

## CMOS 4-bit Single Chip Microcontroller

- High Performance 4-bit Core CPU S1C63000
- Flash EEPROM 16K x 13bit / 4K x bit
- Segment LCD Driver (Max:56SEG x 8COM)
- R/F Converter to Measure Temperature and Humidity
- Low Current Consumption
- Low Voltage Operation

### ■ DESCRIPTIONS

The S1C6F016 is a microcontroller features low voltage operations and low current consumption. It consists of a 4-bit core CPU S1C63000 as the core CPU, Flash EEPROM (16K words x 13 bits), RAM (2K 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 56-segment x 8-common LCD panel, and an R/F converter that can measure temperature and humidity using sensors such as a thermistor.

The S1C6F016 is suitable for battery driven clocks and watches with temperature and humidity measurement functions.

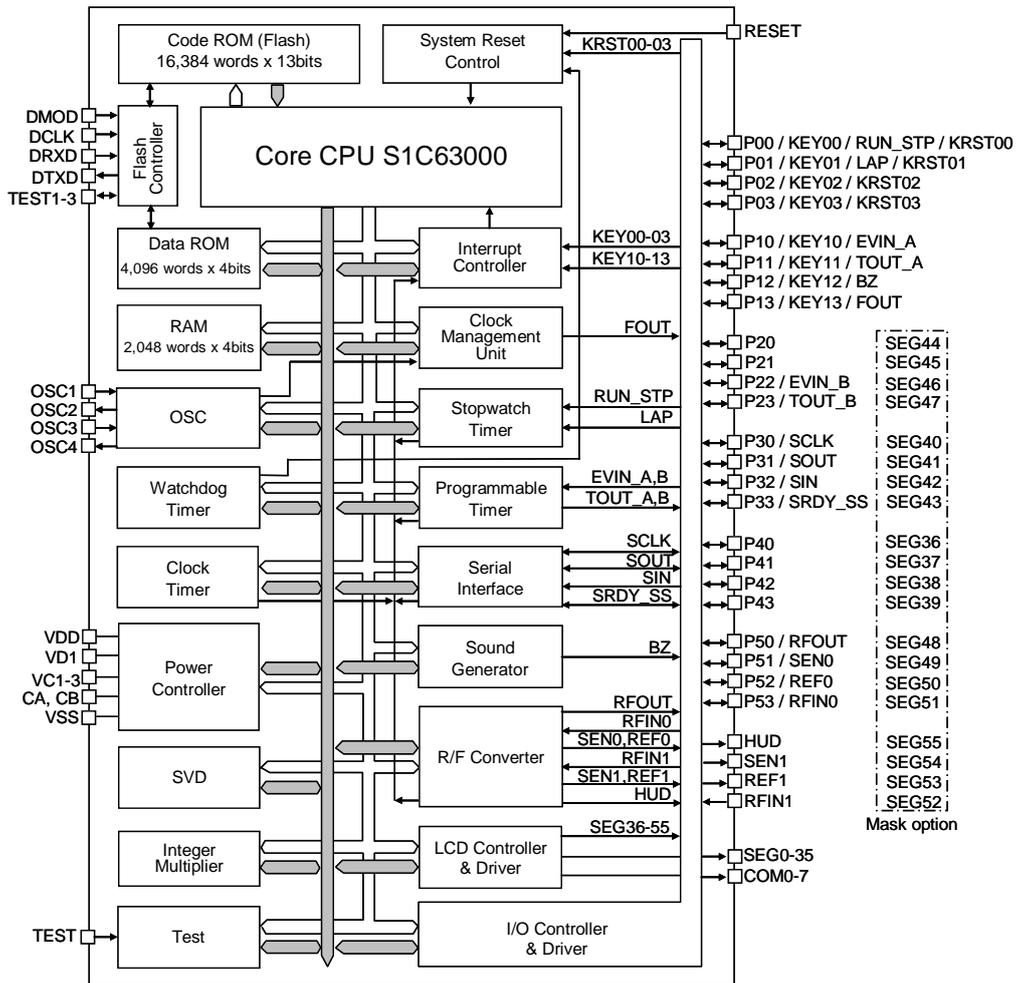
### ■ FEATURES

|  |   |
|--|---|
| ● CPU                                    | 4-bit CMOS core CPU S1C63000  |
| ● OSC1 oscillation circuit               | 32.768kHz (Typ.) crystal oscillation circuit  |
| ● OSC3 oscillation circuit               | 4.2MHz (Max.) ceramic oscillation circuit   |
|  | 1.8MHz (Typ.) CR oscillation circuit (external R), or   |
|  | 500kHz (Typ.) 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   |
| ● Flash EEPROM capacity                  | Code ROM: 16,384 words x 13 bits<br>Data ROM: 4,096 words x 4 bits  |
| ● RAM capacity                           | Data memory: 2,048 words x 4 bits<br>Display memory: 448 bits   |
| ● LCD driver                             | 56 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                     | 16-bit timer x 2 channels<br>Each 16-bit timer is configurable to two 8-bit timer channels (*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 16 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    8 systems<br>Serial interface    1 systems<br>R/F converter    3 systems |
| ● Power supply voltage                   | 1.8 to 3.6V (for normal operation),    2.7 to 3.6V (for Flash programming) (*1)   |
| ● Operation temperature range            | -20 to 70°C   |
| ● Current consumption (Typ.)             | During SLEEP (32kHz)    0.7μA<br>During HALT (32kHz)    2μA<br>During running (32kHz)    9μA<br>During running (4MHz)    950μA  |
| ● Shipment form                          | QFP15-100pin or die form  |

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

# S1C6F016

## ■ BLOCK DIAGRAM



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