S1C17554/564

16-bit Single Chip Microcontroller

- 48-pin wafer-chip-scale package (WCSP)
- 10-bit A/D converter
- Code-efficient architecture optimized for the C language, single-cycle instruction high processing performance, serial ICE, and built-in 16-bit RISC PCU core S1C17

■ DESCRIPTIONS

The S1C17554/564 is a compact 16-bit MCU that delivers high-speed, low power operation with large address space and on-chip ICE. It integrates A/D converter and thus various analog-interface sensors are connectable. The ultra small power-saving 48-pin WCSP is most suitable for sensor-applied products that require low power consumption and high-speed processing.

■ FEATURES

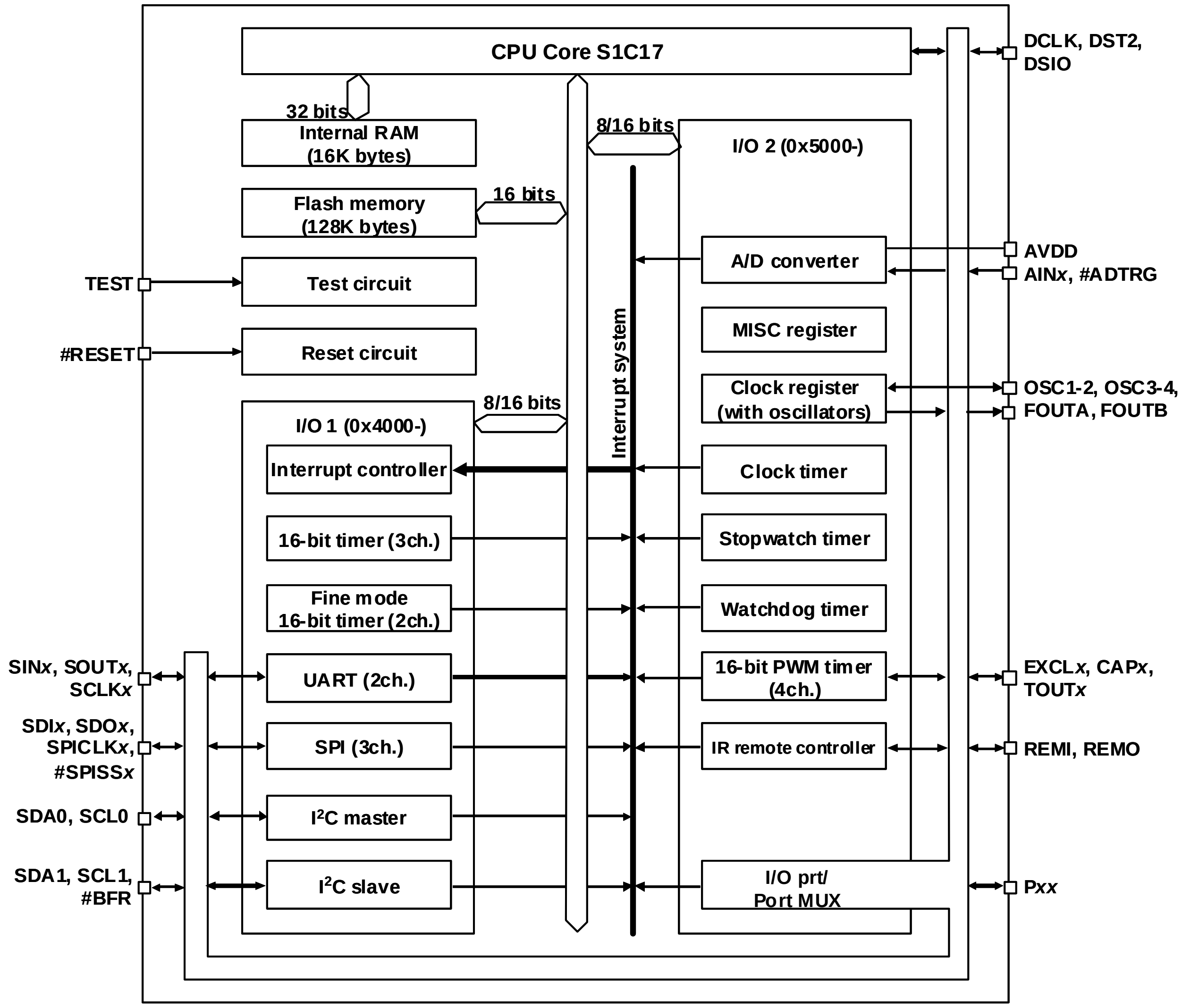
The main features of the S1C17554/564 are listed below.

