

America

Epson America, Inc.
Headquarter:
3840 Kilroy Airport Way
Long Beach, California 90806-2452 USA
Phone: +1-562-290-4677

San Jose Office:
214 Devcon Drive
San Jose, CA 95112 USA
Phone: +1-800-228-3964 or +1-408-922-0200

Europe

Epson Europe Electronics GmbH
Riesstrasse 15, 80992 Munich, Germany
Phone: +49-89-14005-0 FAX: +49-89-14005-110

Asia

Epson (China) Co., Ltd.
4th Floor, Tower 1 of China Central Place, 81 Jianguo Road, Chaoyang District, Beijing 100025 China
Phone: +86-10-8522-1199 FAX: +86-10-8522-1120

Shanghai Branch
Room 1701 & 1704, 17 Floor, Greenland Center II, 562 Dong An Road, Xu Hui District, Shanghai, China
Phone: +86-21-5330-4888 FAX: +86-21-5423-4677

Shenzhen Branch
Room 804-805, 8 Floor, Tower 2, Ali Center, No.3331 Keyuan South RD(Shenzhen bay), Nanshan District, Shenzhen 518054, China
Phone: +86-10-3299-0588 FAX: +86-10-3299-0560

Epson Taiwan Technology & Trading Ltd.
15F., No. 100, Songren Rd., Sinyi Dist., Taipei City 110. Taiwan
Phone: +886-2-8786-6688

Epson Singapore Pte., Ltd.
1 HarbourFront Place, #03-02 HarbourFront Tower One, Singapore 098633
Phone: +65-6586-5500 FAX: +65-6271-3182

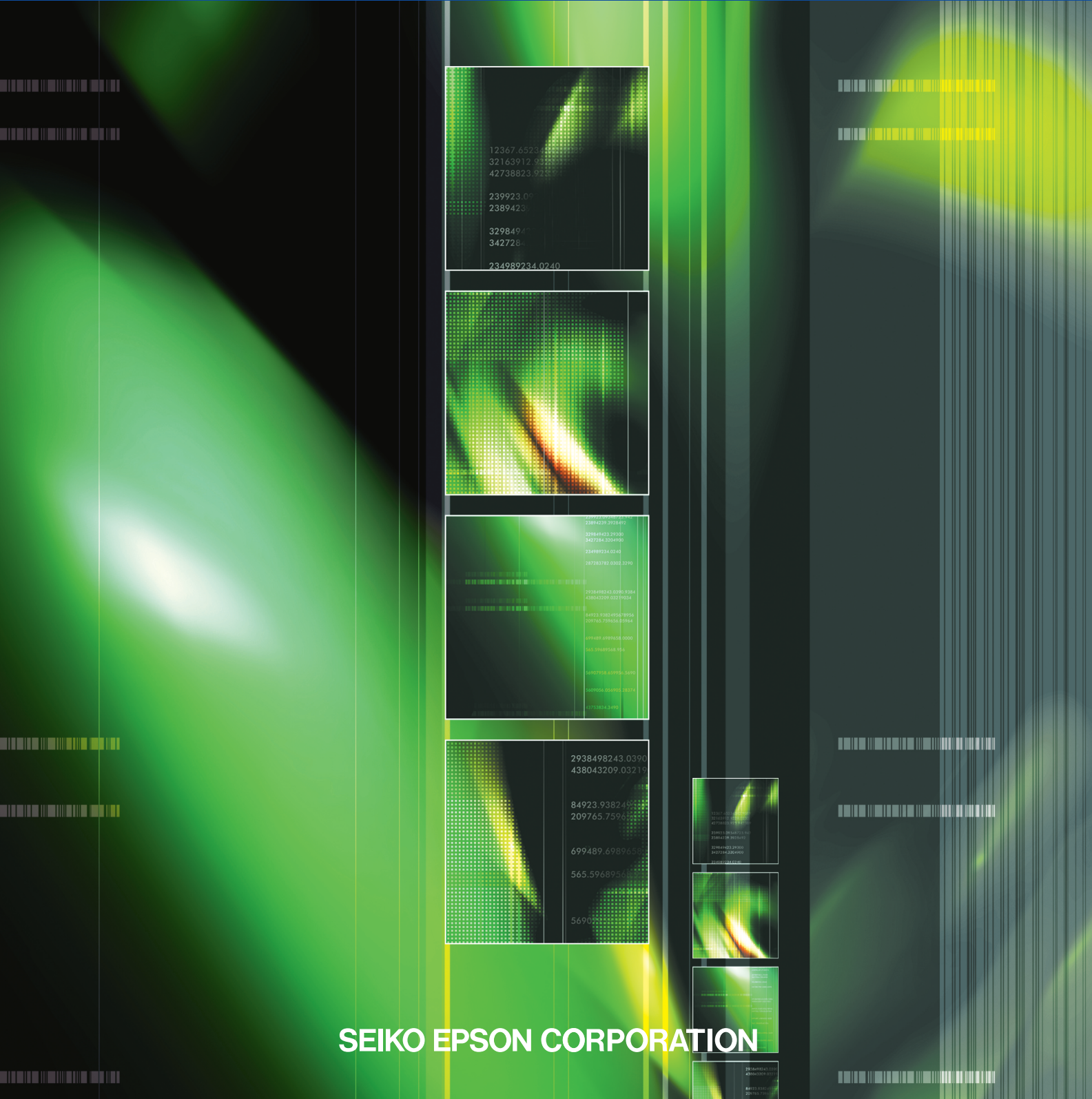
Seiko Epson Corp. Korea Office
19F, KLI 63 Bldg., 60 Yoido-dong, Youngdeungpo-Ku, Seoul 150-763, Korea
Phone: +82-2-784-6027 FAX: +82-2-767-3677

Seiko Epson Corp. Sales & Marketing Division

Device Sales & Marketing Department
421-8, Hino, Hino-shi, Tokyo 191-8501, Japan
Phone: +81-42-587-5816 FAX: +81-42-587-5116

Microcontrollers

2019



Business Concept

Expanding use of smartphones and tablets is giving broadband internet and wireless communications even greater roles in our daily lives, and making the arrival of the ubiquitous network society an inevitable reality. In particular, semiconductors for use in portable devices, information terminals, in-vehicle devices and FA devices are expected to provide higher performance in terms of thinner structure, lighter weight, and longer operation with limited power supply. We have been focusing on the creation of compact, low-power semiconductors since we started the development of CMOS LSI for watches in 1969. Since then, we have steadily built up our expertise in energy-saving, space-saving, and time-saving designs. This has enabled us to quickly obtain the semiconductor development technology needed to meet the demands of the new era of ubiquitous networks. Our concept is to develop "saving technologies" to reduce power consumption, development times, and implementation space. Our goal is to be a true partner for you, providing you with strategic advantages, enhancing your customer value based on our "saving technologies" and mixed analog/digital technologies that we have cultivated, as well as our design capabilities, manufacturing capabilities and stable supply that can satisfy your detailed requirements.

Environmental Responsibility

Epson semiconductor technology provides environmental value to customers by creating and manufacturing eco-friendly products.

- 1) We Epson's products are surely complying with the Eu-RoHS (2011/65/EU) Directive.
- 2) We are releasing information about the containing chemical substances of products at web-site.
Product of QFP & BGA are described in the following URL.
global.epson.com/products_and_drivers/semicon/information/package_lineup.html *Some products are excluded.

Environmental management system third party certification status ISO14001

Type of certification : ISO 14001: 2015, JIS Q 14001: 2015
Awarded to : TOHOKU EPSON CORPORATION, SEIKO EPSON CORPORATION
(Fujimi Plant, Suwa Minami Plant)
Certified by : Bureau Veritas Japan Co., Ltd.
Date of certification : April 3, 1999



Type of certification : ISO 14001: 2015
Awarded to : Singapore Epson Industrial Pte. Ltd.
Certified by : SGS
Date of certification : Jan 12, 1999

Epson's Quality Policy

Keeping the customer in mind at all times, we make the quality of our products and services our highest priority. From the quality-assurance efforts of each employee to the quality of our company as a whole, we devote ourselves to creating products and services that please our customers and earn their trust. Epson has acquired ISO9001 and IATF16949 certification with its IC, module and their application products.

Quality Management system third party certification status ISO9001

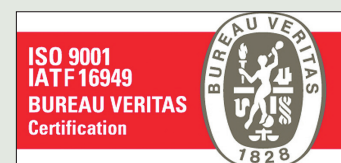
Type of Certification : ISO9001: 2015 , JIS Q 9001: 2015
Awarded to : TOHOKU EPSON CORPORATION, SEIKO EPSON CORPORATION
(Fujimi Plant, Suwa Minami Plant, Hino Office)
Certified by : Bureau Veritas Japan Co., Ltd.
Certificate No. : 3762381
Initial Date of Certification : October 10, 1993

Type of Certification : ISO9001: 2015
Awarded to : Singapore Epson Industrial Pte. Ltd.
Certified by : SGS
Certificate No. : SG03/00011
Initial Date of Certification : February 4, 2003



IATF16949

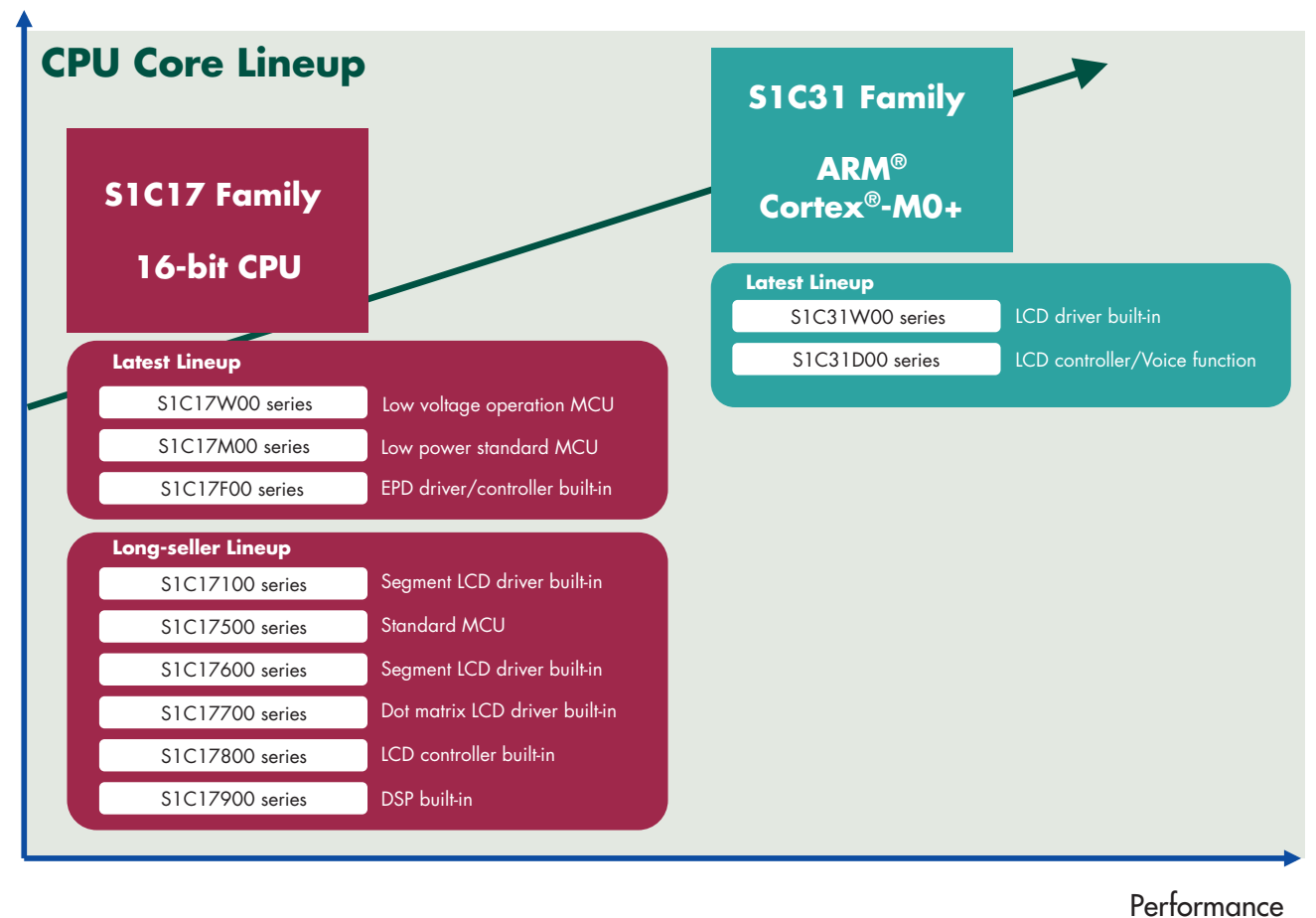
Type of Certification : IATF16949:2016
Awarded to : TOHOKU EPSON CORPORATION, SEIKO EPSON CORPORATION
(Fujimi Plant, Suwa Minami Plant, Hino Office), EPSON EUROPE ELECTRONICS GmbH
Certified by : Bureau Veritas Japan Co., Ltd.
Certificate No. : 281371
Initial Date of Certification : Dec 9, 2017



Type of Certification : IATF16949:2016
Awarded to : Singapore Epson Industrial Pte. Ltd.
Certified by : SGS
Certificate No. : SG07/00021
Initial Date of Certification : May 2, 2018



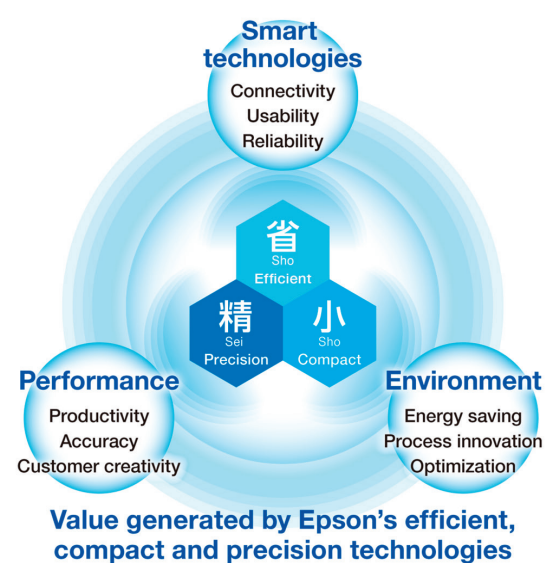
MCUs



C O N T E N T S

History of Epson semiconductor	4-5	Epson MCU website	20-21
Epson microcontroller overview	6	Development environments	22-25
Features of Epson microcontrollers	7-9	Flash memory writing	26-27
S1C31 Family ARM® microcontrollers	10-13	Package lineup	28-29
S1C17 Family 16-bit microcontrollers	14-19		

Value Generated by Epson Technologies



Smart technologies
Create convenient and easy-to-use products that can be used anytime and anywhere, and which help customers reduce waste, and save effort, time and money.

