

CMOS 16-BIT SINGLE CHIP MICROCONTROLLER
S5U1C17564T1 Manual
(Software Evaluation Tool for S1C17564)

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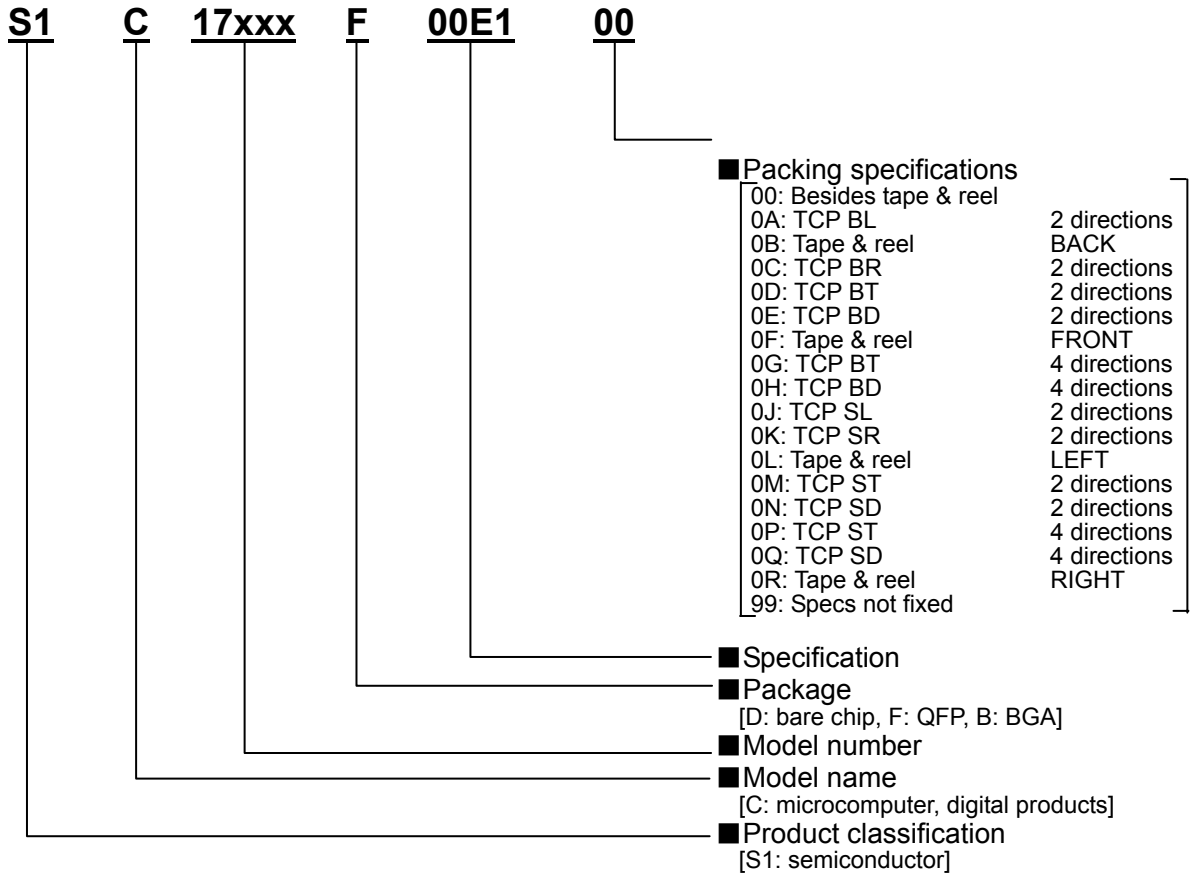
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Configuration of product number

● Devices



● Development tools

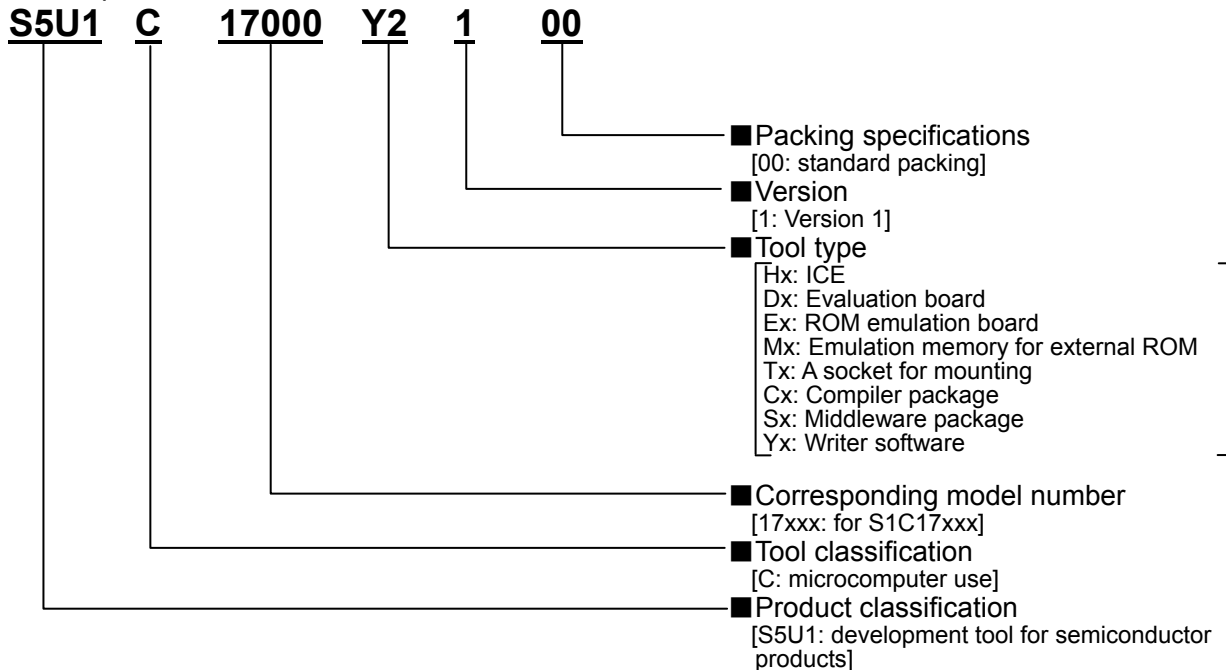


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1. Overview

S5U1C17564T1 (SVT17564: Software eValuation Tool for S1C17564) and S5U1C17564T2 (SVTmini 17564: Software eValuation Tool for S1C17564)^{*1} are evaluation and development boards for S1C17564, a single chip microcontroller from Seiko Epson.

