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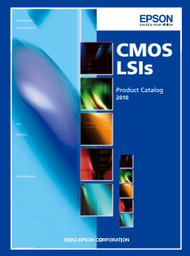

AMERICA

EPSON ELECTRONICS AMERICA, INC.
2580 Orchard Parkway, San Jose, CA 95131, USA
Phone: +1-800-228-3964 FAX: +1-408-922-0238

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.
7F, Jinbao Bldg., No.89 Jinbao St., Dongcheng District,
Beijing 100005, CHINA
Phone: +86-10-8522-1199 FAX: +86-10-8522-1125

SHANGHAI BRANCH
7F, Block B, Hi-Tech Bldg., 900 Yishan Road, Shanghai 200233, CHINA
Phone: +86-21-5423-5577 FAX: +86-21-5423-4677

SHENZHEN BRANCH
12F, Dawning Mansion, Keji South 12th Road, Hi-Tech Park, Shenzhen
518057, CHINA
Phone: +86-755-2699-3828 FAX: +86-755-2699-3838

EPSON HONG KONG LTD.
20/F, Harbour Centre, 25 Harbour Road, Wanchai, Hong Kong
Phone: +852-2585-4600 FAX: +852-2827-4346
Telex: 65542 EPSCO HX

EPSON TAIWAN TECHNOLOGY & TRADING LTD.
14F, No. 7, Song Ren Road, Taipei 110, TAIWAN
Phone: +886-2-8786-6688 FAX: +886-2-8786-6660

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
50F, 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.
SEMICONDUCTOR OPERATIONS DIVISION

IC Sales Dept.
IC International Sales Group
421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-42-587-5814 FAX: +81-42-587-5117

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Microcontrollers

4-bit / 8-bit / 16-bit / 32-bit

2010

SEIKO EPSON CORPORATION

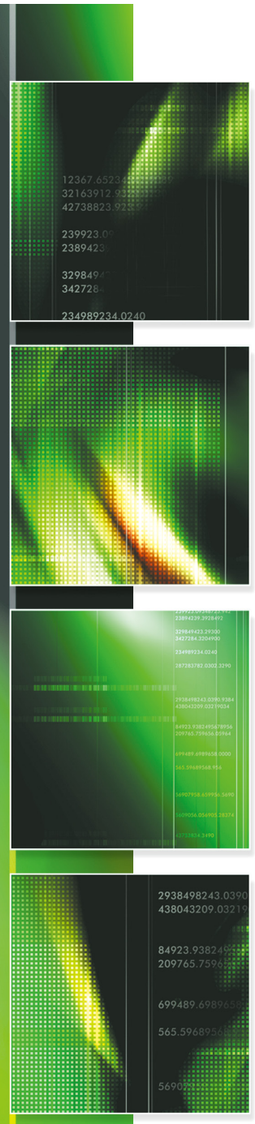
+less design

Our goal in the Epson Semiconductor Operations Division is to be a true partner for you, by looking to give you an edge in product development through our concept of “+ less design”.

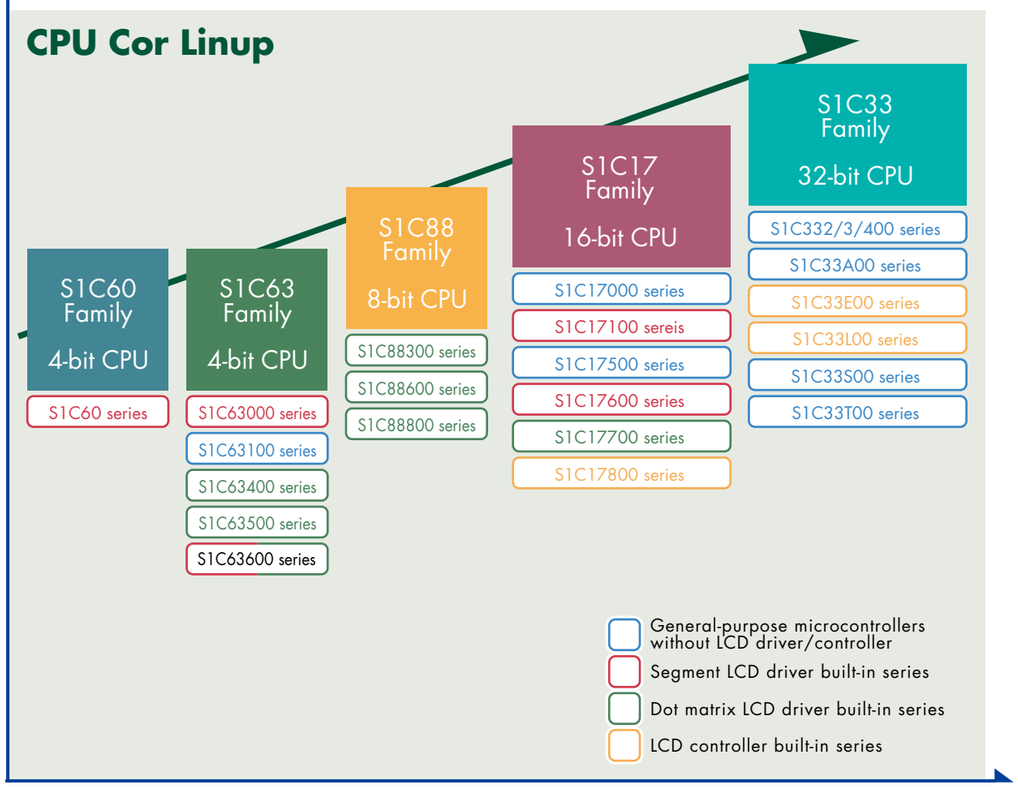
Microcontroller Products

The market for semiconductors is rapidly expanding with the fast emergence of a ubiquitous network society. A variety of mobile devices - mobile phones, information terminals, car electronics and intelligent home appliances - all require semiconductors. There seems to be no limit to the demand for more functions and better performance. Thin, lightweight, low-power devices that operate for extended periods on a single charge are in demand. In addition, devices with these features are expected to have shorter time to market. Never before has the development of new products been so challenging.

We have been focusing on the creation of compact, low-power semiconductors since we started the development of a CMOS LSI for watches in 1969.
Since then, we have steadily built up our expertise in power-saving, spacesaving, and time-saving designs. This has enabled us to quickly obtain the new era of ubiquitous network. Epson has the unique technology and a passion for excellence that enable it to deliver the high added-value solutions that you need.
Our unique range of technologies and passion for excellence enables us to provide high value added solutions that fully meet your demands. The concept is “+ less design”. Our goal is to be a true partner for you, by looking to give you an edge in product development through our concept of “+ less design”.



CPU Cor Linup



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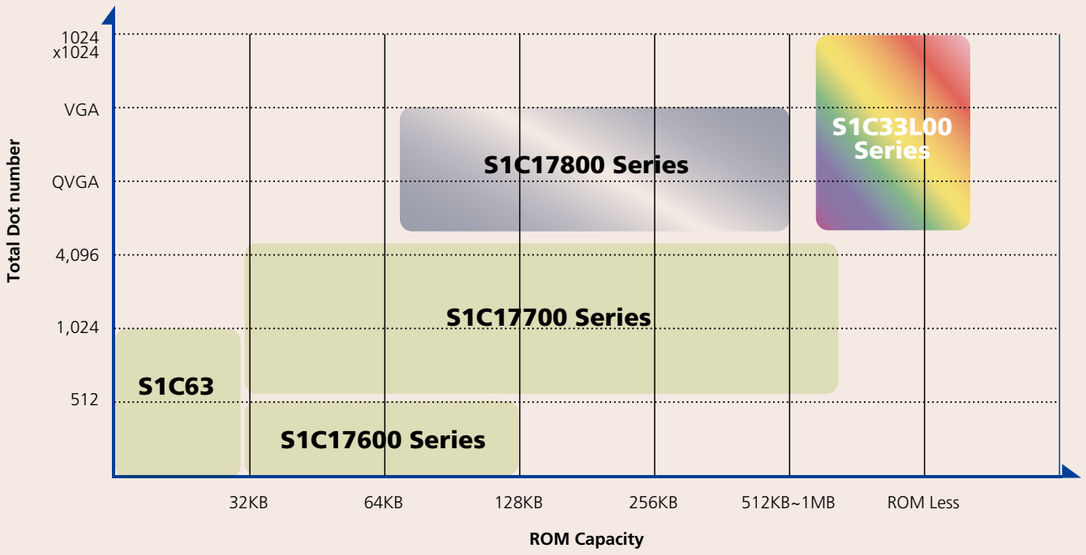
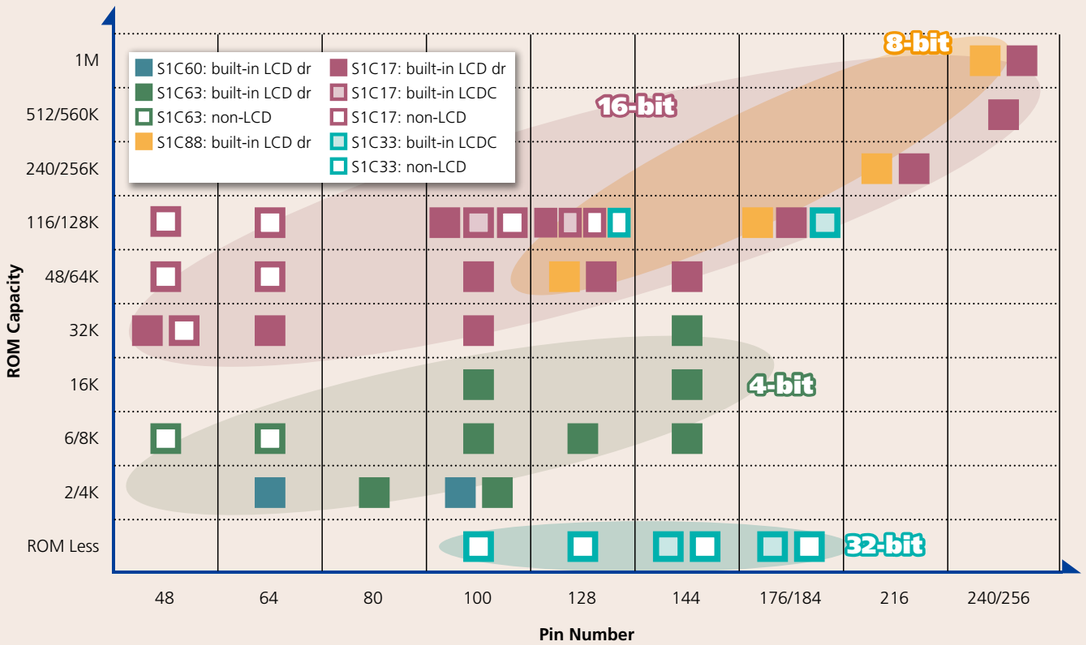
Deployment of Epson microcontroller products

Allowing for display control of a wide range of small- to large-sized panels



Providing package types suitable for a range of applications

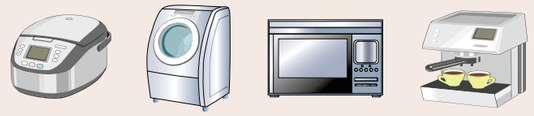


Epson microcontroller application examples

For home appliances

Rice cookers, washing machines, microwave ovens, coffee machines, etc.

The built-in LCD controller provides different types of displays from monochrome to full color up to the STN/TFT VGA class. Features such as touch panel, dial input, and audio guidance can be realized, greatly improving the user interface of your products.



■ Suitable models : S1C33E00/S1C33L00 series and S1C17800 series

For portable devices

Mobile phones, handheld gaming devices, electronic dictionaries, portable information devices, etc.

Different types of displays are provided by the LCD driver that supports monochrome dot matrix displays, or the built-in LCD controller that supports monochrome to full color displays up to the STN/TFT VGA class. Optimum for portable devices that draw low levels of power allowing for extended battery life.

■ Suitable models : S1C17000/S1C17100/S1C17600/S1C17700/S1C17800 series, S1C33E00/S1C33L00 series, S1C63100/600 series, and S1C60 series.

For healthcare devices

Clinical thermometers, blood pressure meters, pedometers, body composition meters, blood glucose meters, etc

The LCD driver that supports segments or dot-matrix displays, and the internal voltage regulator circuit provide various resolutions of “user-friendly displays” that are not affected by the reduced battery voltage levels. Various sensor interfaces enable the device to connect with different types of sensors. Low power consumption feature provides extended battery life.

■ Suitable models : S1C17100/S1C17600/S1C17700 series and S1C63000/S1C63100/S1C63600 series.

For remote control devices

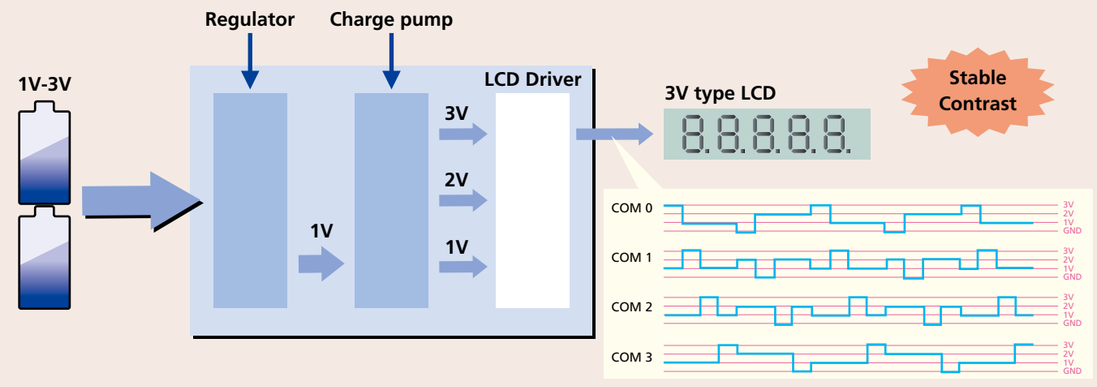
Air conditioners, TV sets, audio devices, lavatories with spray functions, multifunctional remote controllers, wall type remote controllers, etc.

The LCD driver that supports segments or dot-matrix displays, and the internal voltage regulator circuit provide various resolutions of “user-friendly displays” that are not affected by reduced battery voltage levels. The remote control circuit can easily generate carrier signals and provides remote control functions with a small number of part items. Low power consumption feature contributes to extended battery life.