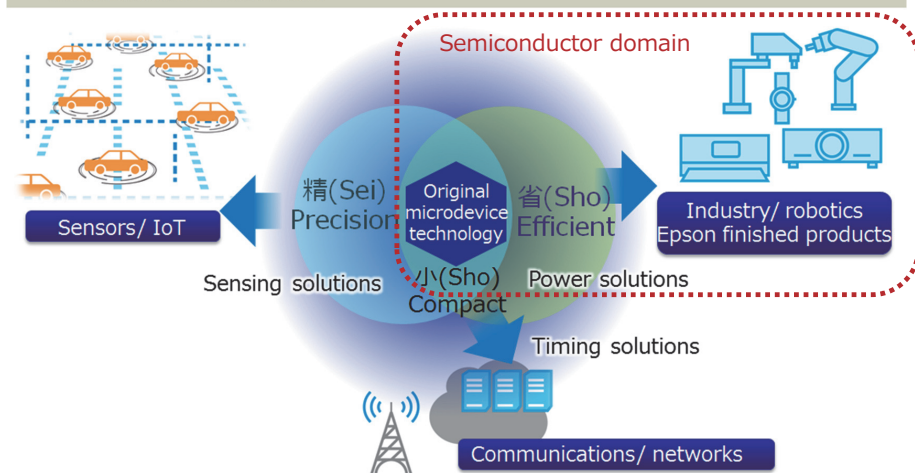
Environment
Leverage Epson products to reduce environmental impact by improving customers' work processes, and contribute to a sustainable society.

Performance
Use outstanding products to contribute to customers' performance through productivity, accuracy and creativity.

The role of Microdevices Div. and Semiconductor domain

Microdevices Vision and Strategy: Supporting the Four Innovations

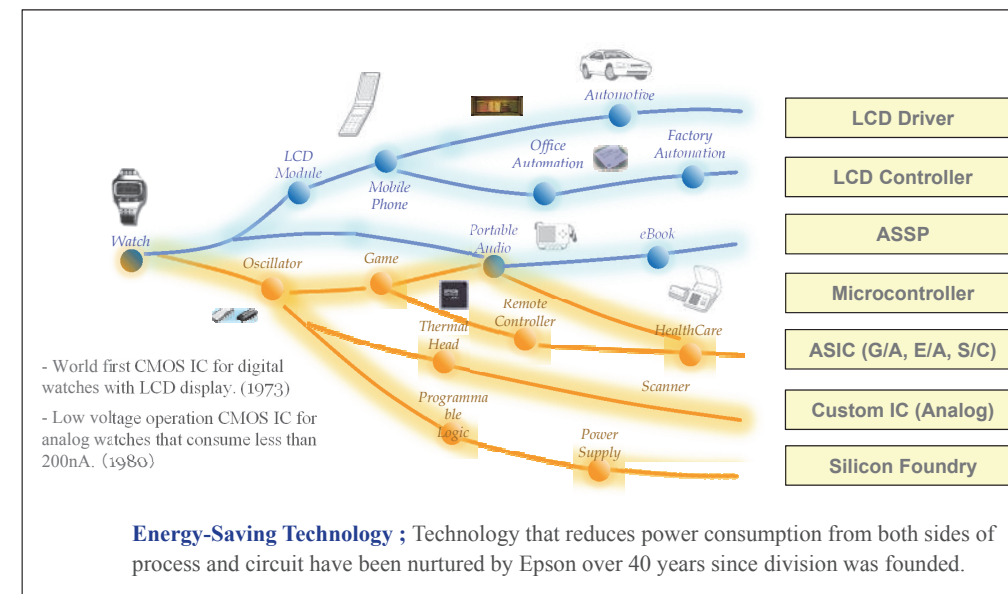
Contribute to Epson's finished products and to the development of smart communications, power, transportation and manufacturing systems with advanced Epson quartz timing and sensing solutions and low-power semiconductor solutions.



Semiconductor business contribute to the value creation of the Epson finished product, by advanced "Power Saving" solutions.

History of Epson Semiconductor's Technology

As the semiconductor division of "worldwide watch maker Seiko", semiconductor business has expanded into LCD Drivers, ASICs and MCUs from IC for Watches. These businesses are all based on Epson's energy-saving technology.



Epson Semiconductor's History

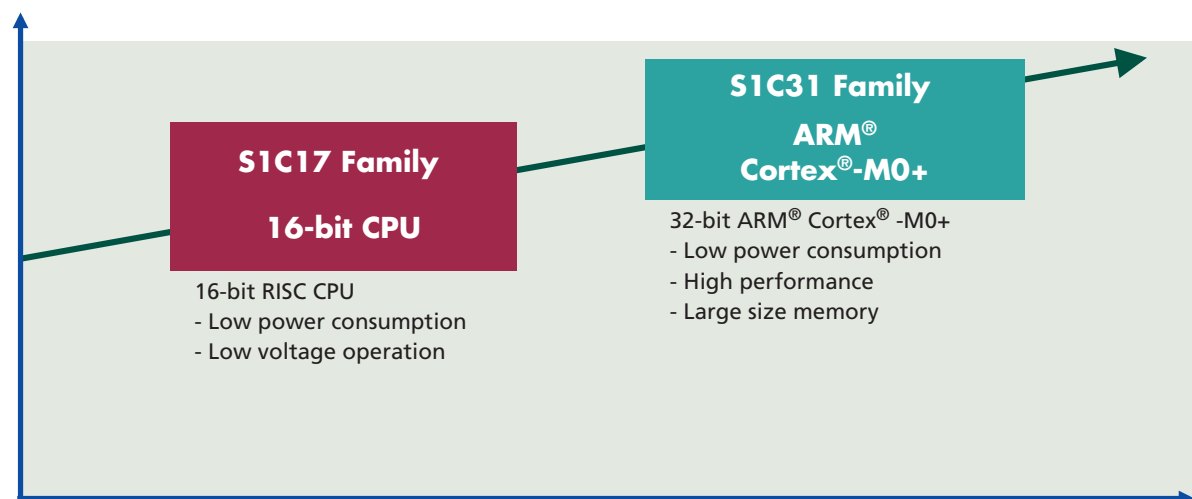


- 1969 Development of CMOS IC for watches started
- 1973 CMOS IC production started in Headquarter
- 1980 Fujimi plant (B-wing, 4 inch) operation started
- 1984 A-wing (5 inch) operation started
- 1985 D-wing (6 inch) operation started
- 1991 Sakata plant (S-wing, 6 inch) operation started
- 1993 ISO9000 series certified
- 1994 Singapore assembly plant (SEP) operation started
- 1997 T-wing (8 inch, Sakata) operation started
- ISO14001 certified
- 2001 T-wing manufacturing line expanded
- 2006 ISO/TS16949 certified
- 2010 Microdevices Operations Division started

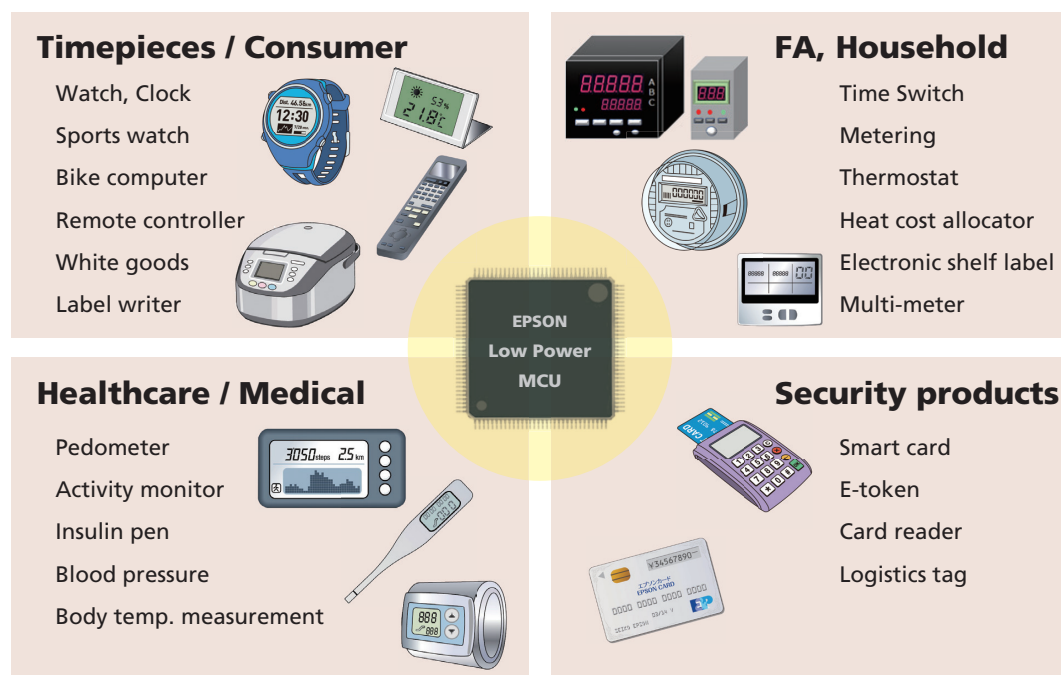
Low power microcontrollers

The technologies of low voltage operation and low power consumption acquired over the years through the development of 4-bit microcontrollers for watches and electronic shelf labels (ESL) are inherited by 16- and 32-bit microcontrollers today. The product lineup has been expanded, while achieving better throughputs. The display functions range from small-sized segment LDC drive to QVGA color display. A wide array of sensor interfaces recently attracting attention are also available. In addition to digital SIO such as SPI, UART, and I²C and the low power ADCs, the Epson original frequency conversion type ADC is capable of supporting measurements by resistance thermometer sensors and humidity sensors. A variety of these functions, low power technology and a highly efficient processor are all built into a single chip. With this one-chip solution, Epson continues to offer optimum products for small-sized battery-driven equipment, operation panel controllers, and sensor built-in healthcare products and housing equipment.

CPU Core Lineup

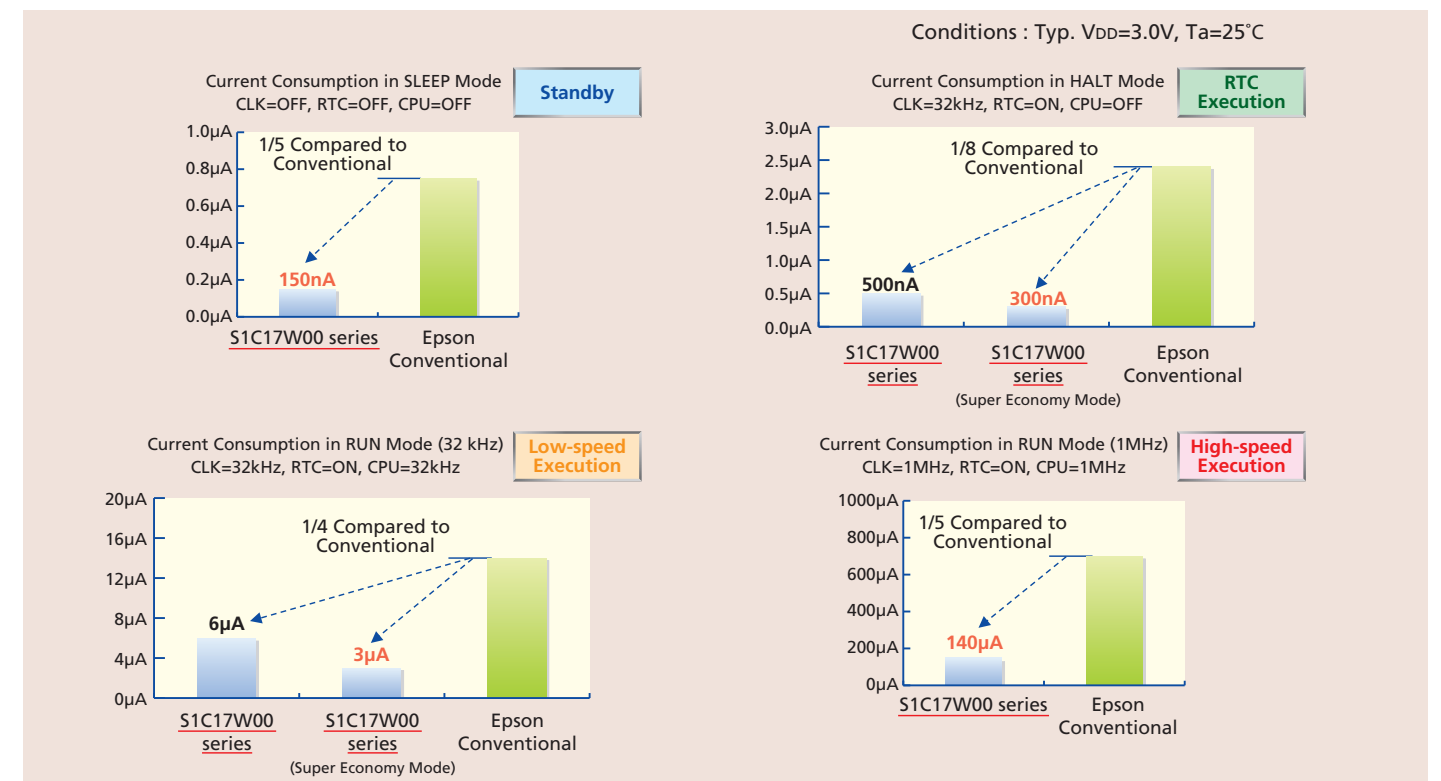


Application Example



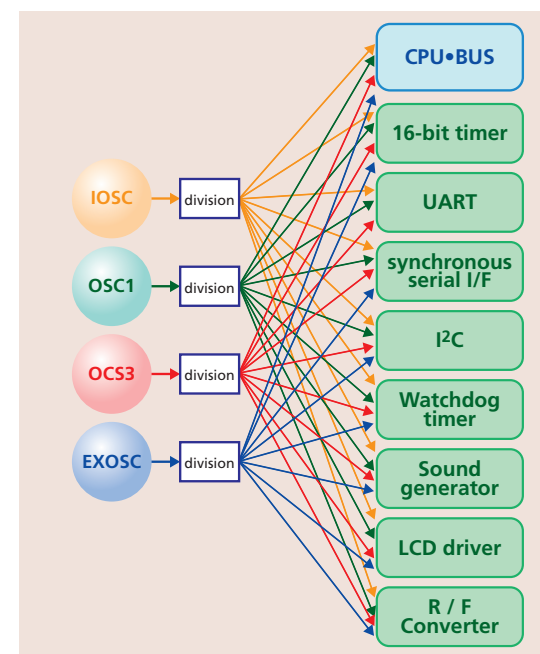
Lowest Current Consumption (16-bit microcontrollers)

In most cases, the S1C17 Family of products will allow customers currently using 8-bit microcontrollers to enjoy higher performance with the same power consumption. In addition, it will enable customers already using 16-bit/32-bit microcontrollers to benefit from longer battery life as a result of low operating voltage.