Model	S1C17554	S1C17564
CPU		
CPU core	Seiko Epson original 16-bit RISC CPU core S1C17	
Multiplier/Divider (COPRO)	• 16-bit × 16-bit multiplier • 16-bit × 16-bit + 32-bit multiply and accumulation unit • 16-bit ÷ 16-bit divider	
Embedded Flash memory		
Capacity	128K bytes (for both instructions and data)	
Erase/program count	Min. 1 time	
Other	• Read/program protection function • An erasing/programming power supply (VPP) is required. • Allows on-board programming using a debugging tool such as ICDmini.	
Embedded RAM		
Capacity	16K bytes	
Clock generator		
System clock source	2 sources (OSC3/OSC1)	3 sources (IOSC/OSC3/OSC1)
IOSC oscillator circuit		2/4/8/12 MHz(typ.) internal oscillator circuit
OSC3 oscillator circuit	24 MHz (max.) crystal or ceramic oscillator circuit Supports an external clock input.	
OSC1 oscillator circuit	32.768 kHz (typ.) crystal oscillator circuit Supports an external clock input.	
Other	• Core clock frequency control • Peripheral module clock supply control	
I/O ports		
Number of general-purpose I/O ports	Max. 40 bits (TQFP13-64pin package) Max. 34 bits (WCSP-48 package) (Pins are shared with the peripheral I/O.)	Max. 40 bits (Pins are shared with the peripheral I/O.)
Serial interfaces		
SPI	3 channels	
I^{2}C master (I2CM)	1 channel	
I^{2}C slave (I2CS)	1 channel	
UART	2 channels (IrDA1.0 supported)	
IR remote controller (REMC)	1 channel	
Universal serial interface (USI)		2 channels (Usable as a UART, SPI, or I^{2}C)
Timers		
16-bit timer (T16)	3 channels	
Fine mode 16-bit timer (T16F)	2 channels	
16-bit PWM timer (T16A)	4 channels	
Clock timer (CT)	1 channel	
Stopwatch timer (SWT)	1 channel	