S5U1C17564T1 is a combination of two boards, a CPU board and a peripheral board. The CPU board is equipped with an IC socket for S1C17564, an extension connector, a debug connector for S1C17564, etc. The peripheral board is equipped with an EPD (Electrophoretic Display), a connector for the EPD, jumpers, through holes, tact switches, etc. By using those peripherals, you can display data on EPD, use switch inputs, etc.

S5U1C17564T2 comes with a CPU board used in S5U1C17564T1 only and can be used for many applications using an extension connector.

1) CPU	S1C17564 (QFP15-128)
2) Power supply voltage	External power supply (DC3.0V) Coin battery (CR2032: 3.0V) CR2032 has been installed in the battery holder.
3) CPU clock generator	OSC1 : 32.768kHz Crystal oscillator OSC3 : 12.000MHz Crystal oscillator
4) Onboard devices	Socket for S1C17564 (S1C17564 has been installed in the socket.)
CPU board:	Crystal oscillator Reset switch Extension connector LED Connector Jumper switches for various settings
Peripheral board:	Connector for EPD EPD panel (2"EPD panel from Chilin) Tact switches Jumper switches for various settings
5) Accessories	Jumper switches × () Power cable
6) Operating ambient temperature range	5 °C to 35 °C
7) Operating power supply voltage range	2.8 V to 3.6 V

^{*1} S5U1C17564T1 is a package that comes with a peripheral board only.
S5U1C17564T2 is a package that comes with a CPU board only.

1. Overview

1.1 Using the board

Follow the steps below to set up an evaluation environment to debug software for S1C17564 along with the 2"EPD panel from PDI.

<When you debug software>

- (1) Use the dedicated cables bundled with S5U1C17001H2 (ICDminiVer.2) to connect the 4-pin connector for target connection and the 4-pin connector for power supply for Flash writing on the ICDminiVer.2 to the connectors CN2-1(J5) and CN2-2(J6) on the CPU board respectively.
- (2) Set the jumper switch for REGEN selection (JP2) on the CPU board to the "EN" side.
- (3) Short-circuit the jumper switches JP1, JP5, JP6, and JP7 on the CPU board.
- (4) You do not need to supply power for the power connectors JP7, JP8, and JP9 on the CPU board.

*) Supply the power from the peripheral board (SVT17564: S5U1C17564T11).

- (5) Use the USB cable bundled with the ICDminiVer.2 to connect the ICDminiVer.2 to the PC.

*) As for the dip switch settings of the ICDminiVer.2, turn OFF all SW1-7 and turn ON SW8.

<In the case of free running operation using a coin battery (when the CPU board and the peripheral board are used in combination.)>

- (1) You do not need to change the jumper switch settings on the CPU board.
- (2) Disconnect all the cables to the ICDminiVer.2.
- (3) Install a coin battery to the battery holder mounted on the peripheral board.
- (4) Short-circuit the jumper (SW3) on the peripheral board.

Table 1.1 List of jumper settings for each selection of power supply

Board	Series	Jumper SW number	Function	Selection of power supply	
				Coin battery	External power supply (CN1)
Peripheral	power supply	SW1	External power supply SW	OPEN	SHORT : on
		SW3	Coin batterySW	SHORT : on	OPEN
	regulator	SW2	shutdown		OPEN
		SW16	REG-enable		SHORT
		SW4	P52-Lo : shutdown		OPEN
		SW5	REG-OUT		SHORT
		SW6	PS-OUT		OPEN
	level shifter	SW29	HVDD-IN		SHORT
		SW30	RVDD-IN		SHORT
		SW37	GND		SHORT
	panel	SW9	—		SHORT
		SW12	—		SHORT
		SW7	—		OPEN
		SW8	—		OPEN
		SW10	—		OPEN
		SW11	—		OPEN
	bypass	SW31	levelshifter bypass		OPEN
		SW32	levelshifter bypass		OPEN
		SW33	levelshifter bypass		OPEN
		SW34	levelshifter bypass		OPEN
		SW35	levelshifter bypass		OPEN
		SW36	levelshifter bypass		OPEN
	offset	SW17	P45:Hi by SHORT		OPEN
		SW18	P45:Lo by SHORT		OPEN
		SW19	P44:Hi by SHORT		OPEN
		SW20	P44:Lo by SHORT		OPEN
		SW21	P43:Hi by SHORT		OPEN
		SW22	P43:Lo by SHORT		OPEN
		SW23	P42:Hi by SHORT		OPEN
		SW24	P42:Lo by SHORT		OPEN
		SW25	P41:Hi by SHORT		OPEN
		SW26	P41:Lo by SHORT		OPEN
		SW27	P40:Hi by SHORT		OPEN
		SW28	P40:Lo by SHORT		OPEN

SHORT: Short-circuit the jumper switch
 —: Any setting is OK

OPEN: Remove the jumper switch
 (Other): Set the jumper switch to the specified side.

2. Function and name of each component

2. Function and name of each component

2.1 Name of each component

The function and name of each component are shown below.

