

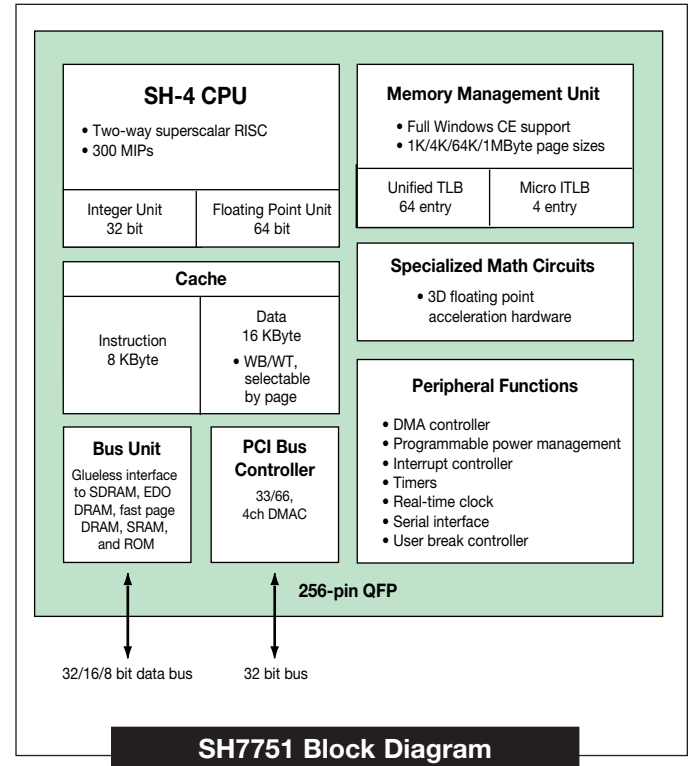
Description

The SH775x device (in the SH-4 series of SuperH products) is a high-performance, well integrated, cost-effective, 2-issue superscalar RISC microprocessor for embedded applications. The SH775x series delivers best-in-class performance, on-chip integration and code size, with excellent low power consumption, support tools and chipsets from Hitachi and third party vendors, as well as a migration path to higher performance and lower power. This complete package makes the SH775x series the optimal choice for use in data processing, communications, industrial, transportation and high-end consumer applications.

The SH775x series' 3D graphics capability (arithmetic accelerator) combines with the 100MHz, 64-bit external bus to deliver 800MB/s data throughput for workstation-class performance at an affordable price. Several operating systems and middleware applications run on the processors, with more in development.

Features

- General
 - Up to 200 MHz/360 MIPS (260MHz/480MIPS in 3Q01)
 - 16 x 32-bit general purpose registers
- CPU
 - Code compatible with SH-3 series
 - 16 x 32-bit general purpose registers
 - 32 x 32-bit single-precision floating point registers or 16 x 64-bit double-precision floating point registers or 4 x 128-bit single-precision vector registers and register matrix
 - 16-bit fixed instruction length for high code density
 - 32 x 32 + 64 → 64 bits multiply-accumulate unit for special functions such as software modems
 - MMU Designed for Windows®CE 1KB, 4KB, 64KB, and 1MB page sizes, 64-entry, fully associative TLB for instructions and operands
 - 4 entry, fully associative TLB for instructions
 - 5 stage pipeline
- Memory
 - On-chip cache, 8KB instruction (16KB in 3Q01) and 16KB data (32KB in 3Q01)
 - Write back or write through, selectable by page
 - Low voltage cache to reduce power consumption
 - On-chip bus state controller allows direct connection to DRAM, SDRAM, SRAM, ROM, and Flash ROM
 - 8, 16, 32, or 64-bit data bus support
- PCI Bus Controller
 - 32-bit PCI bus controller (Rev 2.1)
 - 33/66MHz operation
 - Host/Slave mode support
 - Supports up to 4 channels @ 33MHz, 1 channel @ 66MHz
 - Operation clock
 - Choose from internal clock or external clock (with divider)