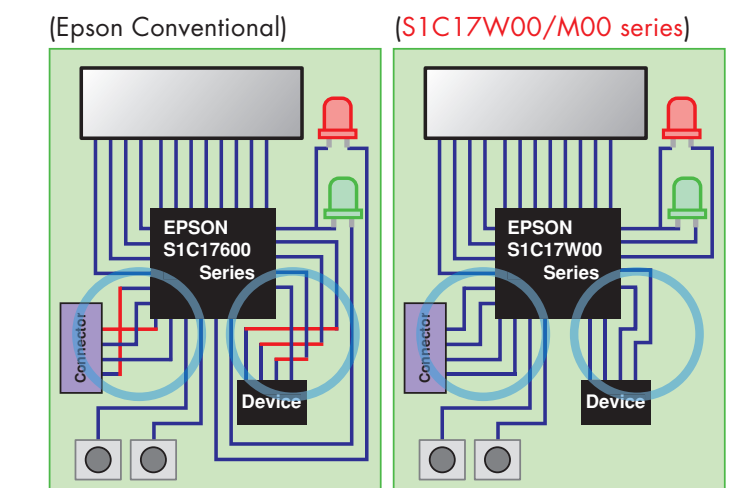
Four types of clock sources

Four types of characteristic clock sources can be freely selected for each circuit.



Terminals can be allocated freely (UPMUX)

SPI, I²C, UART, 16-bit PWM, and other terminals can be freely allocated as individual UPMUX terminals using software.



MCUs Features of Epson microcontrollers

■ Supporting various types of LCD

• Black & White LCD driver

- Segment LCD driver

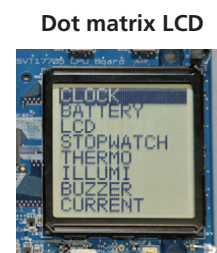
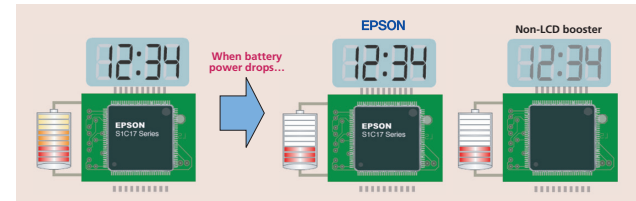
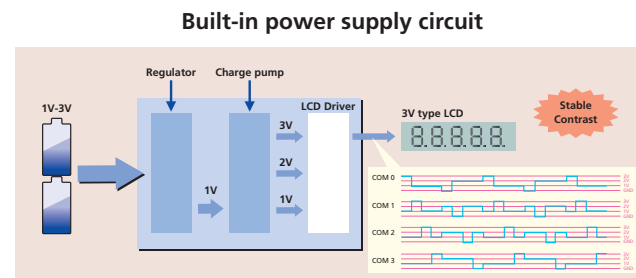
- 12 to 88seg x 4/8com
- 1/3 bias LCD voltage booster built-in

- Dot Matrix LCD driver

- 56 to 128seg x 16/24/32/64com
- 1/4, 1/5 bias LCD voltage booster built-in

Models containing Black & White LCD driver :

- S1C17W10 group
- S1C17W20 group
- S1C17W30 group
- S1C17M30 group
- S1C31W00 series



• LCD controller

- STN/TFT LCD controller

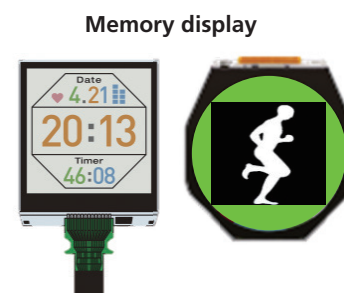
- 320 x 240monochrome / 320 x 240 (QVGA)16gradations

- Memory display controller

- 300 x 300 6-bit color / 640 x 640 Black & White
- Supporting graphic engine function

Models containing LCD controller :

- S1C17800 series
- S1C31D00 series



• Segment EPD driver

- 42 to 256seg + TP/BP
- Voltage booster built-in

Models containing EPD driver :

- S1C17F00 series

• Segment LED drive

- 8seg x 5com supporting 5V

Models containing LED driver :

- S1C17M12/M13

Segment EPD

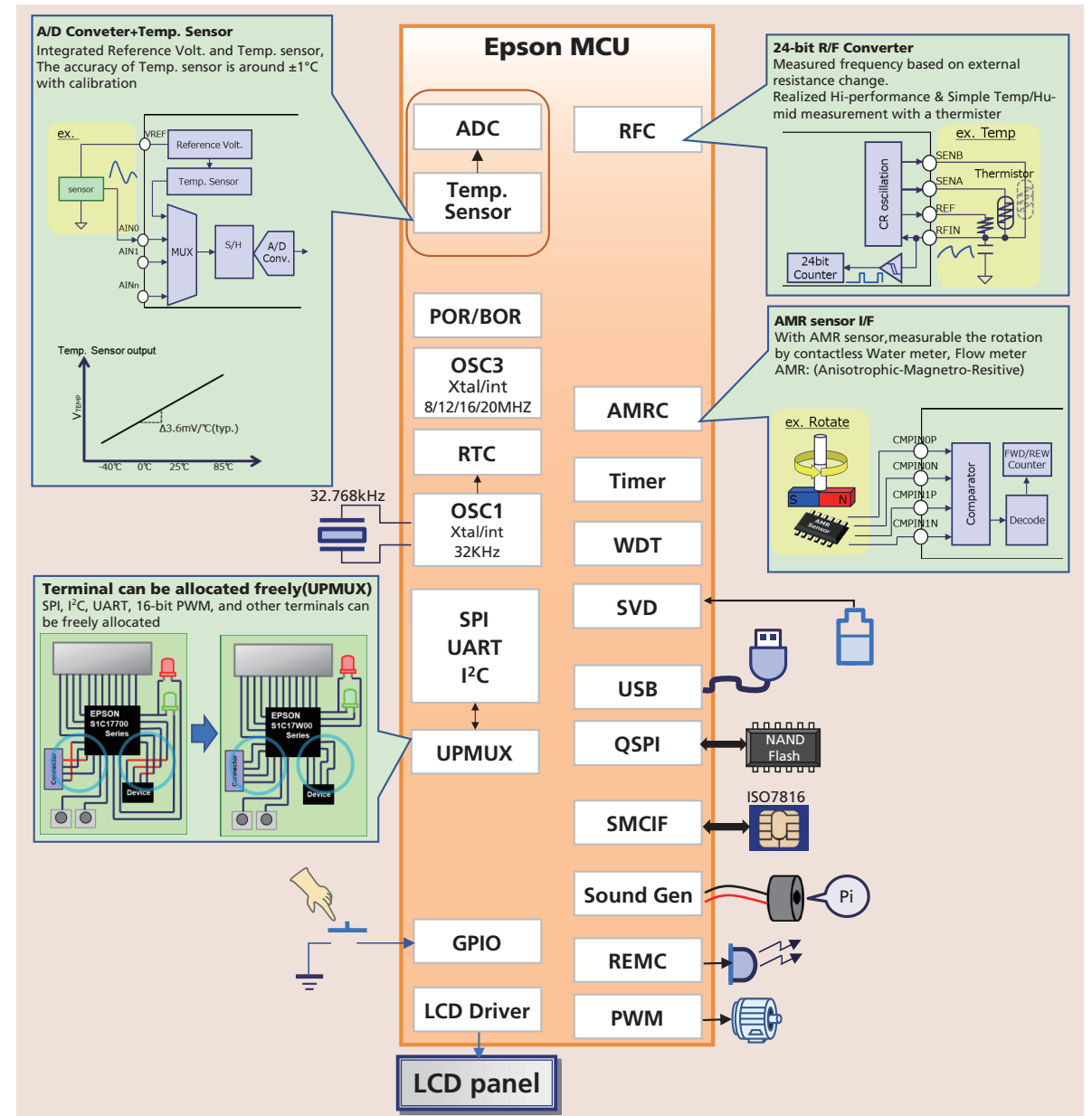


Segment LED

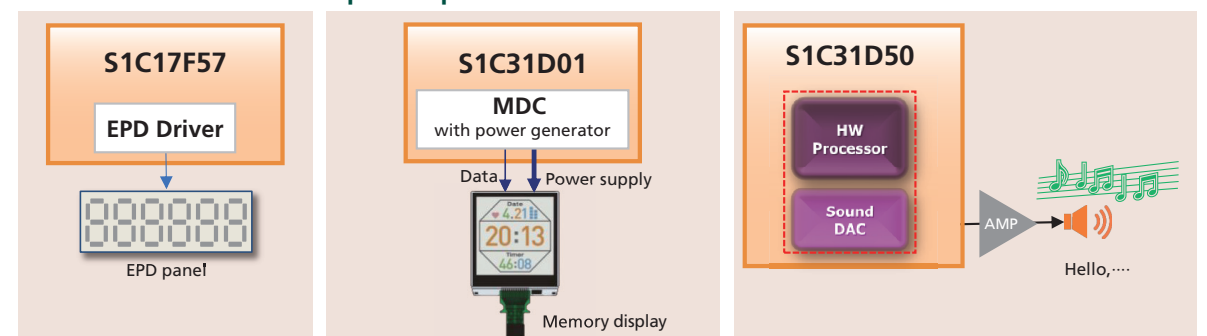


MCUs Features of Epson microcontrollers

■ A large number of different types of interfaces are included



■ Product Dedicated Unique Peripherals



※: Peripheral circuits configured by products are different.

Suitable for wearable and industrial control devices

ARM® microcontroller with Dot-Matrix LCD driver "S1C31W74"

General

The S1C31W74 is a 32-bit MCU with an ARM® Cortex®-M0+ processor included that features low-power operation. It integrates max. 2,304-dot LCD driver and a lot of serial interface circuits.

Large capacity memory

Large capacity memory corresponding to market trend of multi functionality is integrated on a single chip. It is possible to store and operate user programs that size is increasing by complicated software design.

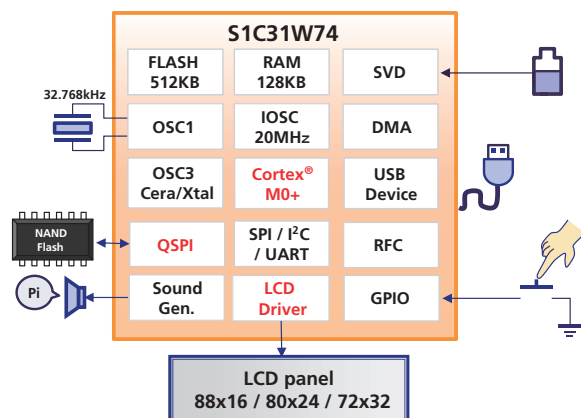
Built-in high resolution LCD driver

S1C31W74 can drive max. 2,304 dot LCD by built-in LCD driver. It equips an internal constant voltage circuit that has been cultivated over the Epson traditional products, and it maintains a high quality display unaffected by the remaining battery level. The contrast can be adjusted by software. It offers optimum and flexible design for user's product development.

Wide variety of interface

In addition to UART, SPI and I²C, it supports Quad-SPI (QSPI) which can communicate with external serial flash memory at high speed. An R/F converter for temperature and humidity measurement, USB FS 2.0 device controller, Universal port multiplexers that increase board layout design flexibility are also supported.

Block Diagram

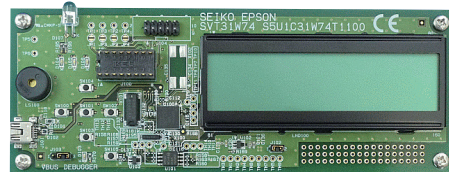


Main Features

Flash	512KB
RAM	128KB
Display RAM	704B
LCD driver	LCD output - 88SEGx1 to 16COM(Max.), - 80SEGx17 to 24COM(Max.), - 72SEGx25 to 32COM(Max.) LCD contrast 16-level programmable 1/5 or 1/4 bias power supply included. (external voltage can be applied.)
Serial Interface	SPI(1ch), UART(2ch), I ² C(2ch), QSPI(1ch)
USB	2.0 FS device controller
RFC	CR oscillation type with 24-bit counters
SVD	Supply Voltage Detector(32-level, 1.7V to 4.3V)
Sound Generator	Buzzer output, Melody generation function
IR remote controller	1ch EL lamp drive waveform can be generated
DMA	4ch
Timer	16-bit Timer, 16-bit PWM, WDT, RTC
Power Supply	1.8V to 3.6V
Clock frequency	Max. 21MHz (internal power : 1.8V) Max. 2.1MHz (internal power : 1.2V)
Current consumption	RUN:250μA/MHz (internal power : 1.8V) RUN:150μA@1MHz (internal power : 1.2V) SLEEP:0.4μA, RTC mode:0.9μA
Package	VFBGA8HX-181 (8mm x 8mm, 0.5mm pitch) Chip (Pad pitch 80μm)

Evaluation Board

The evaluation tool for S1C31W74 has 72SEGx32COM dot matrix LCD panel, LED, Piezoelectric buzzer and tact switches. It is useful for customers to evaluate each function at initial development stage.



Suitable for battery-driven wearable products

ARM® microcontroller with Memory Display Controller "S1C31D01"

General

The S1C31D01 is a 32-bit MCU with an ARM® Cortex®-M0+ processor included that features low-power operation. It integrates a lot of serial interface circuit, a memory display controller, and a voltage booster.

Memory Display Controller (MDC)

MDC supports several panel interfaces for each memory display. It includes graphics hardware acceleration functions such as rotation of frame buffer image to panel, Image/bitmap copy with scaling/rotation/horizontal and vertical shearing/alpha-blending*, Line/Rectangle/Ellipse/Arc drawing with filled and unfilled.

It can contribute to reduce software load by dedicated hardware.

Power booster circuit

The S1C31D01 generates supply voltages for memory display (VMDH/VMDL) with programmable power booster circuit. It is possible to reduce external components.

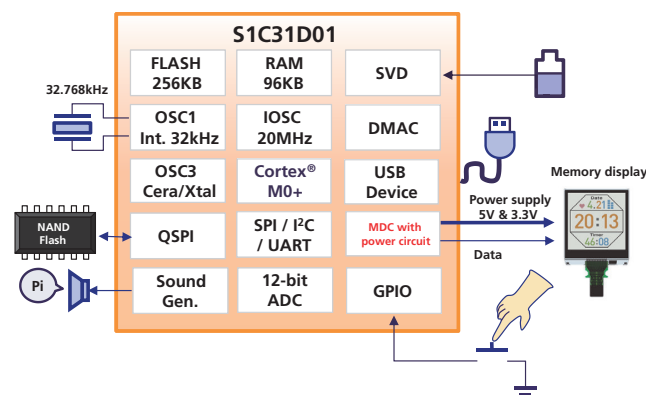
Small size package

Wafer level Chip Size Package (WCSP) is supported as same size with chip. It is suitable for various applications which have limited mounting area on the print circuit board.

Lineup

Epson prepares CPU-less dedicated memory display controller "S1D13C00" for the customers who already have Host CPU. It supports same features with S1C31D01 about graphic acceleration function and power booster circuit. There is a variety of products that can be selected according to your system.

