

## CMOS 4-bit Single Chip Microcontroller

- High Performance 4-bit Core CPU S1C63000
- Segment LCD Driver (Max:50SEG x 8COM)
- R/F Converter to Measure Temperature and Humidity
- Low Current Consumption
- Low Voltage Operation

### ■ DESCRIPTIONS

The S1C63008 is a microcontroller features low voltage operations and low current consumption. It consists of a 4-bit core CPU S1C63000 as the core CPU, ROM (8K words x 13 bits), RAM (1K words x 4 bits), supply voltage detection (SVD) circuit, serial interface, timers, sound generator, and integer multiplier. It also incorporates a segment LCD controller/driver that can drive a maximum 50-segment x 8-common LCD panel, and an R/F converter that can measure temperature and humidity using sensors such as a thermistor.

The S1C63008 is suitable for battery driven clocks and watches with temperature and humidity measurement functions.

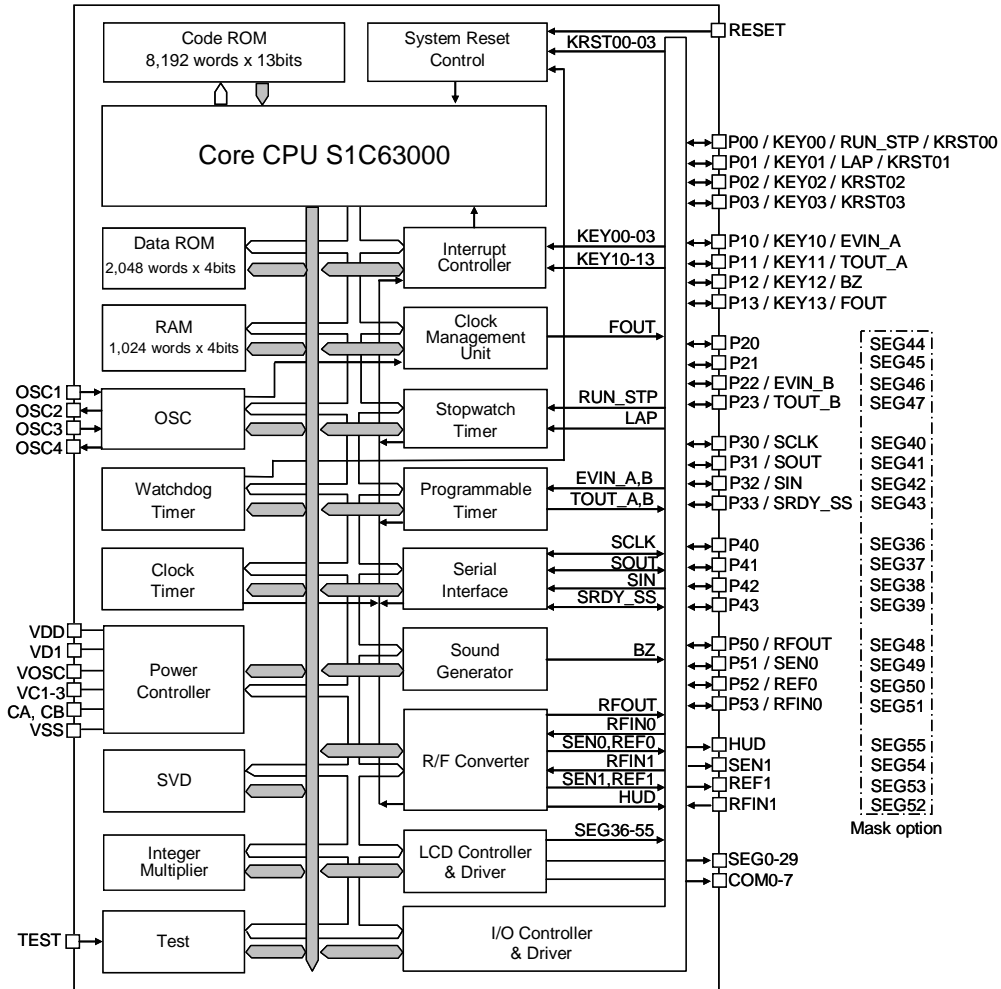
### ■ FEATURES

- |  |   |
|--|---|
| ● CPU                                    | 4-bit CMOS core CPU S1C63000  |
| ● OSC1 oscillation circuit               | 32.768kHz (Typ.) crystal oscillation circuit  |
| ● OSC3 oscillation circuit               | 4.0MHz (Typ., 3V model) / 1.0MHz (Typ., 1.5V model) ceramic oscillation circuit<br>1.8MHz (Typ., 3V model) / 500kHz (Typ., 1.5V model) CR oscillation circuit (external R), or<br>500kHz (Typ., 3V model / 1.5V model) CR oscillation circuit (built-in R) (*1) |
| ● Instruction set                        | 47 types of basic instructions (411 instructions with all),<br>8 types of addressing modes  |
| ● Instruction execution time             | During operation at 32.768kHz: 61μsec    122μsec    183μsec<br>During operation at 4MHz:    0.5μsec    1μsec    1.3μsec   |
| ● ROM capacity                           | Code ROM: 8,192 words x 13 bits<br>Data ROM: 2,048 words x 4 bits   |
| ● RAM capacity                           | Data memory: 1,024 words x 4 bits<br>Display memory: 400 bits   |
| ● LCD driver                             | 50 segments (Max., *1) x 3 to 8 commons (*2)  |
| ● I/O ports                              | 24 bits   |
| ● Serial interface                       | 1 port (8-bit clock synchronous system with SPI supported)  |
| ● Time base counters                     | Clock timer<br>1/1000-second stopwatch timer with direct key input function   |