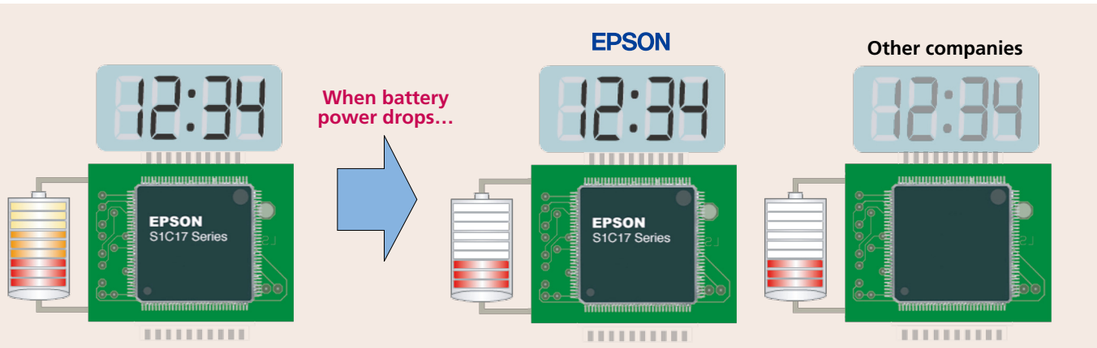
■ Suitable models : S1C17000/S1C17100/S1C17500/S1C17600/S1C17700/S1C17800 series and S1C88800 series

Internal voltage regulator circuit provides a display quality unaffected by battery power level *1

Built-in power supply circuit



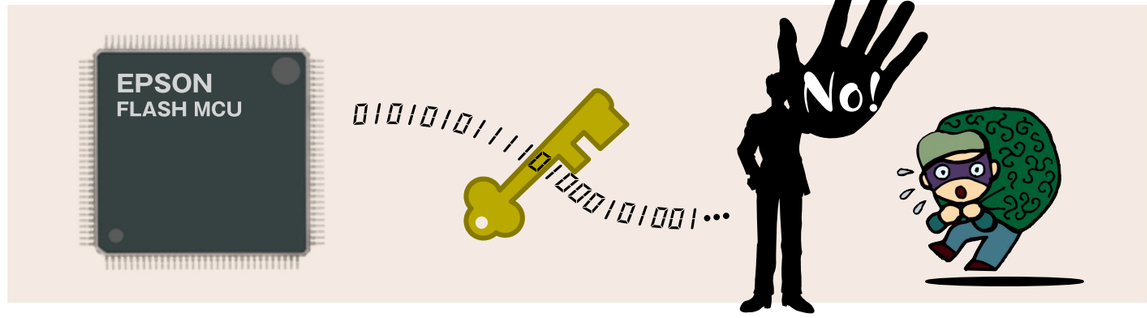
Epson microcontrollers include the voltage regulator circuit. With the built-in regulator, the microcontroller generates sufficient voltage to drive its circuit internally, so that it can maintain a high quality display unaffected by battery power levels. Because the high quality can be maintained without an external regulator, the built-in regulator helps reduce the number of parts, and thereby total cost. Another feature of the Epson microcontroller is that low power consumption can be maintained even with the internal regulator.



Even when battery power level drops, the contrast level is not affected. The same level of display quality as that of a new machine can be maintained until battery power has been completely consumed.
The battery power level is detected by the Supply Voltage Detector (SVD) circuit, so you do not have to be concerned about the level during operation.*2
In addition, a software-based function is included that allows the user to finely adjust contrast. You can use this function to match voltage with liquid crystal panel. Also, a contrast adjustment function can be added to your products.

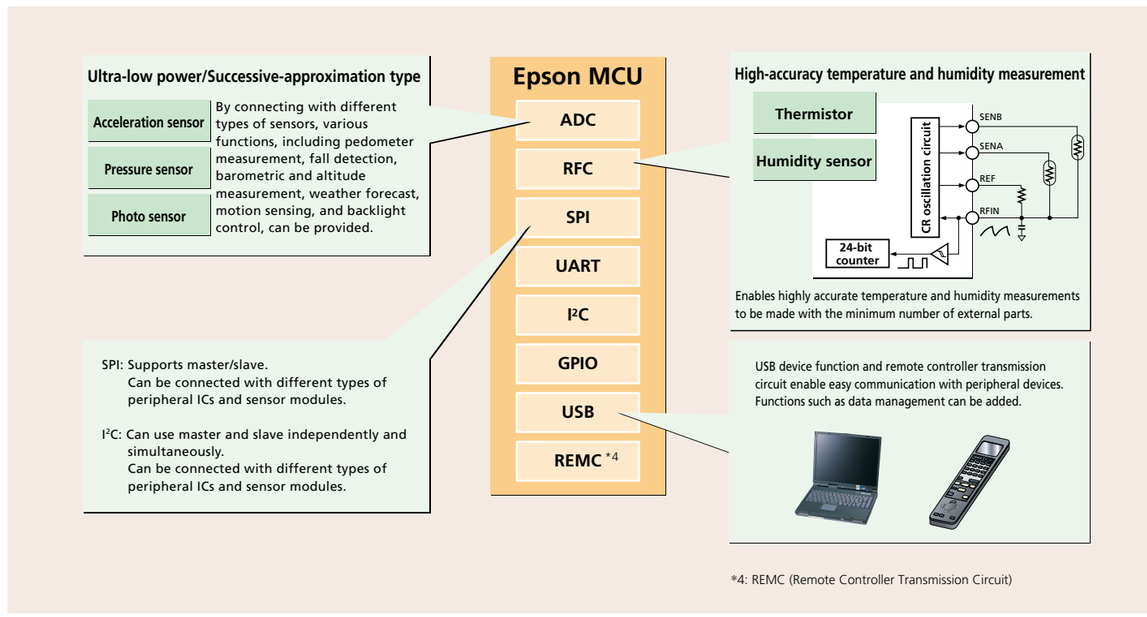
*1: This feature is provided for models containing an LCD driver.
*2: For models that support this feature, see the outline of each product.

Protect functions guard software assets *3



Write protect and data read protect functions are provided to guard the content of internal flash memory.
Your precious software assets are protected by disabling data to be read and written from/to the flash memory.

A large number of different types of interfaces are included



*4: REMC (Remote Controller Transmission Circuit)

*3: S1C33240/S1C17801/S1C17803 are excluded.

S1C33 Family Overview

S1C33 Family are Epson original 32-bit microcontrollers.
The products are equipped with abundant built-in peripherals including highly functional DMA, multi-channel SIO, programmable timer, PLL and prescaler as basic functions.
In addition to the basic functions, the products provide a highly cost-effective 32-bit microcontrollers for specified applications that require many multi-purpose ports, powerful PWM timer/counter, various serial interfaces including USB controllers, ADC and LCD display.
Because of their high-speed operation and extreme low power consumption, S1C33 Family products are suitable for applications such as printers and other OA equipment, electronic dictionaries, multi-functional remote controllers, and mobile devices including toys.

◆ Features of S1C33 RISC CPU

- ■ Includes the instruction set optimized for C language.
- ■ Supports memory space up to 64M bytes
- ■ Includes lower-power instructions (Halt and Sleep).

◆ Includes LCD controller

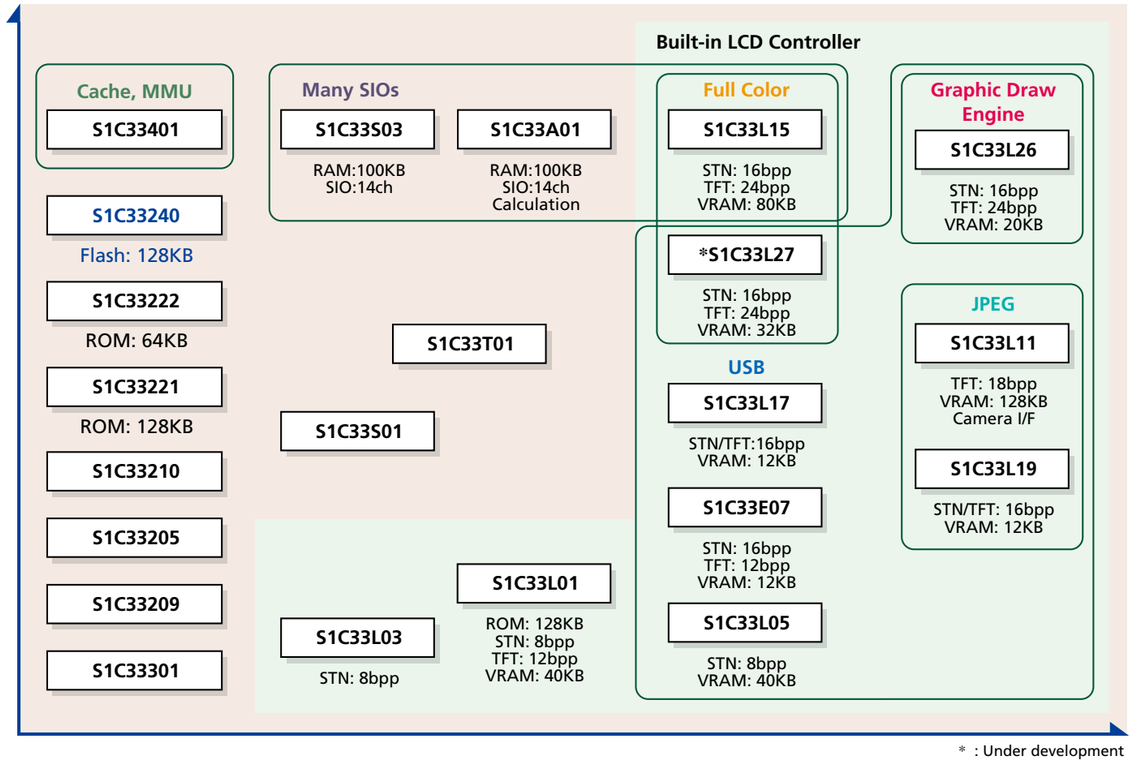
- ■ Integrates microcontroller and LCD controller onto a single chip.
  - ⇒ Reduces mounting area
  - ⇒ Reduces power consumption
  - ⇒ Reduces connection test operation and failure detection rate

◆ Enriched communication interfaces

- ■ Many models include USB and memory card interfaces.
- ■ Supports various serial interfaces (SIO, UART, SPI, I²C, etc.)

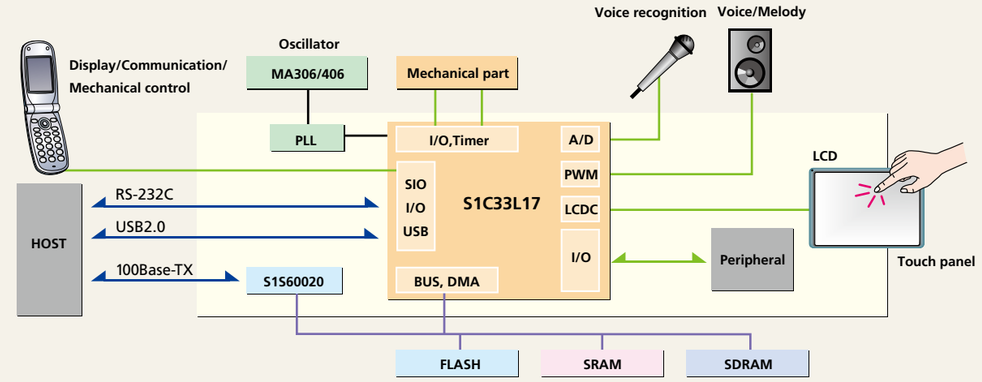
◆ Low power consumption

- ■ Low power consumption with the CPU clock gear function

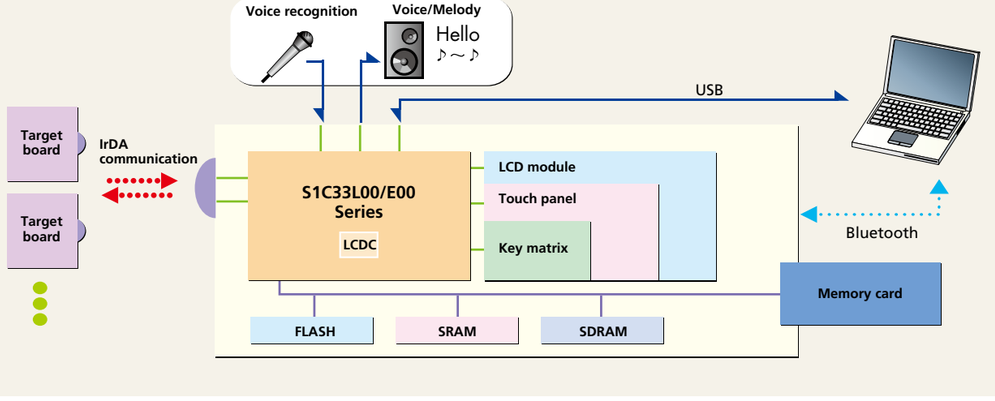


＊ : Under development

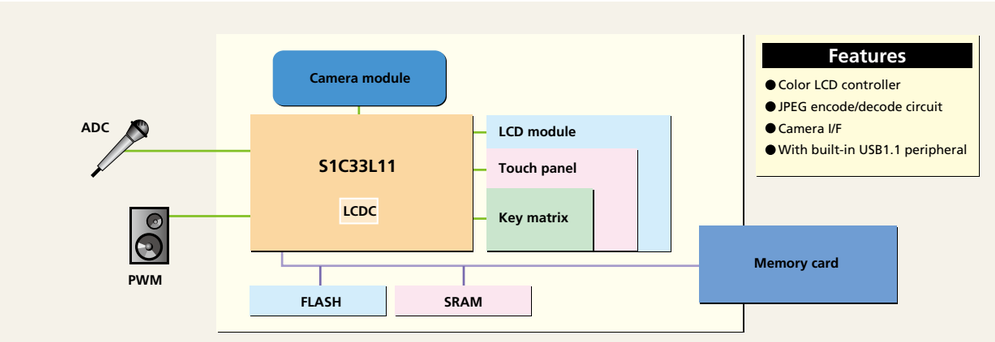
■ Example of an application using the S1C33L17: Multi monitor



