

## 4-bit Single Chip Microcomputer

- Original Architecture Core CPU
- Low Current Consumption
- High Speed Operation in Low Voltage

### ■ DESCRIPTION

The S1C63408 is a microcomputer which has a high-performance 4-bit CPU S1C63000 as the core CPU, code ROM, RAM, data ROM, serial interface, watchdog timer, programmable timer, time base counters (2 systems) and a dot-matrix LCD driver. Furthermore, the built-in reset circuit (with power-on reset function) can detect the power supply voltage to reset the S1C63408 when the power is turned on or an instantaneous power interruption occurs. The S1C63408 features high speed operation with a low operating voltage (1.3 V to 3.6 V) and low current consumption, this makes it suitable for applications working with batteries, such as portable MD and CD player systems.

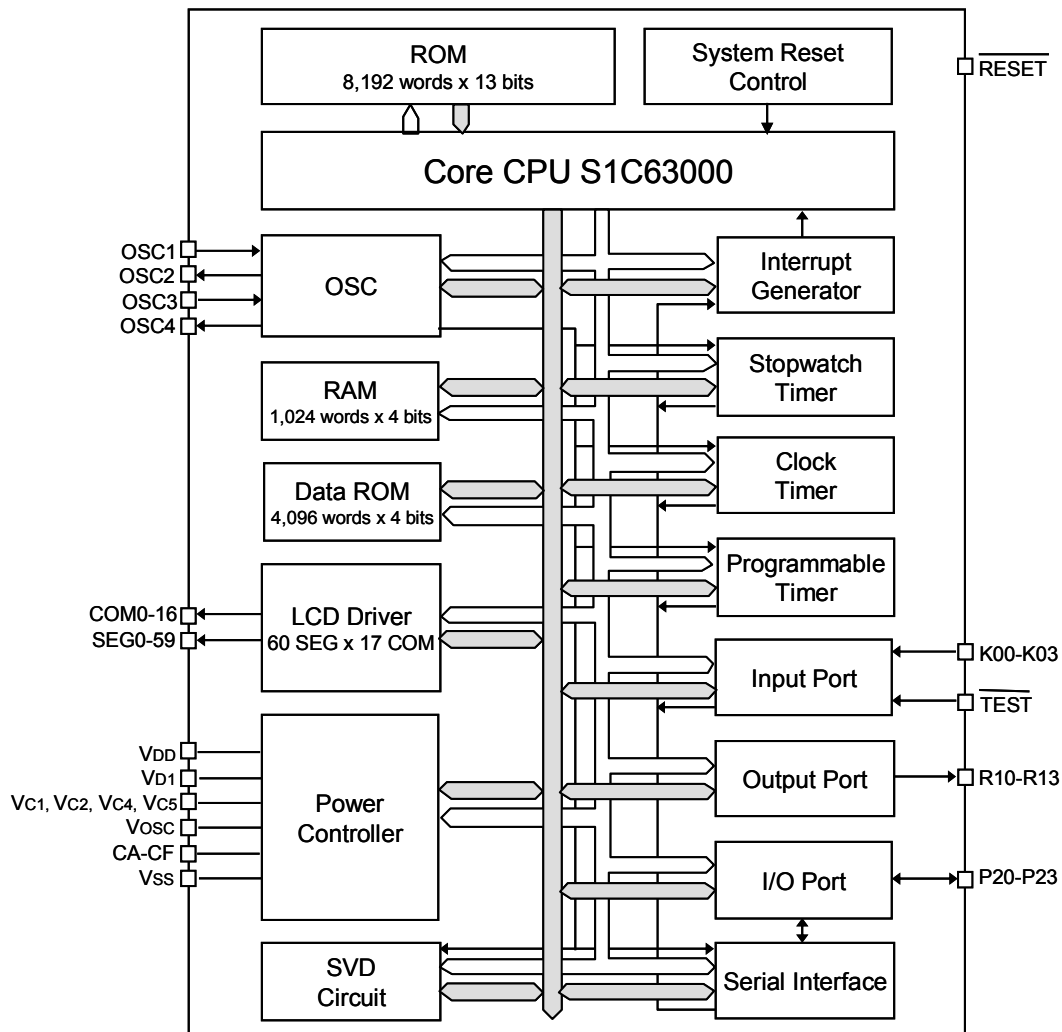
### ■ FEATURES

OSC1 oscillation circuit	32.768 kHz (Typ.) crystal or 60 kHz (Typ.) CR oscillation circuit (*1)
OSC3 oscillation circuit	4 MHz (Typ.) crystal, 3.58 MHz (Typ.) ceramic or 2 MHz (Typ.) CR oscillation circuit (*1)
Instruction set	Basic instruction: 47 types (411 instructions with all) Addressing mode: 8 types
Instruction execution time	During operation at 32.768 kHz: 61 μsec 122 μsec 183 μsec During operation at 60 kHz: 33 μsec 67 μsec 100 μsec During operation at 2 MHz: 1 μsec 2 μsec 3 μsec During operation at 3.58 MHz: 0.56 μsec 1.12 μsec 1.68 μsec During operation at 4 MHz: 0.5 μsec 1 μsec 1.5 μsec
ROM capacity	Code ROM: 8,192 words × 13 bits Data ROM: 4,096 words × 4 bits (S1C63408)
RAM capacity	Data memory: 1,024 words × 4 bits Display memory: 1,020 bits (240 words × 4 bits + 60 × 1 bit)
Input port	4 bits (Pull-up resistors may be supplemented *1)
Output port	4 bits (It is possible to switch the 2 bits to special outputs * 2)
I/O port	4 bits with Schmitt trigger input (Built-in pull-up resistors may be disabled *2 It is possible to switch to serial I/F inputs/outputs *2)
Serial interface	1 port (8-bit clock synchronous or asynchronous system *2)
LCD driver	60 segments × 8, 9, 16 or 17 commons (*2)
