

CMOS 16-BIT SINGLE CHIP MICROCONTROLLER
S5U1C17589T21 Manual
(Software Evaluation Tool for S1C17589)

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Configuration of product number

Devices

S1 C 17xxx F 00E1 00

- Packing specifications
 - 00: Besides tape & reel
 - 0A: TCP BL 2 directions
 - 0B: Tape & reel BACK
 - 0C: TCP BR 2 directions
 - 0D: TCP BT 2 directions
 - 0E: TCP BD 2 directions
 - 0F: Tape & reel FRONT
 - 0G: TCP BT 4 directions
 - 0H: TCP BD 4 directions
 - 0J: TCP SL 2 directions
 - 0K: TCP SR 2 directions
 - 0L: Tape & reel LEFT
 - 0M: TCP ST 2 directions
 - 0N: TCP SD 2 directions
 - 0P: TCP ST 4 directions
 - 0Q: TCP SD 4 directions
 - 0R: Tape & reel RIGHT
 - 99: Specs not fixed

- Specification

- Package
 - D: Bare chip
 - F: QFP
 - B: BGA, WCSP

- Model number

- Model name
 - C: Microcontroller, digital products

- Product classification

- S1: Semiconductor

Development tools

S5U1 C 17000 Y2 1 00

- Packing specifications
 - 00: Standard packing

- Version
 - 1: Version 1

- Tool type
 - Hx: ICE
 - Tx: Evaluation board
 - Cx: Compiler package
 - Yx: Programmer software

- Corresponding model number
 - 17xxx: For S1C17xxx

- Tool classification
 - C: Microcontroller use

- Product classification
 - S5U1: Development tool for semiconductor products

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1. Overview

The S5U1C17589T21 is an evaluation board for the Seiko Epson single-chip microcontroller S1C17589. This board includes an S1C17589, a GPIO interface, and debug interface connectors.

1) CPU	S1C17589 (QFP15-100pin)
2) CPU clock	Internal oscillators OSC1: 32.768 kHz crystal resonator OSC3: 16 MHz crystal resonator
3) Devices mounted	S1C17589 (16-bit MCU) Crystal resonator (32.768 kHz) Crystal resonator (16 MHz) Reset switch Jumper switch for current consumption measurement × 2 Debug interface connector × 2
4) Operating temperature range	5 °C to 35 °C
5) Operating voltage range	HVDD = 1.8 V to 5.5 V, AVDD = 2.7 V to 5.5 V

Note! Be sure to avoid using chlorinated solvents on this board. Depending on the on-board component, they may cause corrosion that interferes with using the board safely.

1. Overview

1.1 Directions for Use

An S1C17589 software debugging and evaluation environment can be constructed with the procedure shown below.

<When performing software debugging>

- (1) Using the exclusive cables supplied with the ICDmini, connect the 4-pin target interface connector on the ICDmini (S5U1C17001H) and connector J6 on this board, and between the 4-pin Flash programming power supply connector on the ICDmini and connector J7 on this board.
- (2) Install jumpers to JP1 and JP2 that are used to measure current consumption if they have been removed.
- (3) Supply power to the power supply connector headers (J5 and J8) on this board from the S5U1C17001H2 (ICDmini Ver. 2) or a stabilized power supply. The power supply voltage must be within the S1C17589 operating voltage range.
- (4) Connect the ICDmini to the PC using the USB cable supplied with the ICDmini.

The DIP switches on the ICDmini (SW4 and SW5 to select the DSIO signal level) should be set to “Voltage input from the target system.” If the S5U1C17001H2 (ICDmini Ver. 2) is used as the emulator and the flash erasing/programming voltage is supplied from the ICDmini, set DIP SW8 on the ICDmini to configure the flash programming voltage output to be enabled.

