S1C17702

EPSON

EXCEED YOUR VISION

Low Power 16-bit Single Chip Microcontroller

- Low Power MCU (Operating voltage 1.8V, 1.2uA/ SLEEP, 2.7uA/ HALT)
- 128K-Byte Flash Memory, 12KB RAM
- High quality, stable display LCD driver (72SEG x 32COM or 88SEG x 16COM) with voltage booster
- Infrared Remote Controller with Carrier Generator
- S1C17 High Performance 16-bit RISC CPU Core with C Optimized Compact Code and Serial ICE Support

■ DESCRIPTIONS

The S1C17702 is a 16-bit MCU featuring high-speed low-power operations, compact dimensions, wide address space, and on-chip ICE. Based on an S1C17 CPU core, this product incorporates 128 KB of flash memory, 12 KB of RAM, a serial interface supporting sensors such as UART, SPI, and I2C to support high-bit rate and IrDA1.0, an 8-bit timer, 16-bit timer, PWM & capture timer, clock timer, stopwatch timer, watchdog timer, 28 general input/output ports, max. 72 segment x 32 common LCD driver and a power supply voltage booster circuit, power supply voltage detection circuit, 32 kHz and max. 8.2 MHz oscillator circuit, and internal 1.8 V voltage regulator.

It allows 8.2 MHz high-speed operation at an operating voltage of just 1.8 V, and executes single instructions using a single clock with 16-bit RISC processing. The product also incorporates a coprocessor for arithmetic functions for multiplication and product-sum operations.

The on-chip ICE function allows onboard programs/deletes of internal flash memory and program debugging and evaluations following connection of the three signal wires to the ICD Mini (S5U1C17702H).

The S1C17702 is ideal for applications (such as remote controllers and sports watches) requiring battery power and sensor interface and for LCD displays of up to 72 x 32 dots.
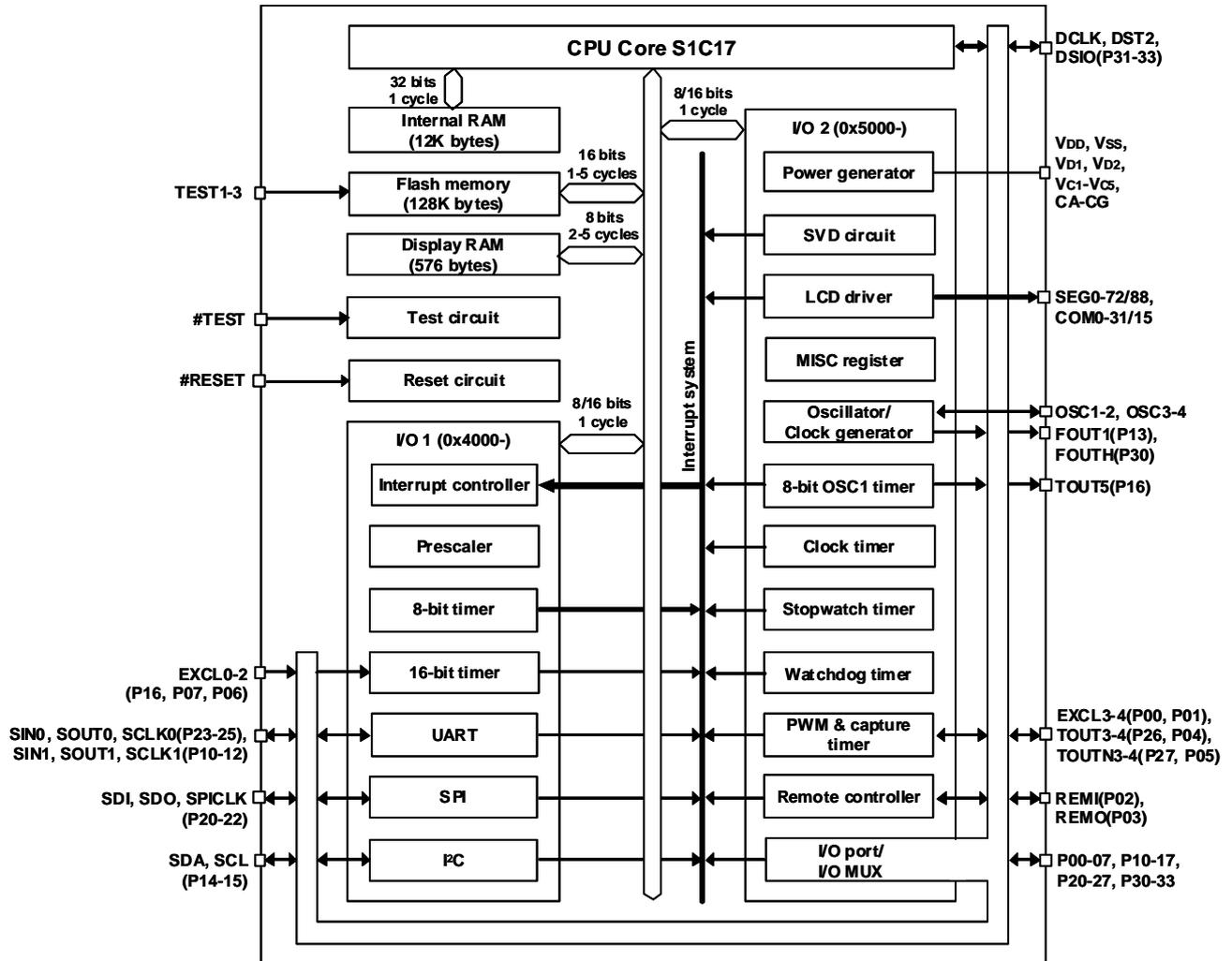
■ FEATURES

