

Renesas Technology to Release SH-MobileHD1 Application Processor for Mobile Phones That Is First in Industry to Offer Full HD Video Recording and Playback Support

— Provides Full HD support with low power consumption and in a small package, contributing to more compact video and audio processing systems —

Tokyo, April 23, 2009 — Renesas Technology Corp. today announced the SH-MobileHD1 application processor for mobile phones (product number: SH7370), the first in the industry to deliver Full High-Definition (1,920 × 1,080 pixels, abbreviated “Full HD”) video recording and playback support. Sample shipments will begin on April 23, 2009 in Japan.

The video processing unit of the SH-MobileHD1 delivers approximately six times the performance of comparable earlier products from Renesas Technology, enabling support for Full HD video on a single chip. In addition to the low power consumption essential for mobile phones, the new application processor also features more robust multimedia functionality. It is available in a small package designed to facilitate more compact video and audio processing systems for mobile phones.

The main features of the SH-MobileHD1 are summarized below:

(1) Full HD video processing on a single chip

Thanks to innovations such as those listed below, the SH-MobileHD1 is the industry’s first application processor for mobile phones to provide Full HD video processing. It supports the H.264/MPEG-4 AVC*¹ video compression standard (H.264) at Full HD video resolution with a recording/playback frame rate of 30 frames per second (fps).

- Maximum operating frequency of 500 MHz, approximately twice as fast as comparable earlier Renesas Technology products
- Video processing unit (VPU) delivering approximately six times the performance of comparable earlier Renesas Technology products
- Video input interface for camera module conforming to Mobile Industry Processor Interface (MIPI) CSI-2 standard
- Improved internal bus architecture

In addition, current consumption is reduced through measures such as enhanced internal power supply control, enabling realization on mobile phones of video applications comparable to those of digital home electronics such as LCD TVs.

(2) Dedicated audio DSPs for reduced power consumption

The SH-MobileHD1 incorporates two 24-bit dedicated audio DSPs to lighten the audio processing load on the CPU and reduce power consumption. This enables one DSP to handle (stereo) audio processing such as the AAC (Advanced Audio Coding) high-quality audio compression standard and Dolby Digital codec, with power to spare, while the other DSP handles sonic enhancement such as equalization and sample rate conversion (SRC). In addition, heavy-load processing tasks such as 5.1-channel audio can be assigned to the dual DSPs. Support for Dolby Digital and 5.1-channel audio allow interoperation with applications designed for consumer audio components.

(3) Improved interoperation with digital home electronics and networks

The SH-MobileHD1 includes an interface that supports connection to a transmitter microchip that implements the HDMI high-speed multimedia interface used for interconnections between AV components. This allows connection and output of Full HD resolution video to digital home electronics components such as LCD TVs or Blu-ray Disc recorders. In addition, the SH-MobileHD1 can connect to an SD memory card and wireless LAN (WLAN) module, and it supports multiplexing*² of the MPEG2-TS (transport system) and MP4*³ formats. Since MPEG2-TS is rapidly gaining popularity as a multiplexing format for HD and Full HD video in the digital home electronics field, support by the SH-MobileHD1 enables easy sharing of content between digital home electronics products and mobile phones. When content is stored as MP4 files, it can be shared easily over a network such as a WLAN. This helps increase the usability of video applications.

(4) Small package

The SH-MobileHD1 supports Full HD video but uses a compact 407-pin BGA package measuring 10 mm × 11 mm. The application processor and 512 megabits of synchronous DRAM (SDRAM) are integrated into a single package as a system-in-package (SiP) device for greater system compactness.

< Product Background >

In recent years, cameras have become pretty much standard equipment on mobile phones, which now include applications for capturing still photos and video. The still photo applications are progressively supporting ever higher pixel counts and now rival those of dedicated digital cameras. In contrast, video applications supporting resolutions higher than VGA (640 × 480 pixels) have been slow to appear, due to the limited opportunities for using them and problems with picture quality, and still cannot be said to have reached the level of dedicated digital camcorders. Though content providers already do produce content aimed at mobile phone users, trends such as the spread of digital home electronics equipment and support for high-quality video by online video posting sites have resulted in the production of more and more video content at HD and Full HD resolution. This is expected to lead to demand for mobile phones capable of recording and playing back HD and Full HD content.

With the SH-Mobile*⁴ Series, Renesas Technology became one of the first in the world to offer a dedicated processor for mobile phone multimedia applications employing audio and video. This contributed to the advancement of mobile phone multimedia applications supporting capabilities such as the reception of terrestrial digital TV broadcasts. The new SH-MobileHD1 responds to the above-mentioned demand for Full HD video recording and playback support and provides enhanced interoperability with digital home electronics components and networks.