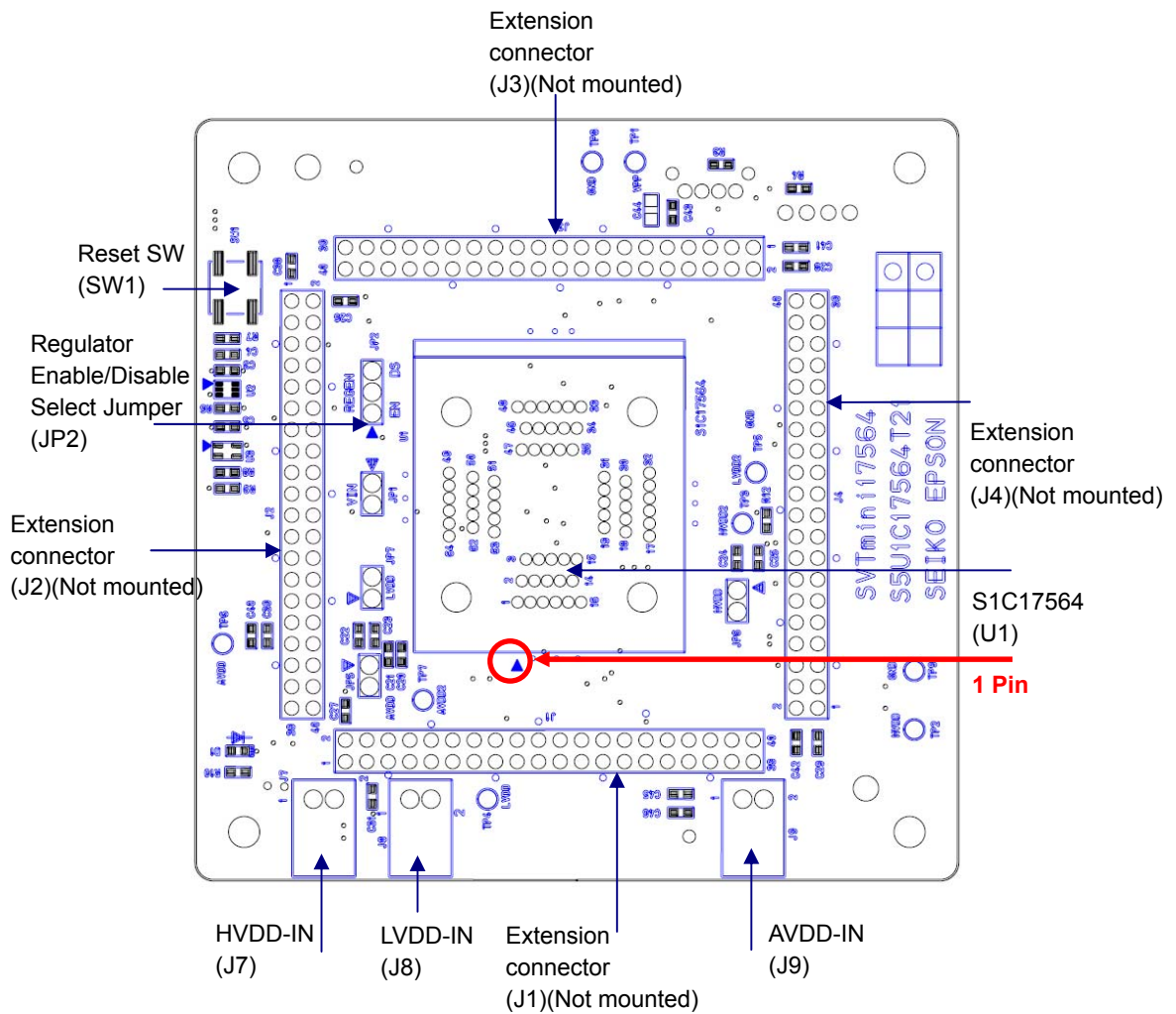


Figure 2.1 Names of the components on the front side of the S5U1C17564T1 CPU board.

2. Function and name of each component

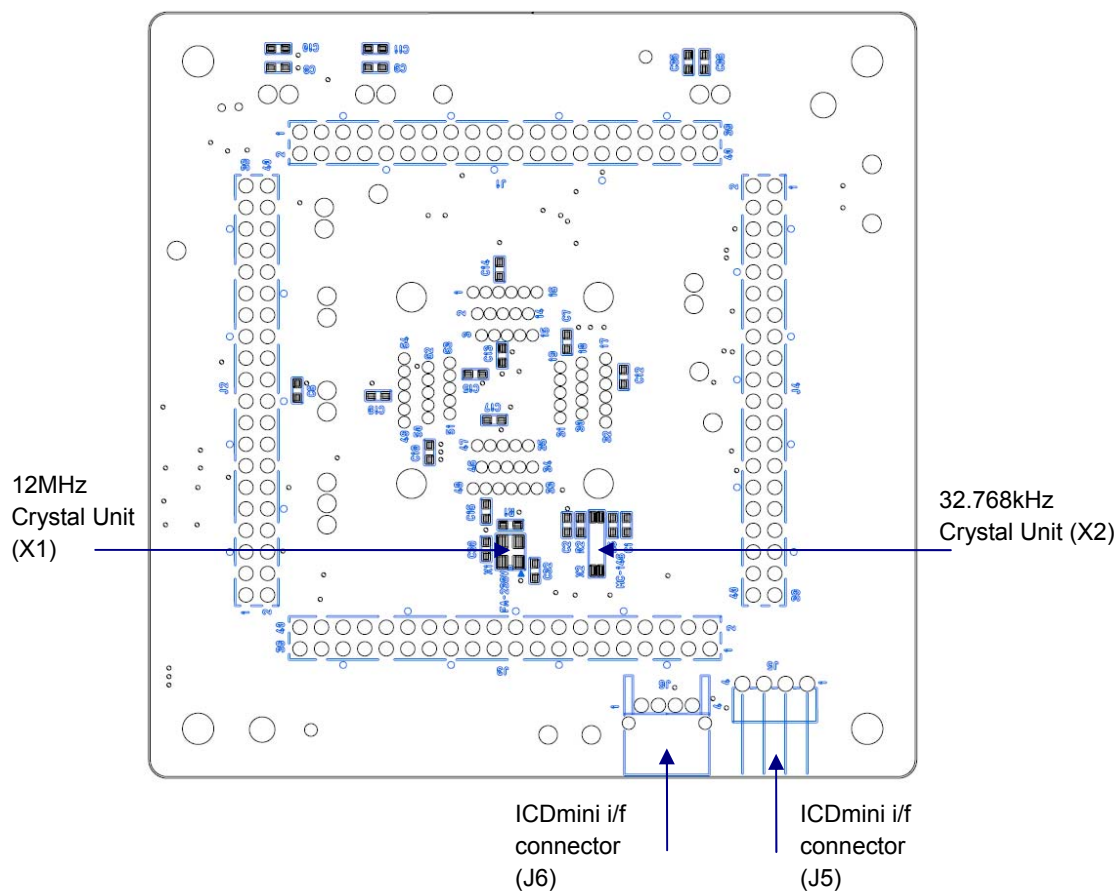


Figure 2.2 Names of the components on the back side of the S5U1C17564T1 CPU board.

Caution! The position of the pin 1 of the CN2-1 (J5) is as shown above. When you connect the ICDminiVer.2 to this board, pay attention to the direction of the connector.

