



## 16-bit Single Chip Microcontroller

- Low power operation from 1.2V with a single alkaline or silver oxide button battery.
- Low power consumption standby driving at HALT 0.3 μA .
   \*super economy mode
- Built-in LCD Driver: 56 SEG x 24 COM (max.)
- Internal R/F converters enable to realize various sensing.

#### DESCRIPTIONS

The S1C17W22/W23 is a 16-bit MCU that features low-voltage operation from 1.2 V even though Flash memory is included. The embedded high-efficiency DC-DC converter generates the constant-voltage to drive the IC with lower power consumption than 4-bit MCUs. This IC includes a real-time clock, a stopwatch, an LCD driver, and a PWM timer capable of being used to generate drive waveforms for a motor driver as well as a high-performance 16-bit CPU. It is suitable for battery-driven applications that require an LCD display and timers.

#### ■ FEATURES

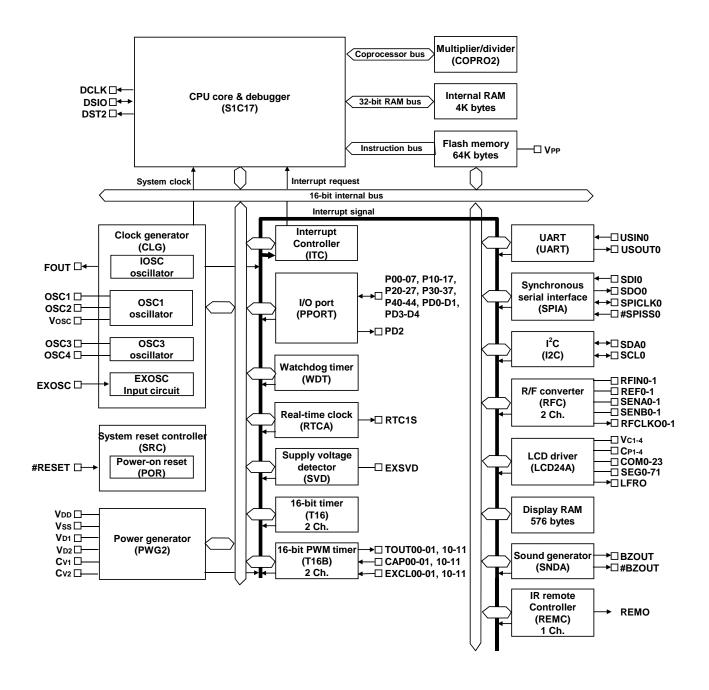
Model	S1C17W22	S1C17W23							
CPU	101011112	310111120							
CPU core	Seiko Epson original 16-bit RISC CPU core S1C17								
Other	On-chip debugger								
Embedded Flash memory									
Capacity	64K bytes (for both instructions and data)	96K bytes (for both instructions and data)							
Erase/program count	50 times (min.) * Programming by the debu								
Other	Security function to protect from reading/pro	ogramming by ICDmini							
	On-board programming function using ICDr	nini							
Embedded RAM	,								
Capacity	4K bytes	8K bytes							
Embedded display RAM	1	_							
Capacity	576 bytes								
Clock generator (CLG)	<u></u>								
System clock source	4 sources (IOSC/OSC1/OSC3/EXOSC)								
System clock frequency	1.1 MHz (max.) VDD = 1.2 to 1.6 V								
(operating frequency) IOSC oscillator circuit	4.2 MHz (max.) VDD = 1.6 to 3.6 V								
IOSC oscillator circuit	700 kHz (typ.) embedded oscillator								
(boot clock source)	23 µs (max.) starting time (time from cancel	ation of SLEEP state to vector table							
	read by the CPU)								
OSC1 oscillator circuit	32.768 kHz (typ.) crystal oscillator								
	Oscillation stop detection circuit included								
OSC3 oscillator circuit	4.2 MHz (max.) crystal/ceramic oscillator								
	500 kHz, 1, 2, and 4 MHz-switchable embedded oscillator								
	500 Hz to 2 MHz CR oscillator (an external	R is required)							
EXOSC clock input	4.2 MHz (max.) square or sine wave input								
Other	Configurable system clock division ratio								
	Configurable system clock used at wake up	from SLEEP state							
	Operating clock frequency for the CPU and	all peripheral circuits is selectable.							
I/O port (PPORT)									
Number of	Input/output port: 41 bits (max.)								
general-purpose I/O	Output port: 1 bit (max.)								
ports	Pins are shared with the peripheral I/O.								
Number of input	37 bits								
interrupt ports									
Number of ports that	32 bits								
support	A peripheral circuit I/O function selected via software can be assigned to each port.								
universal port									
multiplexer (UPMUX)									
Timers Wetchdog timer (WDT)   Congretos NMI or wetchdog timer recet									
Watchdog timer (WDT)									
Real-time clock (RTCA)	Theoretical regulation function for 4 accord	logrestics							
Theoretical regulation function for 1-second correction									