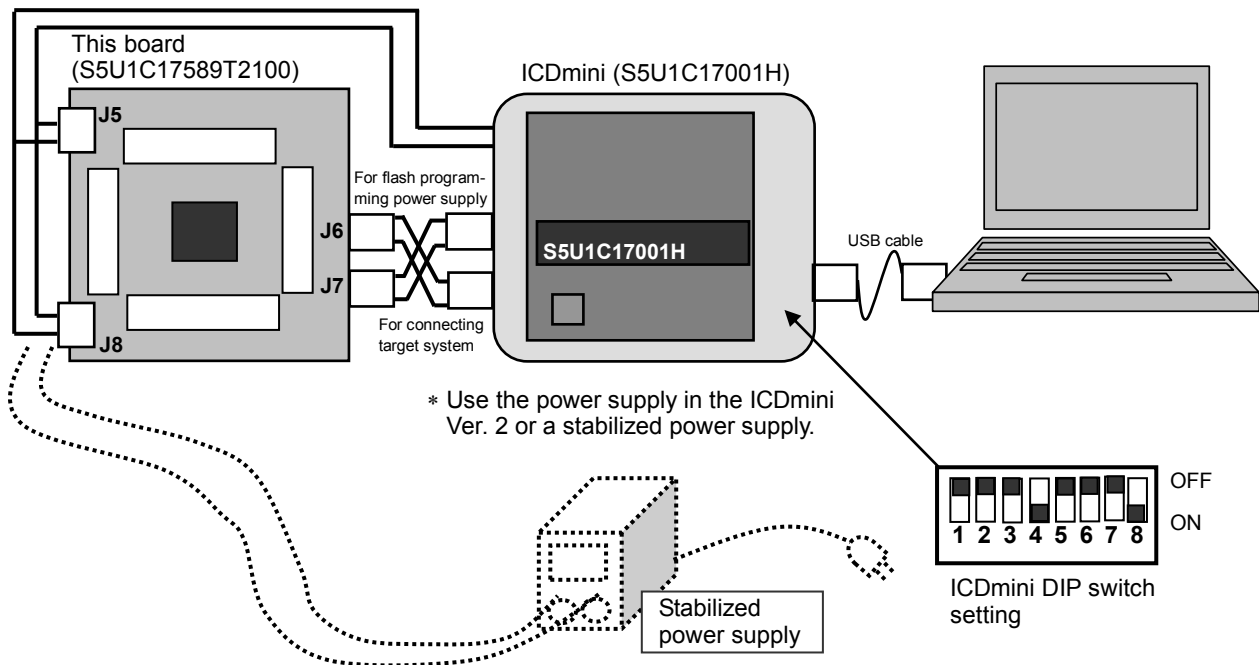


Figure 1.1.1 Connections for Software Debugging

<When performing free running with an external power supply>

Supply power to the power supply connector headers (J5 and J8) on this board from a stabilized power supply. The power supply voltage must be within the S1C17589 operating voltage range.

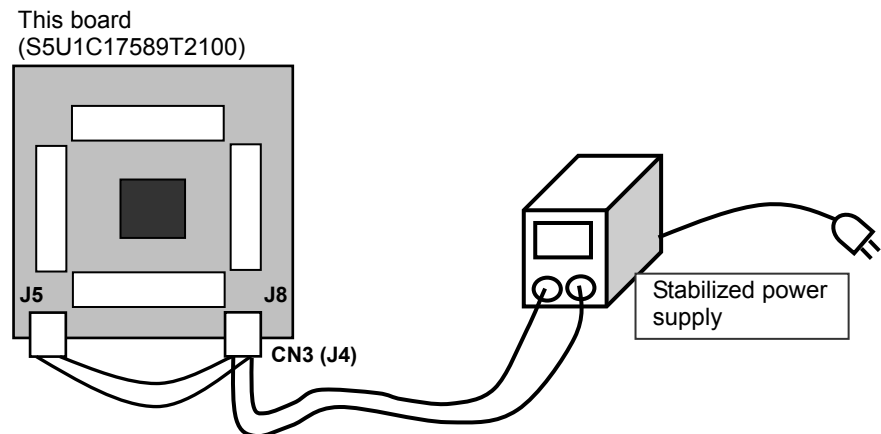


Figure 1.1.2 Connections for Free Running with an External Power Supply

2. Name and Function of Each Part

2. Name and Function of Each Part

2.1 Name of Each Part

The figure below shows the name and function of each part.