2. Function and name of each component

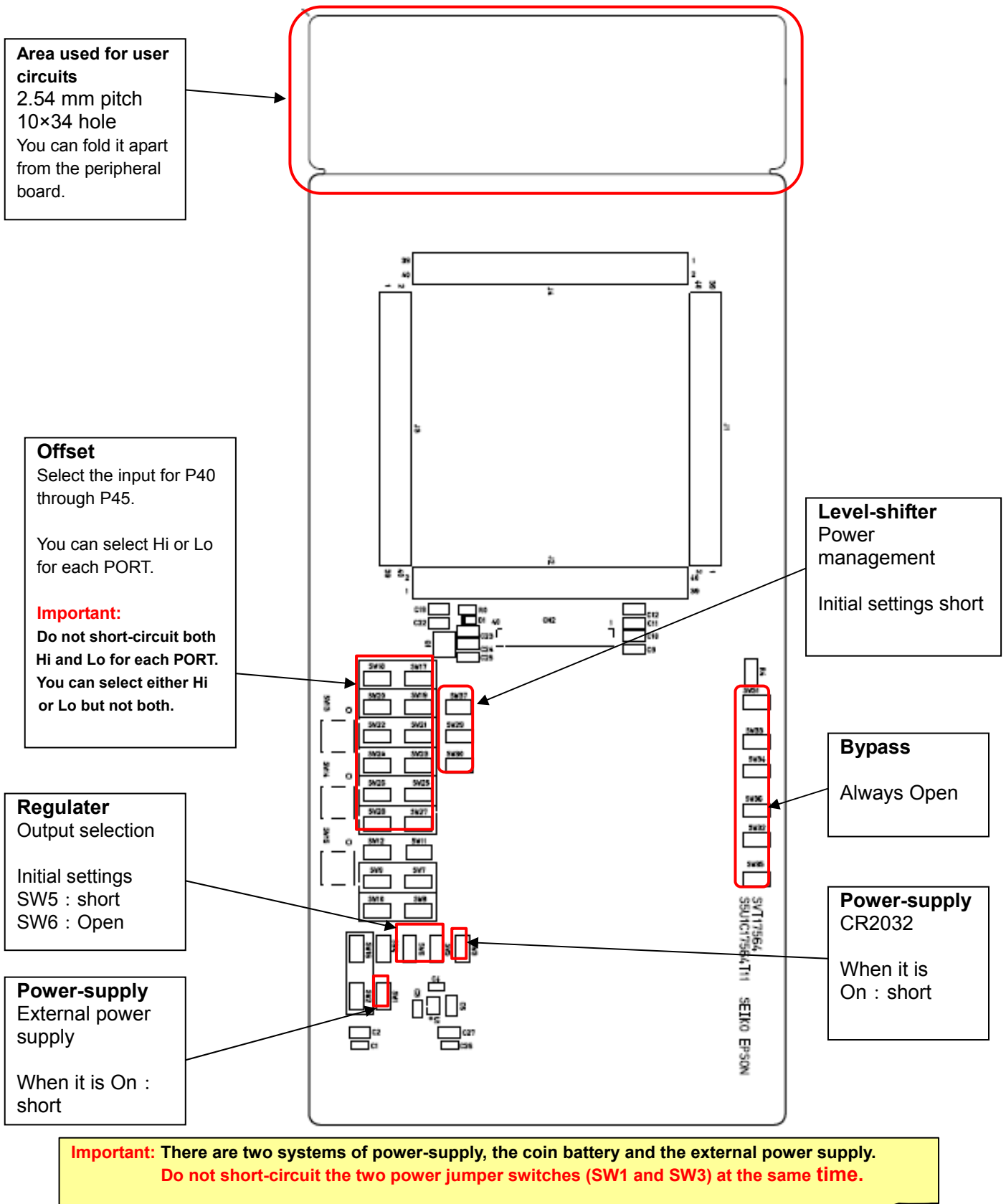


Figure 2.3 Names of the components on the front side of the S5U1C17564T1 peripheral board.

*) Components and circuit diagrams are subject to change without notice.

2. Function and name of each component

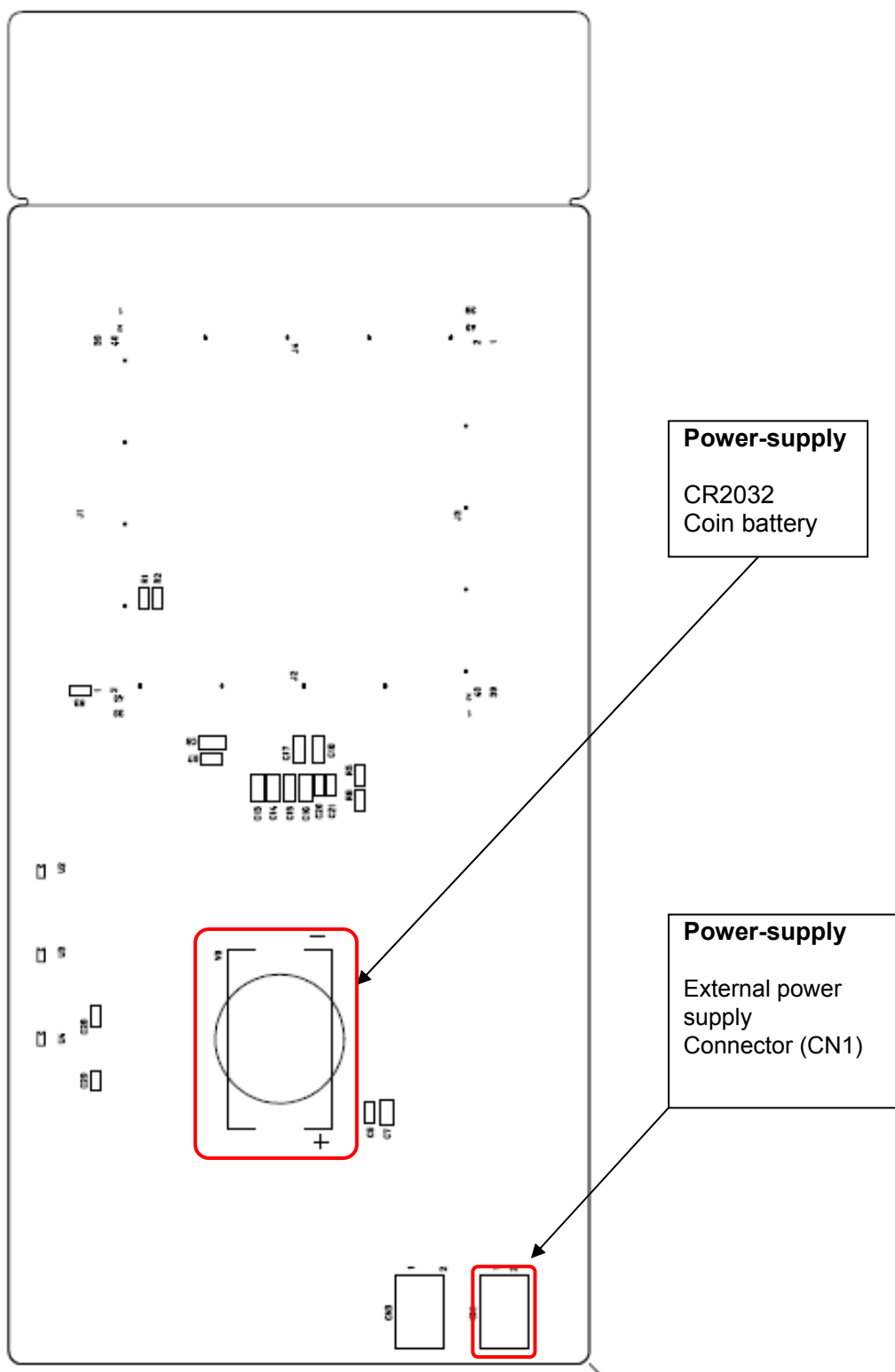


Figure 2.4 Names of the components on the back side of the S5U1C17564T1 peripheral board.

