

HITACHI

SH7044 and SH7045 SuperH™ Flash Microcontrollers

Product Brief

FLASH™

Description

Hitachi's SH7044F and SH7045F flash microcontrollers include 256-kbytes of on-chip flash operating under a single-voltage power supply. A variety of on chip modules are integrated into the SH7040 series including timers that generate 3-phase PWM outputs, A/D converter, serial interface, DMAC, RAM and cache providing a single-chip solution for industrial, communication, OA and consumer applications.

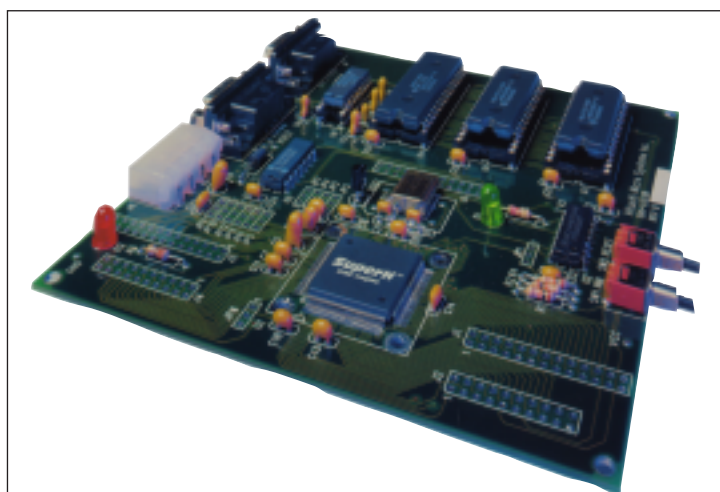
Hardware

CPU

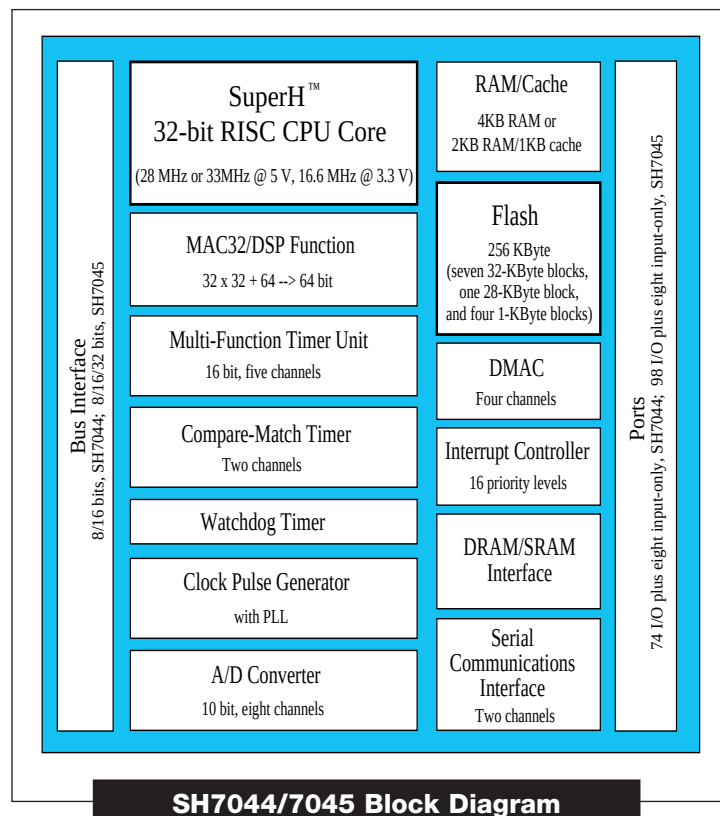
- SuperH 32-bit RISC Architecture (SH-2)
- 32-bit register set with 16-bit instructions for high code density
- 28 MHz or 33 MHz @ 5V
- 16 MHz @ 3.3V
- On-chip multiply accumulate: $32 \times 32 + 64 \rightarrow 64$
- 5 stage pipeline
- 112-pin QFP with 16-bit external bus, SH7040/2/4
- 144-pin QFP with 32-bit external bus, SH7041/3/5

Memory

- Flash Memory: 256-kbytes divided into 12-blocks
- RAM/Cache: 4-kbytes configurable as 2-kbytes of RAM and 1-kbytes of cache



SH7045 EDK Evaluation Board



On-chip peripherals

- Bus State Controller has 4 chip selects and generates DRAM and SRAM signals required for direct interface to memory.
- 7 x Timers capable of 3-phase PWM, automatic dead-time generation, input capture, output compare
- 8 channel 10-bit A/D Converter
- 2 channel serial interface
- 106 x I/O ports for SH7045, 82 for SH7044
- 4 channel DMAC
- Interrupt Controller, 16-level priority, 9 external interrupt pins (NMI, $\overline{\text{IRQ0}}\text{--}\overline{\text{IRQ7}}$)
- User Break Controller for debugging
- Direct Transfer Controller enables data transfer without CPU intervention.
- Watchdog Timer/Interval Interrupt Timer
- Clock Pulse Generator with internal PLL
- 74 I/O Ports and 8 input-only for the SH7044
- 98 I/O Ports and 8 input-only for the SH7045



Hitachi E7000 Emulator

Hardware/Software Support

- E7000 Emulator, device pod, user cable
- Evaluation Development Kit – Includes evaluation board and development software.
- Flash Programming software
- C, C++ compiler, assembler, simulator/debugger

Ordering Information

Order Number	ROM Size	ROM Type	Frequency	Supply Voltage	External Bus	Package
HD6437042AE00F	0	not applicable	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD6437043AE00F	0	not applicable	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP
HD6437040F28	64KB	Mask ROM	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD6437041F28	64KB	Mask ROM	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP
HD6437042AF28	128KB	Mask ROM	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD6477042AF28	128KB	OTP	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD6437043AF28	128KB	Mask ROM	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP
HD6477043AF28	128KB	OTP	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP
HD64F7044F28	256KB	Flash	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD6437044F28	256KB	Mask ROM	28.7 MHz	4.5V - 5.5V	16-bit	112-QFP
HD64F7045F28	256KB	Flash	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP
HD6437045F28	256KB	Mask ROM	28.7 MHz	4.5V - 5.5V	32-bit	144-QFP

Contact Hitachi Sales for the order number information of the low voltage (16.6MHz, 3.3V) and/or industrial temperature grade (-40 to +85°C) versions.

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Third Party Support

- **Device driver generation**
 - Stenkil
- **Emulator**
 - Orion
 - Sophia Systems
 - Hewlett Packard
 - Lauterbach
- **Evaluation board**
 - Densan Systems
- **C, C++ compiler, assembler, simulator/debugger**
 - Cygnus (GNU)
 - IAR
 - Green Hills
- **EPROM Programmers**
 - Data I/O
 - BP Microsystems
 - Tribal Microsystems
- **Task and timing simulation**
 - CARDtools
- **Operating Systems**
 - Wind River Systems
 - U.S. Software
 - Accelerated Technology
 - JMI
 - Integrated Systems

Complete SH-2 technical documentation is available at:
www.hitachi.com/semiconductor

Distributors

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