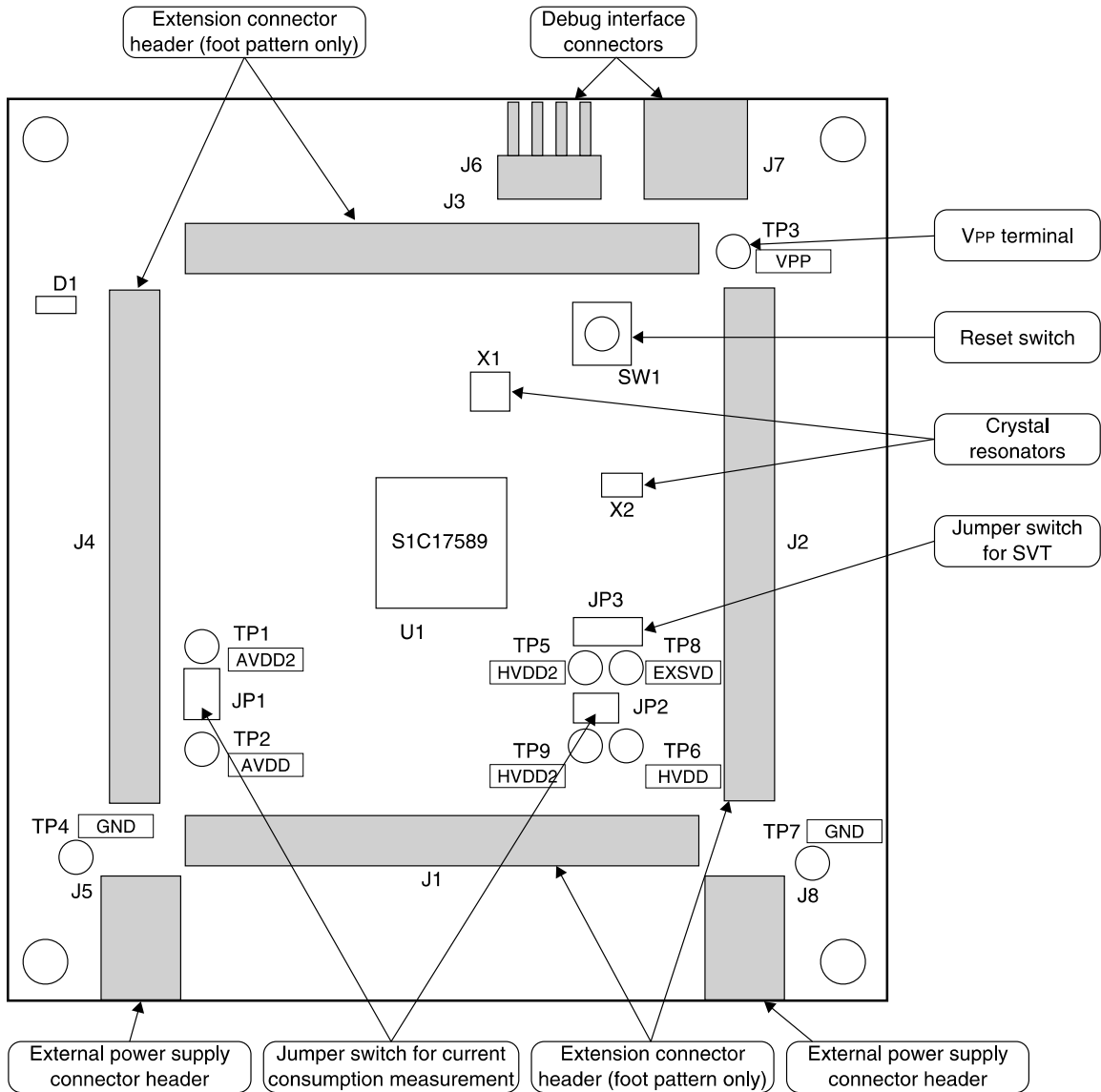


Figure 2.1.1 Component Names Mounted on S5U1C17589T21

2.2 Function of Each Part

2.2.1 Functions of Jumper Switches

Table 2.2.1.1 List of Jumper Switch Functions

Name	Function	Factory setting	Optional setting
JP1	S1C17589 current consumption measurement (AVDD) *1	Short-circuited	Open
JP2	S1C17589 current consumption measurement (HVDD) *1	Short-circuited	Open
JP3	External power supply monitor at EXSVD pin	Pins 1 and 2 short-circuited	<ul style="list-style-type: none"> • Pins 1 and 2 short-circuited The EXSVD pin is connected to the VDD voltage. • Pins 1 and 2 short-circuited The EXSVD pin is connected to TP8 to monitor the external voltage.

*1 To measure current consumption of the S1C17589 alone, insert an ammeter between the jumper switches.

2.2.2 Function of Each Part

Table 2.2.2.1 List of Parts and Functions

Part name	Location	Function
IC	U1	S1C17589 (16-bit MCU)
Connector headers	J1–J4	Extension interface connector headers (foot pattern only)
Connectors	J6, J7	Debug interface connectors (for connecting with S5U1C17001H)
Connectors	J5, J8	External power supply connectors
Switch	SW1	Reset input
Jumper	JP1	Jumper for AVDD current measurement
Jumper	JP2	Jumper for HVDD current measurement
Jumper	JP3	Jumper for switching voltage to be monitored at the EXSVD pin
Monitor pin	TP1 (AVDD2)	Through hole for AVDD2
Monitor pin	TP2 (AVDD)	Through hole for AVDD
Monitor pin	TP3 (VPP)	Through hole for VPP (Flash programming power supply)
Monitor pin	TP4, TP7 (GND)	Through hole for GND
Monitor pin	TP5, TP9 (HVDD2)	Through hole for HVDD2
Monitor pin	TP6 (HVDD)	Through hole for HVDD
Monitor pin	TP8 (EXSVD)	Through hole for inputting an external voltage to be monitored
Crystal resonator	X1	16 MHz
Crystal resonator	X2	32.768 kHz

3. Block Diagram

3. Block Diagram

The figure below shows the block diagram of the S5U1C17589T21.