*) Components and circuit diagrams are subject to change without notice.

2. Function and name of each component

2.2 Function of each component

2.2.1 Jumper switch function

Table 2.2.1 List of jumper functions on the peripheral board (initial settings)

Board	Series	Jumper SW number	Function	Selection of power supply	
				Coin battery	External power supply (CN1)
Peripheral	power supply	SW1	External power supply SW	OPEN	SHORT : on
		SW3	Coin battery SW	SHORT : on	OPEN
	regulator	SW2	shutdown		OPEN
		SW16	REG-enable		SHORT
		SW4	P52-Lo : shutdown		OPEN
		SW5	REG-OUT		SHORT
		SW6	PS-OUT		OPEN
		level shifter	SW29	HVDD-IN	
	SW30		RVDD-IN		SHORT
	SW37		GND		SHORT
	panel	SW9	—		SHORT
		SW12	—		SHORT
		SW7	—		OPEN
		SW8	—		OPEN
		SW10	—		OPEN
		SW11	—		OPEN
	bypass	SW31	levelshifter bypass		OPEN
		SW32	levelshifter bypass		OPEN
		SW33	levelshifter bypass		OPEN
		SW34	levelshifter bypass		OPEN
		SW35	levelshifter bypass		OPEN
		SW36	levelshifter bypass		OPEN
	offset	SW17	P45:Hi by SHORT		OPEN
		SW18	P45:Lo by SHORT		OPEN
		SW19	P44:Hi by SHORT		OPEN
		SW20	P44:Lo by SHORT		OPEN
		SW21	P43:Hi by SHORT		OPEN
		SW22	P43:Lo by SHORT		OPEN
		SW23	P42:Hi by SHORT		OPEN
		SW24	P42:Lo by SHORT		OPEN
		SW25	P41:Hi by SHORT		OPEN
		SW26	P41:Lo by SHORT		OPEN
SW27		P40:Hi by SHORT		OPEN	
SW28		P40:Lo by SHORT		OPEN	

2. Function and name of each component

2.2.2 Function of each part

Table 2.2.3 List of parts and functions of each component of the peripheral board.

Part name	Location	Function
IC	U1	Power regulator for panel
	U2, U3	Level-shifter MCU -> EPD
	U4	Level-shifter EPD -> MCU
Connecter	J1 to J4	Interface to the CPU board
	CN1	Connector to the external power supply for the peripheral board
	CN2	Connector to the EPD panel (used for all 1.5", 2", and 3"W)
	CN3	Connector to the power supply for the EPD panel on the peripheral board
Thermistor	R4	Thermistor for the measurement of the ambient temperature.
MOS-FET	Q1	Used for control of the EPD panel
Tact switch	SW13 to SW15	P20-P22 port input switches
CR2032 holder	V0	Holder for a coin battery used for operation check

3. Block diagram

3. Block diagram

The following figure shows the block diagram of S5U1C17564T1.