- Dedicated 4-channel PCI DMAC
 - PCI to/from memory located on SuperH bus (Bus arbitration capability between DMAC on PCI bus and SuperH bus)
 - On-chip FIFO enables fast data transfer
- Peripherals
 - DMA, 4 channels
 - Timers, 3 channels x 32-bits
 - Watchdog timer
 - Realtime clock
 - PCMCIA control logic
 - Serial communications interface, 1 channel (asynchronous/synchronous, with smart card interface)
 - Serial communication interface, 1 channel (asynchronous, with 16 byte transmit and receive FIFOs)
 - PLL with x1/8, x1/6, x1/4, x1/2, x3/4, x1, x3/2, x2, x3, x6 external clock capability
 - Interrupt controller
- General purpose I/O, 16 lines
- Dynamic power control
 - Low power modes: sleep and standby
 - Peripheral turn off capability
- User break controller for on-chip debugging

SuperH®
RISC engine



Support

• Hardware:

– Emulators:

- Hitachi E10A emulator
- Wind River
- Yokagawa
- Sophia Systems

– Development and Reference boards

- Hitachi HARP and Solution Engine with support for a wide range of RTOS
- Densan

• Software:

– Project Builders, C, C++ compilers, assemblers, simulator/debuggers

- Hitachi
- Redhat GNU
- Green Hills Software
- Microsoft® VC++ for WindowsCE
- Diab SDS

• Operating Systems:

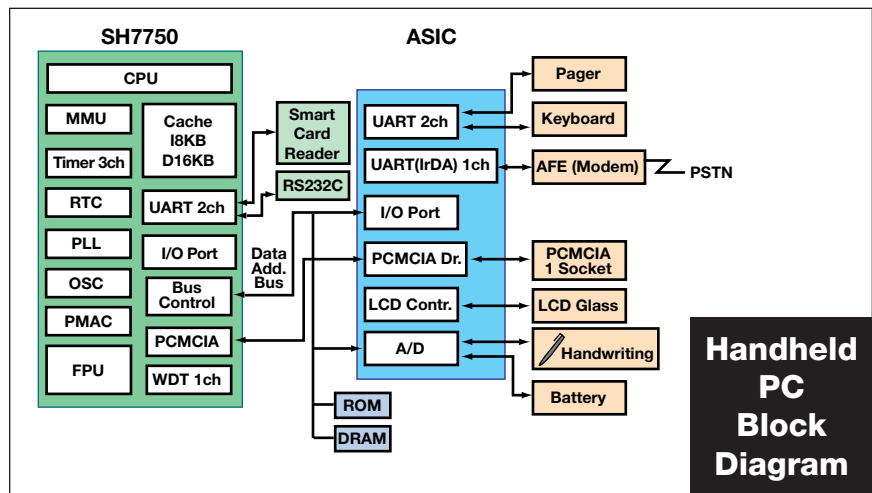
- Microsoft (WindowsCE)
- Wind River (VxWorks)
- ATI (Nucleus+)
- QSSL (QNX/Neutrino)
- Microware (OS9)
- Lineo (Linux)
- CMX (CMX-RTX)
- Others

For more information and links to Hitachi's partners' web sites, visit

<http://www.hitachi.com/semiconductor/tools>

Middleware

- V.90 (up to 56 Kbps) Data/FAX modem
- Voice recognition
- Voice compression
- Handwriting recognition
- JPEG video compression
- Image compression for FAX: MH, MR, MMR



**Handheld
PC
Block
Diagram**

SH-4 Comparison Table and Ordering Information

	SH7750	SH7750V	SH7751	SH7751V
Architecture	32b/2-way	32b/2-way	32b/2-way	32b/2-way
Cache (I+D)	8K + 16K	8K + 16K	8K + 16K	8K + 16K
Instruction	16b	16b	16b	16b
Registers	32b * 16w	32b * 16w	32b * 16w	32b * 16w
Memory-Bus	64b	64b	32b	32b
Peripherals	(All devices) MMU, DMAC, Timer, SCI, RTC, JTAG, Glueless Memory			
PCI-interface	---	---	33/66MHz	33/66MHz
I/O Voltage (V)	3.3	3.3	3.3	3.3
Voltage (V)	1.8	1.5	1.8	1.5
Freq. (MHz)	167/200	128	167	133
MIPS (Dhrystone)	360	230	300	240
Peak GFLOPS	1.4	0.9	1.2	0.9
Typ. Power (mW)	900	400	400	240
Sleep Power (mW)	150	75	100	50
Standby Cur. (μA)	50	50	50	50
MIPS/W	400	575	750	1000
Package	208-QFP/ 256-BGA	208-QFP	256-QFP	256-QFP
Part No.	HD6417750F167/ HD6417750BP200	HD6417750VF128	HD6417751F167	HD6417751VF133

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