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### What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

### Applications of "[Embedded - Microcontrollers](#)"

#### Details

Product Status	Active
Core Processor	S1C17
Core Size	16-Bit
Speed	24MHz
Connectivity	I <sup>2</sup> C, IrDA, SPI, UART/USART
Peripherals	PWM, WDT
Number of I/O	40
Program Memory Size	128KB (128K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	16K x 8
Voltage - Supply (Vcc/Vdd)	1.65V ~ 1.95V
Data Converters	A/D 4x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	64-TQFP
Supplier Device Package	-
Purchase URL	<a href="https://www.e-xfl.com/product-detail/epson/s1c17564f111100">https://www.e-xfl.com/product-detail/epson/s1c17564f111100</a>

# 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.

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Model	S1C17554	S1C17564
<b>CPU</b>		
CPU core	Seiko Epson original 16-bit RISC CPU core S1C17	
Multiplier/Divider (COPRO)	<ul style="list-style-type: none"><li>• 16-bit × 16-bit multiplier</li><li>• 16-bit × 16-bit + 32-bit multiply and accumulation unit</li><li>• 16-bit ÷ 16-bit divider</li></ul>	
<b>Embedded Flash memory</b>		
Capacity	128K bytes (for both instructions and data)	
Erase/program count	Min. 1 time	
Other	<ul style="list-style-type: none"><li>• Read/program protection function</li><li>• An erasing/programming power supply (VPP) is required.</li><li>• Allows on-board programming using a debugging tool such as ICDmini.</li></ul>	
<b>Embedded RAM</b>		
Capacity	16K bytes	
<b>Clock generator</b>		
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	<ul style="list-style-type: none"><li>• Core clock frequency control</li><li>• Peripheral module clock supply control</li></ul>	
<b>I/O ports</b>		
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.)
<b>Serial interfaces</b>		
SPI	3 channels	
I <sup>2</sup> C master (I2CM)	1 channel	
I <sup>2</sup> 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 <sup>2</sup> C)
<b>Timers</b>		
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	