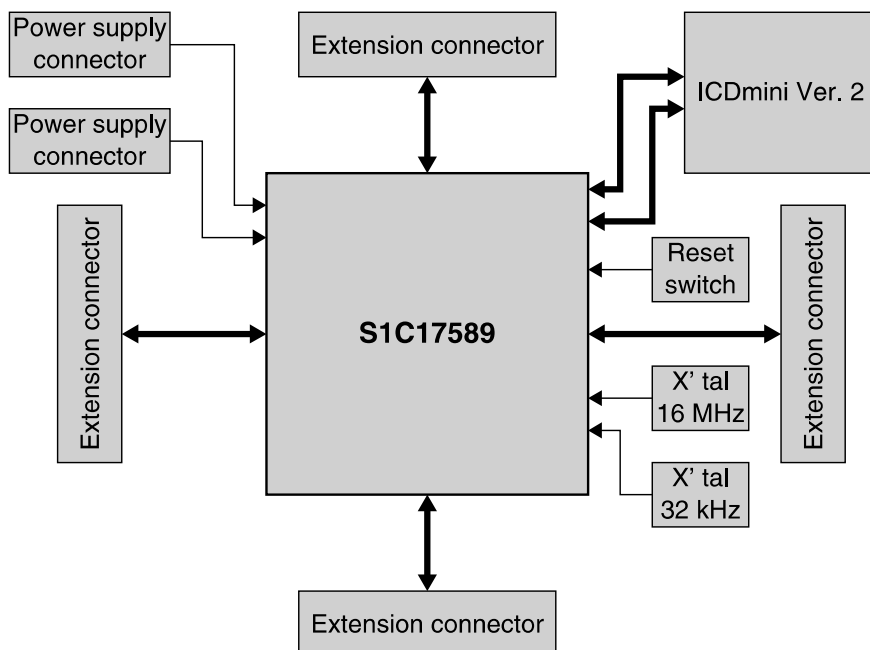


Figure 3.1 S5U1C17589T21 Block Diagram

4. Connectors

4.1 Extension Interface Connectors (J1–J4)

Table 4.1.1 Extension Interface Connector (J1) Pin Assignment Table

No.	Pin name	I/O	Function	No.	Pin name	I/O	Function
1	HVDD	–	Power supply (+)	21	P60	I/O	P60/EXCL20/UPMUX
2	HVDD	–	Power supply (+)	22	P61	I/O	P61/EXCL30/UPMUX
3	P40	I/O	P40	23	P62	I/O	P62/UPMUX
4	P41	I/O	P41	24	P63	I/O	P63/UPMUX
5	P42	I/O	P42	25	P64	I/O	P64/UPMUX
6	P43	I/O	P43	26	P65	I/O	P65/UPMUX
7	P44	I/O	P44	27	P66	I/O	P66/UPMUX
8	P45	I/O	P45	28	P67	I/O	P67/UPMUX
9	P46	I/O	P46	29	N.C.	–	–
10	P47	I/O	P47	30	N.C.	–	–
11	N.C.	–	–	31	N.C.	–	–
12	N.C.	–	–	32	N.C.	–	–
13	P50	I/O	P50	33	N.C.	–	–
14	P51	I/O	P51	34	N.C.	–	–
15	P52	I/O	P52	35	N.C.	–	–
16	P53	I/O	P53	36	N.C.	–	–
17	P54	I/O	P54	37	N.C.	–	–
18	P55	I/O	P55	38	N.C.	–	–
19	NC	–	–	39	GND	–	Power supply (–)
20	NC	–	–	40	GND	–	Power supply (–)

Table 4.1.2 Extension Interface Connector (J2) Pin Assignment Table

No.	Pin name	I/O	Function	No.	Pin name	I/O	Function
1	HVDD	–	Power supply (+)	21	N.C.	–	–
2	HVDD	–	Power supply (+)	22	N.C.	–	–
3	P70	I/O	P70/UPMUX	23	P90	I/O	P90/RTC1S/RTCINT
4	P71	I/O	P71/UPMUX	24	P91	I/O	P91/EXCL01
5	P72	I/O	P72/UPMUX	25	P92	I/O	P92/EXCL11
6	P73	I/O	P73/UPMUX	26	P93	I/O	P93/EXOSC
7	P74	I/O	P74/EXCL21/UPMUX	27	P94	I/O	P94
8	P75	I/O	P75/EXCL31/UPMUX	28	P95	I/O	P95
9	P76	I/O	P76/UPMUX	29	P96	I/O	P96
10	P77	I/O	P77/UPMUX	30	N.C.	–	–
11	N.C.	–	–	31	N.C.	–	–
12	N.C.	–	–	32	N.C.	–	–
13	P80	I/O	P80	33	N.C.	–	–
14	P81	I/O	P81	34	N.C.	–	–
15	P82	I/O	P82	35	N.C.	–	–
16	P83	I/O	P83	36	N.C.	–	–
17	P84	I/O	P84	37	N.C.	–	–
18	P85	I/O	P85	38	N.C.	–	–
19	P86	I/O	P86	39	GND	–	Power supply (–)
20	P87	I/O	P87	40	GND	–	Power supply (–)