● CPU	Epson original 16-bit RISC CPU core S1C17
	16-bit x 16-bit + 32-bit product-sum processor
	16-bit ÷ 16-bit divider
● IOSC oscillator circuit	2.7 MHz (typ)
● OSC3 oscillator circuit	Crystal oscillator circuit or ceramic oscillator circuit, 8.2 MHz(max)
● OSC1 oscillator circuit	Crystal oscillator circuit 32.768 kHz (typ)
● Internal flash memory	128 Kbytes (for both instructions and data)
	Allows 1,000 overwrites (min)
	Read/program protection function
	Allows onboard rewriting with the ICD Mini (S5U1C17702H) debug tool and self-rewriting via software.
● Internal RAM	12 Kbytes
● Internal display RAM	576 bytes
● Input/output port	Max. 28-bit general purpose input/output (shared with peripheral circuit input/output pins)

● Serial interface	SPI (master/slave)	1ch.
	I2C (master)	1ch.
	UART (460,800 bps, IrDA1.0 compatible)	2ch.
	Remote controller (REMC)	1ch.
● Timer	8-bit timer (T8F)	2ch.
	16-bit timer (T16)	3ch.
	PWM& capture timer (T16E)	2ch.
	Clock timer (CT)	1ch.
	Stopwatch timer (SWT)	1ch.
	Watchdog timer (WDT)	1ch.
	8-bit OSC1 timer (T8OSC1)	1ch.

● LCD driver	72 SEG x 32 COM or 88 SEG x 16 COM (1/5 bias)
	Internal booster power supply circuit (16-step programmable contrast)
● Supply voltage detector	16-value programmable (1.7 V to 3.2 V)
● Interrupt	Reset, NMI, Programmable interrupt x18 (8 levels)
● Power supply voltage	1.8 V to 3.6 V (for normal operations, internal regulator-based 1.8 V low-power operations)
	2.7 V to 3.6 V (for flash erase/writing, internal 2.5 V operations)
	Internal constant-voltage circuit (2-step programmable operating voltage)
● Operating temperatures	-20°C to 70°C

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S1C17702

● Current consumption   SLEEP mode: 1.2 µA typ. (OSC1 = OFF, IOSC = OFF, OSC3 = OFF)
                        HALT mode: 2.7 µA typ. (OSC1 = 32 kHz, IOSC = OFF, OSC3 = OFF,
                                           PCKEN = 0x0, LCD OFF)
                                       9.7 µA typ. (OSC1 = 32 kHz, IOSC = OFF, OSC3 = OFF,
                                           PCKEN = 0x0, LCD ON (All on, contrast max.))
                        When operating: 16 µA typ. (OSC1 = 32 kHz, IOSC = OFF, OSC3 = OFF, LCD OFF)
                                       450 µA typ. (OSC1 = OFF, IOSC = OFF,
                                           OSC3 = 1 MHz ceramic oscillator)

● Shipping form   QFP21-176 pin package (26 mm x 26 mm, pin pitch: 0.5 mm)
                        VFBGA8H-181 package (8 mm x 8 mm, ball pitch: 0.5 mm)
                        Chip

Seiko Epson Corporation

■ Block Diagram

CPU Core S1C17 — DCLK, DST2, DSIO(P31-33)

Internal RAM (12K bytes) — 32 bits 1 cycle

I/O 2 (0x5000-)
- Power generator — VDD, VSS, VD1, VD2, VC1-VC5, CA-CG
- SVD circuit
- LCD driver — SEG0-72/88, COM0-31/15
- MISC register
- Oscillator/Clock generator — OSC1-2, OSC3-4, FOUT1(P13), FOUTH(P30)
- 8-bit OSC1 timer — TOUT5(P16)
- Clock timer
- Stopwatch timer
- Watchdog timer
- PWM & capture timer — EXCL3-4(P00, P01), TOUT3-4(P26, P04), TOUTN3-4(P27, P05)
- Remote controller — REMI(P02), REMO(P03)
- I/O port/I/O MUX — P00-07, P10-17, P20-27, P30-33

TEST1-3 — Flash memory (128K bytes) — 16 bits 1-5 cycles

Display RAM (576 bytes) — 8 bits 2-5 cycles

#TEST — Test circuit

#RESET — Reset circuit

8/16 bits 1 cycle

8/16 bits 1 cycle

8/16 bits 1 cycle

Interrupt system

I/O 1 (0x4000-)
- Interrupt controller
- Prescaler
- 8-bit timer
- 16-bit timer — EXCL0-2 (P16, P07, P06)
- UART — SIN0, SOUT0, SCLK0(P23-25), SIN1, SOUT1, SCLK1(P10-12)
- SPI — SDI, SDO, SPICLK (P20-22)
- I²C — SDA, SCL (P14-15)

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