Block Diagram



Main Features

Flash	256KB
RAM	96KB (shared with frame buffer)
MDC	Memory Display Interface - Parallel 6-bit color - SPI 1-bit black and white, 3-bit color 0, 90, 180, 270 degree rotation function Image/bitmap copy function Drawing function Supply voltage generator - VMDL: 2.7V to 3.4V - VMDH: 4.4V to 5.05V
Serial Interface	SPI(2ch), UART(3ch), I ² C(2ch), QSPI(1ch)
USB	2.0 FS device controller
ADC	12-bit(8-port)
TSRVR	Temperature sensor ADC reference voltage generator
SVD	Supply voltage Detector(28level, 1.8V to 5.0V)
Sound Generator	Buzzer output, Melody generation function
DMA	4ch
Timer	16-bit Timer, 16-bit PWM, WDT, RTC
Power Supply	1.8V to 5.5V
Clock frequency	Max. 21MHz (internal power : 1.8V) Max. 2.1MHz (internal power : 1.2V)
Current consumption	RUN:250μA/MHz (internal power : 1.8V) RUN:155μA@1MHz (internal power : 1.2V) SLEEP:0.46μA, RTC mode : 0.95μA
Package	VFBGA5H-81 (5mm x 5mm, 0.5mm Pitch) WCSP (4.45m x 4.45mm, 0.4mm Pitch) TQFP14-80 (14mm x 14mm, 0.5mm Pitch) Chip (Pad pitch 80μm)

* Alpha-blending: supported at 6-bit color only.

Examples of Graphic Acceleration

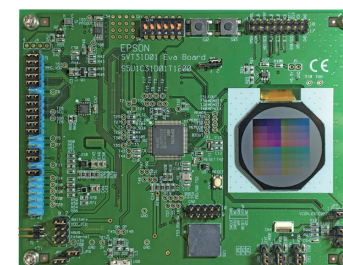
Drawing engine



Image / Bitmap copy



Evaluation Board



ideal sound solution for home appliances and electronics

ARM® microcontroller with Dedicated Sound Hardware "S1C31D50"

General

The S1C31D50 is a 32-bit ARM® Cortex®-M0+ MCU which integrates a specific hardware block called the HW Processor.

HW Processor

The HW Processor can perform 2ch Voice/Audio Play, Voice Speed Conversion, and Self Memory Check without using any CPU resources.

2ch mixing play

A dedicated HW Processor provides 2-channel sound on a single MCU chip. The use of two channels enables music and voice to be played simultaneously. The audio guidance becomes more elegant and warmer.

Voice Speed Conversion

Without changing the voice, the speed can be adjusted from 75% to 125% by 5% step.

High-compression Sound Algorithm

Epson high-compression algorithm(EOV) cultivated in Epson LSI business is inherited. For example, the data size of 1min voice at 15.625kHz sampling frequency is about 120KB. It is 1/4 size of the data created by ADPCM.

Self-Memory Check

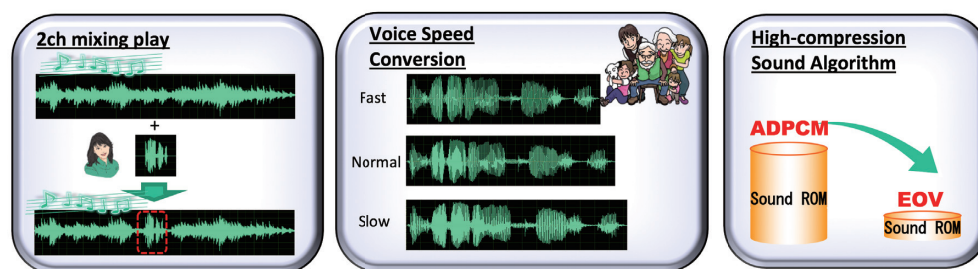
HW processor can detect failures in built-in RAM, built-in Flash, and external SPI-Flash memories without using CPU resources.

Main Features

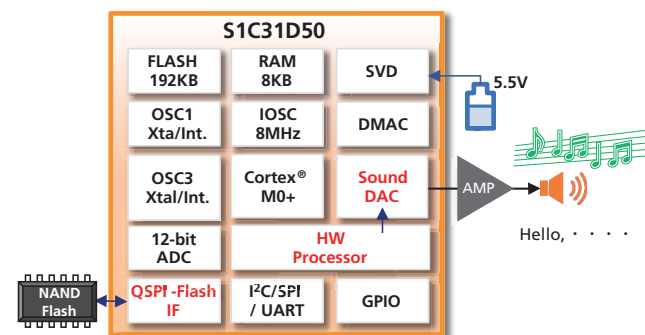
Flash	192KB(for Program & Voice ROM)
RAM	8KB(Disable HW Processor time: up to 22KB)
HW Processor	Voice/Audio Play w/o CPU resource
	- 2ch mixing play
	- Voice Speed Conversion
	- Self-Memory Check w/o CPU resource
Sound DAC	Sampling Frequency 15.625kHz
Serial Interface	SPI(3ch), UART(3ch), I ² C(3ch), QSPI(1ch)
ADC	12-bit(8-port)
SVD	Supply Voltage Detector (32level, 1.7V to 4.3V)
DMA	4ch
RFC	CR oscillation type with 24-bit counters
Timers	16-bit Timer, 16-bit PWM, WDT, RTC
Power Supply	1.8V to 5.5V
	3.3V SPI Flash Interface Power Supply
clock frequency	Max. 16MHz (internal power : 1.8V) Max. 1.8MHz (internal power : 1.2V)
current consumption	RUN:250μA/MHz (internal power : 1.8V) RUN:150μA@1MHz (internal power : 1.2V) SLEEP:0.4μA, RTC mode : 0.9μA
Package	TQFP12-48 (7mm x 7mm, 0.5mm pitch) QFP13-64 (10mm x 10mm, 0.5mm pitch) TQFP14-80 (12mm x 12mm, 0.5mm pitch) QFP15-100 (14mm x 14mm, 0.5mm pitch)

Applications

Boiler Remote Controller
Fire/Smoke Alarm



Block Diagram



User-Friendly Substantial Development Environment

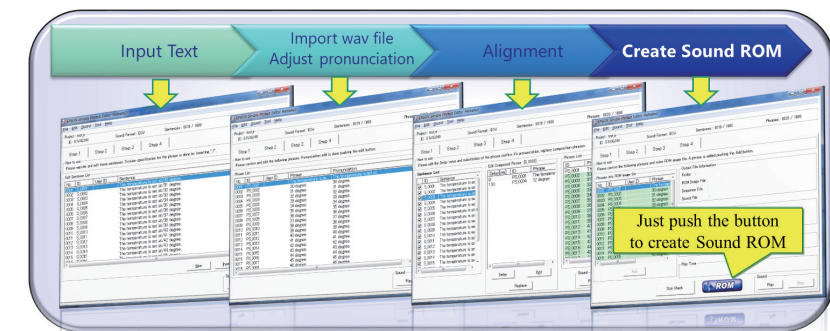
Voice Creation PC Tool, Simple sound play interface, easy sound data update in market

S1C31D50 Development Environment provides User-Friendly Substantial Development, this makes it easy to create natural voice data and play the sound.

Epson Voice Creation PC Tool

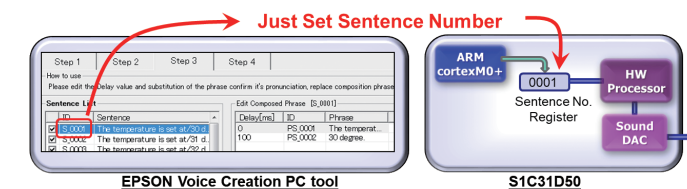
Using Epson Voice Creation PC Tool, natural voice data can be created by just PC, so no need to struggle studio recording, announce arrangement and additional cost. Typically only text input to the tool is enough to create the voice data. The tool also supports phrase combination, pronunciation adjust and importing existing WAV file a customer already has.

The tool supports Japanese, English, Chinese(Mandarin) and Korean languages.



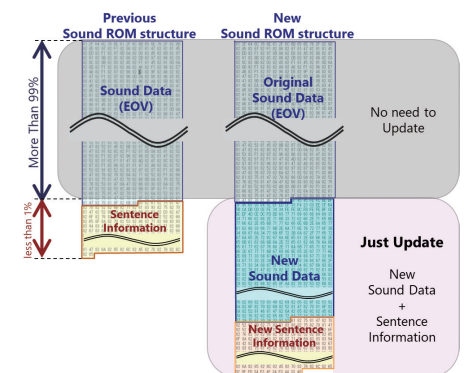
Link between Voice creation Tool and IC

Epson Voice Creation PC tool also makes it easy to develop firmware. A firmware engineer does not need to care phrase combination and delay among phrases etc, because all information is included in Sound ROM and Hardware Processor. By just setting the Sentence Number on the tool to IC register, the sound can be played.



Sound ROM Update

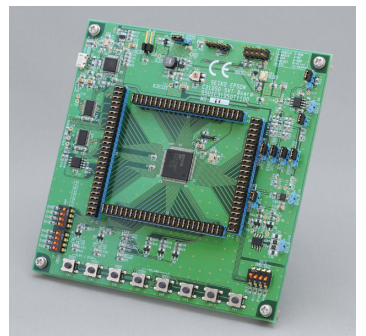
Sound ROM has a structure to update. The existing data does not need to do anything, only NEW "Data & Sound Information" is enough. This makes possible to update the sound after market launch.



Evaluation Board

4 languages sound demo with melody is preset. Pushing the button on the evaluation board, 2ch mixing sound can be played.

Also customers can write new sound ROM Data from PC to this board and play own sound easily.



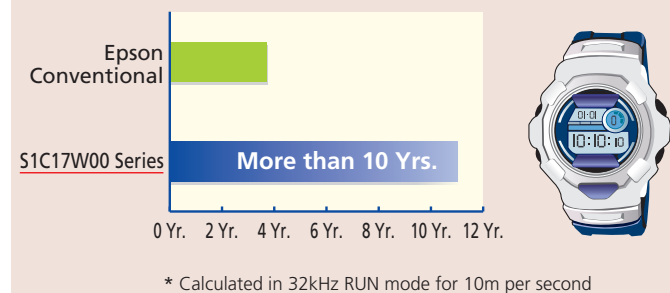
MCUs

S1C17 Family 16-bit microcontrollers

■ World realized by low power consumption of the S1C17W Series

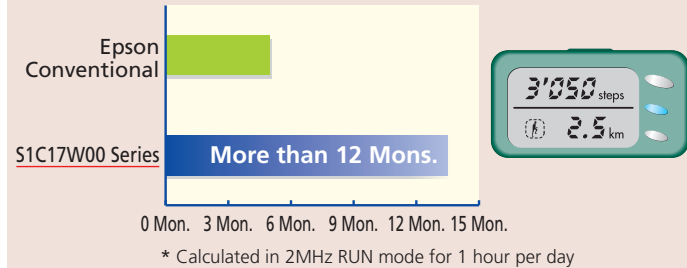
Case of Digital Watch

Conditions: Continuous LCD watch display using LR44 battery (1.5 V)



Case of Pedometer

Conditions: LCD display and acceleration sensing for several hours per day using the CR2032 battery (3V)



■ S1C17W Series Products overview

Products	Display	Operation clock			Supply current				Power supply	Memory		I/O port *8	Timer				SIO					Analog			Others			Form of delivery	
	LCD Driver segxcom	High-speed [Hz] (Max.)	Low-speed [Hz] (Typ.)	Built-in oscillator [Hz] (Typ.)	Sleep [μA] (Typ.)	Halt [μA] (Typ.)	32kHz Operating [μA] (Typ.)	1MHz Operating [μA] (Typ.)	Supply voltage [V]	Flash ROM [Byte]	RAM [Byte]		16-bit timer	16-bit PWM timer	Watchdog timer	Real-time clock	UART	SPI	QSPI	I ² C	Remote controller transmission and reception	R/F converter (24-bit)	A/D converter (12-bit)	SVD *4	Sound generator	Multiple r/Divider	Special function	Package	Chip
S1C17W00 series W00 group		[Ultra Low Power] This is an ultra-low power consumption 16-bit MCU compatible to low voltage operations from 1.2V, even with built-in flash memory. This product is equipped with a built-in RTC, stopwatch, high-performance PWM, external bus I/F and improved analog functions, combined with the powerful										The embedded highly efficient DC-DC converter generates an internal constant voltage, to drive an IC with a low power consumption operation beyond 4-bit MCUs. processing capacity of the 16-bit CPU, suitable for battery driven applications.																	
S1C17W03	—	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.3	4	250	1.2 to 3.6 *1	16K *3	2K	35 24	4	2 x 2	1	1	2	2	—	1	1	2 ^{*5} 1	6 5	1	1	1	—	TQFP12-48 SQFN5-32	○ —
S1C17W04	—	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.3	4	250	1.2 to 3.6 *1	32K *3	2K	35 24	4	2 x 2	1	1	2	2	—	1	1	2 ^{*5} 1	6 5	1	1	1	—	TQFP12-48 SQFN5-32	○ —
S1C17W00 series W10/W20/W30 group		[Ultra Low Power] This is an ultra-low power consumption 16-bit MCU compatible to low voltage operations from 1.2V, even with built-in flash memory. LCD driver, high-performance PWM and improved analog functions, combined with the powerful processing capacity of the 16-bit CPU, suitable for battery										The embedded highly efficient DC-DC converter generates an internal constant voltage, to drive an IC with a low power consumption operation beyond 4-bit MCUs. This product is equipped with a built-in RTC, driven applications that require a LCD and clock function.																	
S1C17W12	26 x 4	4.2M	32.768k	32k/250k/ 384k/500k/ 700k/1M/ 2M/4M	0.15	0.3	2	140	1.2 to 3.6 *9	48K *3	2K	32	3	2 x 2	1	1	2	1	—	1	1	2 ^{*5}	—	1	1	1	LED pin x 2	—	○
	18 x 4		—	—		1.5	5					26										—	—					SQFN7-48	—
S1C17W13	26 x 4	4.2M	32.768k	32k/250k/ 384k/500k/ 700k/1M/ 2M/4M	0.15	0.3	2	140	1.2 to 3.6 *9	48K *3	2K	32	3	2 x 2	1	1	2	1	—	1	1	2 ^{*5}	—	1	1	1	LED pin x 2	QFP13-64 SQFN7-48	○
	18 x 4 20 x 4 *7						4					26										—	—					TQFP12-48	
S1C17W14	54 x 4 50 x 8	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.3	3	200	1.2 to 3.6 *1	48K *3	4K	33	3	2 x 2	1	1	2	2	—	1	1	1	—	1	1	1	—	QFP15-100	○
S1C17W15	34 x 4 30 x 8	4.2M	32.768k	500k/700k/ 1M/2M/4M	0.15	0.3	4	250	1.2 to 3.6 *1	64K *3	4K	36	3	2 x 2	1	1	2	1	—	1	—	4 ^{*5}	—	1	1	1	—	QFP15-100	○
	32 x 4 28 x 8					0.5	8					33																TQFP14-80	
	24 x 4 20 x 8					28	SQFN9-64 TQFP13-64																						
S1C17W16	60 x 4 56 x 8	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.3	3	200	1.2 to 3.6 *1	64K *3	8K	40	5	2 x 2	1	1	2	3	—	1	1	2 ^{*5}	4	1	1	1	—	TQFP15-128	○
S1C17W18	48 x 4 44 x 8	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.3	2	140	1.2 to 3.6 *9	128K (*3)	8K	68	4	3 x 2	1	1	2	2	—	1	1	2 ^{*5}	7	1	1	1	Temperature sensor	TQFP15-128	○
	32 x 4 28 x 8					0.5	4					59																TQFP14-80	
	24 x 4 20 x 8					49	SQFN9-64																						
S1C17W22	72 x 4/8 64 x 16 56 x 24	4.2M	32.768k	500k/700k/ 1M/2M/4M	0.15	0.3	4	250	1.2 to 3.6 *1	64K *3	4K	42	2	2 x 2	1	1	1	1	—	1	1	2 ^{*5}	—	1	1	1	—	TQFP15-128	○
S1C17W23	72 x 4/8 64 x 16 56 x 24	4.2M	32.768k	500k/700k/ 1M/2M/4M	0.15	0.3	4	250	1.2 to 3.6 *1	96K *3	8K	42	4	3 x 2	1	1	2	2	—	1	1	2 ^{*5}	6	1	1	1	—	TQFP15-128	○
S1C17W34	80 x 16 64 x 32	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.4	3	150	1.2 to 3.6 *2, *6	128K (*3)	12K	53	4	3 x 2	1	3	2	2	—	1	1	2 ^{*5}	7	1	1	1	Temperature sensor	QFP21-176	○
S1C17W35	80 x 16 64 x 32	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.4	3	150	1.2 to 3.6 *2, *6	256K (*3)	12K	53	4	3 x 2	1	3	2	2	—	1	1	2 ^{*5}	7	1	1	1	Temperature sensor	QFP21-176	○
S1C17W36	80 x 16 64 x 32	4.2M	32.768k	250k/384k/ 500k/700k/ 1M/2M/4M	0.15	0.4	3	150	1.2 to 3.6 *2, *6	384K (*3)	16K	53	4	3 x 2	1	3	2	2	—	1	1	2 ^{*5}	7	1	1	1	Temperature sensor	QFP21-176	○