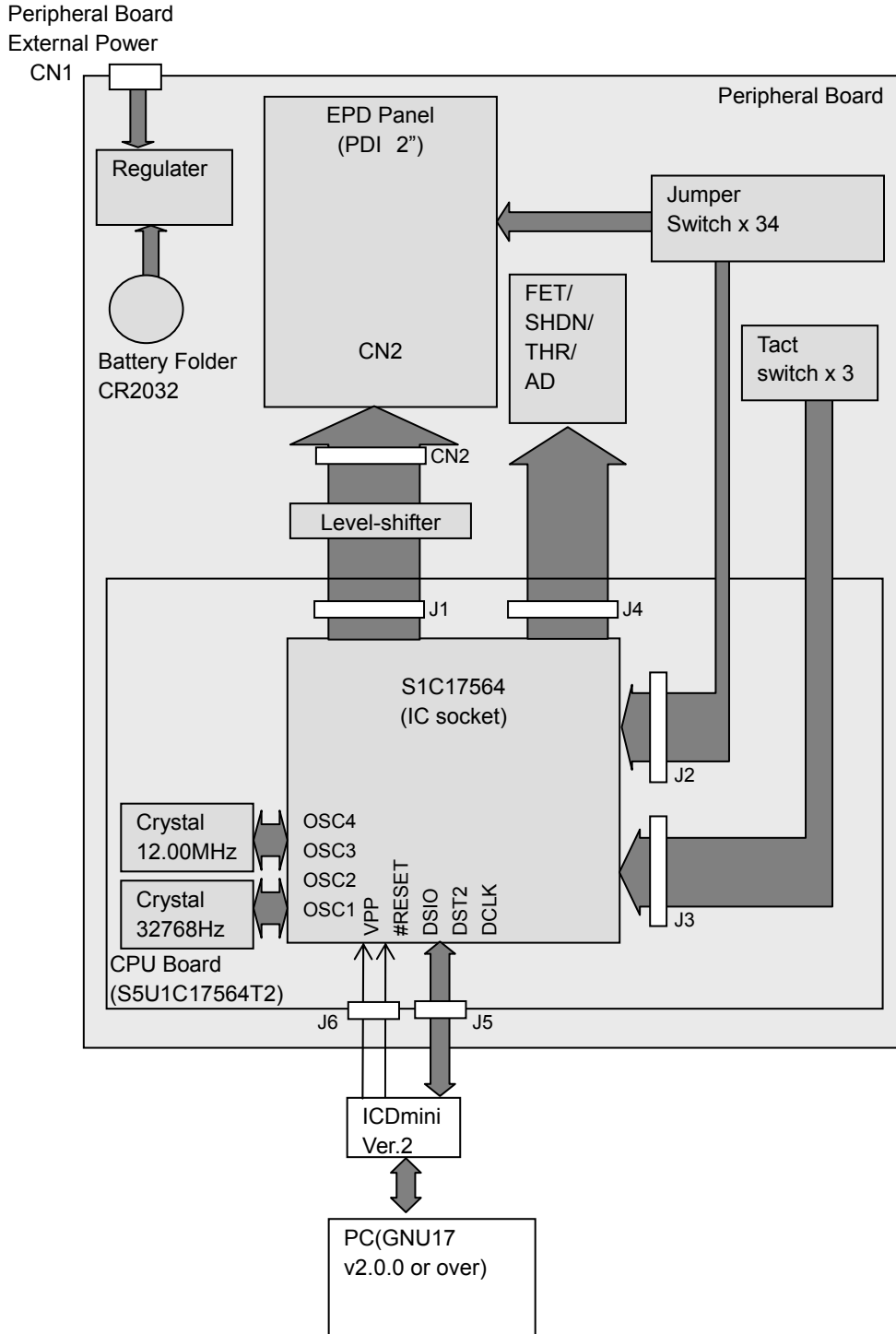


Figure 3.1 S5U1C17564T1 block diagram

4. Connector

4.1 CPU board connector

4.1.1 CPU board interface connector (J1 - J4)

Table 4.1 Pin assignment of CPU board interface connector (J1 and J2)

Pin No	J1 : S1C17564 connected	Pin No	J2 : S1C17564 connected
1	HVDD	1	HVDD
2	HVDD	2	HVDD
3	Non connected	3	Non connected
4	Non connected	4	SIN0/TOUT6/CAP6/P40
5	Non connected	5	Non connected
6	Non connected	6	Non connected
7	US_SDI0/P50	7	Non connected
8	N.C	8	SOUT0/TOUT7/CAP7/P41
9	Vss	9	Non connected
10	Vss	10	Non connected
11	AIN1/P01	11	Non connected
12	AIN0/P00	12	SCLK0/TOUT1/CAP1/P42
13	Vss	13	Non connected
14	Vss	14	Non connected
15	Non connected	15	Non connected
16	Non connected	16	Non connected
17	Non connected	17	Non connected
18	Non connected	18	Non connected
19	Non connected	19	Non connected
20	P31/#BFR/#ADTRG	20	Non connected
21	#SPISS/TOUT5/CAP5/P13	21	SDA0/P45(EXCL0)
22	SDI0/P10	22	#RESET
23	SDO0/P11	23	Non connected
24	SPICLK0/P12	24	SCL0/P17
25	Non connected	25	Non connected
26	SIN1/SDI1/P14	26	Non connected
27	Non connected	27	Non connected
28	SDA1/REMI/P43	28	Non connected
29	Non connected	29	Non connected
30	SCL1/REMO/P44	30	Non connected
31	Vss	31	Vss
32	#BFR/SPISS2/P25	32	Non connected
33	AVDD	33	AVDD
34	US_SDO0/P51	34	TOUT4/CAP4/FOUTA/P32
35	Vss	35	Vss
36	SOUT1/SDO1/P15	36	AIN3/US_SS11/P03
37	SCLK1/SPICLK1/P16	37	Non connected
38	SDO2/P24(EXCL3)	38	AIN2/US_SS10/P02
39	Vss	39	Vss
40	Vss	40	Vss

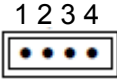
4. Connector

Table 4.1 Pin assignment of CPU board interface connector (J3 and J4)

Pin No	J3 : S1C17564 connected	Pin No	J4 : S1C17564 connected
1	HVDD	1	HVDD
2	HVDD	2	HVDD
3	Non connected	3	Non connected
4	Non connected	4	P52/US_SCK0
5	Non connected	5	Non connected
6	P20/TOUT2/CAP2	6	P26/SDA1
7	Non connected	7	Non connected
8	Non connected	8	P27/SCL1
9	Non connected	9	Non connected
10	P21/TOUT3/CACP3	10	P30/TOUT0/CAPO
11	Non connected	11	Non connected
12	Non connected	12	Non connected
13	Non connected	13	Non connected
14	Non connected	14	Non connected
15	Non connected	15	DSIO/P36
16	Non connected	16	DST2/P37
17	Non connected	17	DCLK/P35
18	Non connected	18	Non connected
19	Non connected	19	Non connected
20	Non connected	20	Non connected
21	Non connected	21	Non connected
22	Non connected	22	Non connected
23	Non connected	23	Non connected
24	Non connected	24	Non connected
25	Non connected	25	Non connected
26	Non connected	26	Non connected
27	Non connected	27	Non connected
28	Non connected	28	Non connected
29	Non connected	29	Non connected
30	P22(EXCL1)/FOUTB	30	P53/US_SDI1
31	Non connected	31	Non connected
32	Non connected	32	P33/REMI/SPICLK2
33	Non connected	33	Non connected
34	P23(EXCL2)/SDI2	34	P34/REMO/#SPISS
35	Non connected	35	Non connected
36	Non connected	36	P54/US_SDO1
37	Non connected	37	Non connected
38	Non connected	38	P55/US_SCK1
39	Vss	39	Vss
40	Vss	40	Vss

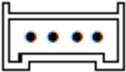
4.1.2 Debug interface connector (J5 - J6)

Table 4.5 Pin assignment of CPU board debug interface (J5)

	No.	Pin name	I/O	Function
	1	DCLK	O	Clock signal for debugging
	2	GND	—	Power (GND)
	3	DSIO	I/O	Input/Output signal for serial interface for debugging
	4	DST2	O	Debug status signal

Caution! The position of the pin 1 of the CN2-1 (J5) is as shown above. When you connect the ICDminiVer.2 to this board, pay attention to the direction of the connector.

Table 4.6 Pin assignment of CPU board interface connector (J6)

	No.	Pin name	I/O	Function
	1	VPP	I	Power input for flash memory programming
	2	GND	—	Power (GND)
	3	RESET	I	Reset signal input for the target
	4	VCCIN	O	Target voltage output

4.1.3 Power connector (J7 - J9)

Table 4.7 Pin assignment of CPU board power connector (J7)

No.	Pin name	I/O	Function
1	HVDD	—	Power(+)
2	GND	—	Power(GND)

Table 4.8 Pin assignment of CPU board power connector (J8)

No.	Pin name	I/O	Function
1	LVDD	—	Power(+)
2	GND	—	Power(GND)

Table 4.9 Pin assignment of CPU board power connector (J9)

No.	Pin name	I/O	Function
1	AVDD	—	Power(+)
2	GND	—	Power(GND)

4. Connector

4.2 Peripheral board connector

4.2.1 Power connector (CN1)

Table 4.9 Pin assignment of peripheral board power connector (CN1)

No.	Pin name	I/O	Function
1	VDD	—	Power(+)
2	GND	—	Power(GND)

*) When you supply external power to the peripheral board, connect the power to CN1.