| ● Programmable timer                     | 8-bit timer x 3 channels<br>(Can be used as 16-bit timer x 1 + 8-bit timer x 1) (*2)  |
| ● Watchdog timer                         | Built-in  |
| ● Sound generator                        | With envelope and 1-shot output functions   |
| ● R/F converter                          | 2 channels, CR oscillation type R/F converter with 20-bit counters,<br>supports resistive humidity sensors  |
| ● Integer Multiplier                     | 8-bit accumulator x 1 channel<br>Multiplication: 8 bits x 8 bits → 16-bit product<br>Division:    16 bits ÷ 8 bits → 8-bit quotient and 8-bit remainder   |
| ● Supply voltage detection (SVD) circuit | Programmable 29 detection voltage levels (*2)   |
| ● External interrupt                     | Key input    8 systems  |
| ● Internal interrupt                     | Watchdog timer (NMI)    1 systems<br>Clock timer    8 systems<br>Stopwatch timer    4 systems<br>Programmable timer    6 systems<br>Serial interface    1 systems<br>R/F converter    3 systems   |
| ● Power supply voltage                   | 1.8 to 5.5V (3V normal type) or 1.1 to 1.7V (1.5V low-voltage type) (*1)  |
| ● Operation temperature range            | -40 to 85°C   |
| ● Current consumption (Typ.)             | SLEEP (32kHz)    0.1μA (3V model) / 0.1μA (1.5V model)<br>HALT (32kHz)    0.5μA (3V model) / 0.5μA (1.5V model)<br>RUN (32kHz)    2.3μA (3V model) / 2.0μA (1.5V model)<br>RUN (4M/1MHz)    220μA (4MHz, 3V model) / 60μA (1MHz, 1.5V model)                    |
| ● Shipment form                          | QFP15-100pin, TQFP14-100pin, or die form  |

\*1: Can be selected with mask option. \*2: Can be selected with software.

# S1C63008

## ■ BLOCK DIAGRAM



### NOTICE:

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. This material or portions thereof may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of Economy, Trade and Industry or other approval from another government agency.

All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

©Seiko Epson Corporation 2010, All rights reserved

**SEIKO EPSON CORPORATION**

**SEMICONDUCTOR OPERATIONS DIVISION**

EPSON semiconductor website

[http://www.epson.jp/device/semicon\\_e/](http://www.epson.jp/device/semicon_e/)

IC Sales Department  
 IC International Sales Group  
 421-8 Hino, Hino-shi, Tokyo 191-8501, JAPAN  
 Phone: +81-42-587-5814 FAX: +81-42-587-5117

Document code: 411895700  
 First issue Feb, 2010 in Japan