4. Connectors

Table 4.1.3 Extension Interface Connector (J3) Pin Assignment Table

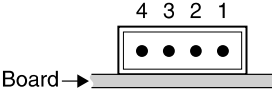
No.	Pin name	I/O	Function	No.	Pin name	I/O	Function
1	HVDD	–	Power supply (+)	21	N.C.	–	–
2	HVDD	–	Power supply (+)	22	N.C.	–	–
3	N.C.	–	–	23	PA0	I/O	PA0
4	N.C.	–	–	24	PA1	I/O	PA1
5	N.C.	–	–	25	PA2	I/O	PA2
6	N.C.	–	–	26	PA3	I/O	PA3
7	N.C.	–	–	27	PA4	I/O	PA4
8	N.C.	–	–	28	PA5	I/O	PA5
9	N.C.	–	–	29	N.C.	–	–
10	N.C.	–	–	30	N.C.	–	–
11	N.C.	–	–	31	P00	I/O	P00/UPMAX
12	N.C.	–	–	32	P01	I/O	P01/UPMAX
13	N.C.	–	–	33	P02	I/O	P02/UPMAX
14	#RESET	I	#RESET	34	P03	I/O	P03/UPMAX
15	N.C.	–	–	35	P04	I/O	P04/UPMAX
16	PD0	I/O	DST2/PD0	36	P05	I/O	P05/UPMAX
17	N.C.	–	–	37	P06	I/O	P06/UPMAX
18	PD1	I/O	DSIO/PD1	38	P07	I/O	P07/UPMAX
19	N.C.	–	–	39	GND	–	Power supply (–)
20	PD2	I/O	DCLK/PD2	40	GND	–	Power supply (–)

Table 4.1.4 Extension Interface Connector (J4) Pin Assignment Table

No.	Pin name	I/O	Function	No.	Pin name	I/O	Function
1	HVDD	–	Power supply (+)	21	N.C.	–	–
2	HVDD	–	Power supply (+)	22	N.C.	–	–
3	P10	I/O	P10/ADIN00	23	P30	I/O	P30/#ADTRG0/UPMUX
4	P11	I/O	P11/ADIN01	24	P31	I/O	P31/#ADTRG1/UPMUX
5	P12	I/O	P12/ADIN02	25	P32	I/O	P32/EXCL00/UPMUX
6	P13	I/O	P13/ADIN03	26	P33	I/O	P33/EXCL10/UPMUX
7	P14	I/O	P14/ADIN04	27	P34	I/O	P34/REMO/UPMUX
8	P15	I/O	P15/ADIN05	28	P35	I/O	P35/FOUT/UPMAX
9	P16	I/O	P16/ADIN06	29	P36	I/O	P36/CLPLS/UPMAX
10	P17	I/O	P17/ADIN07	30	P37	I/O	P37/UPMAX
11	N.C.	–	–	31	N.C.	–	–
12	N.C.	–	–	32	N.C.	–	–
13	P20	I/O	P20/ADIN10	33	N.C.	–	–
14	P21	I/O	P21/ADIN11	34	N.C.	–	–
15	P22	I/O	P22/ADIN12	35	AVDD	–	Power supply (+)
16	P23	I/O	P23/ADIN13	36	AVDD	–	Power supply (+)
17	P24	I/O	P24/ADIN14	37	N.C.	–	–
18	P25	I/O	P25/ADIN15	38	N.C.	–	–
19	P26	I/O	P26/ADIN16	39	GND	–	Power supply (–)
20	P27	I/O	P27/ADIN17	40	GND	–	Power supply (–)

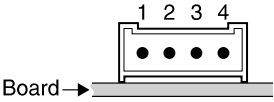
4.2 Debug Interface Connectors (J6, J7)

Table 4.2.1 Debug Interface Connector (J6) Pin Assignment Table

Board →				
	No.	Pin name	I/O	Function
	1	DCLK	O	Clock signal output for debugging
	2	GND	–	Power supply (GND)
	3	DSIO	I/O	Serial communication signal input/output for debugging
	4	DST2	O	Debug status signal output

Note! Make sure of the connector direction before connecting this board to the ICDmini.