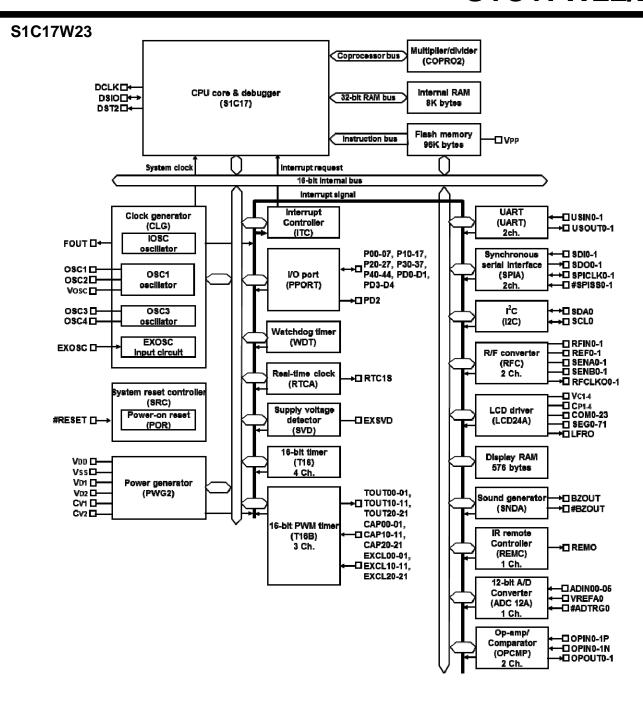
	Alarm and stopwatch functions								
16-bit timer (T16)	2 channels 4 channels								
,	1 channel can generate the SPIA master	Generates the SPIA master clocks							
	clock.	and							
40.1 // 50.4/4.//		the ADC12A trigger signal.							
16-bit PWM timer	2 channels 3 channels								
(T16B)	Event counter/capture function								
	PWM waveform generation function  Number of PWM output or capture input ports: 2 ports/channel								
Supply voltage detector (	Number of PWM output or capture input ports: 2 ports/channel Supply voltage detector (SVD)								
Detection level	30 levels (1.2 to 3.6 V)								
Other	Intermittent operation mode								
	Generates an interrupt or reset according to	the detection level evaluation.							
Serial interfaces									
UART (UART)	1 channel	2 channels							
Complementation Control	Baud-rate generator included, IrDA1.0 supp								
Synchronous Serial Interface	1 channel 2 to 16-bit variable data length	2 channels							
(SPIA)	The 16-bit timer (T16) can be used for the b	naud-rate generator in master mode							
12C (I2C)	1 channel	daud-rate generator in master mode.							
1.20 (1.20)	Baud-rate generator included								
Sound generator (SNDA)									
Buzzer output function	512 Hz to 16 kHz output frequencies								
·	One-shot output function								
Melody generation	Pitch: 128 Hz to 16 kHz ≈ C3 to C6								
function	Duration: 7 notes/rests (Half note/rest to thi	rty-second note/rest)							
	Tempo: 16 tempos (30 to 480)								
ID	Tie may be specified.								
IR remote controller (REN Number of transmitter	/IC)	1 channel							
channels	_	1 channel							
LCD driver (LCD24A)									
LCD output	72 SEG × 1-8 COM (max.), 64 SEG × 9-16	6 COM (max.) 56 SEG × 17–24 COM							
202 oatpat	(max.)	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3							
LCD contrast	32 levels (TBD to TBD V)								
Other 1/4 or 1/3 bias power supply included, external voltage can be applied.									
R/F converter (RFC)									
Conversion method	CR oscillation type with 24-bit counters								
Number of conversion	2 channels (Up to two sensors can be conn	ected to each channel.)							
channels Supported sensors	DC-bias resistive sensors, AC-bias resistive	sensors (Ch () only)							
12-bit A/D converter (ADC		e sensors (on only)							
Conversion method	-	Successive approximation type							
Resolution	-	12 bits							
Number of conversion	-	1 channel							
channels									
Number of analog signal	-	6 ports/channel							
inputs	(ODOME)								
Operational amplifier/com	nparator (OPCMP)	2 shannels							
Number of channels	-   -	2 channels							
Multiplier/divider (COPRO Arithmetic functions	16 hit x 16 hit multiplier								
Antimietic functions	16-bit × 16-bit multiplier 16-bit × 16-bit + 32-bit multiply and accumu	lation unit							
	32-bit ÷ 32-bit divider	iddon dilit							
Reset	1 01 3K 01 3K dividoi								
#RESET pin	Reset when the reset pin is set to low.								
Power-on reset	Reset at power on.								
Key entry reset	Reset when the P00 to P01/P02/P03 keys a	are pressed simultaneously (can be							
_	enabled/								
MAZ-falada C	disabled using a register).								
Watchdog timer reset	Vatchdog timer reset Reset when the watchdog timer overflows (can be enabled/disabled using a								
Supply voltage detector	register).								
Supply voltage detector reset	Reset when the supply voltage detector detects the set voltage level (can be enabled/								
16361	disabled using a register).								
Interrupt									
monupe									