< Product Details >

The video processing unit (VPU) of the SH-MobileHD1 incorporates video processing IP enabling better performance and reduced power consumption. It delivers approximately six times the performance of Renesas Technology's earlier SH-MobileL3V2. It performs MPEG2-TS multiplexing in hardware using an EMUX module.

- The VPU can encode or decode Full HD resolution video at a rate of 30 fps and 40 Mbps while maintaining low power consumption. The CPU is free for other processing tasks while the VPU is performing video processing. This makes it possible to keep the operating frequency low, reducing the power consumption of the SH-MobileHD1 even further.
- The EMUX module can handle MPEG2-TS multiplexing of up to 40 megabits per second (Mbps) at its maximum operating frequency of 166 MHz. Its operation can be modified to match the customer's system configuration by updating the firmware.

The SH-MobileHD1 also has a camera interface that supports direct connection to a 15-megapixel camera module. This allows high-speed importing of large blocks of data from a high-resolution camera and makes possible a variety of display functions, including electronic zoom and superimposed effects such as an on-screen display (OCD) function or hardware cursor (HWC) function. There is also compatibility with BT.709 format YUV data as part of the support for One-Seg*⁵ terrestrial digital TV broadcasts. This makes it possible to convert snippets of TV broadcast data to JPEG format with no degradation in image quality. The many on-chip peripheral functions suitable for mobile phone systems also include an LCD controller with support for 24-bit TFT color LCD panels and a sound interface.

Renesas Technology will continue to add new products to the SH-Mobile Series as the multimedia applications of mobile phones grow more advanced and sophisticated, delivering products optimized to meet market requirements in a timely manner.

< Notes >

- Notes: 1. H.264/MPEG-4 AVC (Advanced Video Coding) is a video compression standard established jointly by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) and the international standardization organizations ISO/IEC.
2. Multiplexed: As used in this press release, the term multiplexing refers to the synchronizing and combining of a video file and an audio file into a single file.
 3. MP4 format: A file format in which compressed video data, such as MPEG-4 or H.264, and compressed audio data, such as AAC, are multiplexed.
 4. SH-Mobile (SuperH™ Mobile Application Processor): An exclusive Renesas Technology processor for mobile phone systems that is connected to a baseband processor and performs dedicated processing for multimedia applications using audio and video. SuperH is a trademark of Renesas Technology Corp.
 5. One-Seg: A service offering terrestrial digital broadcasts in Japan for mobile and portable devices.
- * Other product names, company names, or brands mentioned are the property of their respective owners.

< Typical Applications >

- Mobile phone handsets incorporating multimedia applications
- Mobile devices for the consumer market incorporating video applications

< Prices in Japan > *For Reference

Product Name	Operating Frequency	Package	Price in Lots of 10,000 [Tax Included] (Yen/Unit)
SH-MobileHD1(SH7370)	500 MHz	407-pin BGA	4,000

< Specifications >

Item	SH-MobileHD1 Specifications
Product name	SH7370
CPU core	SH4AL-DSP
Power supply voltage	Internal: 1.15 V to 1.3 V External: 2.5 V to 3.6 V or 1.65 V to 1.95 V
Max. operating frequency	500 MHz
On-chip RAM	<ul style="list-style-type: none">• ILRAM: 4 Kbytes• RSRAM: 2 Kbytes
Cache memory	32 Kbytes instruction/32 Kbytes data, separate, 4-way set associative
X/Y memory (for DSPs)	16 Kbytes
On-chip peripheral functions	<ul style="list-style-type: none">• Support functions for 15-megapixel camera• VPU (H.264, MPEG-4, MPEG2)• DMAC x 6 channels• MMU• SPU (24-bit dedicated audio DSP x 2)• LCD controller with 24-bit TFT color LCD panel support• Gamma correction function• Enlarged edge enhancement function
Interfaces	<ul style="list-style-type: none">• Dedicated interface (for connection to baseband processor, etc.)• Transport stream (TS) interface• HDMI transmitter chip interface• Video I/O (direct interface to camera module)• I²C bus interface• Clock-synchronous serial interface x 1 channel• Serial interface with FIFO x 1 channel• Asynchronous serial interface x 1 channel• Sound interface unit x 2 channels• SD memory card interface x 2 channels• High-speed serial interface (sub-LVDS)
On-chip SDRAM	512 Mbits
Package	407-pin BGA (10 x 11 mm, 0.4 mm pin pitch, 1.4 mm thick)

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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. ***