■ Example of an application using the S1C33L00/E00 Series: Multifunctional remote controller



■ Example of an application using the S1C33L11: Portable device with built-in camera



S1C33 Family 32-bit microcontrollers MCUs

S1C33 Family 32-bit microcontrollers

S1C33 Family Products overview

Products	CPU Core			Display		Clock frequency		Supply current			Supply voltage				Memory					I/O			Timer					SIO							A/D converter 10-bit	DMA		USB	SRAMC	SDRAMC	NAND flash C (SLC)	NAND flash C (MLC)	JPEG	Form of delivery		Remarks
	STD	PE	ADV	LCD Controller STN/CSTN (bpp)	LCD Controller TFT (bpp)	High-speed [Hz] (Max.)	Low-speed [Hz] (Max.)	Sleep [A] (Typ.)	Halt [A] (Typ.)	Operating [A] (Typ.)	Core [V]	I/O [V] When in unuse of USB	I/O [V] When in use of USB	External bus interface	FLASH [Byte]	ROM [Byte]	RAM [Byte]	VRAM [Byte]		Input port	Output port	I/O port	8-bit	16-bit	PWM	Watchdog timer	Real-time clock	Clock synchronous	UART	SPI	I²C (DCSIO)	I²S	Remote control circuit			HSDMA	IDMA							Package	Chip	
S1C33L00/E00 series	The 32-bit RISC microcontroller has the built-in LCD controller and can greatly contribute to the compact instrumentation design and reduced power consumption in the IC dictionary, PDA and other portable display applications.																																											
S1C33L01	○	–	–	8	12	50M 50M 20M	32.768k	1µ	30m (50MHz) 7m (20MHz)	60m (50MHz) 12m (20MHz)	2.7 to 3.6 2.7 to 3.6 1.8 to 2.2	4.5 to 5.5 2.7 to 3.6 1.8 to 2.2	–	–	–	128K	8K	40K		13	–	29	4	6		○	–	2	–	–	–	–	8	4	128	–	○	–	–	–	–	QFP21-176	–	
S1C33L03	○	–	–	8	–	50M 50M 20M	32.768k	1µ	30m (50MHz) 7m (20MHz)	65m (50MHz) 14m (20MHz)	2.7 to 3.6 2.7 to 3.6 1.8 to 2.2	4.5 to 5.5 2.7 to 3.6 1.8 to 2.2	–	–	–	–	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	○	–	–	–	QFP20-144	○	
S1C33L05	○	–	–	8	–	48M	32.768k	1µ	10m (48MHz)	23m (48MHz) *2	1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	16K	40K		13	–	70 *5	6	6		○	–	5	–	–	–	–	5	4	128	FS1.1	○	○	○	–	–	QFP21-176	○	
S1C33L11	○	–	–	–	18	50M	32.768k	4µ	13m (50MHz)	28m (50MHz) *3	1.65 to 1.95	2.7 to 3.3	3.0 to 3.6	–	–	–	16K	128K		13	–	47 *5	6	6		○	–	5	–	–	–	–	8	4	128	FS1.1	○	–	–	–	○	PFBGA12U-208	–	Camera I/F
S1C33L15	–	○	–	16	24	90M	32.768k	1µ	3.5m (48MHz)	103.5m (90MHz)	1.65 to 1.95	2.7 to 3.6	–	2.3 to 3.6	–	–	20K	80K		–	–	96 *5/8	4	4		○	○	6	4	4 *7	2	○	–	2	14	–	○	○	○	○	–	QFP20-184 PFBGA12U-180	○	
S1C33L17	–	○	–	16	16	66M	32.768k	1µ	6.3m (66MHz)	30m (66MHz)	1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	10K	12K		5	–	86 *5/8	–	4		○	○	3	1	–	2	–	5	4	128	FS2.0	○	○	○	○	–	TQFP24-144 PFBGA12U-180	○	
S1C33L19	–	○	–	16	16	66M	32.768k	1µ	3.2m (48MHz)	22m (48MHz)	1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	10K	12K		5	–	86 *5/8	–	4		○	○	3	1	–	2	–	5	4	128	FS2.0	○	○	○	○	○	TQFP24-144 PFBGA12U-180	○	
S1C33L26	–	○	–	16	24	60M	32.768k	1.6µ	4.2m (48MHz)	22m (48MHz)	1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	12K	20K		6	–	71 *5/8	8	2	1	○	○	2 2 *1			1	○	6	–	8	FS2.0	○	○	○	○	–	TQFP15-128 TQFP24-144 PFBGA12U-180	○	Hardware drawing function
S1C33L27	–	○	–	16	24	60M	32.768k	TBD			1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	22.5K	32K		8	–	95 *5/8	6	4	2	○	○	1 4 *1	1		2	○	8	–	8	FS2.0	○	○	○	○	–	TQFP15-128 TQFP24-144 QFP20-144 PFBGA12U-180	○	LCD Dr DMA functions
S1C33E07	–	○	–	16	12	60M	32.768k	1µ	4m (60MHz)	23.5m (60MHz) *4	1.65 to 1.95	2.7 to 3.6	3.0 to 3.6	–	–	–	10K	12K		5	–	86 *5/8	–	6		○	○	3	1	1 *7	1	–	5	4	128	FS2.0	○	○	○	–	–	TQFP24-144 PFBGA12U-180	○	
S1C33200/300/400 series	The S1C33209 and other generic series devices. This series, which has various peripheral functions and low current consumption as features, is used in a wide range of fields such as portable terminals or TOY.																																											
S1C33401	–	–	○	–	–	66M	32.768k	5µ	20m (66MHz)	36m (66MHz)	1.65 to 1.95	2.7 to 3.6	–	–	–	–	33K/ 8K (cache)	–		–	–	71 *5/8	6	10		○	○	4	–	–	–	–	8	4	128	–	○	–	–	–	–	PFBGA10U-160 QFP20-184	–	Cache, MMU
S1C33301	○	–	–	–	–	50M	32.768k	1µ	10m (50MHz)	22m (50MHz)	1.65 to 1.95	2.7 to 3.6	–	–	–	–	8K	–		13	–	47 *5/8	6	6		○	–	5	–	–	–	–	8	4	128	–	○	–	–	–	–	PFBGA10U-121 QFP15-128	–	High-speed SIO
S1C33209	○	–	–	–	–	60M	32.768k	1µ	30m (50MHz) 7m (20MHz)	60m (50MHz) 12m (20MHz)	2.7 to 3.6 2.7 to 3.6 1.8 to 2.2	4.5 to 5.5 2.7 to 3.6 1.8 to 2.2	–	–	–	–	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	–	–	–	–	QFP15-128	–	
S1C33205	○	–	–	–	–	50M	32.768k	1µ	29m (50MHz)	65m (50MHz)	1.8 to 3.6	1.8 to 5.5	–	–	–	–	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	○	–	–	–	QFP15-128	○	
S1C33222	○	–	–	–	–	50M	32.768k	1µ	30m (50MHz) 7m (20MHz)	60m (50MHz) 12m (20MHz)	2.7 to 3.6 2.7 to 3.6 1.8 to 2.2	4.5 to 5.5 2.7 to 3.6 1.8 to 2.2	–	–	–	64K	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	–	–	–	–	QFP15-128	–	S1C33209 MaskROM model
S1C33221	○	–	–	–	–	50M	32.768k	1µ	30m (50MHz) 7m (20MHz)	60m (50MHz) 12m (20MHz)	2.7 to 3.6 2.7 to 3.6 1.8 to 2.2	4.5 to 5.5 2.7 to 3.6 1.8 to 2.2	–	–	–	128K	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	–	–	–	–	QFP15-128	–	S1C33209 MaskROM model
S1C33240	○	–	–	–	–	50M	32.768k	5µ	43m (50MHz)	85m (50MHz)	2.7 to 3.6	2.7 to 5.5	–	–	128K *6	–	8K	–		13	–	29	6	6		○	–	4	–	–	–	–	8	4	128	–	○	–	–	–	–	QFP15-128 PFBGA10U-160	–	S1C33209 FlashROM model
S1C33210	○	–	–	–	–	50M	32.768k	1µ	37m (50MHz)	64m (50MHz)	2.7 to 3.6	2.7 to 3.6	–	–	–	–	8K	–		7	–	27	6	6		○	–	4	–	–	–	–	4	4	128	–	○	–	–	–	–	QFP15-128	–	Bridge IC for communication terminal
S1C33T00/S00/A00 series	S1C33T00 series: Provides the reinforced pheripheral functions such as I/O ports, internal timers, I²C buses, and the number of interrupts. S1C33S00 series: The model for amusement equipment. S1C33A00 series: The model that integrates the arithmetic operation accelerator and has the enhanced audio functions.																																											
S1C33T01	○	–	–	–	–	60M 20M	32.768k	1µ	30m (50MHz)	65m (50MHz)	2.7 to 3.6 1.8 to 2.2	2.7 to 5.5	–	–	–	–	8K	–		13	–	69	6	10		○	–	4	–	2	–	–	8	4	128	–	–	–	–	–	–	QFP21-176	–	Enhanced peripheral model
S1C33S01	○	–	–	–	–	50M	32.768k	1µ	20m (50MHz)	49m (50MHz)	1.8 to 3.6		–	–	–	–	8K	–		–	–	29	4	6		○	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	QFP15-100	–	S1C33209 Low power consumption
S1C33S03	–	○	–	–	–	90M	32.768k	1µ	3.5m (48MHz)	103.5m (90MHz)	1.65 to 1.95	2.7 to 3.6	–	2.3 to 3.6	–	–	100K	–		–	–	96 *5/8	4	4		○	○	6	4	4 *7	–	–	–	2	14	–	–	○	○	○	–	TQFP24-144 QFP20-184 PFBGA12U-180	–	Graphic LSI Dedicated buses
S1C33A01	–	○	–	–	–	90M	32.768k	1µ	3.5m (48MHz)	103.5m (90MHz)	1.65 to 1.95	2.7 to 3.6	–	2.3 to 3.6	–	–	100K	–		–	–	96 *5/8	4	4		○	○	6	4	4 *7	2	○	–	2	14	–	–	○	○	○	–	TQFP24-144 QFP20-184 PFBGA12U-180	–	External LSI dedicated bus Arithmetic accelerator

____: Under development

*1: Universal serial interface (Any of UART, SPI and I²C functions can be selected.) *2: At the time of LCD use: +1mA (Typ.), At the time of USB use+7.3mA (Typ.)
*3: camera + at the time of use LCD Interface: +12mA (Typ.), camera + LCD Interface + at the time of use JPEG: +46mA (Typ.), at the time of use USB: +7mA (Typ.)
*4: At the time of SRAM use: +3.4mA, At the time of SDRAM use: +5.4mA, At the time of DMA use: +3.9mA, At the time of LCD controller use: +5.3mA, At the time of USB use: +10mA
*5: In common with the bus line. *6: This product uses the SuperFlash® technologies under license from Silicon Storage Technology, Inc.
*7: Each channel consists of two single line bidirectional serial buses. *8: This specification varies depending on the type of package.

S1C17 Family 16-bit microcontrollers

S1C17 Family Overview

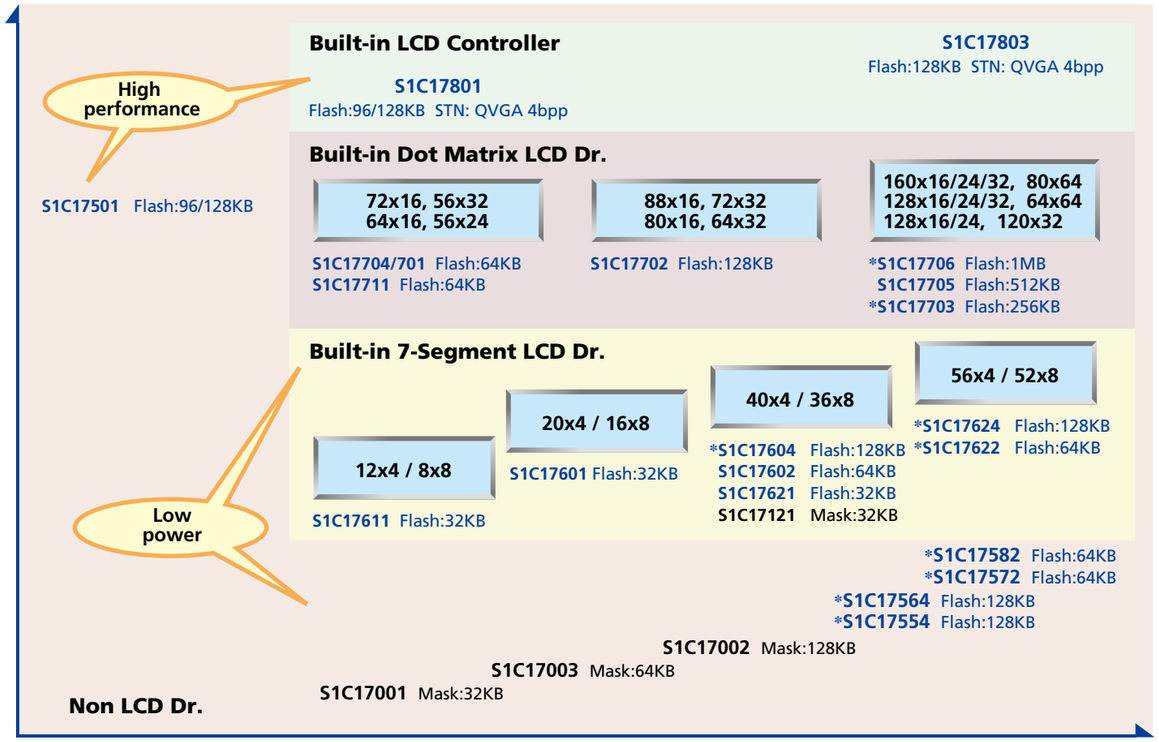
The S1C17 Family, 16-bit microcontrollers integrate a wide variety of peripheral circuits such as various interfaces that meet various types of sensors and the LCD driver/controller that covers the wide display area into a single chip design. They can realize both high-speed operation and low power consumption, and provide the products suitable to portable gears. Also, various flash ROM built-in products are lined up. The flexible development environment and on-chip ICE functions can shorten the product development period.