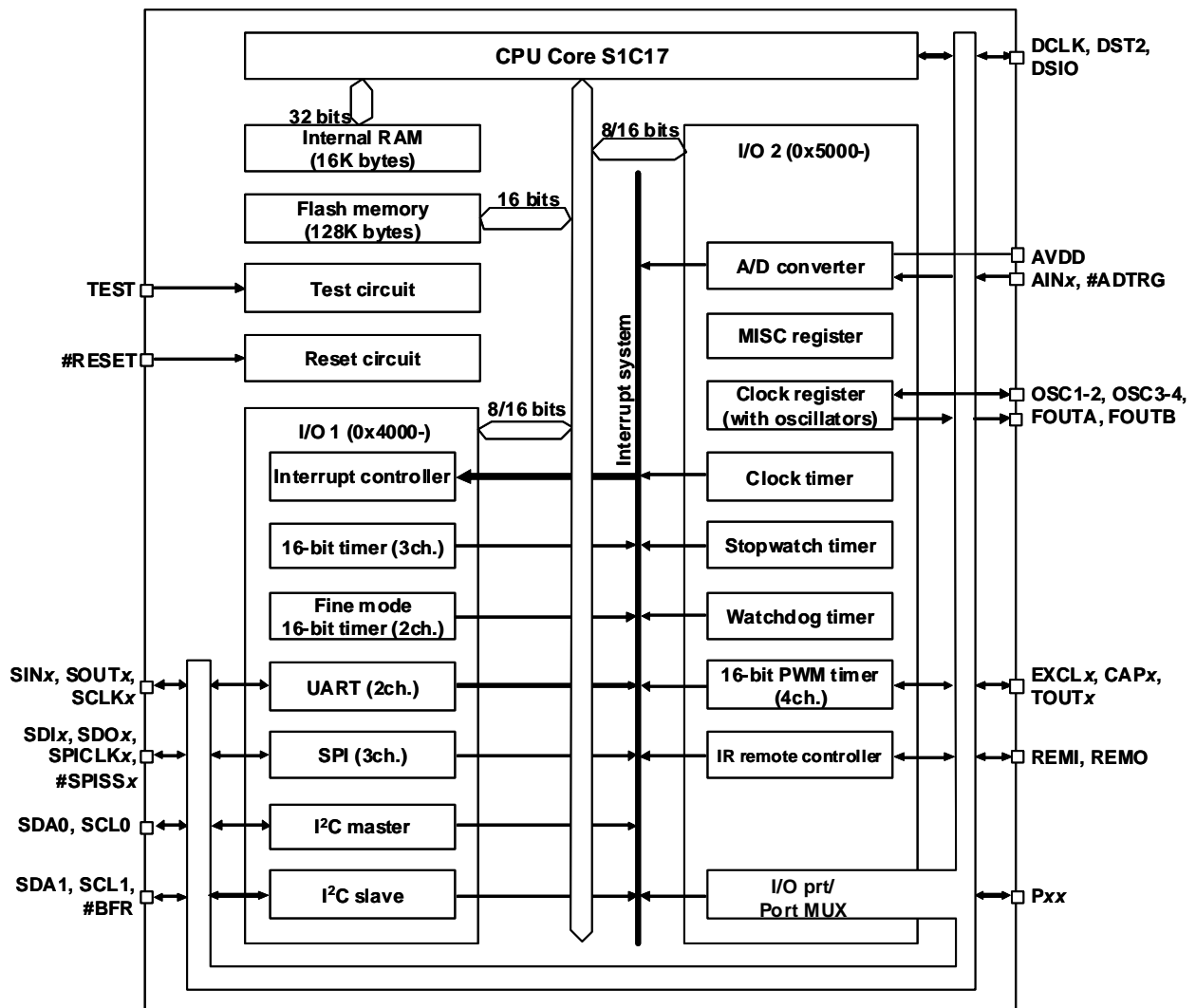
# S1C17554/564

Watchdog timer (WDT)	1 channel	
<b>A/D converter</b>		
Conversion method	Successive approximation type	
Number of analog input channels	4 channels (max.)	
Resolution	10 bits	
<b>Interrupts</b>		
Reset interrupt	#RESET pin	
NMI	Watchdog timer	
Programmable interrupts	23 systems (8 levels)	
<b>Power supply voltage</b>		
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	
<b>Regulator</b>		
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.
<b>Operating temperature</b>		
Operating temperature range	-40° C to 85° C	
<b>Current consumption (Typ value, LVDD = HVDD = 1.8 V)</b>		
SLEEP state	0.8 $\mu$ A (OSC1 = Off, OSC3 = Off)	1.2 $\mu$ A (OSC1 = Off, IOSC = Off, OSC3 = Off)
HALT state	2.7 $\mu$ A (OSC1 = 32 kHz, OSC3 = Off)	3.1 $\mu$ A (OSC1 = 32 kHz, IOSC = Off, OSC3 = Off)
Run state	16 $\mu$ A (OSC1 = 32 kHz, OSC3 = Off)	16 $\mu$ A (OSC1 = 32 kHz, IOSC = Off, OSC3 = Off)
	3000 $\mu$ A (OSC1 = Off, OSC3 = 8 MHz ceramic)	3000 $\mu$ A (OSC1 = Off, IOSC = Off, OSC3 = 8 MHz ceramic)
		4500 $\mu$ A (OSC1 = Off, IOSC = 12 MHz, OSC3 = Off)
A/D conversion	380 $\mu$ A (AVDD = 3.6 V, 100 kHz sampling, FSEL[1:0] = 0x0, XPD[1:0] = 0x3)	
<b>Shipping form</b>		
1	TQFP13-64pin (10 mm $\times$ 10 mm $\times$ 1.0 mm, lead pitch: 0.5 mm)	
2	Die form (3.137 mm $\times$ 3.137 mm, pad pitch: 140 $\mu$ m)	
3	WCSP-48 (3.137 mm $\times$ 3.137 mm $\times$ 0.72 mm, ball pitch: 0.4 mm)	