Non-maskable interrupt	4 systems (Reset, address misaligned interrupt, debug, NMI)						
Programmable interrupt	External interrupt: 1 system (8 levels)						
	Internal interrupt: 16 systems (8 levels)	Internal interrupt: 23 systems (8 levels)					
Power supply voltage							
VDD operating voltage	1.2 to 3.6 V						
VDD operating voltage	1.8 to 3.6 V (VPP = 7.5 V external power su	upply is required.)					
for Flash programming							
VDD operating voltage	2.7 to 3.6 V						
for super economy							
mode							
Operating temperature							
Operating temperature	-40 to 85 °C						
range							
Current consumption	LOAFA (TDD)						
SLEEP mode	0.15 µA (TBD)						
HALT mode	IOSC = OFF, OSC1 = OFF, OSC3 = OFF						
HALTINOGE	0.5 µA (TBD)						
	0.3 μA (TBD)	OSĆ1 = 32 KHz, RTC = ON					
	OSC1 = 32 kHz, RTC = ON, super economy mode						
	1.5 µA (TBD)						
	OSC1 = 32 kHz, RTC = ON, CPU = OSC1, LCD = ON (no panel load, VC2						
	reference,						
	1/3 bias), super economy mode						
RUN mode	8 µA (TBD)						
	OSC1 = 32  kHz, RTC = ON, CPU = OSC1,	FLASHCWAIT.RDWAIT[1:0] bits = 0x1					
	4 μA (TBD)						
	OSC1 = 32 kHz, RTC = ON, CPU = OSC1, super economy mode,						
	FLASHCWAIT.RDWAIT[1:0] bits = 0x1						
	250 μA (TBD)						
	OSC3 = 1 MHz (internal oscillator), OSC1 = 32 kHz, RTC = ON, CPU = OSC3,						
	FLASHCWAIT.RDWAIT[1:0] bits = 0x1						
Shipping form	TOED45 400min (Landa Hala O. 4						
1	TQFP15-128pin (Lead pitch: 0.4 mm)						
2	Die form (Pad pitch: 80 µm (min.))						