*1: During erasing / programming in flash memory (V_{DD}): 1.8V to 3.6 V

*2: During operations LCD (V_{DD}): 2.5V to 3.6V

*3: During erasing / programming voltage in flash memory (V_{PP}): The external applying of 7.5V / 7.5V (Typ.) is needed. (*3) can be rewritten even with internal power supply.

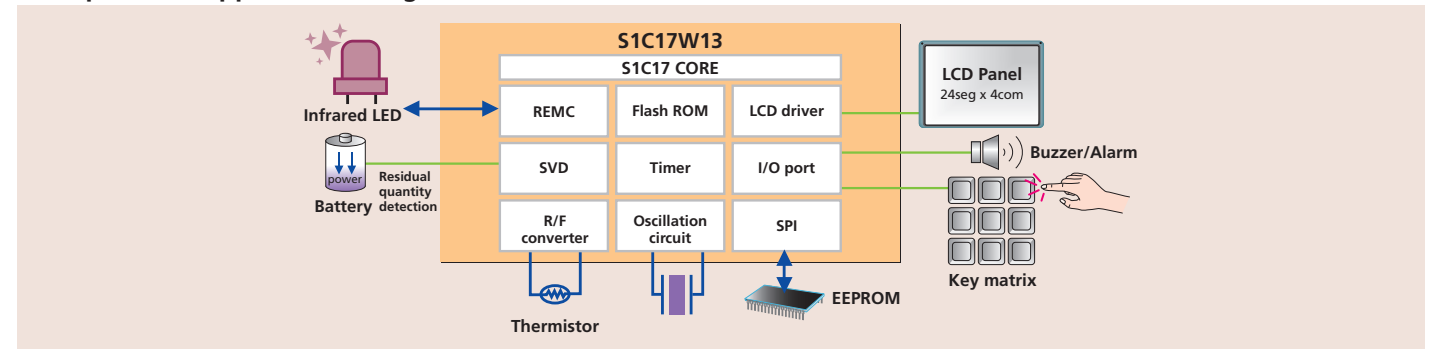
MCUs

MCUs

S1C17 Family 16-bit microcontrollers

■ S1C17W Series Application examples

Example of an application using the S1C17W13: Remote controller



*6: During erasing / programming in flash memory (V_{DD}): 2.7V to 3.6V, 1.8V to 3.6V during the external applying V_{PP}=7.5V/7.5V(Typ.)

*7: External voltage application mode only.

*8: Including Input port and Output port.

*9: During erasing / programming in flash memory (V_{DD}): 2.4V to 3.6 V

MCUs

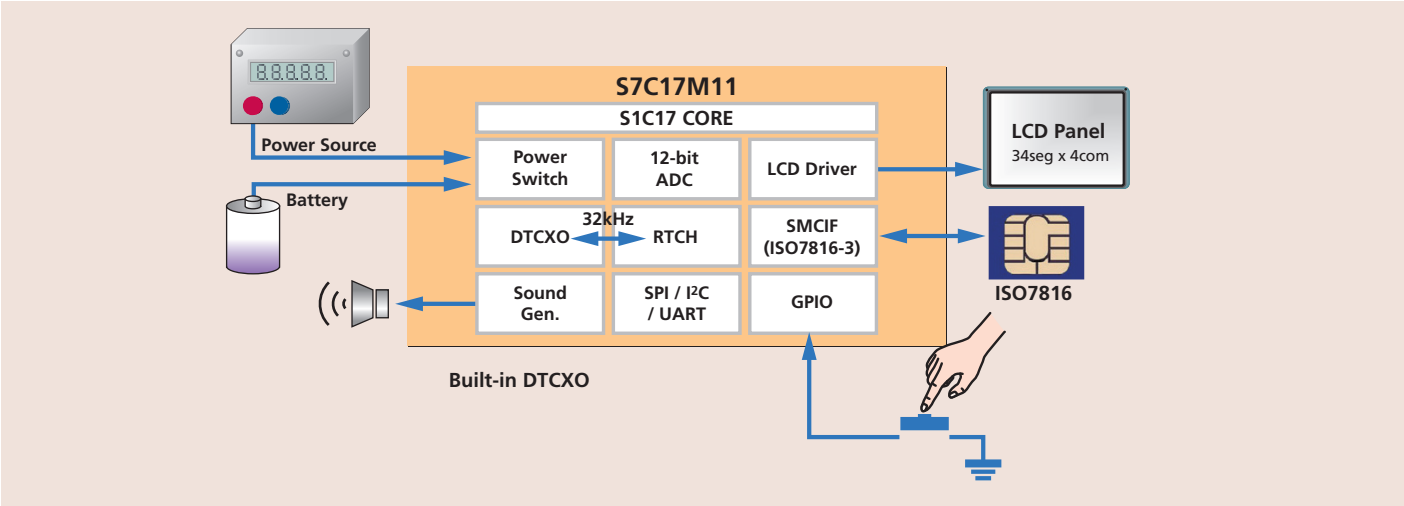
MCUs

S1C17 Family 16-bit microcontrollers

MCUs

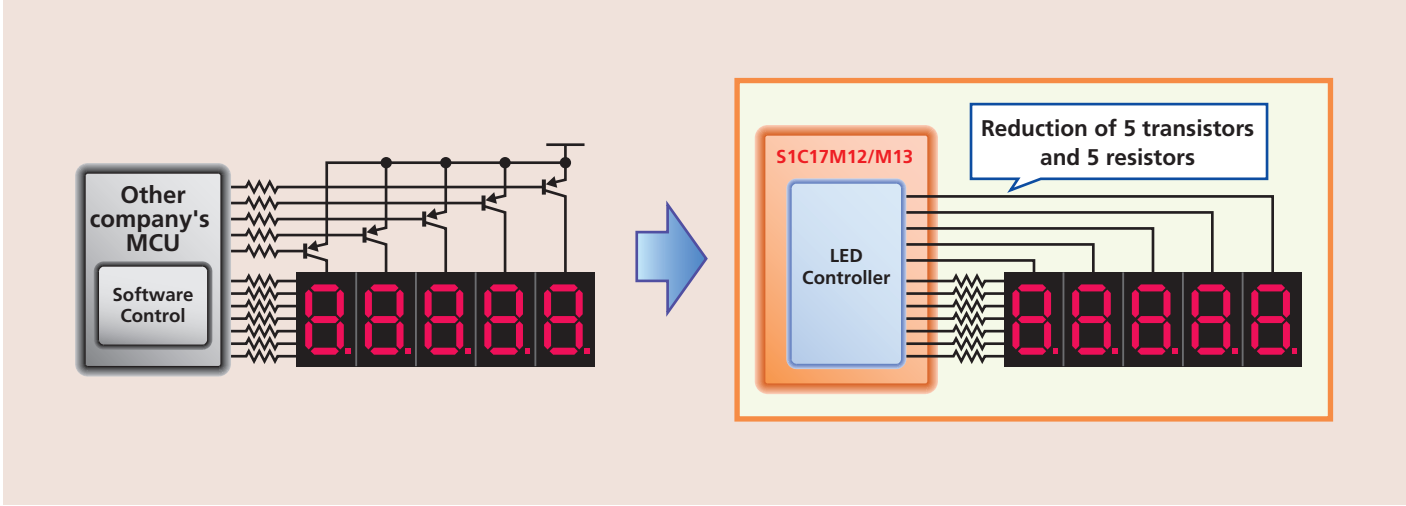
■ S1C17M Series Application examples

Example of an application using the S7C17M11: Electricity meter



■ S1C17M Series Function introduction

Example of 7 seg LED lighting up using the S1C17M12/M13



■ S1C17M Series Products overview

Products	Display		Operation clock			Supply current				Power supply	Memory			I/O I/O port ^{*5}	Timer				SIO					Analog			Reset		Others			Form of delivery	
	LCD Driver segxcom	Display controller	High-speed [Hz] (Max.)	Low-speed [Hz] (Max.)	Built-in oscillator [Hz] (Typ.)	Sleep [μA] (Typ.)	Halt [μA] (Typ.)	32kHz Operating [μA] (Typ.)	1MHz Operating [μA] (Typ.)	Supply voltage [V]	Flash ROM [Byte]	EEPROM [Byte]	RAM [Byte]		16-bit timer	16-bit PWM timer	Watchdog timer	Real-time clock	UART	SPI	Quad SPI	I ² C	Remote controller transmission and reception	RF converter (24-bit)	AD converter (12-bit)	SVD ^{*4}	POR	BOR	Sound generator	Multiple r/Divider	Special function	Package	Chip
S1C17M00 series		It is an application specialized series. It is a 16-bit MCU with Flash memory compatible with high processing while achieving low power consumption, supporting power supply voltages from 1.8 V to 5.5 V.																															
S1C17M01	32 x 4 28 x 8	—	16.3M	32.768k	7.37M	0.35	0.8	12.5	210	1.8 to 5.5 ^{*1, *7}	32K ^{*3}	—	4K	19	5	—	1	1	1	2	—	1	—	1	—	1	○	—	—	—	AMRC	TQFP13-64	○
S1C17M10	88 x 8 80 x 16	—	16M	32.768k	32k/ 4M/8M/ 12M/16M	0.16	0.6	4	145	1.8 to 5.5 ^{*2}	64K ^{(*)3}	—	4K	33	5	1 x 2	1	1	1	1	—	1	—	—	1	○	—	—	1	SMCIF	TQFP15-128	○	
S7C17M11	34 x 4 32 x 6 30 x 8	—	16.8M	—	32.768k/ 4M/8M/ 12M/16M	2.25	2.35	8	187	1.8 to 5.5 ^{*2}	126K ^{*3}	—	8K	43	4	1 x 2	1	1	4	1	—	2	—	—	8	1	○	○	1	1	SMCIF x 2 DTCXO	H4QFP15-100	—
S1C17M12	—	LED controller 8x5	16.8M	—	4M/8M/ 12M/16M	0.35	40	—	150	1.8 to 5.5 ^{*2}	16K ^{*3}	—	2K	39	4	1 x 2	1	—	1	2	—	1	1	—	—	1	○	○	—	1	High current port x 5	TQFP12-48	○
S1C17M13	—	LED controller 8x5	16.8M	—	4M/8M/ 12M/16M	0.35	40	—	150	1.8 to 5.5 ^{*2}	16K ^{*3}	—	2K	39	4	1 x 2	1	—	1	2	—	1	1	—	8	1	○	○	—	1	High current port x 5	TQFP12-48	○
S1C17M20	—	—	21M	— 32.768k	32k/700k/ 12M/16M/20M	0.36	1.5 0.7	5.5 5	160	1.8 to 5.5 ^{*2}	16K ^{(*)3}	—	2K	18 24	4	2 x 2	1	1	2	2	—	1	1	—	4 6	1	○	○	1	1	—	SQFN4-24 SQFN5-32	—
S1C17M21	—	—	21M	32.768k	32k/700k/ 12M/16M/20M	0.36	0.7	5	160	1.8 to 5.5 ^{*2}	16K ^{(*)3}	—	2K	24	4	2 x 2	1	1	2	2	—	1	1	—	6	1	○	○	1	1	—	TQFP12-32	—
S1C17M22	—	—	21M	32.768k	32k/700k/ 12M/16M/20M	0.36	0.7	5	160	1.8 to 5.5 ^{*2}	16K ^{(*)3}	—	2K	40	4	2 x 2	1	1	2	2	—	1	1	2	8	1	○	○	1	1	—	TQFP12-48	—
S1C17M23	—	—	21M	— 32.768k	32k/700k/ 12M/16M/20M	0.36	1.5 0.7	5.5 5	160	1.8 to 5.5 ^{*2}	32K ^{(*)3}	—	2K	18 24	4	2 x 2	1	1	2	2	—	1	1	—	4 6	1	○	○	1	1	—	SQFN4-24 SQFN5-32	—
S1C17M24	—	—	21M	32.768k	32k/700k/ 12M/16M/20M	0.36	0.7	5	160	1.8 to 5.5 ^{*2}	32K ^{(*)3}	—	2K	24	4	2 x 2	1	1	2	2	—	1	1	—	6	1	○	○	1	1	—	TQFP12-32	—
S1C17M25	—	—	21M	32.768k	32k/700k/ 12M/16M/20M	0.36	0.7	5	160	1.8 to 5.5 ^{*2}	32K ^{(*)3}	—	2K	40	4	2 x 2	1	1	2	2	—	1	1	2	8	1	○	○	1	1	—	TQFP12-48	—
S1C17M30	26 x 4 22 x 8 ^{*6}	—	16.8M	32.768k	32k/700k/ 12M/16M	0.2	0.7	5	160	1.8 to 5.5 ^{*2}	48K ^{(*)3}	256	4K	38	4	3 x 2	1	1	2	2	—	1	1	2	2	1	○	○	1	1	—	TQFP12-48	—
S1C17M31	26 x 4 22 x 8	—	16.8M	—	32k/700k/ 12M/16M	0.2	1.4	5.5	160	1.8 to 5.5 ^{*2}	48K ^{(*)3}	256	4K	38	4	3 x 2	1	1	2	2	—	1	1	2	2	1	○	○	1	1	—	TQFP12-48	—
S1C17M32	42 x 4 38 x 8 ^{*6}	—	16.8M	32.768k	32k/700k/ 12M/16M	0.2	0.7	5	160	1.8 to 5.5 ^{*2}	64K ^{(*)3}	256	4K	54	4	3 x 2	1	1	2	2	—	1	1	2	2	1	○	○	1	1	—	TQFP13-64	—
S1C17M33	50 x 4 46 x 8	—	16.8M	32.768k	32k/700k/ 12M/16M	0.2	0.7	5	160	1.8 to 5.5 ^{*2}	96K ^{(*)3}	32 to 512 ^{*8}	4K	66	4	3 x 2	1	1	2	2	—	1	1	2	5	1	○	○	1	1	—	TQFP14-80	○
S1C17M34	37 x 4 33 x 8	—	16.8M	32.768k	32k/700k/ 12M/16M	0.2	0.7	5	160	1.8 to 5.5 ^{*2}	64K ^{(*)3}	256	4K	52	4	3 x 2	1	1	2	2	—	1	1	2	5	1	○	○	1	1	—	TQFP13-64	—

*1: During erasing / programming in flash memory (V_{DD}): V_{PP}=2.7V to 5.5V without the external applying, V_W=1.8V to 5.5V during the external applying

*2: During erasing / programming in flash memory (V_{DD}): 2.7V to 5.5 V

3: During erasing / programming voltage in flash memory (V_{PP}): The external applying of 7.5V / 7.5V (Typ.) is needed. ()3 can be rewritten even with internal power supply.