◆ **Features of S1C17 RISC CPU**
- Includes the instruction set optimized for C language.
- Supports memory space of up to 16M bytes.
- Includes lower-power instructions (Halt and Sleep).
- Incorporates coprocessor interface that allows for expansion of product-sum/division operator.

◆ **Includes Flash ROM**
- Protect functions that guard software assets.
- Self-rewriting function

◆ **User-friendly and comfortable development tools**
- On-chip debugger and highly-functional software simulator
- Software evaluation board (SVT board)

◆ **Low power consumption**
- CPU clock gear function allows for low power consumption.
- Provides low power consumption equivalent to that of 8-bit microcontroller.

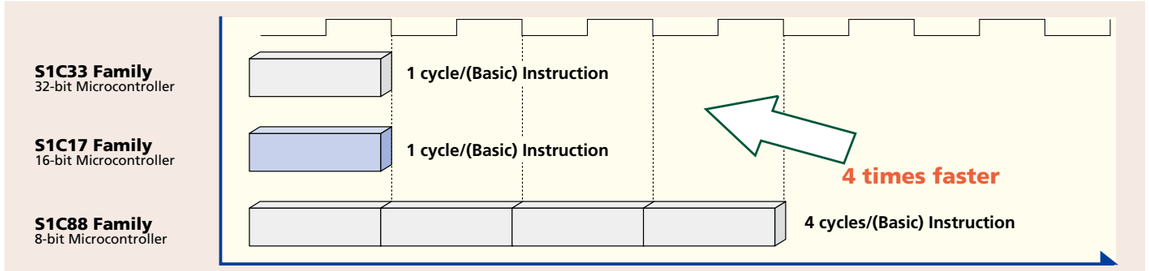


* : Under development

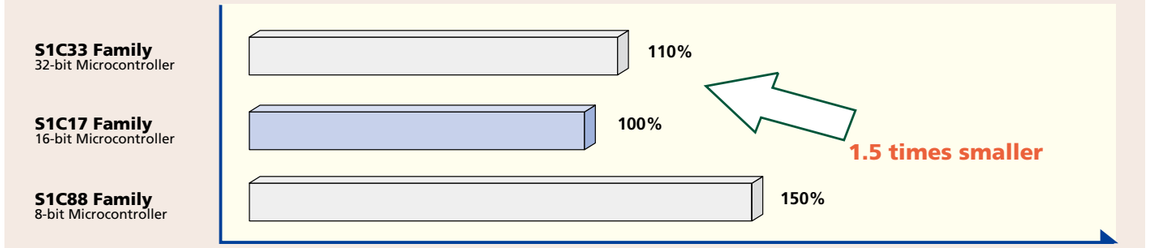
S1C17 Family Features

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.

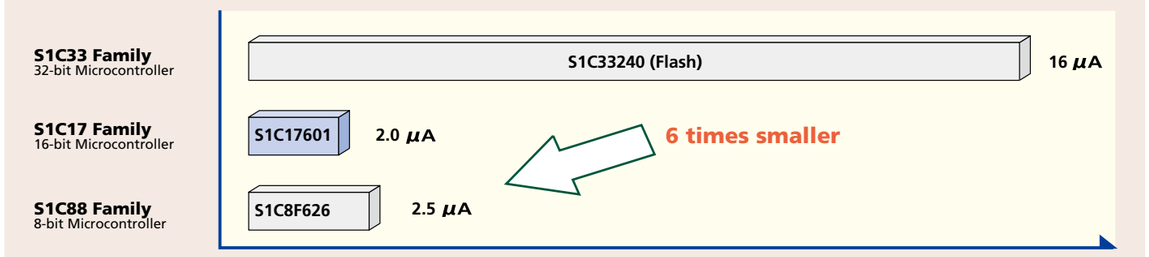
1. CPU processing power (Cycle/Instruction)



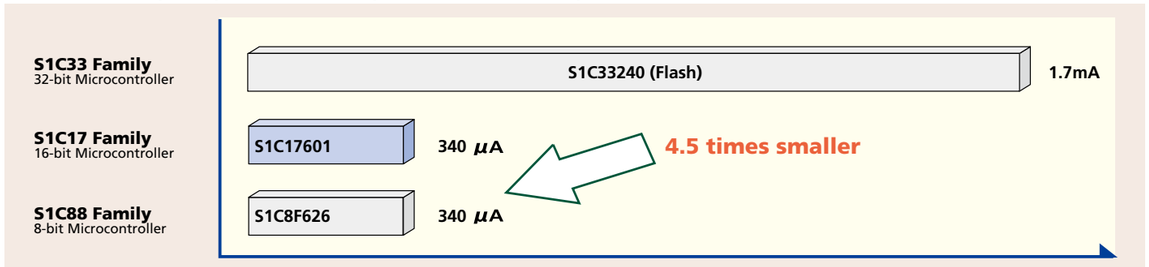
2. C-Compiler codes efficiency (Code size)



3. Current consumption (32KHz in HALT mode / Flash built-in products)



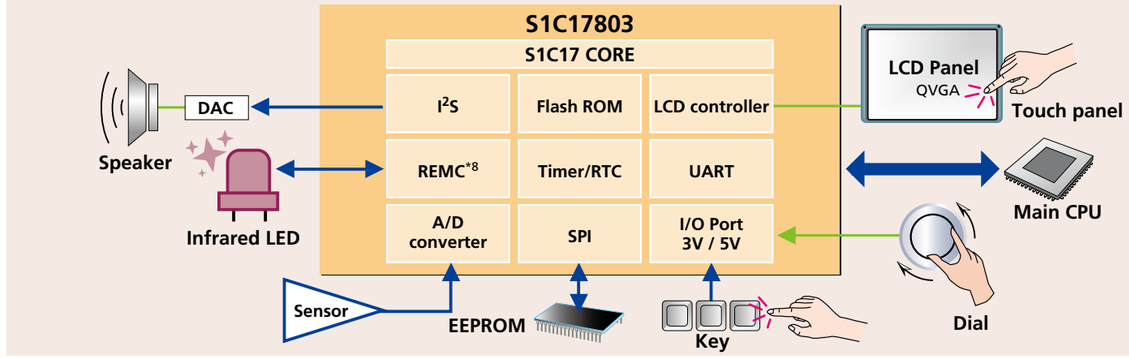
4. Current consumption (μA(mA) / MHz in operation / Flash built-in products)



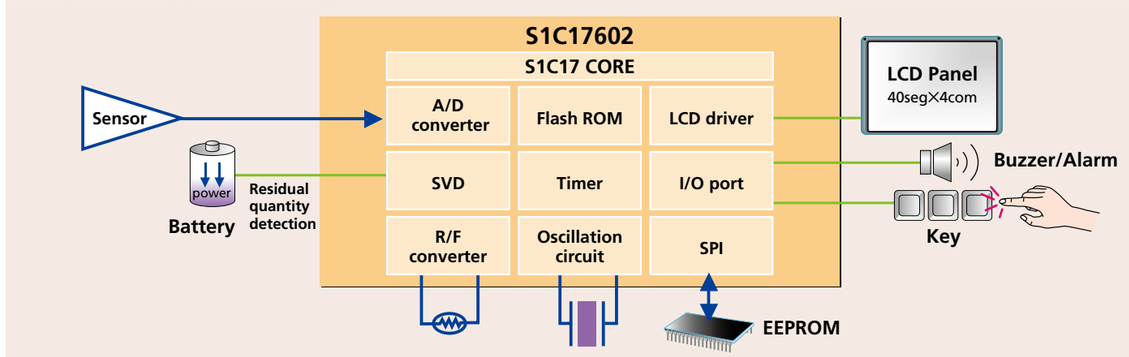
S1C17 Family 16-bit microcontrollers MCUs

S1C17 Family Application examples

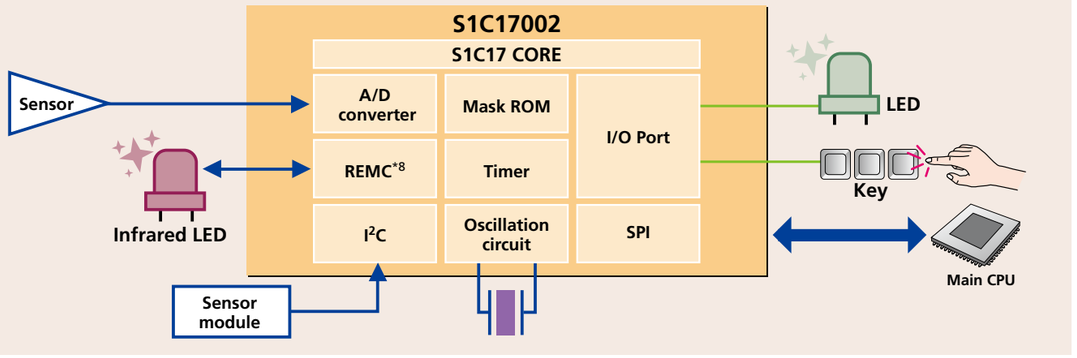
Example of an application using the S1C17803: Home appliances (Adding functions)



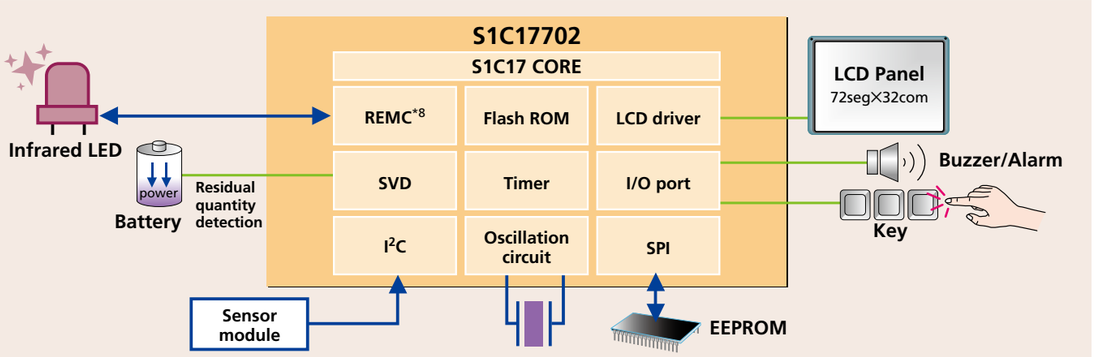
Example of an application using the S1C17602: Healthcare product



Example of an application using the S1C17002: Portable device



Example of an application using the S1C17702: Multifunctional remote controller



S1C17 Family Products overview

Products	Display: LCD Controller: with built-in VRAM [bpp]	Display: LCD Controller: with external VRAM [bpp]	Clock frequency: High-speed [Hz] (Max.)	Clock frequency: Low-speed [Hz] (Typ.)	Clock frequency: Built-in oscillator (Hz) (Typ.)	Supply current: Sleep [A] (Typ.)	Supply current: Halt [A] (Typ.)	Supply current: Operating [A] (Typ.)	Supply voltage [V]	Memory: Flash ROM [Byte]	Memory: Mask ROM [Byte]	Memory: RAM [Byte]	Memory: VRAM [Byte]	Memory: Backup RAM [Byte]	Bus: Address bus	Bus: Data bus	I/O: Input port	I/O: I/O port	I/O: Support of multiple voltages *6	Timer: 8-bit timer	Timer: 16-bit timer	Timer: 16-bit PWM timer	Timer: Stopwatch	Timer: Watchdog timer	Timer: Clock	Timer: Real-time clock	SIO: UART (IrDA1.0)	SIO: SPI	SIO: I²C master	SIO: I²C slave	SIO: Remote controller transmission and reception	A/D converter	DMA	Multiplier/MAC	Divider	USB	Form of delivery: Package	Form of delivery: Chip	Remarks
S1C17500 series	[High-performance] The 16-bit Microcontrollers allowing the 32-bit level sophisticated processing to perform. Suitable for a wide range of whiteware products and other home appliances due to the utilization of various types of built-in interfaces such as USB, UART, SPI, I²C, I²S, A/D converter, and remote controller transmission circuits, as well as the improved user interface using music, audio, touch switches, etc.																																				
S1C17501	–	–	48M	32.768k	–	1.5µ *4	20m (48MHz)	40m (48MHz)	3.0 to 3.6	96K *9 128K *9	–	4K	–	2K	23	8/16 *3	8	83	–	6	2	1	–	1	–	○ *2	1	2	1	–	○	8	–	○	–	FS2.0	TQFP14-100 *7 TQFP15-128 *7	–	
S1C17800 series	[High-performance] The 16-bit Microcontrollers allowing the 32-bit level sophisticated processing to perform. The device having the LCDC can display the 1-bpp maximum VGA monochrome images. Also suitable for controlling the operation panels of whiteware products and other various types of products due to the utilization of a wide array of built-in interfaces such as USB, various types of serial interfaces, and A/D converter, as well as the improved user interface using display, music, touch panel, etc.																																				
S1C17801	1 (120 × 120)	4 (QVGA) 1 (VGA)	48M	32.768k	–	1.5µ *4	20m (48MHz)	40m (48MHz)	3.0 to 3.6	128K *9	–	4K	2K *1		23	8/16	8	83	–	6	2	1	–	1	–	○ *2	1	2	1	–	○	8	–	○	–	FS2.0	TQFP15-128 PFBGA7U-144	–	I/F of LCD-DR only
S1C17803	1 (QVGA)	4 (QVGA) 1 (VGA)	33M	32.768k	–	1.3µ *4	15m (33MHz)	19m (33MHz)	2.7 to 5.5	128K *9	–	16K		16	23	8/16 *3	4	95	○	4	1	2	–	1	–	○ *2	1	2 *5	1	1	○	4	4	○	○	–	TQFP14-100 TQFP15-128 QFP5-128	–	I/F of LCD-DR only

____: Under development
*1: Also used as the RAM
*2: Real-time clock (The battery backed up operation is supported.)
*3: The TQFP14-100 has the 8-bit fixed data bus.
*4: Unmounted OSC1.
*5: Universal serial interface (Any of UART, SPI and I²C functions can be selected.)
*6: Coexistence of 5V and 3V (and other) different interface voltages is supported.
*7: TQFP14-100(Flash96KB), TQFP15-128(Flash128KB)
*8: Built-in a remote controller transmission and reception circuit
*9: This product uses SuperFlash® technology licensed from Silicon Storage Technology, Inc.