### **■ BLOCK DIAGRAM**

### S1C17W22

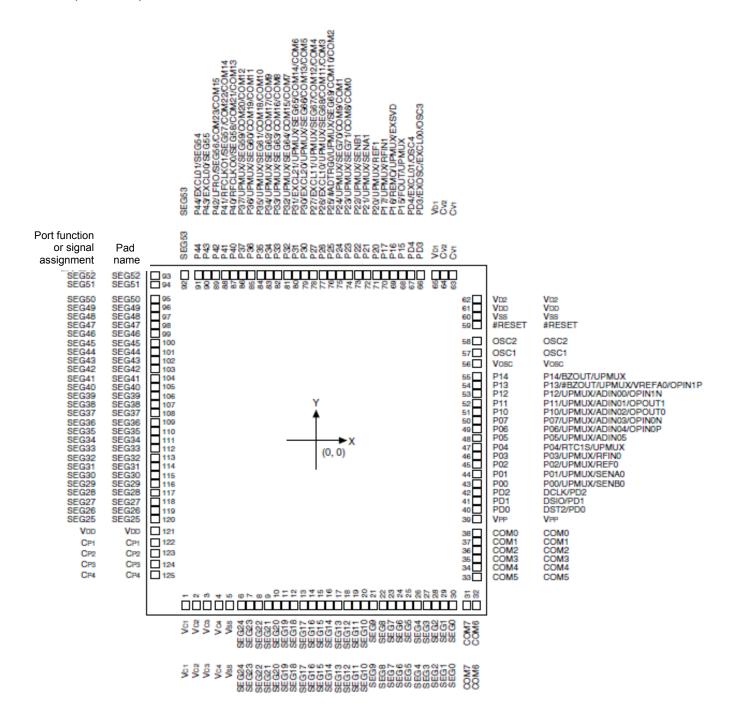


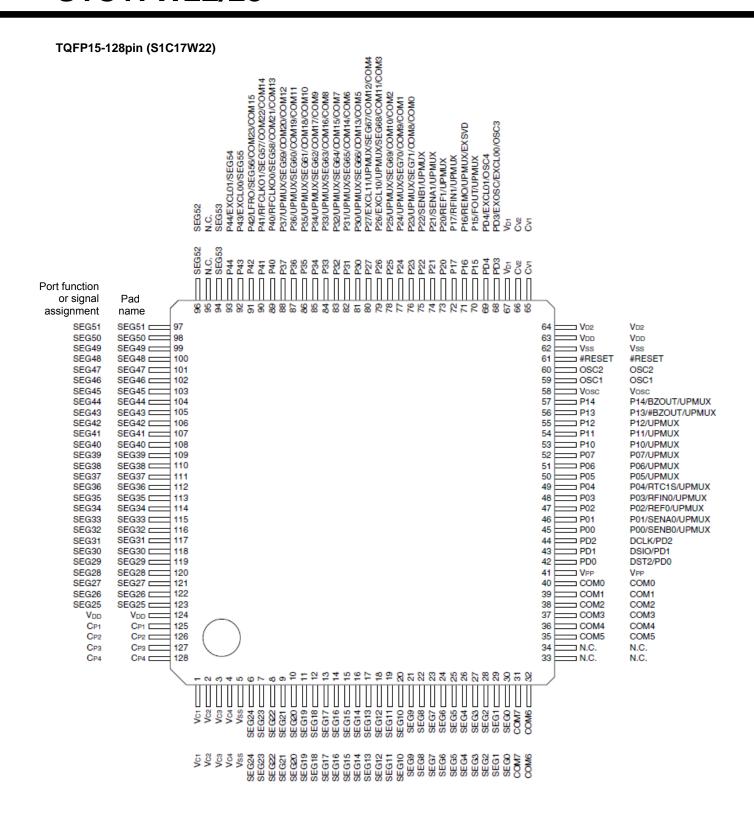


### ■ Pin Configuration Diagram

CHIP (S1C17W22) 12/00M4 11/00M3 P44/EXCL01/SEG54
P43/EXCL00/SEG56
P42/LFD/SEG56/COM23/COM15
P40/FFCLKO1/SEG57/COM22/COM14
P40/FFCLKO1/SEG57/COM21/COM13
P40/FFCLKO1/SEG57/COM21/COM13
P40/FFCLKO1/SEG57/COM21/COM13
P34/UPMUX/SEG61/COM19/COM11
P34/UPMUX/SEG61/COM19/COM10
P34/UPMUX/SEG61/COM11/COM9
P34/UPMUX/SEG61/COM11/COM9
P34/UPMUX/SEG61/COM11/COM9
P34/UPMUX/SEG61/COM11/COM19/COM10
P26/UPMUX/SEG61/COM11/COM19/COM10
P26/UPMUX/SEG61/COM11/COM19/COM10
P26/UPMUX/SEG61/COM10/COM11/COM10
P26/UPMUX/SEG61/COM10/COM11/COM10
P26/UPMUX/SEG61/COM10/COM11/COM10
P26/UPMUX/SEG61/COM10/COM11/COM10
P26/UPMUX/SEG61/UCOM10/COM11/COM10
P26/UPMUX/SEG61/UCOM10/COM11/COM10
P26/UPMUX/SEG61/UCOM10/COM11/COM10/ Port function PP444 PP4441 PP4 or signal assignment Pad name 93 94 SEG52 SFG52 SEG51 SEG51 288888888888888888888888888888888 SEG50 SEG50 95 96 97 98 99 100 101 102 103 104 105 106 106 107 108 62 61 Vna Vna SEG49 SEG49 VDD VDD SEG48 SEG47 SEG48 SEG47 60 59 Vss Vss #RESET #RESET SEG46 SEG45 SEG46 SEG45 OSC<sub>2</sub> OSC2 SEG44 SEG43 SEG44 57 OSC1 OSC1 SEG43 Vosc 56 Vosc SEG42 SEG42 P14/BZOUT/UPMUX 55 SEG41 SEG40 SEG41 SEG40 P13 P12 P13/#BZOUT/UPMUX P12/UPMUX 53 SEG39 SEG38 P11 P10 P07 P11/UPMUX P10/UPMUX P07/UPMUX 52 SEG38 51 50 SEG37 SEG37 SEG36 SEG35 SEG36 SEG35 49 P06 P05 P06/UPMUX P05/UPMUX | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 48 SEG34 SEG34 P04/RTC1S/UPMUX P03/RFIN0/UPMUX 47 P04 SFG33 SEG33 (0, 0)P03 SEG32 SEG31 SEG30 SEG32 46 45 P02/REF0/UPMUX SEG31 SEG30 44 P01 P01/SENA0/UPMUX P00 P00/SENB0/UPMUX SEG29 SEG29 SEG28 43 PD2 PD1 42 DCLK/PD2 DSIO/PD1 SEG28 41 40 PDO DST2/PD0 SEG26 SEG26 SEG25 SEG25 39 \_\_121 COM0 COM1 COM2 VDD VDD COM0 38 COM1 COM2 37 36 CP1 C<sub>P1</sub> \_\_\_122 CP2 C<sub>P2</sub> **123** Die No. CJxxxxx 35 COM3 COM4 COM3 COM4 СРЗ СРЗ 124 CP4 125 CP4 COM5 COM5 32 SEG22 SEG22 SEG22 SEG32 