Table 4.2.2 Debug Interface Connector (J7) Pin Assignment Table

Board →				
	No.	Pin name	I/O	Function
	1	VPP	I	Flash programming voltage input
	2	GND	–	Power supply (GND)
	3	RESET	I	Target reset signal input
	4	VCCIN	O	Target operating voltage output

4.3 Power Supply Connectors (J5, J8)

Table 4.3.1 AVDD Power Supply Connector (J5) Pin Assignment Table

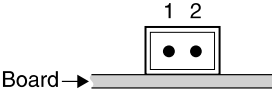
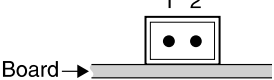
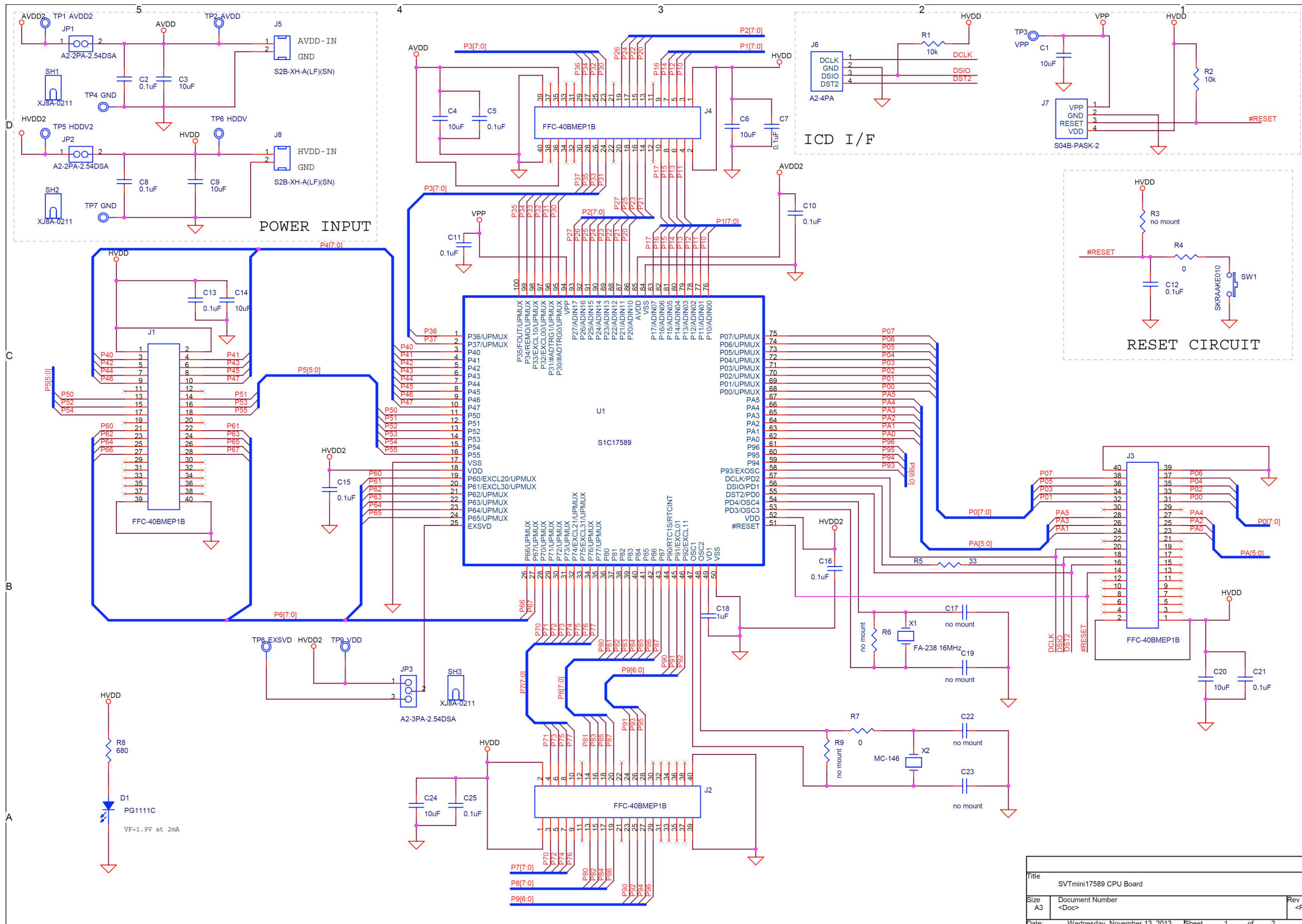
Board →			
	No.	Pin name	Function
	1	AVDD-IN	AVDD power supply Supply a power voltage even if the A/D converter is not used.
	2	GND	Power supply (GND)