S1C17 Family 16-bit microcontrollers MCUs

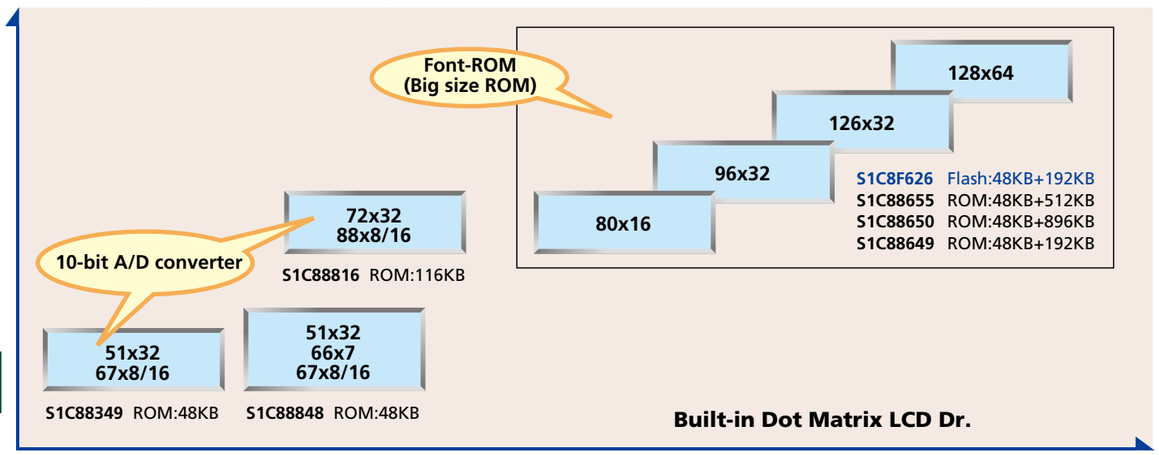
S1C17 Family Products overview

Products	Display	Clock frequency			Supply current				Supply voltage [V]	Memory			I/O	Timer								SIO					R/F converter	A/D converter	Multiplier/Divider	SVD *1	Form of delivery	
	LCD Driver seg×com	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.)		Flash ROM [Byte]	Mask ROM [Byte]	RAM [Byte]	I/O port	8-bit timer	16-bit timer	16-bit PWM timer	Stopwatch	Watchdog timer	Clock	Real-time clock	UART	SPI	I^2C master	I^2C slave	Remote controller transmission and reception					Package	Chip
S1C17100/600/700 series	[Stand-alone Low Power] This 16-bit MCU has improved the throughput and the development environment while maintaining low power consumption just like 4/8-bit Epson MCU. It includes LCD driver, power circuit, clock function and various types of interfaces, and is suitable for watches, clocks, remote controllers, and healthcare devices.																															
S1C17121	40 × 4/3/2/1 36 × 8	4.2M	32.768k	2.7M	0.15	0.9	7.0	250	1.8 to 3.6	–	32K	2K	36	3	3	1	○	○	○	–	2	1	○	○	○	2	8	○	○	TQFP14-100 VFBGA7H-144	○
S1C17611	12 × 4/3/2/1 8 × 8	8.2M	32.768k	2.7M	0.6	2.0	12	400	1.8 to 3.6 *2	32K *3	–	2K	19	2	3	2	○	○	○	–	1	1	○	○	–	1	4	○	○	QFP12-48	○
S1C17601	20 × 4/3/2/1 16 × 8	8.2M	32.768k	2.7M	0.6	2.0	12	340	1.8 to 3.6 *2	32K *3	–	2K	24	2	3	2	○	○	○	–	1	1	○	○	–	1	4	○	○	TQFP13-64 VFBGA8H-81	○
S1C17621	40 x 4/3/2/1 36 x 8	8.2M	32.768k	2.7M	0.75	2.5	15	410	1.8 to 3.6 *2	32K *3	–	2K	36	3	3	1	○	○	○	–	2	1	○	○	○	2	8	○	○	TQFP14-100	○
S1C17602	40 × 4/3/2/1 36 × 8	8.2M	32.768k	2.7M	0.75	2.5	15	410	1.8 to 3.6 *2	64K *3	–	4K	36	3	3	1	○	○	○	–	2	1	○	○	○	2	8	○	○	TQFP14-100 VFBGA7H-144	○
S1C17622	56 × 4/3/2/1 52 × 8	8.2M	32.768k	2.7M	1.0	2.5	TBD		1.8 to 3.6 *2	64K *3	–	4k	47	3	3	1	○	○	○	–	2	1	○	○	○	2	8	○	○	TQFP15-128	○
S1C17604	40 × 4/3/2/1 36 × 8	8.2M	32.768k	2.7M	1.0	2.5	TBD		1.8 to 3.6 *2	128K *3	–	8K	36	3	3	3	○	○	○	○	2	1	○	○	○	2	8	○	○	TQFP14-100	○
S1C17624	56 × 4/3/2/1 52 × 8	8.2M	32.768k	2.7M	1.0	2.5	TBD		1.8 to 3.6 *2	128K *3	–	8K	47	3	3	3	○	○	○	○	2	1	○	○	○	2	8	○	○	TQFP15-128	○
S1C17711	64 × 16/8 56 × 24	8.2M	32.768k	2.0M	1.0	2.0	12	400	1.8 to 3.6 *2	64K *3	–	4k	29	–	4	4	○	○	○	–	1	1	○	○	○	2	8	○	○	TQFP15-128 VFBGA10H-144	○
S1C17704 (S1C17701 *5)	72 × 16 56 × 32	8.2M	32.768k	–	1.0	2.6	17 *6	550 *7	1.8 to 3.6 *2	64K *3	–	4K	28	2	3	1	○	○	○	–	1	1	○	–	○	–	–	–	○	TQFP24-144 VFBGA10H-144 VFBGA8H-161	○
S1C17702	88 × 16 72 × 32	8.2M	32.768k	2.7M	1.0	2.5	16	450	1.8 to 3.6 *2	128K *3	–	12K	28	3	3	2	○	○	○	–	2	1	○	–	○	–	–	○	○	QFP21-176 VFBGA10H-180 VFBGA8H-181	○
S1C17703	128 × 16/24 120 × 32	8.2M	32.768k	2.7M	1.0	2.5	TBD		1.8 to 3.6 *2	256K *3	–	12K	35	–	5	4	○	○	○	–	2	3	○	○	○	2	8	○	○	QFP21-216	○
S1C17705	128 × 16/24/32 64 × 64	8.2M	32.768k	2.7M	1.2	2.7	18	550	1.8 to 3.6 *4	512K *3	–	12K	35	–	5	4	○	○	○	–	2	3	○	○	○	2	8	○	○	QFP23-240 VFBGA10H-240	○
S1C17706	160 × 16/24/32 80 × 64	8.2M	32.768k	2.7M	TBD				1.8 to 3.6 *4	1M *3	–	12K	35	–	5	4	○	○	○	○	2	3	○	○	○	2	8	○	○	QFP22-256	○
S1C17000/500 series	[Small package] The series products specialized for applications. Lineup of WCSP 48-pin packages (approx. 3-mm square) are suitable for portable gears having the limited packaging area. Also, various types of serial interface (I/F) and A/D converters are available in sensor applications.																															
S1C17001	–	8.2M	32.768k	–	0.5	2.5	10	256	1.65 to 2.7 (Core) 1.65 to 3.6 (I/O)	–	32K	2K	28	2	3	1	○	○	○	–	1	1	○	–	○	–	–	–	–	QFP12-48 QFN7-48 WCSP-48	○
S1C17002	–	20M	32.768k	–	0.5	3.3	8.0	310	1.65 to 1.95 (Core) 1.65 to 3.6 (I/O)	–	128K	8K	34	8	2	1	–	○	–	○	1	1	○	○	○	–	4	○	–	TQFP12-64 WCSP-48	○
S1C17003	–	20M	32.768k	–	1.0	3.3	8.0	350	1.65 to 1.95 (Core) 1.65 to 3.6 (I/O)	–	64K	4K	34	3	3	1	○	○	○	–	2	1	○	○	○	–	4	○	–	TQFP12-64 WCSP-48	○
S1C17554	–	24M	32.768k	–	TBD				1.65 to 1.95 (Core) 1.65 to 5.5 (I/O)	128K	–	16K	34	–	5	4	○	○	○	–	2	3	○	○	○	–	4	○	–	TQFP13-64 WCSP-48	○
S1C17564	–	24M	32.768k	2 to 12M	TBD				2.0 to 5.5	128K	–	16K	34	–	5	4	○	○	○	–	2	3	○	○	○	–	4	○	–	TQFP13-64	○
S1C17572	–	24M	32.768k	2 to 12M	TBD				1.65 to 1.95 (Core) 1.65 to 5.5 (I/O)	64K	–	8K	16	–	5	4	○	○	○	–	1	2	○	○	–	–	9 *8	○	–	WCSP-48	–
S1C17582	–	24M	32.768k	2 to 12M	TBD				2.0 to 5.5	64K	–	8K	24	–	5	4	○	○	○	–	2	3	○	○	○	–	9 *8	○	–	TQFP13-64	○

____: Under development
*1: SVD is an abbreviation for Supply Voltage Detector.
*2: During programming in flash memory: 2.7V to 3.6V
*3: This product uses SuperFlash® technology licensed from Silicon Storage Technology, Inc.
*4: During programming in flash memory: 2.5V to 3.6V
*5: Executes 1 instruction/1.5 clocks
*6: For S1C17701: 14µA
*7: For S1C17701: 420µA
*8: 12-bit resolvability

S1C88 Family Overview

S1C88 Family is made up of 8-bit microcontrollers with 8-bit core CPU in the kernel, together with ROM, RAM and LCD drivers, and various peripheral circuits including serial interface, all of which are condensed into a single chip.
The Family products feature low voltage operation and low current consumption, which enable the products to be used for a wide range of applications including mobile devices.



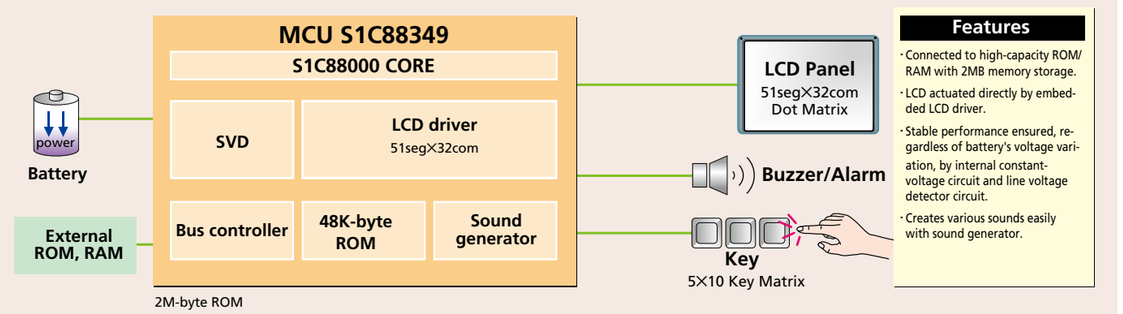
S1C88 Family Products overview

Products	Display	Clock frequency			Supply current				Supply voltage [V]	Memory		External expansion Max. (Byte)	I/O			Timer				SIO		A/D converter	Comparator	Sound generator	SVD *1	Interrupts		Form of delivery	
	LCD Driver seg×com	High-speed [Hz] (Max.)	Normal-speed [Hz] (Typ.)	Low-speed [Hz] (Max.)	Sleep [µA] (Typ.)	Halt [µA] (Typ.)	32kHz Operating [µA] (Typ.)	In high-speed oscillation [µA] (Typ.)		ROM [Byte]	RAM [Byte]		Input port	Output port	I/O port	Programmable 8-bit	Stopwatch	Watchdog timer	Clock	Asynchronous	Clock synchronous					External	Internal	Package	Chip
S1C88300 series	S1C88300 series microcontrollers are equipped with ROM, RAM, LCD driver, serial I/Os, timers and external bus-line. Easy connection to external ROM, RAM, peripherals and LCD drivers. Especially suitable for portable equipments such as high-performance data banks and pager.																												
S1C88349	51 × 32 67 × 8/16	8.2M	4.2M	32.768k	0.3	1.5	9.0	1100 (4M)	1.8 to 3.5/Low-speed 2.4 to 5.5/Normal-speed 3.5 to 5.5/High-speed	48K	2K	2M	10	34 *2	16 *2	2 *3	○	○	○	1 *4		4 *5	2	○	○	3	13	QFP21-176	○
S1C88600 series	This is a series of microcontrollers complete with ROM, RAM, LCD driver and various timer functions. With a built-in KANJI ROM, display of KANJI is easy without an external ROM.																												
S1C88649	80 × 8/16	4.2M	–	32.768k	1.0	2.5	7.0	670(4M)	1.8 to 3.6	48K +192K	8K	2M	8	25	16	4 *3	○	○	○	1 *4		–	–	○	○	8	18	–	○
S1C88650	126 × 8/16/32	8.2M	–	32.768k	1.0	2.5	9.0	1700(8M)	1.8 to 3.6	48K +896K	8K	3M	8	26	16	8 *3	–	○	○	1 *4		–	–	–	○	8	19	QFP22-256 VFBGA10H-240	○
S1C88655	128 × 64	8.2M	–	32.768k	1.0	2.0	5.0	800(8M)	1.8 to 3.6	48K +512K	8K	4M	0	26	24	8 *3	–	○	○	2 *4		–	–	–	○	8	26	TCM *6	○ *7
S1C8F626	96 × 8/16/32	8.2M	–	32.768k	1.0	2.5	10	1800(8M)	1.8 to 3.6	48K +192K (Flash) *8	8K	–	8	–	24	8 *3	–	○	○	2 *4		–	–	–	○	8	29	QFP21-216 VFBGA10H-240	○
S1C88800 series	This series of microcontrollers integrates ROM, RAM, dot matrix LCD driver, serial I/O, and timers.																												
S1C88848	51 × 32 66 × 7 67 × 8/16	8.2M	–	32.768k	1.0	1.7	4.0	700(8M)	1.8 to 5.5	48K	1.5K	–	10	5	8	4 *3	○	○	○	1 *4		–	–	○	○	3	15	QFP15-128	○ *9
S1C88816	72 × 32 88 × 8/16	8.2M	4.2M	32.768k	0.45	1.5	7.0	900(4M)	1.8 to 3.5/Low-speed 2.4 to 5.5/Normal-speed 3.5 to 5.5/High-speed	116K	8K	–	9	7	16	2 *3	○	○	○	1 *4		4 *5	–	○ *10	○	3	14	VFBGA10U-121 PFBGA12U-180	○

*1: SVD is an abbreviation for Supply Voltage Detector.
*2: It doubles as external bus terminal.
*3: Two 8 bits serve as a 16-bit timer.
*4: Asynchronous or clock synchronous system can be selected by software.
*5: 10 bits successive-approximation type and serves as general-purpose I/O.
*6: Tape Carrier Module. It is the package form which mounted passive parts, such as resistance and a capacitor, on COF.
*7: Au Bump
*8: This product uses SuperFlash® technology licensed from Silicon Storage Technology, Inc.
*9: Pad pitch is 80µm.
*10: A melody generator is included.