4.2.2 Power connector (CN3)

Table 4.10 Pin assignment of peripheral board power connector (CN3)

No.	Pin name	I/O	Function
1	VDD	—	Power(+)
2	GND	—	Power(GND)

*) If you need to supply power for the EPD panel on the peripheral board, connect the power to CN3.
(Normally, this connector is not used.)

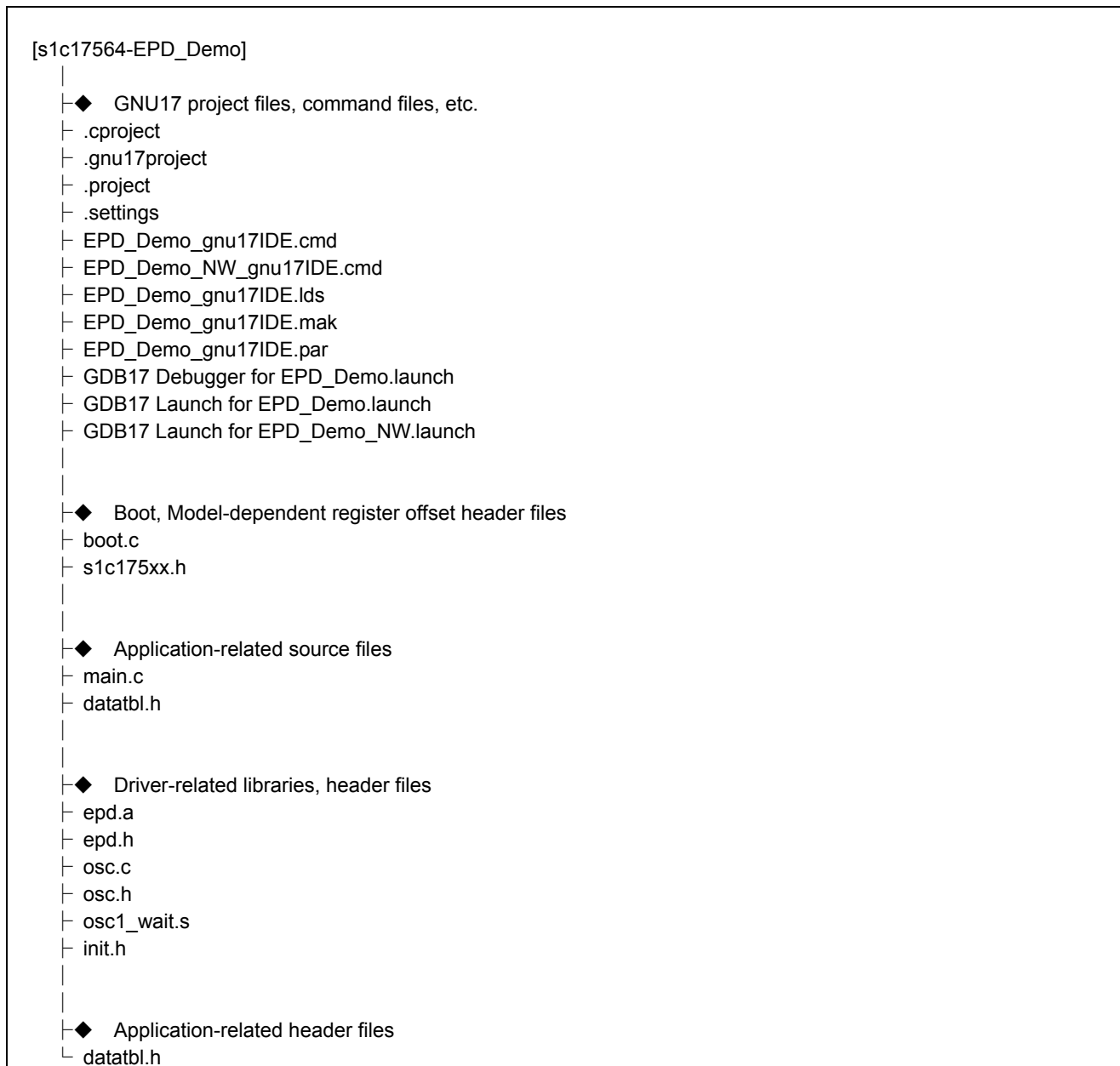
4.2.3 EPD panel interface connector (CN2)

Table 4.11 Pin assignment of EPD interface connector (CN2)