Table 4.3.2 HVDD Power Supply Connector (J8) Pin Assignment Table

Board →			
	No.	Pin name	Function
	1	HVDD-IN	HVDD power supply
	2	GND	Power supply (GND)

Appendix A Circuit Diagram and Parts List



Appendix A Circuit Diagram and Parts List

Table A.1 S5U1C17589T21 Parts List *1

Item	Quantity	Reference	Part	Manufacture
1	8	C1, C3, C4, C6, C9, C14, C20, C24	10 μ F/10 V LMK107BBJ106MALT	TAIYO YUDEN CO., LTD.
2	12	C2, C5, C7, C8, C10, C11, C12, C13, C15, C16, C21, C25	0.1 μ F/10 V GRM188B31H104K	Murata Manufacturing Co., Ltd.
3	4	C17, C19, C22, C23	–	Not mounted.
4	1	C18	1 μ F/10 V GRM188B31E105K	Murata Manufacturing Co., Ltd.
5	2	R3, R6, R9	–	Not mounted.
6	1	D1	PG1111C	STANLEY ELECTRIC CO., LTD.
7	2	JP2, JP1	A2-2PA-2.54DSA	HIROSE ELECTRIC CO., LTD.
8	1	JP3	A2-3PA-2.54DSA	HIROSE ELECTRIC CO., LTD.
9	4	J1, J2, J3, J4	–	Not mounted.
10	2	J8, J5	S2B-XH-A(LF)(SN)	J.S.T. Mfg. Co.,Ltd.
11	1	J6	A2-4PA-2.54DS(71)	HIROSE ELECTRIC CO., LTD.
12	1	J7	S04B-PASK-2(LF)(SN)	J.S.T. Mfg. Co.,Ltd.
13	2	R2, R1	10 k Ω MCR03EZPJ103	ROHM Co., Ltd.
14	2	R7, R4	0 Ω MCR03EZPJ000	ROHM Co., Ltd.
15	1	R5	33 Ω MCR03EZPJ330	ROHM Co., Ltd.
16	1	R8	680 Ω MCR03EZPJ681	ROHM Co., Ltd.
17	3	SH1, SH2, SH3	XJ8A-0211	OMRON Corporation
18	1	SW1	SKRAAKE010	ALPS ELECTRIC CO., LTD.
19	1	U1	S1C17589	SEIKO EPSON CORPORATION
20	1	X1	FA-238 16 MHz	SEIKO EPSON CORPORATION
21	1	X2	MC-146 32.768 kHz	SEIKO EPSON CORPORATION
22	4	(Spacer)	AS-315	Hirosugi-Keiki Co., Ltd.
23	4	(Round head screw with washer)	B-0306-N	Hirosugi-Keiki Co., Ltd.

*1 Parts are subject to change without notice.

Revision History

Revision History

Attachment-1

Rev. No.	Date	Page	Category	Contents
Rev 1.0	2015/03/23	All	New	New establishment

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