*4: SVD is an abbreviation for Supply Voltage Detector.

*5: Output dedicated port 1 included.

*6: External voltage application mode only.

*7: (MR sensor controller) Operation (V_{DD}) : 2.0V to 5.5V

*8: Flash area is used.

MCUs

S1C17 Family 16-bit microcontrollers

MCUs

■ S1C17 Long-running Series

Products	Display	Operation clock			Supply current				Power supply	Memory			I/O port ^{*9}	Timer								SIO				Remote controller transmission and reception	Analog		Others			Form of delivery			
	LCD Driver segxcom	High-speed [Hz] (Max.)	Low-speed [Hz] (Typ.)	Built-in oscillator [Hz] (Typ.)	Sleep [μA] (Typ.)	Halt [μA] (Typ.)	32kHz Operating [μA] (Typ.)	1MHz Operating [μA] (Typ.)	Supply voltage [V]	Flash ROM [Byte]	Mask ROM [Byte]	RAM [Byte]		8-bit timer	16-bit timer	16-bit PWM timer	Stopwatch	Watchdog timer	Clock	Real-time clock	UART	SPI	I ² C master	I ² C slave	R/F converter (24-bit)		A/D converter (10-bit)	SVD ^{*5}	Sound generator	Multiplier /Divider	Special function	Package	Chip		
S1C17100/600 series		[Low Power] This is a 16-bit MCU with improved processing capacity and development environment, while maintaining low power consumption equivalent to This product is equipped with a built-in segment LCD driver, power circuit, clock function and various I/F, suitable for watches, clocks, remote controllers and											Epson's 4/8-bit MCUs. healthcare devices.																						
S1C17153	32 x 4	–	32.768k	500k/1M/2M	0.13	0.42	4	160	2.0 to 3.6	–	16K	2K	12	1	–	1	–	1	1	1	1	1	–	–	–	–	1	1	1	–	–	○			
S1C17121	40 x 4 36 x 8	4.2M	32.768k	2.7M	0.15	0.9	7	250	1.8 to 3.6	–	32K	2K	36	3	3	1	1	1	1	–	2	1	1	1	2	8	1	–	1	–	TQFP14-100	○			
S1C17651	20 x 4	4.2M	32.768k	32k/500k/1M/2M	0.09	0.42	10	350	2.0 to 3.6	16K ^{*3}	–	2K	12	1	–	1	–	1	1	1	1	1	–	–	–	–	1	1	1	–	TQFP13-64	○			
S1C17653	32 x 4	4.2M	32.768k	32k/500k/1M/2M	0.09	0.42	10	350	2.0 to 3.6	16K ^{*3}	–	2K	12	1	–	1	–	1	1	1	1	1	–	–	–	–	1	1	1	–	TQFP14-80	○ ^{*7}			
S1C17656	32 x 4	–	32.768k	500k/1M/2M/4M	0.13	0.5	7.3	280	1.8 to 3.6	24K ^{*4}	–	2K	20	1	–	1	–	1	1	1	1	1	–	–	–	1	–	1	1	1	–	TQFP14-80	○		
S1C17611	12 x 4 8 x 8	8.2M	32.768k	2.7M	0.6	2.0	12	400	1.8 to 3.6 ^{*1}	32K ^{*6}	–	2K	19	2	3	2	1	1	1	–	1	1	1	1	–	1	4	1	–	1	–	QFP12-48	○		
S1C17601	20 x 4 16 x 8	8.2M	32.768k	2.7M	0.6	2.0	12	340	1.8 to 3.6 ^{*1}	32K ^{*6}	–	2K	24	2	3	2	1	1	1	1	–	1	1	1	1	–	1	4	1	–	1	–	TQFP13-64	○	
S1C17621	40 x 4 36 x 8	8.2M	32.768k	2.7M	0.75	2.5	15	410	1.8 to 3.6 ^{*1}	32K ^{*6}	–	2K	36	3	3	1	1	1	1	1	–	2	1	1	1	1	2	8	1	–	1	–	TQFP14-100	○	
S1C17602	40 x 4 36 x 8	8.2M	32.768k	2.7M	0.75	2.5	15	410	1.8 to 3.6 ^{*1}	64K ^{*6}	–	4K	36	3	3	1	1	1	1	1	–	2	1	1	1	1	2	8	1	–	1	–	TQFP14-100	○	
S1C17622	56 x 4 52 x 8	8.2M	32.768k	2.7M	0.75	2.3	14	400	1.8 to 3.6 ^{*1}	64K ^{*6}	–	4K	47	3	3	1	1	1	1	1	–	2	1	1	1	1	2	8	1	–	1	–	TQFP15-128	○	
S1C17604	40 x 4 36 x 8	8.2M	32.768k	2.7M	0.75	2.3	14	400	1.8 to 3.6 ^{*1}	128K ^{*6}	–	8K	36	3	3	3	1	1	1	1	2	1	1	1	1	2	8	1	–	1	–	TQFP14-100	○		
S1C17624	56 x 4 52 x 8	8.2M	32.768k	2.7M	0.75	2.3	14	400	1.8 to 3.6 ^{*1}	128K ^{*6}	–	8K	47	3	3	3	1	1	1	1	2	1	1	1	1	2	8	1	–	1	–	TQFP15-128	○		
S1C17500 series		[Low Power] This is a 16-bit MCU with built-in flash memory, which realizes high-speed processing at low power consumption. This product is equipped with various											features, such as a general-purpose I/O port, A/D converter input and serial I/F, and is suitable for controlling various sensor built-in devices, including household appliances.																						
S1C17564	–	24M	32.768k	2M to 12M	0.8	2.7	16	450	2.0 to 5.5	128K ^{*3}	–	16K	40	–	5	4	1	1	1	–	2	3	1	1	1	–	4	–	1	–	–	TQFP13-64 VFBGA5H-81	○		
S1C17589	–	16.8M	32.768k	4M/8M/ 12M/16M	0.2	0.6	9	280	1.8 to 5.5	128K ^{*4}	–	16K	88	–	6	4 x 6	–	1	–	1	3	2	1	1	1	–	16	1	1	–	–	QFP15-100	○		
													68														11					QFP14-80	–		
													52														7					QFP13-64	–		
S1C17700 series		It is an application specialized series. It is a 16-bit MCU with Flash memory compatible with high processing while achieving low power consumption, supporting power supply voltages from 1.8 V to 5.5 V.																																	
S1C17711	64 x 16 56 x 24	8.2M	32.768k	2.7M	1.0	2.0	12	400	1.8 to 3.6 ^{*1}	64K ^{*6}	–	4K	29	–	4	4	1	1	1	1	–	1	1	1	1	2	8	1	–	1	–	TQFP15-128	○		
S1C17702	88 x 16 72 x 32	8.2M	32.768k	2.7M	1.0	2.5	16	450	1.8 to 3.6 ^{*1}	128K ^{*6}	–	12K	28	3	3	2	1	1	1	–	1	1	1	–	1	–	1	–	1	–	–	QFP21-176 VFBGA10H-180 VFBGA8H-181	○		
S1C17703	120 x 16/24/32 60 x 64	8.2M	32.768k	2.7M	1.0	2.5	15	450	1.8 to 3.6 ^{*2}	256K ^{*6}	–	12K	34	–	5	4	1	1	1	–	2	3	1	1	1	2	8	1	–	1	–	QFP21-216 VFBGA10H-240	○		
S1C17705	128 x 16/24/32 64 x 64	8.2M	32.768k	2.7M	1.2	2.7	18	550	1.8 to 3.6 ^{*2}	512K ^{*6}	–	12K	35	–	5	4	1	1	1	–	2	3	1	1	1	2	8	1	–	1	–	VFBGA10H-240	○		
S1C17800 series		[High Performance] This 16-bit MCU realized advanced processing equivalent to 32-bit. The built-in LCD controller provides maximum VGA monochrome displays. This product is equipped with abundant built-in I/F, such as USB, various serial interfaces											and A/D converters, suitable for operation panel control of white home appliances and various products, with improved user interface utilizing displays, music, sound, touch panels and etc.																						
S1C17801	LCD Controllers	48M	32.768k	–	1.4 ^{*10}	12	–	6000	3.0 to 3.6	128K ^{*6}	–	4K	99	6	2	1	–	1	–	1 ^{*11}	1	2	1	–	1	–	8	–	Multiplier :○ Divider :x	–	BUS supported USB FS	TQFP15-128	–		
S1C17803	LCD Controllers	33M	32.768k	–	1.3 ^{*10}	5	–	6500	2.7 to 5.5	128K ^{*6}	–	16K	97 69	4	1	2	–	1	–	1 ^{*11}	1	2 ^{*12}	1	1	1	–	4	–		1	–	BUS supported	TQFP15-128 TQFP14-100	–	
S1C17900 series		[Application-specific type] Incorporating low power consumption, DSP has made it possible to achieve advanced signal processing, which was difficult for conventional This series can be used for a variety of sensor-mounted applications, together with a rich array of serial interfaces and analog-to-digital converters.											battery-driven devices to perform, with extremely low power consumption.																						
S1C17955	–	–	32.768k	2M/4M/ 8M/12M	1.0	2.9	15	400	1.65 to 1.95 (Core) 1.65 to 3.6 (I/O)	128K ^{*4}	–	16K	20	–	5	4	1	1	1	–	1	3	1	1	–	–	–	–	1	–	FSA ^{*13}	WCSP-48	○		
S1C17965	–	24M	32.768k	2M/4M/ 8M/12M	1.0	2.9	15	400	2.0 to 3.6	128K ^{*4}	–	16K	24	–	5	4	1	1	1	–	2	3	1	1	1	–	6 ^{*9}	–	1	–	FSA ^{*13}	TQFP13-64	○		

*1: During erasing / programming in flash memory (V_{DD}): 2.7V to 3.6 V
*2: During erasing / programming in flash memory (V_{DD}): 2.5V to 3.6 V
*3: During erasing / programming voltage in flash memory (V_{PP}): The external applying of 7.5V / 7.0V (Typ.) is needed.

*4: During erasing / programming voltage in flash memory (V_{PP}): The external applying of 7.5V / 7.5V (Typ.) is needed.
*5: SVD is an abbreviation for Supply Voltage Detector.
*6: This product uses SuperFlash® technology licensed from SST UK Ltd.

*7: Al pad, Au bump
*8: Including Input port and Output port.
*9: Resolution: 12-bit

*10: Unmounted OSC1
*11: The battery backed up operation is supported.
*12: Universal serial interface (Any of UART, SPI and I²C functions can be selected.)

*13: Low power DSP

Products	Display	Operation clock			Supply current				Power supply	Memory			I/O port ^{*4}	Timer								SIO				Analog		Others		Form of delivery			
	EPD Driver seg (TP/BP)	High-speed [Hz] (Max.)	Low-speed [Hz] (Typ.)	Built-in oscillator [Hz] (Typ.)	Sleep [μA] (Typ.)	Halt [μA] (Typ.)	32kHz Operating [μA] (Typ.)	4MHz operating [μA] (Typ.)	Supply voltage [V]	Flash ROM [Byte]	Mask ROM [Byte]	RAM [Byte]		8-bit timer	16-bit timer	16bit-PWM timer	Stopwatch	Watchdog timer	Clock	Real-time clock	UART	SPI	I ² C master	I ² C slave	Remote controller transmission and reception	R/F converter (24-bit)	A/D converter	SVD ^{*1}	Multiplier/Divider	Temperature detection circuit	Package	Chip	
S1C17F50 series		[Medium and small segment EPD] The product also includes embedded features such as a real-time clock, theoretical regulation, a driver capable of wringing the maximum performance from segmented EPDs, and a temperature sensor. As a result, the device does not simply drive the display, but also corrects temperature effects that could harm display quality making it possible to maximize the characteristics of an e-paper display with a single chip.																															
S1C17F57	64 (2TP/2BP)	4.2M	32.768k	32k/500k/1M/2M	0.10	0.55	12	1,400	2.0 to 3.6	32K ^{*2}	–	2K	29	2	–	2	1	1	1	1	1	1	1	1	–	1	–	1	1	1	–	○ ^{*3}	

*1: SVD is an abbreviation for Supply Voltage Detector.

*2: During erasing / programming voltage in flash memory (V_{PP}) : The external applying of 7.0V / 7.5V (Typ.) is needed.

*3: Al pad, Au bump

*4: Including Input port and Output port.

MCUs

18

MCUs

19

global.epson.com/products_and_drivers/semicon/products/micro_controller/

On the Epson MCU website, you can access a variety of information required for device selection and design development.

Microcontrollers [Sales & Support](#)

General **4bit (Non Promotion)** **High Performance 4bit** **8bit (Non Promotion)** **16bit** **32bit (Non Promotion)** **ARM®**

4-bit to 32-bit low power microcontrollers

The technologies of low voltage operation and low power consumption acquired over the years through the development of 4-bit microcontrollers for watches and electronic shelf labels (ESL) are inherited by 16- and 32-bit microcontrollers today. The product lineup has been expanded, while achieving better throughputs. The display functions range from small-sized segment LDC drive to QVGA color display. A wide array of sensor interfaces recently attracting attention are also available. In addition to digital SIO such as SPI, UART, and I2C and the low power ADCs, the Epson original frequency conversion type ADC is capable of supporting measurements by resistance thermometer sensors and humidity sensors. A variety of these functions, low power technology and a highly efficient processor are all built into a single chip. With this one-chip solution, Epson continues to offer optimum products for small-sized battery-driven equipment, operation panel controllers, and sensor built-in healthcare products and housing equipment.

