheral modules and interfaces installed. In addition, with development platform, application programs development is also easy.
This product has various peripheral modules and interfaces incorporated that are required for next-generation mobile phones such as the hardware motion picture accelerator that enables to run high-speed processing of moving pictures, interface that connects directly to camera module , and interface with AND type and NAND type flash memory. Further, a development platform, with keypad and small size LCD panel and also an extremely small size camera, is available. So, it is possible to realize quick and easy development of various multimedia application programs.

(5) Quick development of multifunction applications is possible due to abundant multimedia middleware.
Abundant middleware has been prepared in cooperation with partner vendors in addition to MPEG-4, JPEG and MP3 etc., which are necessary in order to run multimedia applications. For example, ACCESS CO., LTD.'s 'Compact NetFront'*[7] for browser, Aplix Corporation's 'JBlend'*[8] for embedded Java platform, HI CORPORATION, 'Mascot Capsule Engine'*[9] for 3-dimentional display, OFFICE NOA Inc.'s 'Nancy Codec'*[10] for moving pictures compression/decompression technology, NAVITIME JAPAN CO., LTD.'s high-speed vector map drawing engine 'Mviewer'*[11] for drawing maps, are supported. Due to these, the user is able to develop sophisticated applications, depending on the objectives, in a short time.

The packages used are small two type CSP packages that are 0.65 mm pin pitch CSP-240 and 0.5 mm pin pitch CSP-256.

By using this product, it will be possible to develop in short time next-generation mobile phone systems with multimedia applications, and development costs can be reduced. Further, it can respond quickly toapplication development and changes arising from diversification in future services or changes in service contents.

In future, Hitachi will promote this product to be the de facto standard device in mobile phone market. Hitachi will also develop and expand the product line-up meeting the needs of the market such as multi-chip modules, performance-improved products and function-strengthened products in line with further increases in function of mobile phone systems.

Notes: 1. Super H is a trademark of Hitachi Ltd.

2. CDMA2000 1x: One of the telecommunication methods for 3rd generation mobile phones using the CDMA (Code Division Multiple Access) system

3. W-CDMA (Wideband Code Division Multiple Access): One of the telecommunication methods for 3rd generation mobile phones communication system

4. Java and Java related trademarks and logos are trademarks of Sun Microsystems, Inc. USA

5. MPEG-4 (Moving Picture Experts Group phase 4): One of the specifications for compressing moving pictures.

6. MP3 (MPEG-1 Audio layer 3): One of the methods for audio data compression

7. Compact NetFront is a registered trademark or trademark of ACCESS CO., LTD. in Japan or other countries. It is a high-speed micro-browser for small-sized information portable devices.

8. JBlend is a trademark or registered trademark of Aplix Corporation in Japan or other countries. It is a product name for highly expansive embedded Java platforms.

9. Mascot Capsule is a registered trademark of HI CORPORATION in Japan. It is a software engine to run real-time 3-D pictures on mobile phone equipment.

10. Nancy Codec is a CODEC developed by OFFICE NOA Inc. for compression and expansion processing of moving pictures with light load on CPU.

11. Mviewer: Products of NAVITIME JAPAN CO., LTD. It is a light viewer that can be available on mobile terminals with small-size memory capacity such as a mobile phone.

< Typical Applications >

- Next generation mobile phone terminals with multimedia applications installed

< Prices in Japan >(For Reference)

Product Name		Operating frequency	Package	Unit Price for 10,000 Unit Lot (Yen)
SH7290	HD6417290BP133	133MHz	CSP-240	2,500
	HD6417290BL133	133MHz	CSP-256	2,600

< Specifications >

Item	SH7290 specifications	
Product code	HD6417290BP133	HD6417290BL133
CPU core	SH3-DSP	
Operating voltage	Internal :1.4 to 1.6 V , External: 2.7 to 3.6 V	
Operating frequency	133 MHz	
Processing performance	173 MIPS	
On-chip RAM	128 Kilobytes	
Cache memory	32 Kilobytes	
For X/Y memory (DSP)	16 Kilobytes	
On-chip peripheral functions	• DMAC $\times$ 6 channels • MMU • USB function (USB specification v1.1 supported) $\times$ 1 channel	
Interface	• Dedicated interface (Connect to baseband LSI etc.) • NAND/AND flash memory interface • Video I/O (direct interface to camera module) • MultiMediaCard*[1] interface • SIM card interface • Key scan interface • I^{2}C interface • Serial interface $\times$ 2 channels • Serial interface with FIFO $\times$ 2 channels • Asynchronous serial interface $\times$ 2 channels	
Package	240 pin CSP (13mm $\times$ 13mm 0.65mm pin pitch)	256 pin CSP (11mm $\times$ 11mm 0.5mm pin pitch)

*1: MultiMediaCard is a trademark of Infineon Technologies AG, Germany, and is licensed to MMCA (MultiMediaCard Association). Hitachi is an MMCA Board Member. http://www.mmca.org/