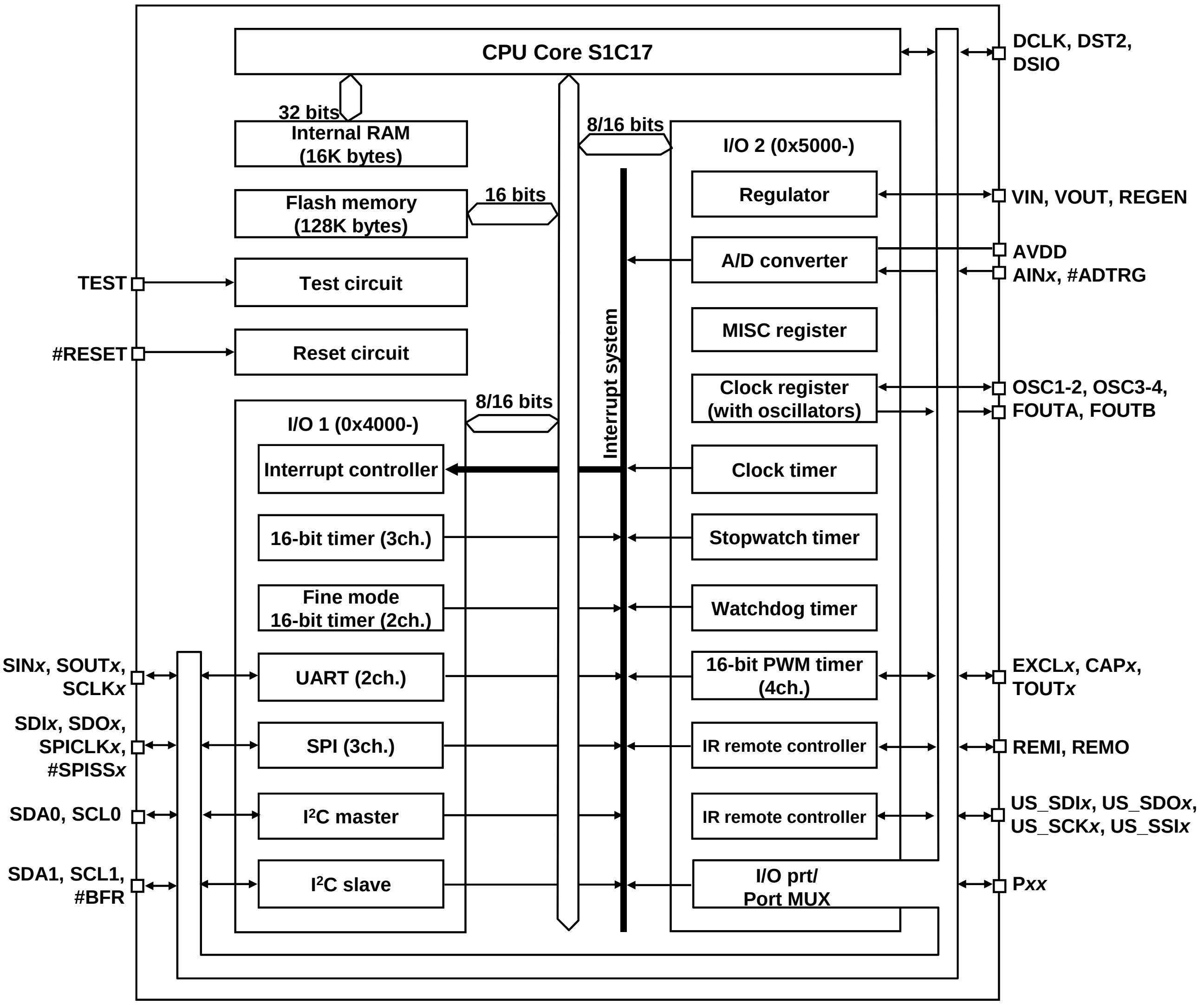
Watchdog timer (WDT)	1 channel	
A/D converter		
Conversion method	Successive approximation type	
Number of analog input channels	4 channels (max.)	
Resolution	10 bits	
Interrupts		
Reset interrupt	#RESET pin	
NMI	Watchdog timer	
Programmable interrupts	23 systems (8 levels)	
Power supply voltage		
Core voltage (LVDD)	1.65 V to 1.95 V	1.65 V to 1.95 V (Not required when the regulator is used.)
I/O voltage (HVDD)	1.65 V to 5.5 V	2.0 V to 5.5 V (Regulator used) 1.65 V to 5.5 V (Regulator not used)
Analog voltage (AVDD)	2.7 V to 5.5 V	
Flash programming voltage (VPP)	7 V/7.5V	
Regulator		
Input voltage		2.0 V to 5.5 V
Output voltage		1.8 V
Other		Enables the system to operate with a 3.3 V or 5.0 V single power supply.
Operating temperature		
Operating temperature range	-40° C to 85° C	
Current consumption (Typ value, LVDD = HVDD = 1.8 V)		
SLEEP state	0.8 µA (OSC1 = Off, OSC3 = Off)	1.2 µA (OSC1 = Off, IOSC = Off, OSC3 = Off)
HALT state	2.7 µA (OSC1 = 32 kHz, OSC3 = Off)	3.1 µA (OSC1 = 32 kHz, IOSC = Off, OSC3 = Off)
Run state	16 µA (OSC1 = 32 kHz, OSC3 = Off)	16 µA (OSC1 = 32 kHz, IOSC = Off, OSC3 = Off)
	3000 µA (OSC1 = Off, OSC3 = 8 MHz ceramic)	3000 µA (OSC1 = Off, IOSC = Off, OSC3 = 8 MHz ceramic)
		4500 µA (OSC1 = Off, IOSC = 12 MHz, OSC3 = Off)
A/D conversion	380 µA (AVDD = 3.6 V, 100 kHz sampling, FSEL[1:0] = 0x0, XPD[1:0] = 0x3)	
Shipping form		
1	TQFP13-64pin (10 mm × 10 mm × 1.0 mm, lead pitch: 0.5 mm)	
2	Die form (3.137 mm × 3.137 mm, pad pitch: 140 µm)	
3	WCSP-48 (3.137 mm × 3.137 mm × 0.72 mm, ball pitch: 0.4 mm)	

■ BLOCK DIAGRAM

S1C17554



S1C17564



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SEIKO EPSON CORPORATION

MICRODEVICES OPERATIONS DIVISION

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

EPSON semiconductor website

http://www.epson.jp/device/semicon_e/

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