S1C88 Family Application examples

Example of an application using the S1C88 Family: Databank



S1C60/63 Family Overview

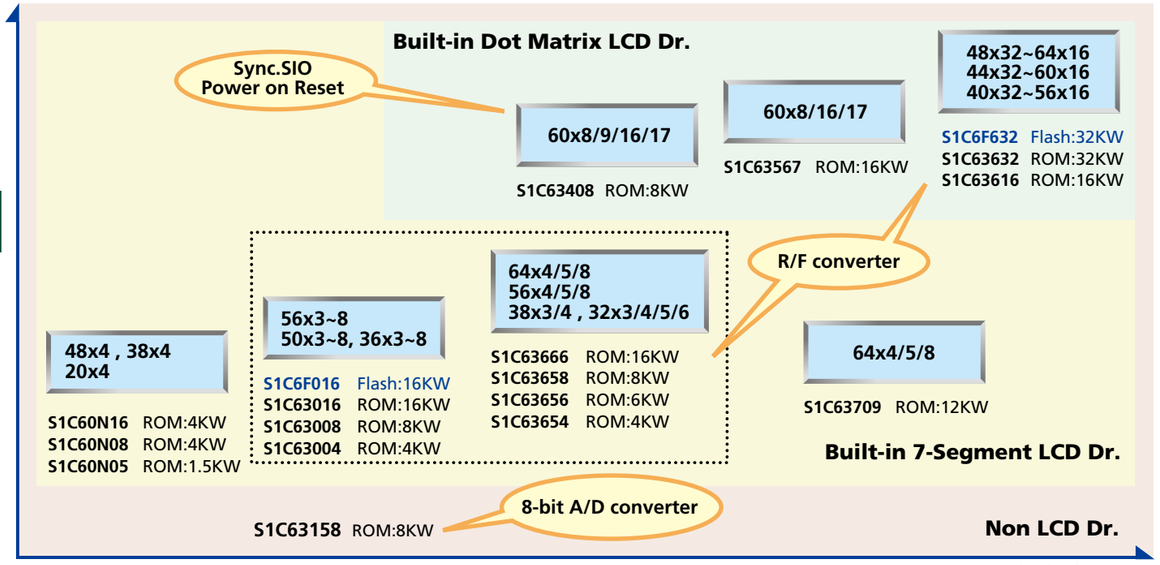
The S1C60/S1C63 Family microcontroller has a 4-bit core CPU together with various peripheral circuits including ROM, RAM, I/O ports, and LCD drivers, all of which are condensed into a single chip. This 4-bit microcontroller is fused with unique low voltage/power consumption technology proprietary to Seiko Epson.

◆ **Features of S1C63 CPU**
- ■ Abundant instruction sets and high-speed instruction cycle.
  Each of most typical instructions runs in one single cycle (two clocks).
- ■ Linear address space of program memory: 64 KW *, and data memory: 64KW.

◆ **Low power consumption and a wide range of operating voltages**
- ■ HALT/SLEEP standby functions

◆ **Enhanced development tools**
- ■ A thorough evaluation can be achieved using the Full ICE development tool.
- ■ Software simulator allows for software debugging on your PC

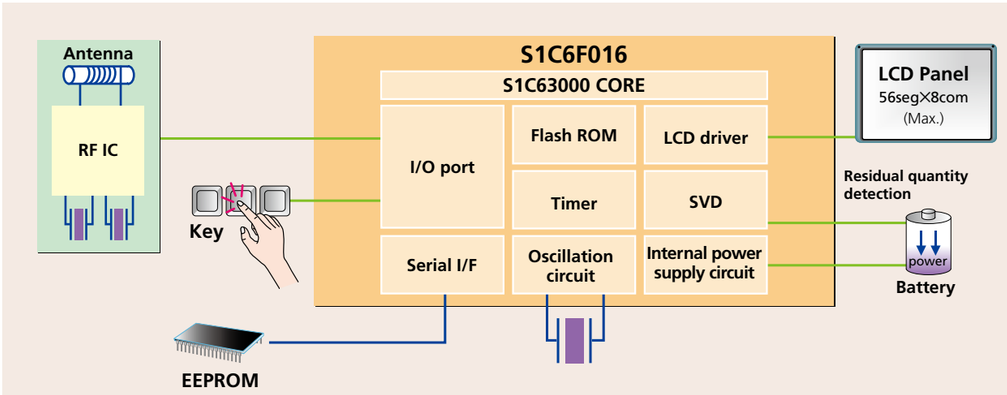
* 1KW=1,024 x 12-bit (S1C60 Family)
1KW=1,024 x 13-bit (S1C63 Family)



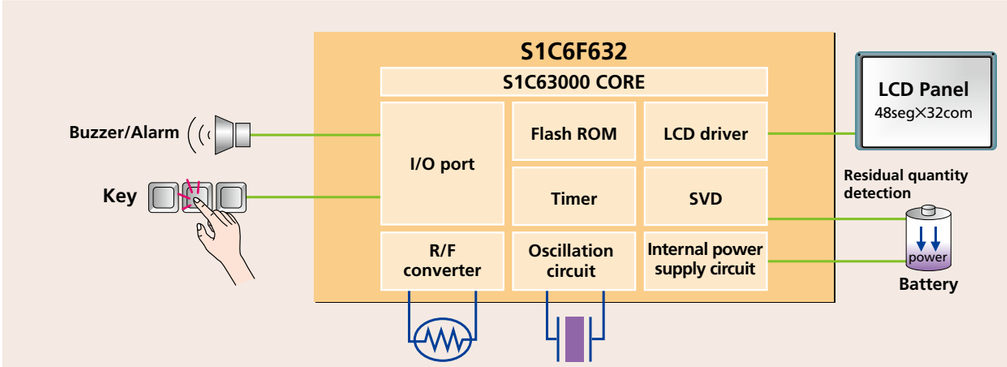
* : Under development

S1C60/S1C63 Family Application examples

Example of an application using the S1C6F016: Radio controlled clock



Example of an application using the S1C6F632: Weather stations



S1C60 Family Products overview

Products	Display	Clock frequency		Supply current				Supply voltage [V]	Memory		I/O			Timer				SIO		Comparator	R/F converter	SVD *1	Interrupts		Form of delivery	
	LCD Driver seg×com	High-speed [Hz] (Max.)	Low-speed [Hz] (Max.)	Sleep [µA] (Typ.)	Halt [µA] (Typ.)	32kHz Operating [µA] (Typ.)	In high-speed oscillation [µA] (Typ.)		ROM [×12-bit]	RAM [×4-bit]	Input port	Output port	I/O port	Event	Stopwatch	Watchdog timer	Clock	Asynchronous	Clock synchronous				External	Internal	Package	Chip
S1C60 series		The microcontroller of this series integrates ROM, RAM, LCD driver, and various timer functions. It is suitable for applications to small sized equipment such as clocks, timers and thermometers.																									
S1C60N05	20 × 4/3/2/1	–	32.768k	–	0.8	1.5	–	1.8 to 3.5	1,536	80	4	4	4	–	–	–	○	–	–	–	2	–	1	2	QFP13-64	○
S1C60L05								1.2 to 2.0																		
S1C60N08	48 × 4/3/2/1	–	32.768k	–	1.0	2.2	–	1.8 to 3.5	4,096	832	9	8	8	2	○	○	○	–	1	○	–	○	3	3	QFP15-100	○
S1C60L08								0.9 to 1.7																		
S1C60A08		500k	32.768k	–	1.1	3.0	50(500k)	2.2 to 3.5																		
S1C60N16	38 × 4/3/2/1	–	32.768k	–	0.7	1.4	–	2.2 to 3.6	4,096	256	5	8	8	2	○	○	○	–	1	○	–	○	2	3	QFP14-80	○
S1C60L16								1.2 to 1.8																		
S1C60A16		1M	32.768k	–	1.5	2.4	50(1M)	2.2 to 3.6																		

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

S1C60/63 Family 4-bit microcontrollers MCUs

S1C63 Family Products overview

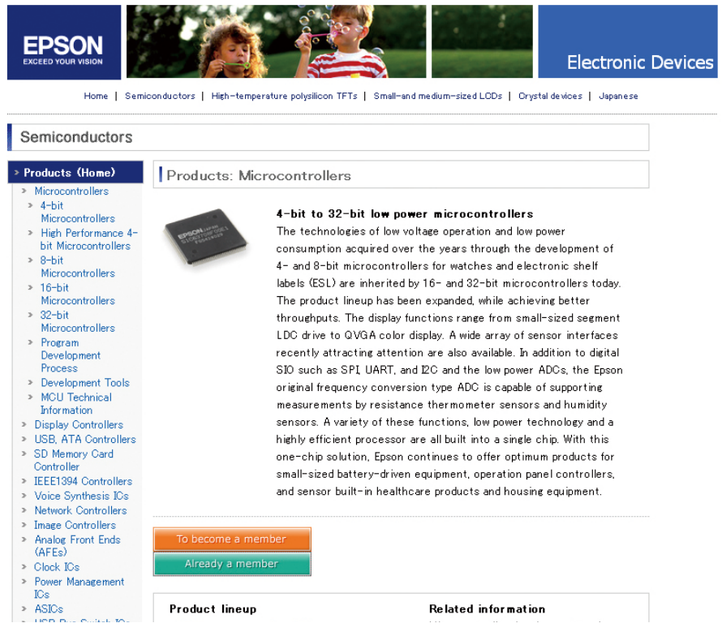
Products	Display	Clock frequency		Supply current				Supply voltage [V]	Memory		I/O			Timer				SIO		A/D converter	R/F converter	Buzzer	SVD *1	DTMF output	DP output	Interrupts		Form of delivery	
	LCD Driver seg×com	High-speed [Hz] (Max.)	Low-speed [Hz] (Max.)	Sleep [µA] (Typ.)	Halt [µA] (Typ.)	32kHz Operating [µA] (Typ.)	4MHz Operating [µA] (Typ.)		ROM [×13-bit]	RAM [×4-bit]	Input port	Output port	I/O port	Programmable 8-bit	Stopwatch	Watchdog timer	Clock	Asynchronous	Clock synchronous							External	Internal	Package	Chip
S1C63000 series	The microcontroller of this Family integrates ROM, RAM, LCD driver, and various timer functions. It is characterized by a wide range of operating voltages and low levels of power consumption, and is suitable for watches and clocks for which you want to extend battery life, as well as portable devices with temperature measurement functions.																												
S1C63004	36 (Max) × 3/4/5/6/7/8 *2	4M (3V)	32.768k	0.1	0.5	2.3	220	1.1 to 1.7	4,096	512	–	–	20 *3	3 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	23	QFP14-80 TQFP14-100	○
		1M (1.5V)				2.0	60	1.8 to 5.5																					
S1C63008	50 (Max) × 3/4/5/6/7/8 *6	4M (3V)	32.768k	0.1	0.5	2.3	220	1.1 to 1.7	8,192	1,024	–	–	24 *7	3 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	23	QFP15-100 TQFP14-100	○
		1M (1.5V)				2.0	60	1.8 to 5.5																					
S1C63016	56 (Max) × 3/4/5/6/7/8 *6	4M (3V)	32.768k	0.1	0.5	2.3	220	1.1 to 1.7	16,384	2,048	–	–	24 *7	4 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	25	QFP15-100 TQFP14-100	○
		1M (1.5V)				2.0	60	1.8 to 5.5																					
S1C6F016	56 (Max) × 3/4/5/6/7/8 *6	4M	32.768k	0.7	2.0	9.0	950	1.8 to 3.6 *8	16,384 (Flash) *9	2,048	–	–	24 *7	4 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	25	QFP15-100	○
S1C63100 series	A microcontroller being equipped with ROM, RAM, serial interface, A/D converter, various timer functions, etc. It features built-in A/D converter, wide operating voltage range and low power consumption and is suitable for portable equipment.																												
S1C63158	–	–	32.768k	–	1.0	3.0	900	0.9 to 3.6	8,192	512	9	12	20	2 *4	–	○	○	–	1	4 *10	–	○	○	–	–	3	8	QFP12-48 QFP13-64 PFBGA5U-60	○
		4M						2.2 to 3.6																					
S1C63400 series	A microcontroller being equipped with ROM, RAM, dot-matrix LCD driver, various timer functions, etc. It features wide operating voltage range and low power consumption and is suitable for portable equipment such as data banks which require dot-matrix indications.																												
S1C63408	60 × 8/9/16/17	–	32.768k	–	1.3	3.0	550	1.3 to 3.6	8,192	1,024	4	4	4	2 *4	○	○	○	1 *11		–	–	–	○	–	–	4	11	QFP15-128	○
		4M						1.8 to 3.6																					
S1C63500 series	A microcontroller being equipped with ROM, RAM, dot-matrix LCD driver, DTMF/DP generator, FSK demodulator, various timer functions, etc. It features wide operating voltage rane and low power consumption and is suitable for communication-equipment and portable-equipment such as data banks and Caller-ID which require dot-matrix indications.																												
S1C63567	60 × 8/16/17	3.58M	32.768k	–	1.5	10	600	2.2 to 5.5	16,384	5,120	8	12	16	2 *4	○	○	○	1 *11		–	–	○	○	○	○	2	12	QFP20-144	○
S1C63600 series	The microcontroller of this series integrates ROM, RAM, multiplication and division circuits, LCD driver, R/F converter, and a variety of timer functions. Since this series features a wide range of operating voltage and low power consumption, it is best fit for portable equipment with temperature measuring facility that requires battery-powered operation.																												
S1C63654	32 × 3/4/5/6	–	32.768k	–	0.65	2.5	800	1.8 to 3.6	4,096	512	8	4	8	2 *4	○	○	○	–	1	–	2	○	○	–	–	2	15	QFP15-100	○
		4M						2.4 to 3.6																					
S1C63656	38 × 3/4	–	32.768k	–	0.6	2.5	800	1.1 to 3.6 *12	6,144	1,024	8	4	8	2 *4	○	○	○	–	1	–	2	○	○	–	–	2	18	QFP20-144	○
		4M						2.4 to 3.6																					
S1C63658	56 × 4/5/8	–	32.768k	–	0.65	2.5	800	1.8 to 3.6	8,192	1,024	8	8	8	3 *4	○	○	○	–	1	–	2	○	○	–	–	2	16	QFP20-144	○
		4M						2.4 to 3.6																					
S1C63666	64 × 4/5/8	–	32.768k	–	0.65	2.5	800	1.5 to 3.6	16,384	5,120	8	8	8	3 *4	○	○	○	–	1	–	2	○	○	–	–	2	14	QFP20-144	○
		4M						2.4 to 3.6																					
S1C63616	56 × 16 48 × 24 40 × 32	4M	32.768k	0.08	0.6	2.5	320	1.6 to 5.5	16,384	2,048	–	–	16	8 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	32	TQFP15-128	○
S1C63632	64 × 16 56 × 24 48 × 32	4M	32.768k	0.08	0.6	2.5	320	1.6 to 5.5	31,744	8,192	–	–	24	8 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	32	QFP20-144 VFBGA10H-144	○
S1C6F632	64 × 16 56 × 24 48 × 32	4M	32.768k	0.7	2.0	9.0	960	1.8 to 3.6 *8	31,744 (Flash) *9	8,192	–	–	24	8 *4	○	○	○	–	1 *5	–	2	○	○	–	–	8	32	QFP20-144 VFBGA7H-144	○
S1C63700 series	A microcontroller being equipped with ROM, RAM, LCD driver, various timer functions, etc. It has the feature of super low power consumption, and it is suitable for a portable equipment such as watches that want to extend the battery life.																												
S1C63709	64 × 4/5/8	–	32.768k	–	0.15	3.5	1,000	1.0 to 3.6	12,288	2048	13	–	18	3 *4	○	○	○	–	1	–	–	○	○	–	–	2	18	QFP20-144	○
		4M						2.1 to 3.6																					