[if you want updated information by email](#)

[Parametric Search](#)

CPU Core Lineup

S1C17 Family 16-bit CPU

Latest Lineup

- S1C17W00 series Low voltage operation MCU
- S1C17M00 series Low power standard MCU
- S1C17F00 series EPD driver/controller builtin

Long-seller Lineup

- S1C17100 series Segment LCD driver builtin
- S1C17500 series Standard MCU
- S1C17600 series Segment LCD driver builtin
- S1C17700 series Dot matrix LCD driver builtin
- S1C17800 series LCD controller builtin
- S1C17900 series DSP builtin

S1C31 Family ARM® Cortex®-M0+

Latest Lineup

- S1C31W00 series LCD driver builtin
- S1C31D00 series LCD controller/Voice function

Product lineup

4bit (Non Promotion) **High Performance 4bit** **8bit (Non Promotion)**

16bit **32bit (Non Promotion)** **ARM®**

Related information

Document download **Partner information** **CPU core comparison table**

Maintenance item

Downloadable information

- Hardware Development Tool
- Software Development Tool
- Application Note
- Sample Program
- MP Support Tool

Microcontrollers Parametric Search

It's useful for your model selection of microcontrollers. You can download Data sheets, Technical manuals and Manual errata sheets.

Parametric Search [Sales & Support](#)

If you want to set detailed numerical values with each gauge, please fill in the input field on the right of the gauge.

[Setting](#) [Clear](#)

Products	Document Data sheet Manual Errata	CPU 16 ARM® Cortex®-M0+	Segment Max 120 Min 20	LCD Driver		LCD Controller Yes	Other Driver	High-speed [kHz] (Max.) Max 48 Min 0	Low-speed [Hz] (Typ.) 32,768	Operat
				segacom com 4 8 16 32						
S1C17W03	Data sheet Manual Errata	16	No	No	No	No	No	4.2	32,768k	
S1C17W03	Data sheet Manual Errata	16	No	No	No	No	No	4.2	32,768k	
S1C17W04	Data sheet Manual Errata	16	No	No	No	No	No	4.2	32,768k	
S1C17W04	Data sheet Manual Errata	16	No	No	No	No	No	4.2	32,768k	
S1C17W13	Data sheet Manual Errata	16	104	26x4	No	2	2	4.2	32,768k	
S1C17W13	Data sheet Manual Errata	16	72	18x4	No	2	-	32,768k		
S1C17W13	Data sheet Manual Errata	16	80	20x4	No	2	4.2	32,768k		
S1C17W14	Data sheet Manual Errata	16	400	54x4/50x8	No	No	4.2	32,768k		
S1C17W15	Data sheet Manual Errata	16	240	34x4/30x8	No	No	4.2	32,768k		
S1C17W15	Data sheet Manual Errata	16	224	32x4/28x8	No	No	4.2	32,768k		

Downloadable information

- Data sheets
- Technical manuals
- Manual errata sheets

Overall development environment

Things prepared by customers

*The screen is an integrated development environment
IAR Embedded Workbench for ARM manufactured by IAR Systems

Debug Probe

Supported products
- IAR Systems I-jet
- SEGGER J-LINK
etc.
*The picture is the "IAR Systems I-jet"

Integrated development environment

Supported products
- IAR Systems IAR Embedded Workbench for ARM
- ARM MDK-ARM
etc.

Offered from Epson

Bridge Board

Initial evaluation target board

Offered from Epson

Model-specific information tool and Flash loader for integrated development environment

Sample program

Configuration tool for factory ROM write

Offered from Epson

Bridge Board

Target board for product development

Development environments - S1C31 Family -

MCUs

Development support tool (Evaluation board)

- S1C31 chip built in
- Possible to evaluate the IC functions
- Provides a sample sources for various functions
- Debugging and Flash programming supported

Bridge Board

SVT31D01

SVT31W74

SVT13C00

SVT31D50

Evaluation board

Model Name	Product Name	Mounted Product Name	Remarks
Bridge Board	S5U1C31001L1	–	Connector conversion, Power supply generation for FLASH
SVT31D01	S5U1C31D01T1	S1C31D01	Color memory display, Acceleration gyro sensor, Pulse sensor, Bridge Board
SVT31W74	S5U1C31W74T1	S1C31W74	Dot matrix liquid crystal panel, Infrared LED, USB connector, Bridge Board
SVT31D50	S5U1C31D50T1	S1C31D50	AMP(class AB, class D), SPI-FLASH(8MB)
SVT13C00	S5U13C00K00C	S1D13C00	Color memory display, Bridge Board for connecting to Host CPU.

Outside tool inquiries

Integrated Development Environment, Debug Probe

IAR SYSTEMS

IAR Systems K.K.
www.iar.com/buy/contact/

MCUs

22

MCUs

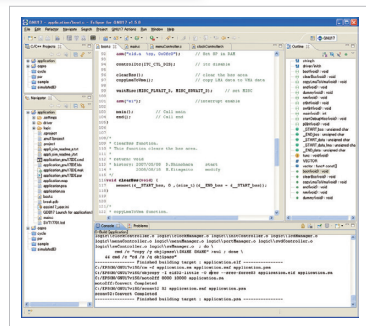
23

MCUs

Development environments - S1C17 Family -

GNU17 package

Optimized C compiler supporting 16MB space Assembler, linker and ANSI library GUI-based debugger Eclipse integrated environment



ICD mini

On-chip ICE, S1C17 Family products are supported. Connect with the target board with 4 pins at minimum (3 signal pins and 1 GND pin). Includes execution time measurement function. Uses USB bus power. Can be used as a single on-chip flash writer. *1 Can be used as a Multi Programmer. Includes firmware update function. Power supply function for target devices of 3.3V or 1.8V *2



Ver 1.0 to 2.0



Ver 3.0

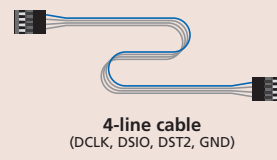
GNU17



USB cable



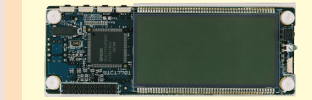
ICD mini (SSU1C17001H)



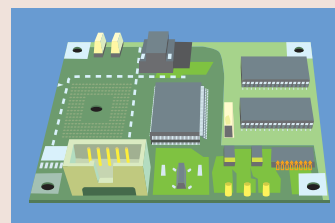
4-line cable (DCLK, DSIO, DST2, GND)

Starter / Beginner

S1C17 SVT board



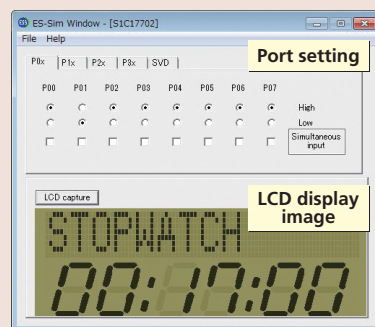
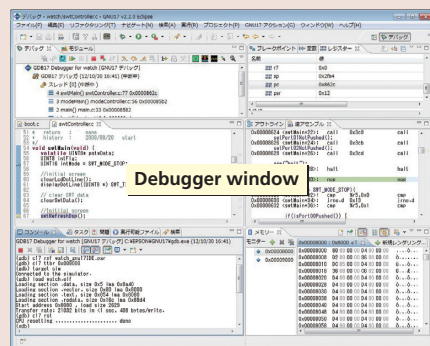
Initial evaluation target board



Target board for product development

*1: Installs it in hardware Ver2.0 or less. *2: Installs it in hardware Ver2.0. Up to each power supply and 100mA or less. Hardware Ver 3.0 is powered by 3.3 V alone.

Development support tool (Software simulator)



- Simulatable on PC including the LCD display, without using external debugging hardware (Custom-made LCD Panels can be created)
- Ability to show various data at the same time in multiple windows
- Ability to execute frequently using commands from the tool bar or menus
- Function of displaying C source, program code and symbols using disassembler
- Consecutive program execution and 3 types of step executions
- 3 types of break functions
- Trace and coverage functions
- Automatic command execution using command files

MCUs

Development environments - S1C17 Family -

Development support tool (Evaluation board)

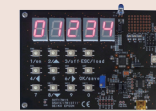
- S1C17 chip built in
- Possible to evaluate the IC functions
- Provides a sample software for various functions
- Debugging and Flash programming supported



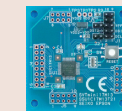
SVTmini17M10



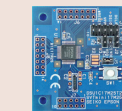
SVTmini17M11



SVT17M13



SVTmini17M13



SVTmini17M25



SVT17M33



SVTmini17M33



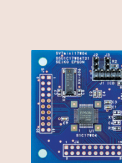
SVT17F57



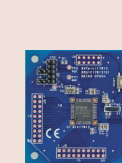
SVTmini17F57



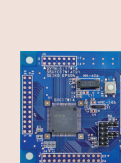
SVT17M01



SVTmini17W04



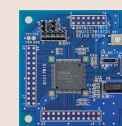
SVTmini17W13



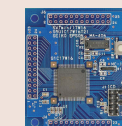
SVTmini17W14



SVT17W15



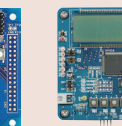
SVTmini17W15



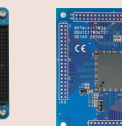
SVTmini17W16



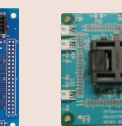
SVTmini17W18



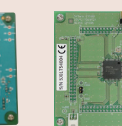
SVT17W23



SVTmini17W36



SVTmini17564



SVTmini17589



SVT17602



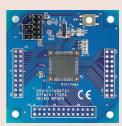
SVTmini17611



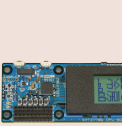
SVTmini17651



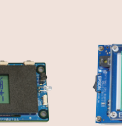
SVT17656



SVTmini17656



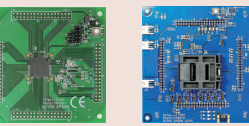
SVT17702



SVT17801



SVTmini17803

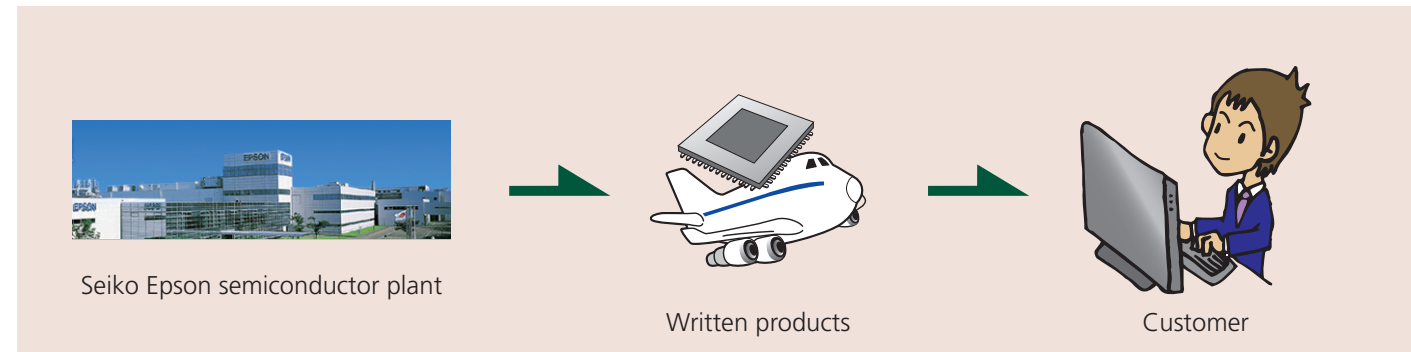


SVTmini17965

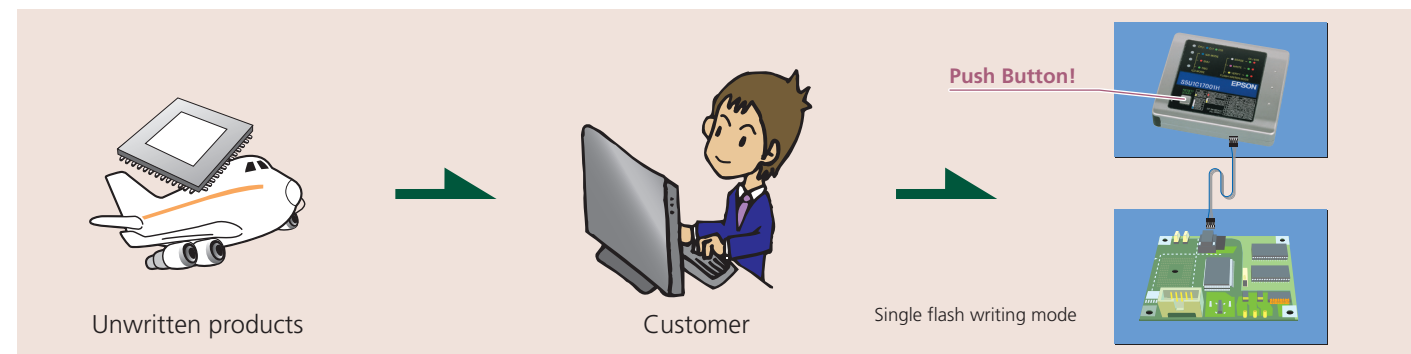
Model	Name	Product Name	Mounted Microcontroller Name	Remarks
SVT17F57		S5U1C17F57T11	S1C17F57	Segment EPD panel
SVTmini17F57		S5U1C17F57T21	S1C17F57	
SVT17M01		S5U1C17M01T11	S1C17M01	LCD panel, MR Sensor with EEPROM
SVTmini17M10		S5U1C17M10T21	S1C17M10	
SVTmini17M11		S5U7C17M11T21	S7C17M11	
SVT17M13		S5U1C17M13T11	S1C17M13	7 seg LED 5 digits, EEPROM, Infrared LED, Key matrix 3x4
SVTmini17M25		S5U1C17M25T21	S1C17M25	
SVT17M33		S5U1C17M33T11	S1C17M33	Reference board of remote controller
SVTmini17M33		S5U1C17M33T21	S1C17M33	
SVTmini17M13		S5U1C17M13T21	S1C17M13	
SVTmini17W04		S5U1C17W04T21	S1C17W04	
SVTmini17W13		S5U1C17W13T21	S1C17W13	
SVTmini17W14		S5U1C17W14T21	S1C17W14	
SVT17W15		S5U1C17W15T11	S1C17W15	JDI memory display panel, Piezoelectric buzzer
SVTmini17W15		S5U1C17W15T21	S1C17W15	
SVTmini17W16		S5U1C17W16T21	S1C17W16	
SVTmini17W18		S5U1C17W18T21	S1C17W18	
SVT17W23		S5U1C17W23T11	S1C17W23	LCD panel, Piezoelectric buzzer
SVTmini17W36		S5U1C17W36T21	S1C17W36	
SVTmini17564		S5U1C17564T21	S1C17564	
SVTmini17589		S5U1C17589T21	S1C17589	
SVT17602		S5U1C17602T11	S1C17602	LCD panel, Remote control transmitter and receiver, Thermal/Humidity/Illuminance sensor
SVTmini17611		S5U1C17611T21	S1C17611	
SVTmini17651		S5U1C17651T21	S1C17651	
SVT17656		S5U1C17656T11	S1C17656	LCD panel, Capacitive touch button, Piezoelectric buzzer
SVTmini17656		S5U1C17656T21	S1C17656	
SVT17702		S5U1C17702T11	S1C17702	LCD panel, Remote control transmitter and receiver
SVT17801		S5U1C17801T11	S1C17801	LCD module(QVGA), Touch Panel, Voice Input/Output, USB, Remote control transmitter and receiver, Various
SVTmini17803		S5U1C17803T21	S1C17803	
SVTmini17965		S5U1C17965T21	S1C17965	