#### CHIP (S1C17W23)





#### TQFP15-128pin (S1C17W23) PATIFICA, NOTISEGAT XONAZZOONA PATIFICA, NOTISEGAT XONAZZOONA PANIFICA, NOTISEGAS YOONA ZOONA SATUPA ULVISEGAS YOONA ZOONA SATUPA ULVISEGAS YOONA TOONA PANIFICANI STOONA TO PANIFICANI STOONA TOONA PANIFICA ZAUPA ULXISEGAS CONTISCONA TAOONA PANIFICA ZAUPA ULXISEGAS CONTISCONA SATUPA ULXISEGAS CONTISCONA SATUPA ULXISEGAS CONTISCONA PANIFICA ZAUPA ULXISEGAS CONTISCONA PANIFICA ZAUPA ULXISEGAS CONTISCONA PANIFICA ZAUPA ULXISEGAS CONTISCONA PANIFICA ZAUPA ULXISEGAS CONTISCONA PANIFICA TAUPA ULXISEGAS CONTISCONA PANIFICA TAUPA ULXISEGAS TA CONA SOONA PANIFICA TAUPA ULXISEGAS TA CONA SOONA PANIFICANI TA CONA SOONA TA CO Port function or signal Pad assignment name SEG54 SEGM F 97 T Vns Voo SEG49 SEG49 \_\_\_\_\_ 99 62 Vss Vss Vss SEG48 SEG48 100 #RESET #RESET SEG47 101 SEG47 60 OSC2 OSC2 SEG46 SEG45 SEG46 SEG45 102 OSC1 58 Vosc Vosc P14/BZOUT/UPMUX P13/#BZOUT/UPMUX/VREFA0/OPIN1P P12/UPMUX/ADIN00/OPIN1N SEG44 SEG44 104 105 □ P14 SEG43 SEG43 **=**P13 SEG42 SEG42 106 55 P12 SEG41 SEG41 P11/UPMUX/ADIN01/OPOUT SEG40 53 52 P10/UPMUX/ADIN02/OPOUT0 P07/UPMUX/ADIN03/OPIN0N P06/UPMUX/ADIN04/OPIN0P 108 □ P10 □ P07 SEG40 SEG39 109 SEG38 SEG38 110 51 ■ P06 P05 P05/UPMUX/ADIN05 P04/RTC1S/UPMUX SEG37 50 49 SEG36 SEG36 112 P03/UPMUX/RFIN0 P02/UPMUX/REF0 P01/UPMUX/SENA0 SEG35 ==== — P03 — P02 SEG35 113 114 SEG34 SEG33 SEG33 115 46 \_\_\_ P01 SEG32 SEG32 = P00 P00/UPMUX/SENB0 SEG31 117 44 PD2 DCLK/PD2 42 SEG29 SEG29 119 $\neg PD0$ DST2/PD0 SEG28 = 120 121 VPP COM0 Vpp COM0 SEG28 SEG27 SEG26 SEG26 c 122 39 38 □ COM1 COM1 SEG25 123 COM2 COM2 VDD CP1 CP2 CP3 VDD CP1 124 125 COM3 37 36 COM3 COM4 COME N.C. N.C. CP₂ = 126 35 COM5 127 N.C.

### **■** Pin Descriptions

**Symbol meanings** 

Assigned signal: The signal listed at the top of each pin is assigned in the initial state. The pin function must

be switched via software to assign another signal (see the "I/O Ports" chapter).