____: Under development
*1: SVD is an abbreviation for Supply Voltage Detector.
*2: Total 16 segment terminals share the function with I/O ports and R/F converter terminals (to be selected by mask option).
*3: Total 8 I/O ports share the function with segment terminals (to be selected by mask option), and 4 share with R/F converter terminals (to be selected by software).
*4: Two 8 bits serve as a 16-bit timer.
*5: Connectable to SPI.
*6: A total of 20 segment terminals share the function with I/O ports and R/F converter terminals (to be selected by mask option).
*7: A total of 12 I/O ports share the function with segment terminals (to be selected by mask option), and 4 I/O ports share with R/F converter terminals (to be selected by software).
*8: During programming in flash memory: 2.7V to 3.6V
*9: This product uses SuperFlash® technology licensed from Silicon Storage Technology, Inc.
*10: 8 bits successive-approximation type and serves as general-purpose I/O.
*11: Either the asynchronous system or clock synchronous system can be selected by software.
*12: When the OSC1 single clock is used, and LCD contrast is not adjusted. (1.8V to 3.6V for other specifications)

Epson MCU website

http://www.epson.jp/device/semicon_e/product/mcu/index.htm

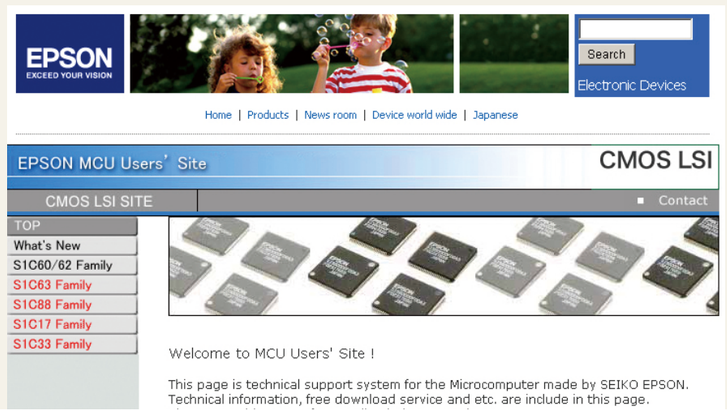
On the Epson MCU website, you can access a variety of information required for device selection and design development.



Downloadable information

- Product overviews
- Core manuals
- Data sheets
- Technical manuals
- Bug reports
- Manual errata sheets

On the Epson MCU user's site, detailed design information including a variety of application notes is available in addition to software such as compilers and assemblers. You can access and download required information and software by user registration.



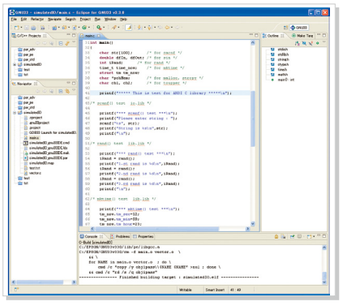
Downloadable information

- List of the latest development tools
- Software development tools (such as compiler and assembler)
- Application notes
- Sample programs
- Hardware tool manuals
- Software tool manuals

Development environments - S1C33 Family -

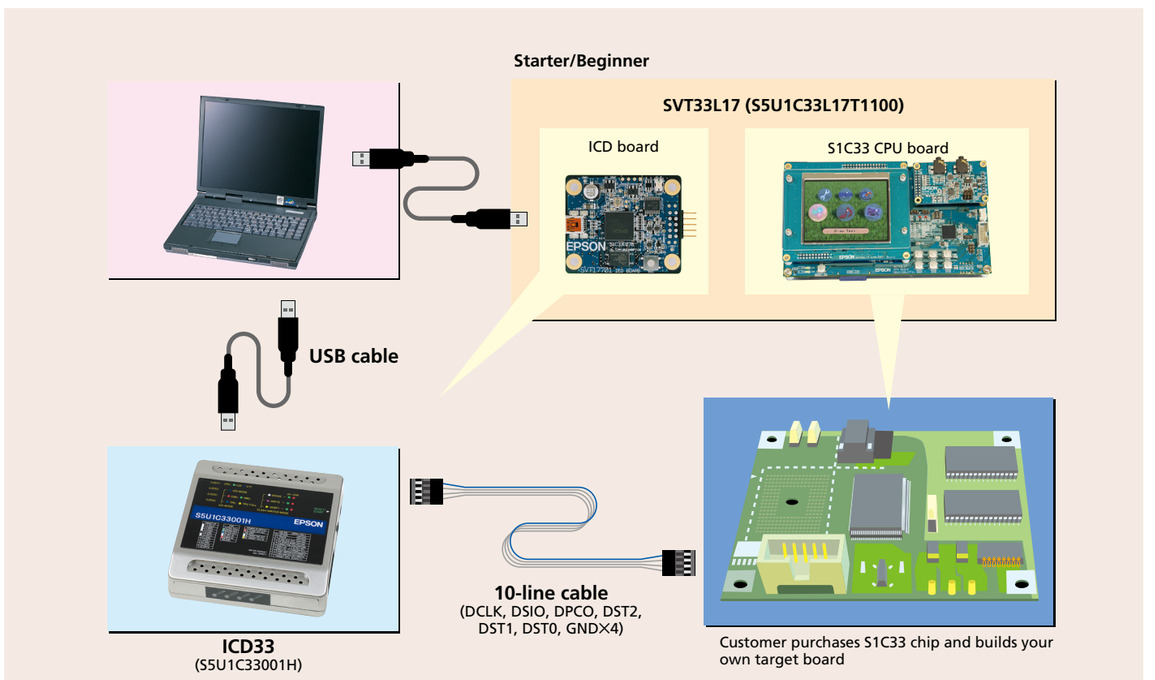
GNU33 Package

Optimized C compiler supporting 64MB space
Assembler, linker, and ANSI library
GUI-based debugger
Eclipse integrated environment



ICD33

On-chip ICE, All S1C33 products supported
Connects with a target board via 4 pins (3 signal pins and 1 GND pin).
Real time PC trace is available by connecting with a target board via 10 pins (6 signal pins and 4 GND pins).
Includes execution time and cycle measurement functions.
Uses USB bus power.
Can function as a single on-chip flash writer
Includes firmware update function.
Supports target voltages of 1 to 5 V.



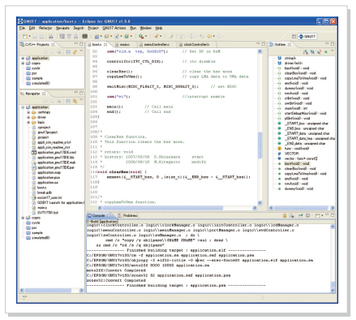
ICD33 supports all S1C33 Family products.

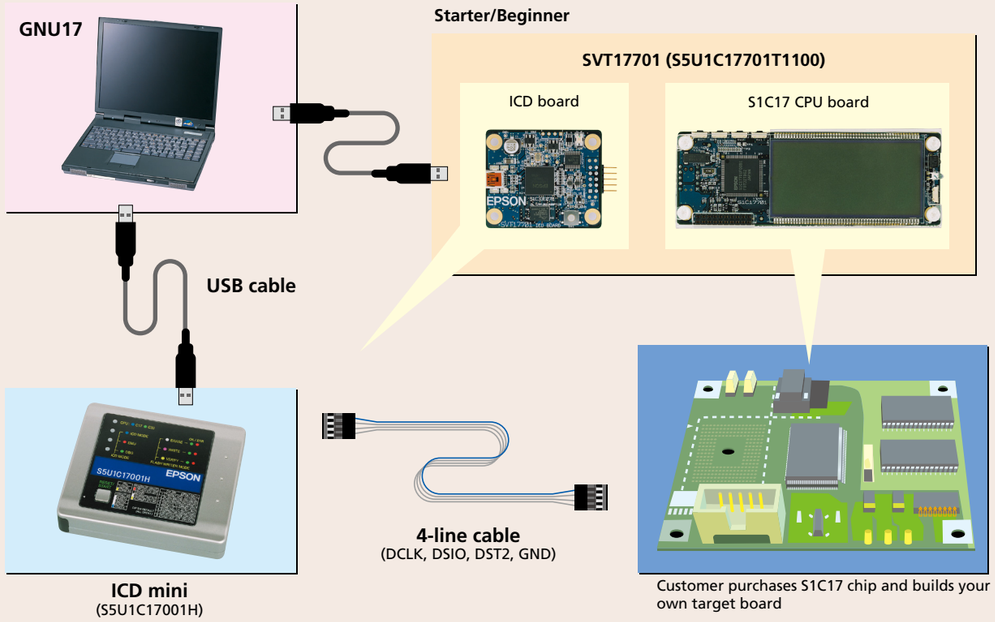
GNU17 package

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

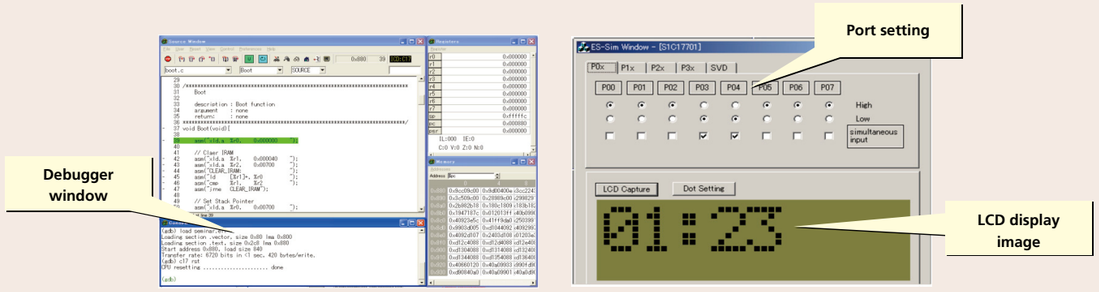
ICD mini

On-chip ICE, All S1C17 products supported
Connects with a target board via 4 pins (3 signal pins and 1 GND pin).
Includes execution time measurement function.
Uses USB bus power.
Can function as a single on-chip flash writer
Can be used as a GangWriter in multiple units.
Includes firmware update function.