MCUs Flash memory writing

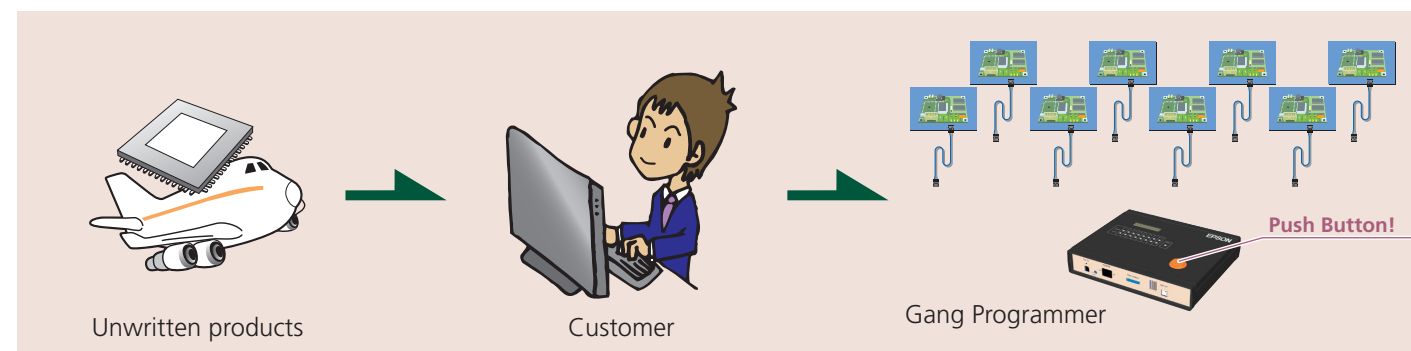
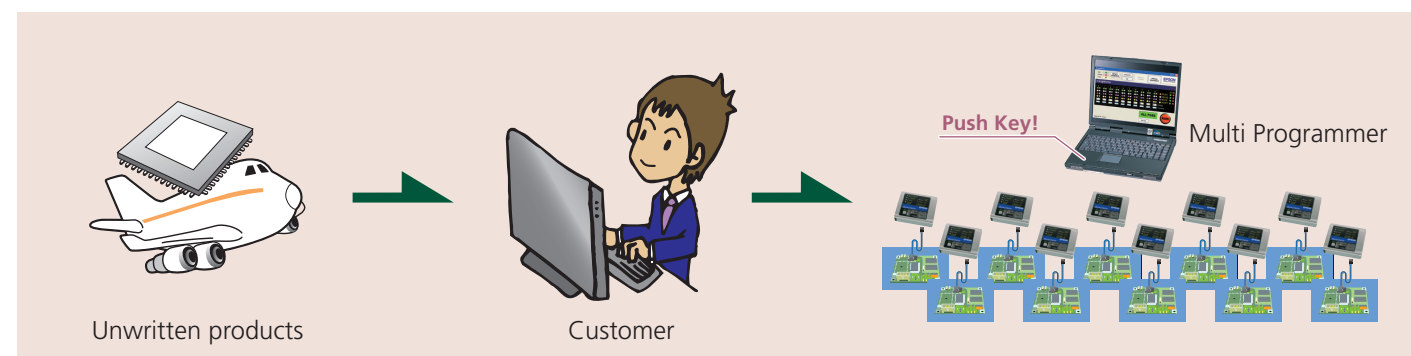
■ If you procure written products from a Seiko Epson dealer



■ If you write to flash memory on your side (Single writing)



■ If you write to flash memory on your side (Simultaneous multiple writing)



Flash memory writing MCUs

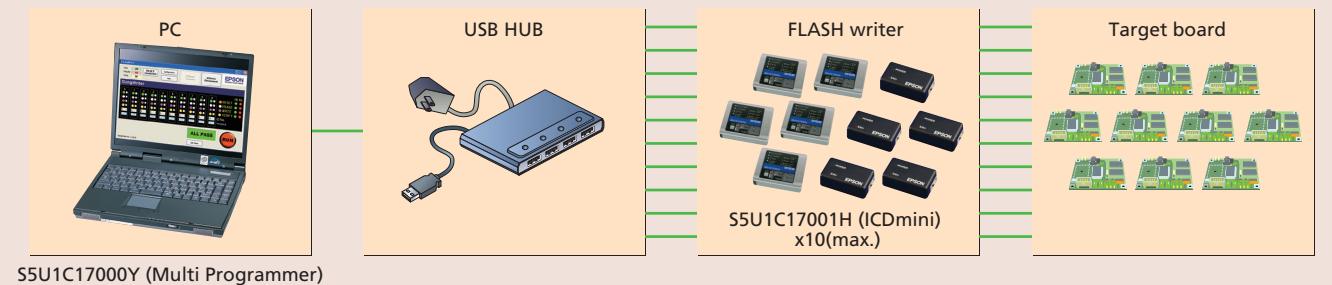
■ On-board writing tools and environments

Compatible models:S1C17 Family



- A single S5U1C17001H (ICDmini) unit operates as an on-chip flash writer. Simply by pressing a button, user data previously saved in the ICDmini can be written to the internal flash ROM on the target board, or the flash ROM connected to the external bus.
- You can enjoy on-board programming easily at any location where a 5V power supply is available.
- * Power supply to the target board is required separately.
- * The product does not include the target board, and AC adapter or battery box to supply power to USB terminals.

Compatible models:S1C17 Family



- Up to 10 units of the S5U1C17001H (ICDmini) can be used to construct an environment enabling user data to be downloaded simultaneously to multiple targets.
- The S5U1C17000Y, Multi Programmer software that controls the ICDmini, provides user-friendly screen and simple operation.
- * Power supply to the target board is required separately.
- * The product does not include the target board, PC and the USB hub operating on self-power.

Compatible models:S1C17 Family



- A single S5U1C1700W unit downloads user data simultaneously to maximum 8 targets.
- SD card is used to input user data, and the operating status can be checked by LCD, LED and buzzer.
- A serial number writing function is also built-in.

■ QFP & TQFP & SQFN

PKG type/Pin count	Body size (mm)	Lead pitch (mm)
SQFN4-24	4 X 4 X 1.0	0.5
SQFN5-32	5 X 5 X 1.0	0.5
TQFP12-32	7 X 7 X 1.2	0.8
QFP12-48	7 X 7 X 1.7	0.5
SQFN7-48	7 X 7 X 1.0	0.5
TQFP12-48	7 X 7 X 1.2	0.5
SQFN9-64	9 X 9 X 1.0	0.5
TQFP12-64	7 X 7 X 1.2	0.4
QFP13-64	10 X 10 X 1.7	0.5
TQFP13-64	10 X 10 X 1.2	0.5
TQFP14-80	12 X 12 X 1.2	0.5
QFP14-80	12 X 12 X 1.7	0.5

PKG type/Pin count	Body size (mm)	Lead pitch (mm)
QFP15-100 / H4QFP15-100	14 X 14 X 1.7	0.5
TQFP14-100	12 X 12 X 1.2	0.4
QFP15-128	14 X 14 X 1.7	0.4
TQFP15-128	14 X 14 X 1.2	0.4
QFP20-144	20 X 20 X 1.7	0.5
QFP21-176	24 X 24 X 1.7	0.5
QFP21-216	24 X 24 X 1.7	0.4

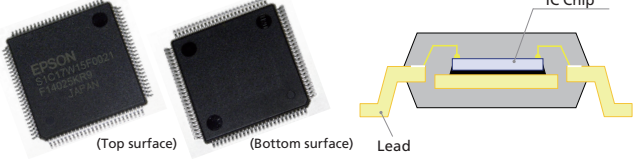
■ WCSP

PKG type/Pin count	Body size (mm)	Ball pitch (mm)
WCSP-48 (S1C17955)	3.9 X 3.9 X 0.9	0.5
WCSP-96 (S1C31D01)	4.5 X 4.5 X 0.7	0.4

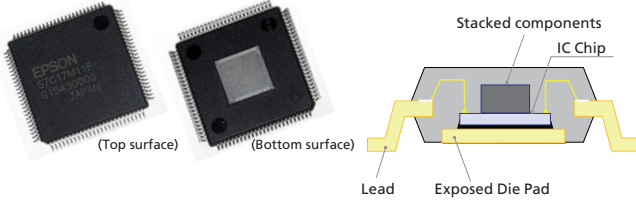
■ Compact BGA (PFBGA) & Thin type BGA (VFBGA)

PKG type/Pin count	Body size (mm)	Ball pitch (mm)
PFBGA5U-60	5 X 5 X 1.2	0.5
VFBGA5H-81	5 X 5 X 1.0	0.5
VFBGA10H-180	10 X 10 X 1.0	0.65
VFBGA8H-181	8 X 8 X 1.0	0.5
VFBGA10H-240	10 X 10 X 1.0	0.5

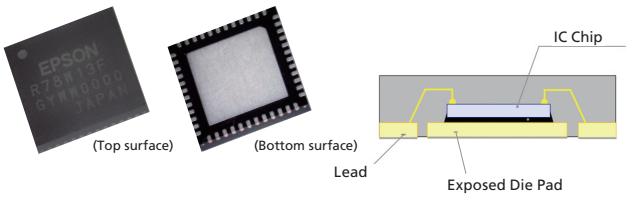
QFP



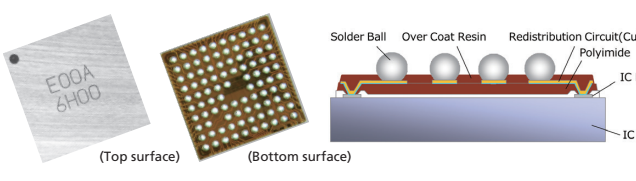
H4QFP (QFP with exposed die pad)



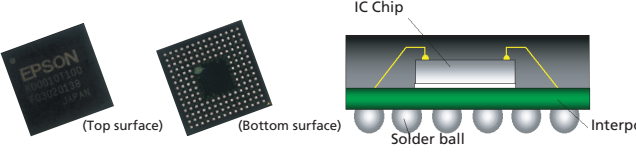
SQFN



WCSP



Thin type BGA (VFBGA)



The content of this document is subject to change without notice.

1. This document may not be copied, reproduced, or used for any other purpose, in whole or in part, without the consent of Seiko Epson Corporation ("Epson").
2. Before purchasing or using Epson products, check with our sales representative for the latest information. Always consult Epson's web site or other sources for the latest information.
3. Information provided in this document concerning application circuits, programs, usage, etc., are for reference only. Epson makes no guarantees against any infringements of or damages to a third party intellectual property rights or any other rights resulting from the information. Epson does not give any licenses to use the intellectual property rights or any other rights of a third party or Epson under this document.
4. Epson is committed to constantly improving quality and reliability, but semiconductor products in general are subject to malfunction and failure. Customers using Epson products assume responsibility for ensuring that their hardware, software, and systems are designed with essential safety to ensure that any malfunction or failure of Epson products would not cause harm to life or health or cause damage to property. During design of the customers' products using Epson products, check the latest information of Epson products (in this document, specifications, data sheets, manuals, Epson's web site, etc.) and comply with the latest information. If using information from technical content, programs, algorithms, examples of application circuits, or other information indicated in product data, schematics, tables, etc., from the above materials, etc., the customers should evaluate their own individual products and overall systems thoroughly and decide whether to use Epson products with the products and systems at their own responsibility.
5. Epson has prepared this document carefully and accurately as much as possible, but Epson does not guarantee that the information presented herein is error-free. Epson assumes no responsibility for any damages caused by the customers resulting from information errors in this document.
6. No dismantling, analysis, reverse engineering, modification, alteration, adaptation, reproduction, etc., of Epson products is allowed.
7. Epson products are intended for use in general applications (office equipment, communications equipment, measuring instruments, home electronics, etc.) and applications individually listed in this document. Our products are not intended for use in the applications specified below where particular quality or reliability is required or where a malfunction or failure could cause harm to life or health or serious damage to property or have a serious impact on society. Customers wishing to use our products in any of the following specified applications (other than applications individually listed in this document) should contact our sales representative in advance.
 - Space equipment (artificial satellites, rockets, etc.)
 - Transportation vehicles and their control equipment (automobiles, aircraft, trains, ships, etc.)
 - Medical equipment intended for maintaining life
 - Relay equipment to be placed on sea floor
 - Power station control equipment
 - Disaster or crime prevention equipment
 - Traffic control equipment
 - Financial equipment
 - Other applications requiring similar levels of reliability as the above
8. Epson products listed in this document and their associated technologies may not be used in equipment or systems that are prohibited to manufacture, use or sell under the laws, regulations, or rules in Japan or any other countries. Furthermore, Epson products and their associated technologies may not be used for the development, etc., of weapons of mass destruction, for military uses, or other military applications. If exporting Epson products or their associated technologies, be sure to comply with the Foreign Exchange and Foreign Trade Control Act in Japan and other export-related laws and ordinances in Japan and any other countries and follow the required procedures as provided by the relevant laws and ordinances.
9. Epson assumes no responsibility if our products are used in violation of conditions listed in this document and such use results in damage.
10. Epson assumes no responsibility if customers transfer, loan, etc., our products to a third party and these results in damage.
11. For more details or other concerns about this document, contact our sales representative.
12. Company names and product names listed in this document are trademarks or registered trademarks of their respective companies.

©Seiko Epson Corporation 2019

[Registered trademarks, trademarks, and company names]

Design Compiler® : Synopsys Inc. in U.S.A.
 NC-Verilog® : Cadence Design Systems Inc. in U.S.A.
 Compact Flash® : Western Digital Technologies Inc. in U.S.A.
 ARM® and Cortex® are the registered trademarks of ARM Limited in the EU and other countries.
 SuperFlash® Technology : SST UK Ltd. in U.K.

Other brand names and product names are trademarks or registered trademarks of their respective owners.