I/O: I = Input O = Output

O = Output
I/O = Input/output
P = Power supply
A = Analog signal
Hi-Z = High impedance state

Initial state: I (Pull-up) = Input with pulled up

I (Pull-down) = Input with pulled down
Hi-Z = High impedance state
O (H) = High level output

O (L) = Low level output

Tolerant fail-safe structure:

= Over voltage tolerant fail-safe type I/O cell included

(see the "I/O Ports" chapter)

Pin/pad name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function	
VDD	VDD	Р	_	-	Power supply (+)	
VSS	VSS	Р	_	-	GND	
VPP	VPP	Р	_	_	Power supply for Flash programming	
VD1	VD1	Α	_	_	DC-DC converter output	
VD2	VD2	Α	_	_	DC-DC converter stabilization capacitor connect pin	
CV1-2	CV1-2	Α	_	_	DC-DC converter charge pump capacitor connect pins	
VC1-4	VC1-4	P	_	_	LCD panel driver power supply	
CP1-4	CP1-4	Α	_	_	LCD power supply booster capacitor connect pins	
VOSC	VOSC	Α	_	_	OSC1 oscillator circuit voltage regulator output	
OSC1	OSC1	Α	_	_	OSC1 oscillator circuit input	
OSC2	OSC2	A	_	_	OSC1 oscillator circuit output	
#RESET	#RESET	1	I (Pull-up)	_	Reset input	
P00	P00	1/0	Hi-Z	_	I/O port	
. 00	UPMUX	1/0			User-selected I/O (universal port multiplexer)	
	SENB0	A			R/F converter Ch.0 sensor B oscillator pin	
P01	P01	1/0	Hi-Z	_	I/O port	
101	UPMUX	1/0	1112		User-selected I/O (universal port multiplexer)	
	SENA0	A			R/F converter Ch.0 sensor A oscillator pin	
P02	P02	1/0	Hi-Z	_	I/O port	
1 02	UPMUX	1/0	111-2	_	User-selected I/O (universal port multiplexer)	
	REF0	A			R/F converter Ch.0 reference oscillator pin	
P03	P03	1/0	Hi-Z		I/O port	
F03	UPMUX	1/0	111-2	_	User-selected I/O (universal port multiplexer)	
	RFIN0	A			R/F converter Ch.0 oscillation input	
P04	P04	I/O	Hi-Z	1	I/O port	
1 04	RTC1S	0	111-2	•	Real-time clock 1-second cycle pulse output	
	UPMUX	1/0			User-selected I/O (universal port multiplexer)	
P05	P05	1/0	Hi-Z		I/O port	
F03	UPMUX	1/0	ПІ-Д	_	User-selected I/O (universal port multiplexer)	
	ADIN05	1/O			12-bit A/D converter Ch.0 analog signal input 5	
	ADINOS	_ ^			(S1C17W23 only)	
P06	P06	I/O	Hi-Z		I/O port	
1 00	UPMUX	1/0	111-2	_	User-selected I/O (universal port multiplexer)	
	ADIN04	A			12-bit A/D converter Ch.0 analog signal input 4	
	ADINOT	_ ^			(S1C17W23 only)	
	OPIN0P	Α			Operational amplifier/comparator Ch.0 analog signal input (+)	
	OI IIVOI				(S1C17W23 only)	
P07	P07	I/O	Hi-Z	_	I/O port	
1 07	UPMUX	1/0	111-2		User-selected I/O (universal port multiplexer)	
	ADIN03	A			12-bit A/D converter Ch.0 analog signal input 3	
	ADINOS	_ ^			(S1C17W23 only)	
	OPIN0N	Α			Operational amplifier/comparator Ch.0 analog signal input (-)	
	31 114014				(S1C17W23 only)	
P10	P10	I/O	Hi-Z		I/O port	
. 10	UPMUX	1/0	111-2		User-selected I/O (universal port multiplexer)	
	ADIN02	A			12-bit A/D converter Ch.0 analog signal input 2	
	, (DII 402				(S1C17W23 only)	
	OPOUT0	Α	1		Operational amplifier/comparator Ch.0 analog signal output	