Time base counter	2 systems (Clock timer, stopwatch timer)
Programmable timer	8 bits × 2 ch. or 16 bits × 1 ch., with event counter function
Watchdog timer	Built-in
Supply voltage detection (SVD) circuit	16 values, programmable (1.30 V to 2.80 V)
Reset circuit	Built-in (1.8 V, 1.6 V or 1.4 V * 1), with power-on reset function
External interrupt	Input port interrupt: 4 systems
Internal interrupt	Clock timer interrupt: 4 systems Stopwatch timer interrupt: 2 systems Programmable timer interrupt: 2 systems Serial interface interrupt: 3 systems
Power supply voltage	1.3 V to 3.6 V (Min. 1.4 V when 700 kHz (Max.) OSC3 CR oscillator is used) (Min. 1.6 V when 2.2 MHz (Max.) OSC3 CR oscillator is used) (Min. 1.8 V when 4.2 MHz (Max.) OSC3 oscillator is used)
Operating temperature range	-40°C to 85°C
Current consumption	Low-power operation (*3): During SLEEP 1.2 μA (Typ.) During HALT (32 kHz crystal oscillation) 3.6 V (LCD OFF) 1.3 μA (Typ.) 3.6 V (LCD ON, VC1 standard) 3.0 μA (Typ.) 3.6 V (LCD ON, VC2 standard) 2.5 μA (Typ.)

# S1C63408

	During operation (32 kHz crystal oscillation) 3.6 V (LCD OFF)	3.0 $\mu$ A (Typ.)
	During HALT (60 kHz CR oscillation) 3.6 V (LCD OFF)	3.5 $\mu$ A (Typ.)
	3.6 V (LCD ON, VC1 standard)	6.2 $\mu$ A (Typ.)
	3.6 V (LCD ON, VC2 standard)	4.6 $\mu$ A (Typ.)
	During operation (60 kHz CR oscillation) 3.6 V (LCD OFF)	7.0 $\mu$ A (Typ.)
	High-speed operation:	
	During operation (500 kHz CR oscillation) 3.6 V (LCD OFF)	90 $\mu$ A (Typ.)
	During operation (1 MHz CR oscillation) 3.6 V (LCD OFF)	200 $\mu$ A (Typ.)
	During operation (2 MHz CR oscillation) 3.6 V (LCD OFF)	350 $\mu$ A (Typ.)
	During operation (3.58 MHz ceramic oscillation) 3.6 V (LCD OFF)	500 $\mu$ A (Typ.)
	During operation (4 MHz crystal oscillation) 3.6 V (LCD OFF)	550 $\mu$ A (Typ.)
Package	QFP15-128pin (plastic) or chip	
	*1: Can be selected with mask option	*2: Can be selected with software
	*3: Current consumption when the reset circuit option is not selected (Reset circuit current will be added when the reset circuit option is selected.)	

## ■ BLOCK DIAGRAM



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