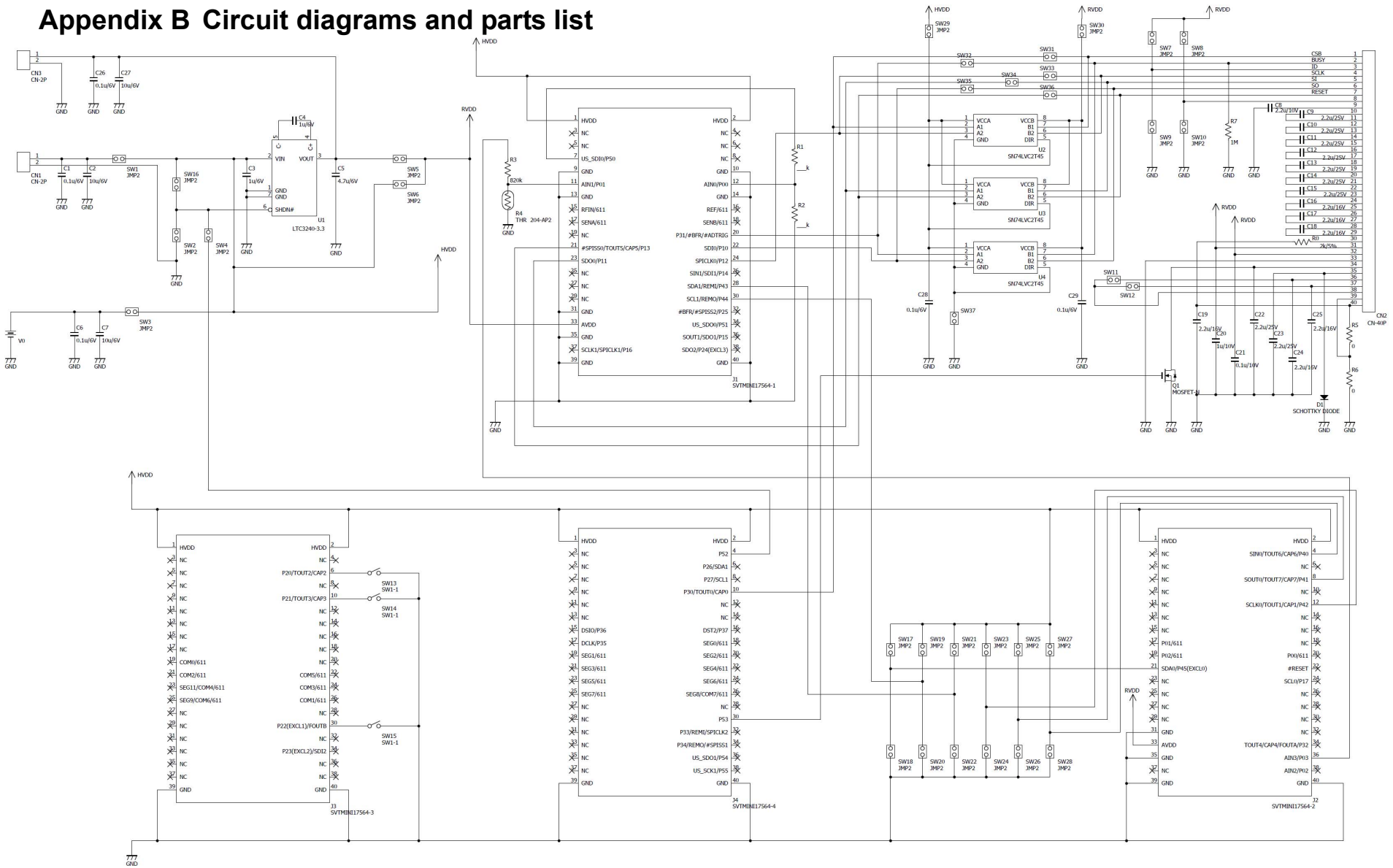
No	Pin name	I/O	Function
1	CSB	O	cs
2	BUSY	I	Panel-BUSY
3	ID	—	—
4	SCLK	O	Clk
5	SI	O	DATA OUT(MCU)
6	SO	I	DATA IN(MCU)
7	RESET	O	RESET OUT(MCU)
8	—	—	—
9	—	—	—
10	—	—	—
11	—	—	—
12	—	—	—
13	—	—	—
14	—	—	—
15	—	—	—
16	—	—	—
17	—	—	—
18	—	—	—
19	—	—	—
20	—	—	—
21	—	—	—
22	—	—	—
23	—	—	—
24	—	—	—
25	—	—	—
26	—	—	—
27	—	—	—
28	—	—	—
29	—	—	—
30	—	—	—
31	—	—	—
32	—	—	—
33	—	—	—
34	—	—	—
35	—	—	—
36	—	—	—
37	—	—	—
38	—	—	—
39	—	—	—
40	—	—	—

Appendix A File organization of the sample software

The following diagram shows the organization of the sample software.



Appendix B Circuit diagrams and parts list



Appendix B Circuit diagrams and parts list

S5U1C17564T1100 parts list (Peripheral board)*1

No	PARTS NAME	MATERIAL LOCATION	STANDARD	MODEL No.	MAKER
1	Connector	CN1,3		S2B-XH-A(LF)(SN)	JST
2	Connector	CN2		40-pin connector	
3	Connector	J1,2,3,4	40pin,2.54mm,Female	BCS-120-L-D-TE	Samtec
4					
5	Coin battery holder	V0	CR2032	BA2032SM	TAKACHI
6					
7	IC	U1	MS10	LTC3240-3.3	Linear Technology
8	IC	U2,3,4	DCU	SN74LVC2T45	TI
9					
10	Diode	D1	SCHOTTKY DIODE	RB520CS-30T2R	ROHM
11					
12	Transistor	Q1	SOT-23-3	2N7002K	Fairchild
13				2N7002	NXP
14	Switch	SW 13,14,15		SKRAAKE010	ALPS
15	Jumper	SW1,2,3,4,5,6,7,8,9,10,11,12,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37	2Pin	JTS-2502	HIROSUGI-KEIKI
16					
17					
18					
19	Ceramic capacitor	C1,6,21,26,28,29	0.1uF/50V,1608,JB	C1608JB1H104K	TDK
20	Ceramic capacitor	C3,4,20	1uF/16V,1608,JB	C1608JB1C105K	TDK
21	Ceramic capacitor	C5	4.7uF/10V,2012,X7R	C2012X7R1A475M	TDK
22	Ceramic capacitor	C2,7,27	10uF/16V,2012,X5R	C2012X5R1C106M	TDK
23	Ceramic capacitor	C8,9,10,11,12,13,14,15,16,17,18,19,22,23,24,25	2.2uF/50V,2012,X7R	C2012X7R1H225K	TDK
24			2.2uF/25V,2012,X7R		Murata
25					
26	Resistor	R0	2kΩ/5%,1608	RK73H1JTTD202F	KOA
27	Resistor	R1	220kΩ/1%,1608	RK73H1JTTD2203F	KOA
28	Resistor	R2	330kΩ/1%,1608	RK73H1JTTD3303F	KOA
29	Resistor	R3	820kΩ/1%,1608	RK73H1JTTD8203F	KOA
30	Thermistor	R4		204-AP2	SEMITEC
31	Resistor	R5	0Ω,1608	RK73Z1JTDD	KOA
32	Resistor	R6	Not mounted	RK73Z1JTDD	KOA
33	Resistor	R7	Not mounted	RK73H1JTDD1004F	KOA

*1 Components and circuit diagrams are subject to change without notice

S5U1C17564T1100 parts list (Attachments and Accessories)*1

No	PARTS NAME	MATERIAL LOCATION	STANDARD	MODEL No.	MAKER
1	Jumper socket			MJS-0605B	HIROSUGI-KEIKI
2					
3	Housing			XHP-2	JST
4	Contact			BXH-001T-P0.6	JST
5	Wire		AWG#24, length=30cm, red	AWM1007/TR-64 red	SHINAGAWA ELECTRIC WIRE
6	Wire		AWG#24, length=30cm, black	AWM1007/TR-64 black	SHINAGAWA ELECTRIC WIRE
7					
8	Coin battery		CR2032EC	CR2032	TOSHIBA
9					
10	Spacer		M=3, L=9.5mm, Female	ASB-309.5E	HIROSUGI-KEIKI
11	Screw		M=3,L=5	FB-0305N	Wilco

*1 Components are subject to change without notice.

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