

# SH7724: Multimedia Application Processor for Mobile Internet Devices

## High-definition H.264 recording and playback at low power for video encoding, PND, and connected media device applications

The SH7724 application processor, based on the SH-Mobile series of chips widely used in portable multimedia products, decreases the power needed to run high-definition video applications. It expands markets by enabling power-efficient designs for enhanced products such as Megapixel security cameras, video-VoIP equipment, and personal navigation devices (PNDs).



This low-power device combines a unique video processing unit (VPU) and a 500MHz, 32-bit SH-4A superscalar CPU core containing a floating-point unit (FPU) and L2 cache. The SH7724's high-speed VPU rapidly processes analytics, user-interface software and graphics-intensive tasks, readily handling imaging, compression, and sound processing. This offloads the CPU core, making it available for the fast execution of computationally intensive tasks. Performance is up to 900MIPS (Dhrystone benchmark) for the CPU and up to 3.5 GFLOPS for the FPU.

The device provides an extensive set of peripheral functions (see diagram below). Particularly noteworthy are the 2D graphics accelerator, LCD controller, camera interface, sound I/O module, Ethernet MAC, dual high-speed USB interfaces with host or function control capability, and two high-speed SDIO interfaces. System engineering support for the SH7724 includes a full suite of hardware and software development tools integrated into the easy-to-use HEW development environment. Also, Linux®, middleware, reference platforms and other support products are available or planned.

### Features

- ▶ 900DMIPS/500MHz 32-bit superscalar RISC CPU with 7-stage pipeline
- ▶ 3.5 GFLOP IEEE754-compliant single-/double-precision FPU with a 10-stage pipeline
- ▶ Parallel access to 4-way set-associative 32KB I-cache and 32KB D-cache
- ▶ 256KB L2 cache
- ▶ MPEG4, H.264, and WMV accelerators with 720p HD quality
- ▶ 2D graphics accelerator
- ▶ LCD controller for high-resolution panels
- ▶ Two camera interfaces; up to 5M pixel sensors
- ▶ ATAPI interface
- ▶ MPEG2 Transport Stream (TS) input
- ▶ Audio I/O module
- ▶ 2x USB2.0 host/function controller
- ▶ DDR2/Mobile DDR, SDRAM, NOR
- ▶ Ethernet MAC (10/100Mbps)
- ▶ eMMC 4.2 for managed NAND Flash
- ▶ Two channels of SDHI for SD memory cards and SDIO cards
- ▶ Comprehensive suite of development tools and an easy-to-use IDE
- ▶ Middleware: video (H.264, MPEG-4, and WMV) and audio (aacPlus)

### Benefits

- ▶ Offers leading multimedia capabilities while enabling products that are more power efficient
- ▶ Has rich connectivity capabilities and high-speed peripherals for host-based applications
- ▶ Enables great web-based playback systems with WMV and H.264 hardware accelerators that can perform 1280x720-size encoding or decoding at 30fps
- ▶ Achieves faster, better-quality map rendering in navigation applications
- ▶ Delivers clear TV pictures that don't appear fuzzy when enlarged from QVGA to WVGA or larger sizes
- ▶ Uses the compact SuperH® instruction set, reducing memory footprint by 30-40% vs. other chips
- ▶ Saves power because the superscalar architecture achieves 1.8MIPS/MHz, allowing fast application execution with a relatively low clock frequency
- ▶ Drives high-resolution displays that deliver a rich GUI
- ▶ Implements system designs with fewer external functions, reducing BOM cost and saving board space
- ▶ Supports Linux and other RTOS products, facilitating complex application development
- ▶ Enables shorter system development cycles so products can reach markets in less time

### SH7724 Block Diagram