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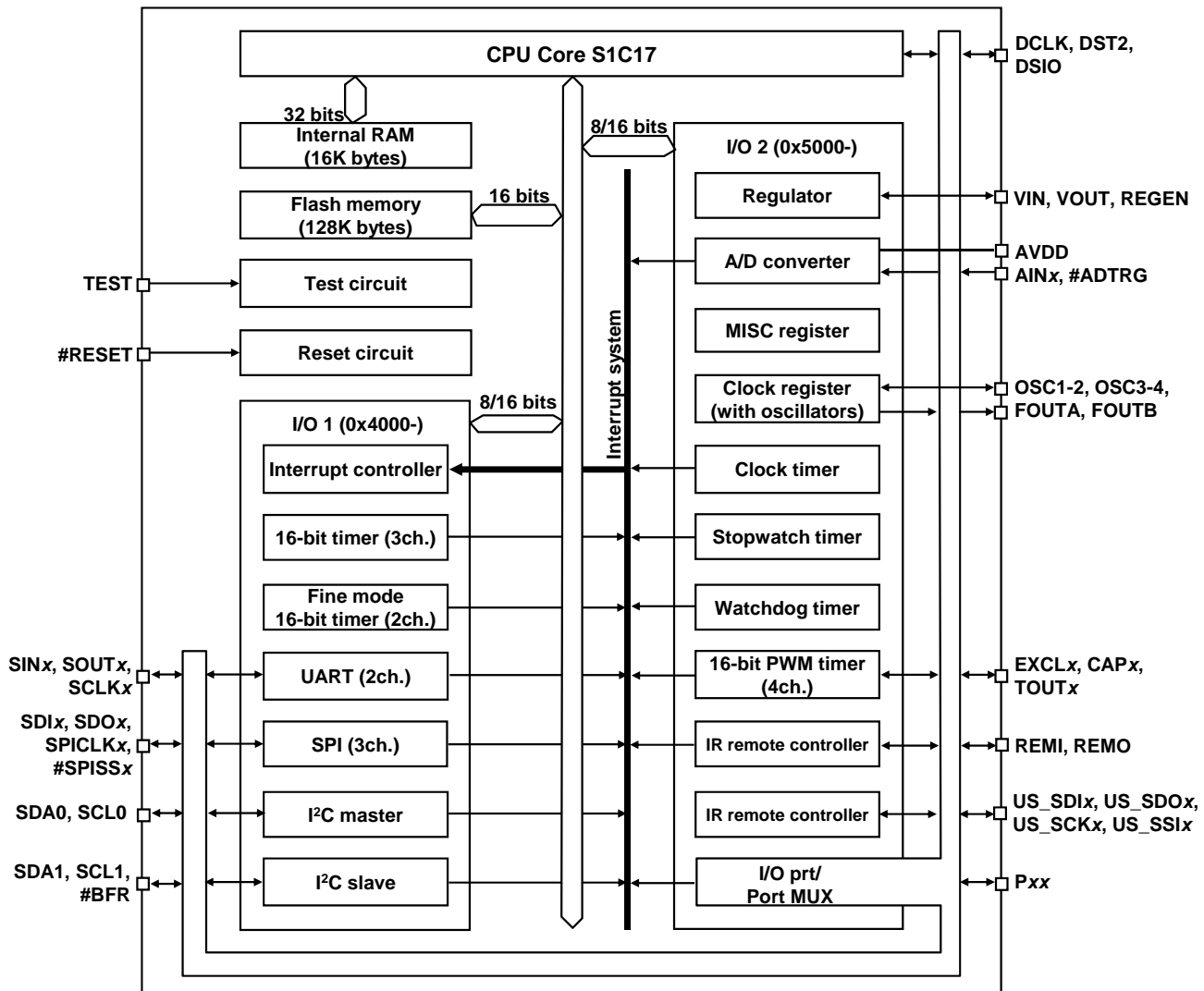
## ■ BLOCK DIAGRAM

S1C17554



# S1C17554/564

S1C17564



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Document code: 411827101  
First issue April, 2010  
Revised Aug, 2013.