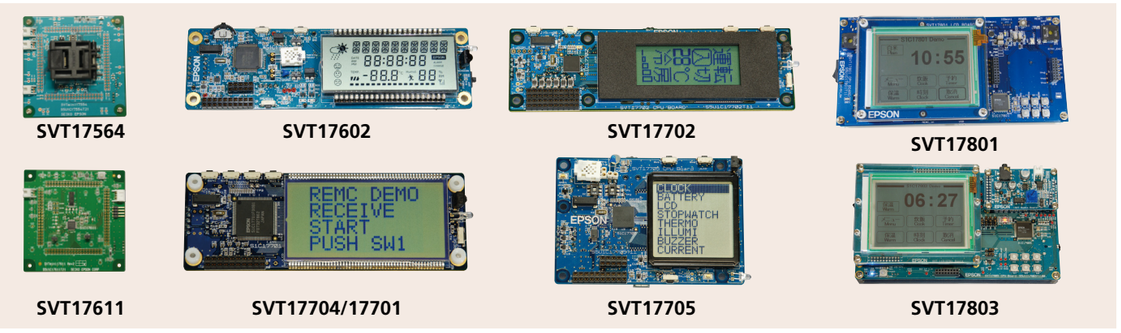
Development support tool (Software simulator)



- Simulatable on PC including the LCD display, without the need to use external debugging hardware
- Ability to view various data at the same time in multiple windows
- Ability to execute frequently used 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

Development support tool (Evaluation board)

SVT17xxx (S5U1C17xxxT1100) : Software Evaluation Tool
- S1C17 xxx chip built in
- Possible to evaluate the IC functions
- Sample sources for various functions available
- Wide range of interfaces (including IR remote, SPI and GPIO extensions) supported
- Debugging and Flash programming supported

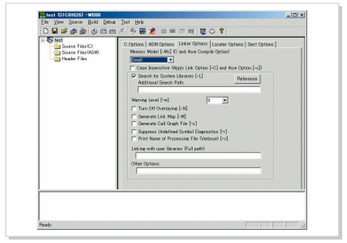


Evaluation board

Model Name	Mounted microcontroller name	Remarks
S5U1C17564T1	S1C17564	LCD panel none, Equipped with one-chip microcontroller
S5U1C17611T1	S1C17611	LCD panel none, Equipped with one-chip microcontroller
S5U1C17602T1	S1C17602	LCD panel, Remote control transmitter and receiver, Equipped with Thermal/Humidity/Illuminance sensor
S5U1C17704T1/17701T1	S1C17704/701	LCD panel, Remote control transmitter and receiver
S5U1C17702T1	S1C17702	LCD panel, Remote control transmitter and receiver
S5U1C17705T1	S1C17705	LCD panel, Remote control transmitter and receiver, Equipped with Thermal/Humidity/Illuminance sensor
S5U1C17801T1	S1C17801	LCD module(QVGA), Touch Panel, Voice Input/Output, USB, Remote control transmitter and receiver, Various memories
S5U1C17803T1	S1C17803	LCD module(QVGA), Touch Panel, Voice Output, Remote control transmitter and receiver, Various memories

S1C88 integrated tool package

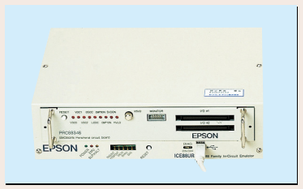
Integrated development environment of the S1C88 family
Provides a work environment that efficiently compiles, assembles and debugs ANSI C source programs.



ICE88

S1C88 ICE
(S1C88 Family In-Circuit Emulator)
Hardware tool to facilitate the development of software for the S1C88 family.
Provides a software development environment by combining a peripheral circuit board and a PC.

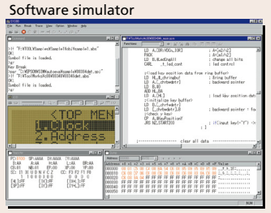
USB cable



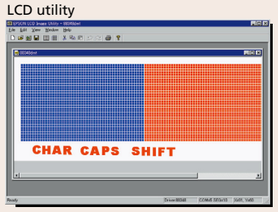
ICE88
(S5U1C88000H)

Software development support tool (S1C88 software simulator, various utility tools)

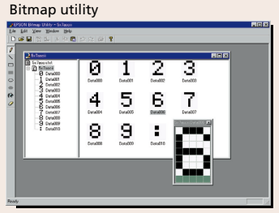
Software simulator



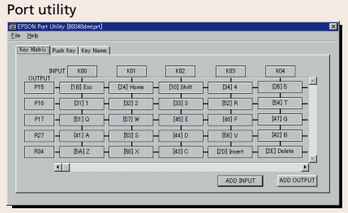
LCD utility



Bitmap utility



Port utility



- Simulation can be performed on a PC, including an LCD display, without the need to use dedicated hardware tools such as ICE.
- Multi-window display allows users to view various kinds of data at the same time.
- Source code display and symbolic debug function that corresponds to assembly source code.
- Function to create panel layout and COM/SEG port assignment data.
- Function to create bitmap image data for use in a dot-matrix LCD display.
- Function to assign push keys and key matrix to ports and set PC keys.

■ Development Tool H/W version

As of February, 2010. For the latest information, please visit Epson microcontroller user's site.

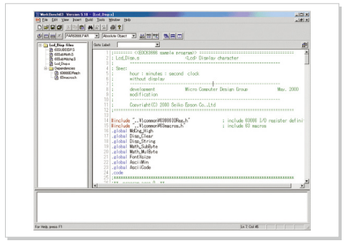
Model Name	ICE	PRC	FPGA Data *1	Add-on board
S1C88349	S5U1C88000H5	S5U1C88000P1	S5U1C88816F11(Ver.1)	S5U1C88816P2100
S1C88649			S5U1C88649F12(Ver.2)	S5U1C88649P2200
S1C88650			S5U1C88650F12(Ver.2)	
S1C88655			S5U1C88655F11(Ver.1)	S5U1C88655P2100
S1C8F626			S5U1C8F626F11(Ver.1)	S5U1C88655P2100
S1C88816			S5U1C88816F11(Ver.1)	S5U1C88816P2100
S1C88848			S5U1C88848F11(Ver.1)	S5U1C88816P2100

*1 : Downloadable from Epson microcontroller user's site.

Development environments - S1C63 Family -

S1C63 assembler package

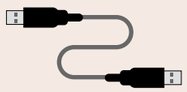
Integrated development environment of the S1C63 family
Editing of source code using GUI
Provides an efficient work environment to implement tasks from assembling to debugging.



ICE63

S1C63 ICE
(S1C63 Family In-Circuit Emulator)
Hardware tool to facilitate the development of software for the S1C63 family.
Provides a software development environment by combining a peripheral circuit board and a PC.

*Use the RS232C cable for ICE earlier than version 6.

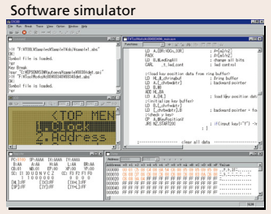


USB cable[*1]

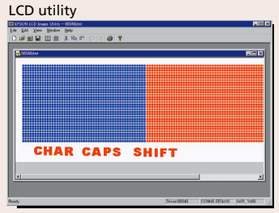
ICE63
(S5U1C63000H)

Software development support tool (S1C63 software simulator, various utility tools)

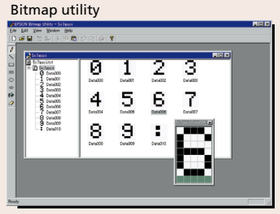
Software simulator



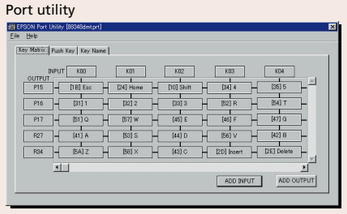
LCD utility



Bitmap utility



Port utility



- Simulation can be performed on a PC, including an LCD display, without the need to use dedicated hardware tools such as ICE.
- Multi-window display allows users to view various kinds of data at the same time.
- Source code display and symbolic debug function that corresponds to assembly source code.
- Function to create panel layout and COM/SEG port assignment data.
- Function to create bitmap image data for use in a dot-matrix LCD display.
- Function to assign push keys and key matrix to ports and set PC keys.

Development environments - S1C63 Family -

MCUs

■ Development Tool H/W version

As of February, 2010. For the latest information, please visit Epson microcontroller user's site.

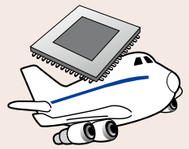
Model Name	ICE	PRC [*2]	FPGA Data [*3]	Add-on board
S1C63004	S5U1C63000H2 or S5U1C63000H6 [*1]	S5U1C63000P6	S5U1C6F016F61(Ver.1)	S5U1C6F016P2
S1C63008				
S1C63016				
S1C6F016				
S1C63158		S5U1C63000P1 or S5U1C63000P6	S5U1C63358F12(Ver.2) S5U1C63358F61(Ver.1)	—
S1C63408		S5U1C63000P1 or S5U1C63000P6	S5U1C63408F11(Ver.1) S5U1C63408F61(Ver.1)	—
S1C63567		S5U1C63007P1	—	—
S1C63654		S5U1C63000P1 or S5U1C63000P6	S5U1C63654F11(Ver.1) S5U1C63654F62(Ver.2)	S5U1C63658P2
S1C63656			S5U1C63656F11(Ver.1) S5U1C63656F61(Ver.1)	
S1C63658			S5U1C63658F12(Ver.2) S5U1C63658F61(Ver.1)	
S1C63666			S5U1C63666F14(Ver.4) S5U1C63666F61(Ver.1)	—
S1C63616		S5U1C63000P6	S5U1C6F632F62(Ver.2)	S5U1C6F632P2
S1C63632				
S1C6F632				
S1C63709		S5U1C63000P1 or S5U1C63000P6	S5U1C63709F13(Ver.3) S5U1C63709F61(Ver.1)	S5U1C63709P2100

*1 : S5U1C63000H2 : RS-232C connection S5U1C63000H6 : USB connection RoHS
*2 : S5U1C63000P6 : RoHS
*3 : Downloadable from the Epson MCU user's site. Upper line data is for S5U1C63000P1. Lower line data is for S5U1C63000P6.

Flash memory writing

If you procure written products from a Seiko Epson dealer

Seiko Epson semiconductor plant



Written products

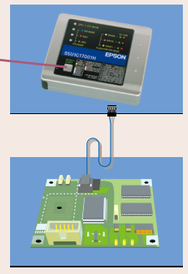
Customer

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

Unwritten products

Customer

Push Button!



Single flash writing mode

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

Unwritten products

Customer

Push Key!

GangWriter

Flash memory writing

MCUs

On-board writing tools and environments

■Compatible models:S1C6F016, S1C6F632, S1C8F626

- User data can be written to a model with internal flash ROM using the S5U1C88000W4 (USB serial on-board writer).
- PROM on-board programming environment can be constructed easily using the S5U1C88000W4, a compact and lightweight writer operating on USB bus power.

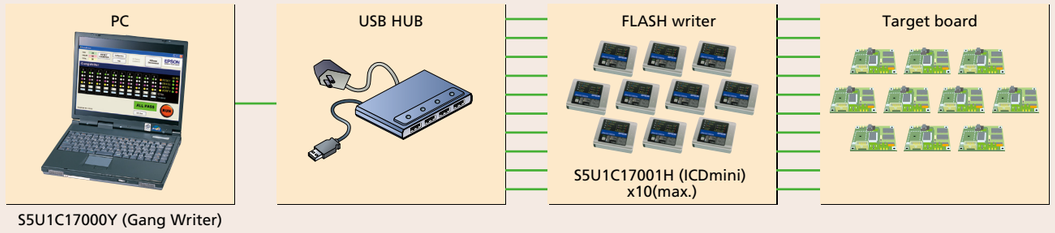
* Power supply to the target board is required separately.
* The product does not include the target board and PC.

■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

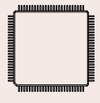


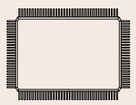
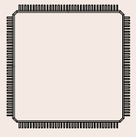
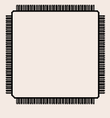
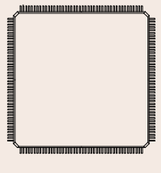
- Up to 10 units of the S5U1C17001H (ICDmini) can be used to construct an environment enabling user data to be downloaded simultaneously to multiple targets.
- The S5U1C17000Y, GangWriter software that controls the ICDmini, provides user- friendly screen and simple operation.

* 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.

Package lineup

QFP & TQFP

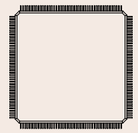
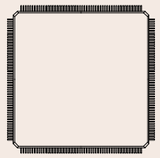
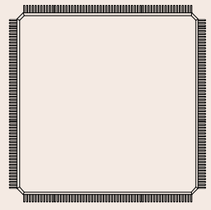
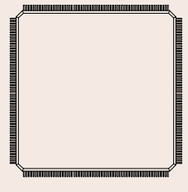
PKG type/Pin count	Body size (mm)	Lead pitch (mm)
QFP12-48	7 X 7 X 1.7	0.5
QFN7-48	7 X 7 X 1.0	0.5
TQFP12-64	7 X 7 X 1.0	0.4
QFP13-64	10 X 10 X 1.7	0.5
TQFP13-64	10 X 10 X 1.2	0.5
QFP14-80	12 X 12 X 1.7	0.5
QFP15-100 	14 X 14 X 1.7	0.5
TQFP14-100	12 X 12 X 1.2	0.4

PKG type/Pin count	Body size (mm)	Lead pitch (mm)
QFP15-128	14 X 14 X 1.7	0.4
TQFP15-128	14 X 14 X 1.2	0.4
QFP5-128 	20 X 14 X 3.5	0.5
QFP20-144 	20 X 20 X 1.7	0.5
TQFP24-144 	16 X 16 X 1.2	0.4
QFP21-176 	24 X 24 X 1.7	0.5

Package lineup

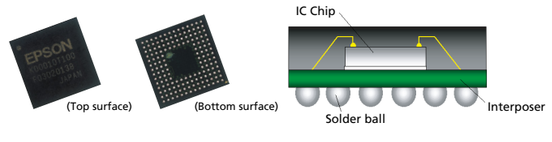
MCUs

QFP & TQFP

PKG type/Pin count	Body size (mm)	Lead pitch (mm)
QFP20-184 	20 X 20 X 1.7	0.4
QFP21-216 	24 X 24 X 1.7	0.4
QFP23-240 	32 X 32 X 4.1	0.5
QFP22-256 	28 X 28 X 1.7	0.4

PKG type/Pin count	Body size (mm)	Ball pitch (mm)
WCSP-48	3.2 X 3.2 X 0.7	0.4
VFBGA7-144 PFBGA7-144	7 X 7 X 1.0 7x7x1.2	0.5
VFBGA8-181	8 X 8 X 1.0	0.5

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

PKG type/Pin count	Body size (mm)	Lead pitch (mm)
PFBGA5-60	5 X 5 X 1.2	0.5
VFBGA8-81	8 X 8 X 1.0	0.8
PFBGA10-121	10 X 10 X 1.2	0.8
VFBGA10-121	10 X 10 X 1.0	0.8
PFBGA10-144 VFBGA10-144	10 X 10 X 1.2 10 X 10 X 1.0	0.8
PFBGA10-160	10 X 10 X 1.2	0.65
PFBGA8-161 VFBGA8-161	8 X 8 X 1.2 8 X 8 X 1.0	0.5
PFBGA12-180	12 X 12 X 1.2	0.8
VFBGA10-180	10 X 10 X 1.0	0.65
PFBGA12-208	12 X 12 X 1.2	0.65
VFBGA10-240	10 X 10 X 1.0	0.5

Thin type BGA (VFBGA)