					(S1C17W23 only)
P11	P11	I/O	Hi-Z	_	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
1	ADIN01	Α			12-bit A/D converter Ch.0 analog signal input 1
					(S1C17W23 only)
	OPIOUT1	Α			Operational amplifier/comparator Ch.1 analog signal output
					(S1C17W23 only)
P12	P12	I/O	Hi-Z	_	I/O port
1	UPMUX	I/O			User-selected I/O (universal port multiplexer)
1	ADIN00	Α			12-bit A/D converter Ch.0 analog signal input 0
1	OPIN1N	Α			(S1C17W23 only)  Operational amplifier/comparator Ch.1 analog signal input (-)
1	OFININ	A			(S1C17W23 only)
P13	P13	I/O	Hi-Z	_	I/O port
	#BZOUT	0			Sound generator inverted output
1	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	VREFA0	Α			12-bit A/D converter Ch.0 reference voltage input
					(S1C17W23 only)
	OPIN1P	Α			Operational amplifier/comparator Ch.1 analog signal input (+)
					(S1C17W23 only)
P14	P14	I/O	Hi-Z	_	I/O port
1	BZOUT	0			Sound generator output
P15	UPMUX P15	I/O I/O	Hi-Z	,	User-selected I/O (universal port multiplexer)  I/O port
P 15	FOUT	0	⊓I-Z	✓	Clock external output
1	UPMUX	1/0			User-selected I/O (universal port multiplexer)
P16	P16	1/0	Hi-Z	_	I/O port
	REMO	0			IR remote controller transmit data output
	UPMUX	1/0			User-selected I/O (universal port multiplexer)
	EXSVD	A			External power supply voltage detection input
P17	P17	I/O	Hi-Z	1	I/O port
1	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	RFIN1	Α			R/F converter Ch.1 oscillation input
P20	P20	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
L	REF1	A			R/F converter Ch.1 reference oscillator pin
P21	P21	1/0	Hi-Z	✓	I/O port
	UPMUX SENA1	I/O A			User-selected I/O (universal port multiplexer) R/F converter Ch.1 sensor A oscillator pin
P22	P22	I/O	Hi-Z	1	I/O port
1 22	UPMUX	1/0	111-2	•	User-selected I/O (universal port multiplexer)
	SENB1	A			R/F converter Ch.1 sensor B oscillator pin
P23	P23	I/O	Hi-Z	/	I/O port
1	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	SEG71	Α			LCD segment output
	COM8/COM0	Α			LCD COMMON OUTPUT
P24	P24	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
1	SEG70	Α			LCD segment output
DOE	COM9/COM1	A	11: 7	,	LCD COMMON OUTPUT
P25	P25 #ADTRG0	I/O	Hi-Z	/	I/O port  12-bit A/D converter Ch.0 trigger input (S1C17W23 only)
1	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	SEG69	A			LCD segment output
	COM10/COM2	A			LCD COMMON OUTPUT
P26	P26	I/O	Hi-Z	/	I/O port
	EXCL10	I		_	16-bit PWM timer Ch.1 event counter input 0
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	SEG68	Α			LCD segment output
	COM11/COM3	Α			LCD COMMON OUTPUT
P27	P27	I/O	Hi-Z	✓	I/O port
	EXCL11	1			16-bit PWM timer Ch.1 event counter input 1
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	SEG67	A			LCD segment output
P30	COM12/COM4	A I/O	11: 7	,	LCD COMMON OUTPUT
P30	P30 EXCL20	I/O	Hi-Z	✓	I/O port 16-bit PWM timer Ch.2 event counter input 0 (S1C17W23
	LAGLZU	'			only)
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	SEG66	A			LCD segment output
•			i	İ	
P31	COM13/COM5	A I/O	Hi-Z		LCD COMMON OUTPUT  I/O port

	EVOL04		I		4C hit DMM times Ch 2 avent acceptanism to 4 (C4C47)MO2	
	EXCL21	ı			16-bit PWM timer Ch.2 event counter input 1 (S1C17W23 only)	
	UPMUX	I/O	1		User-selected I/O (universal port multiplexer)	
	SEG65	A			LCD segment output	
	COM14/COM6	A	1		LCD COMMON OUTPUT	
P32	P32	1/0	Hi-Z	<b>✓</b>	I/O port	
	UPMUX	I/O		•	User-selected I/O (universal port multiplexer)	
	SEG64	A			LCD segment output	
	COM15/COM7	A			LCD COMMON OUTPUT	
P33	P33	I/O	Hi-Z	/	I/O port	
. 55	UPMUX	I/O	1	•	User-selected I/O (universal port multiplexer)	
	SEG63	A			LCD segment output	
	COM16/COM8	A			LCD COMMON OUTPUT	
P34	P34	I/O	Hi-Z	/	I/O port	
	UPMUX	I/O	1 –	•	User-selected I/O (universal port multiplexer)	
	SEG62	A			LCD segment output	
	COM17/COM9	A			LCD COMMON OUTPUT	
P35	P35	I/O	Hi-Z	/	I/O port	
. 55	UPMUX	I/O	1	•	User-selected I/O (universal port multiplexer)	
	SEG61	A			LCD SEGMENT OUTPUT	
	COM18/COM10	Α			LCD COMMON OUTPUT	
P36	P36	1/0	Hi-Z	<b>✓</b>	I/O port	
. 55	UPMUX	I/O	1	•	User-selected I/O (universal port multiplexer)	
	SEG60	A			LCD SEGMENT OUTPUT	
	COM19/COM11	A			LCD COMMON OUTPUT	
P37	P37	1/0	Hi-Z	/	I/O port	
	UPMUX	I/O	· · · · -	v	User-selected I/O (universal port multiplexer)	
	SEG59	A			LCD SEGMENT OUTPUT	
	COM20/COM12	A	1		LCD COMMON OUTPUT	
P40	P40	1/0	Hi-Z	/	I/O port	
1 40	RFCLKO0	0	12	•	R/F converter Ch.0 clock monitor output	
	SEG58	A			LCD SEGMENT OUTPUT	
	COM21/COM13	A			LCD COMMON OUTPUT	
P41	P41	1/0	Hi-Z	/	I/O port	
1 71	RFCLKO1	0	1 2	v	R/F converter Ch.1 clock monitor output	
	SEG57	A			LCD SEGMENT OUTPUT	
	COM22/COM14	A			LCD COMMON OUTPUT	
P42	P42	1/0	Hi-Z	/	I/O port	
1 72	LFRO	0	111-2	•	LCD frame signal monitor output	
	SEG56	A			LCD SEGMENT OUTPUT	
	COM23/COM15	A			LCD COMMON OUTPUT	
P43	P43	1/0	Hi-Z	/	I/O port	
1 43	EXCL00	1/0	111-2	•	16-bit PWM timer Ch.0 event counter input 0	
	SEG55	A			LCD SEGMENT OUTPUT	
P44	P44	1/0	Hi-Z	,	I/O port	
1	EXCL01	1	111-2	✓	16-bit PWM timer Ch.0 event counter input 1	
	SEG54	A	1		LCD SEGMENT OUTPUT	
PD0	DST2	0	O (L)	<b>√</b>	On-chip debugger status output	
1 50	PD0	1/0	J (L)	<b>,</b>	I/O port	
PD1	DSIO	1/0	I (Pull-up)	,	On-chip debugger status output	
ן רטו	PD1	1/0	i (Full-up)	✓	I/O port	
PD2	DCLK	0	O (H)	,	On-chip debugger status output	
FDZ	PD2	0	U (n)	✓	I/O port	
PD3	PD2 PD3	1/0	Hi-Z		I/O port	
PDS		1/0	□ -∠	_		
	EXOSC	<u> </u>	-		Clock generator external clock input	
	EXCL00	I	-		16-bit PWM timer Ch.0 event counter input 0	
DD4	OSC3	A	11: 7		OSC3 oscillator circuit input	
PD4	PD4	1/0	Hi-Z	_	I/O port	
	EXCL01	l ^	-		16-bit PWM timer Ch.0 event counter input 1	
COMO 7	OSC4	A	11: 7		OSC3 oscillator circuit output	
COM0-7	COM0-7	A	Hi-Z	_	LCD COMMON OUTPUT	
SEG0-53	SEG0-53	Α	Hi-Z	-	LCD SEGMENT OUTPUT	

Notes:

<sup>·</sup> In the peripheral circuit descriptions, the assigned signal name is used as the pin name.

<sup>·</sup> Both the S1C17W23 A/D converter and operational amplifier/comparator pins are assigned to the same pin function.

#### **Universal port multiplexer (UPMUX)**

The universal port multiplexer (UPMUX) allows software to select the peripheral circuit input/output function to be assigned to each pin from those listed below.

Peripheral circuit	Signal to be assigned	I/O	Channel number n	Function
Synchronous serial	SDI <i>n</i>	I	S1C17W22: n = 0	SPIA Ch.n data input
interface	SDO <i>n</i>	0	S1C17W23: n = 0, 1	SPIA Ch.n data output
(SPIA)	SPICLK <i>n</i>	I/O		SPIA Ch.n clock input/output
	#SPISSn	I		SPIA Ch.n slave-select input
I2C	SCL <i>n</i>	I/O	S1C17W22: n = 0	I2C Ch.n clock input/output
(I2C)	SDA <i>n</i>	I/O	S1C17W23: n = 0	I2C Ch.n data input/output
UART	USIN <i>n</i>	I	S1C17W22: n = 0	UART Ch.n data input
(UART)	USOUT <i>n</i>	0	S1C17W23: n = 0, 1	UART Ch.n data output
16-bit PWM timer	TOUTn0/CAPn0	I/O	S1C17W22: n = 0, 1	T16B Ch.n PWM output/capture input 0
(T16B)	TOUTn1/CAPn1	I/O	S1C17W23: <i>n</i> = 0, 1, 2	T16B Ch.n PWM output/capture input 1

Note: Do not assign a function to two or more pins simultaneously.

#### 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. When exporting the products or technology described in this material, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You are requested not to use, to resell, to export and/or to otherwise dispose of the products (and any technical information furnished, if any) for the development and/or manufacture of weapon of mass destruction or for other military purposes.

All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies. ©Seiko Epson Corporation 2013, All rights reserved

### 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/

Document code: 412533601 First issue Nov., 2012 in Japan Revised Jun., 2013