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CMOS 4-BIT SINGLE CHIP MICROCONTROLLER

S5U1C6F016T Manual

（Software Evaluation Tool for S1C6F016）

SEIKO EPSON CORPORATION

Rev. 2.0

NOTICE

Configuration of product number

●**Devices**

S1 C 63158 F 0A01 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: Packing specs not fixed	

■**Specification**

■**Package**
[D: Die form, F: QFP, B: BGA]

■**Model number**

■**Model name**
[C: Microcomputer, digital products]

■**Product classification**
[S1: Semiconductor]

●**Development tools**

S5U1 C 63000 A1 1 00

■**Packing specifications**
[00: Standard packing]

■**Version**
[1: Version 1]

■**Tool type**

Hx: ICE
Ex: EVA board
Px: Peripheral board
Wx: ROM writer for flash microcomputer
Xx: ROM writer peripheral board
Cx: C compiler package
Ax: Assembler package
Dx: Utility tool by each model
Qx: Software simulator
Zx: Adapter board

■Corresponding model number
[63000: Common to S1C63 family]

■Tool classification
[C: Microcomputer use]

■Product classification
[S5U1: Development tool for semiconductors]

Table of Contents

1. Overview

S5U1C6F016T1 and S5U1C6F016T2 (SVT6F016: Software eValuation Tools for S1C6F016)[*1] are evaluation and development support boards for the single-chip microcontroller S1C6F016 made by Seiko Epson. S5U1C6F016T1 is equipped with S1C6F016 and peripheral circuit, expansion connector and power circuit, and it can be used to operate LCD display, temperature and humidity measurement, buzzer output, pressure measurement and acceleration measurement as a single unit. It is also possible to expand the functions through the expansion connectors. In addition, it is equipped with a connector for writing to flash ROM and can write the desired program.

S5U1C6F016T2[*2] connects to in-circuit emulator (ICE63: S5U1C63000H) installed with standard peripheral board (S5U1C63000P6) and add-on board (S5U1C6F016P2), and offers a software development environment for S5U1C6F016T1.

■S5U1C6F016T1

1)	CPU	S1C6F016 (mask option specification: standard TYPE B)[*3]
2)	Input power supply voltage	Coin battery (CR2032) +3.0 V (DC), or external power supply +5.0 V (DC)[*3*4]
3)	CPU clock	OSC1: 32.768 kHz onboard crystal unit[*3] OSC3: 4 MHz onboard ceramic resonator[*3]
4)	Onboard devices	• Reset switch • USB-Serial on Board Writer (S5U1C88000W4) connector (CN2) • Expansion connector (CN1, CN4) • Push lever switch input • DIP switch (switching of serial interface connection) • Parts for temperature/humidity measurement use[*3] • Pressure sensor • Acceleration sensor • Piezobuzzer • LCD panel

*1 SVT6F016 is the abbreviation for S5U1C6F016T1 and S5U1C6F016T2. They are sold separately, and check the model number when making a purchase.

*2 For S5U1C6F016T2, refer to “5. S5U1C6F016T2” in this document.

*3 In S5U1C6F016T2, it is emulated using In-Circuit Emulator (ICE63: S5U1C63000H).

*4 3V is supplied to VDD using inbuilt regulator.

2. Part Names and Functions

2.1 Part Names

The part names and functions are shown below.

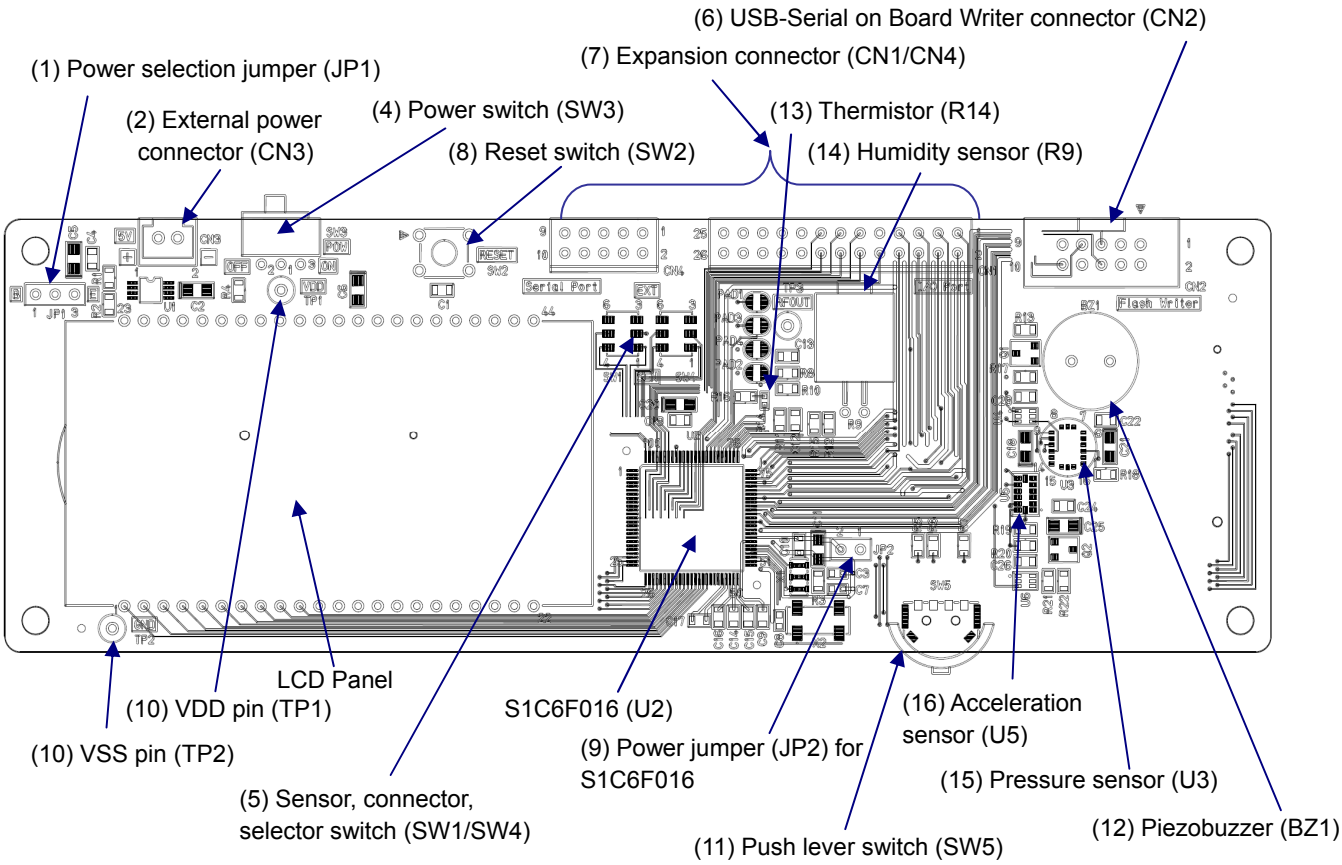


Figure 2.1 Names of Components on the Front Side of S5U1C6F016T1

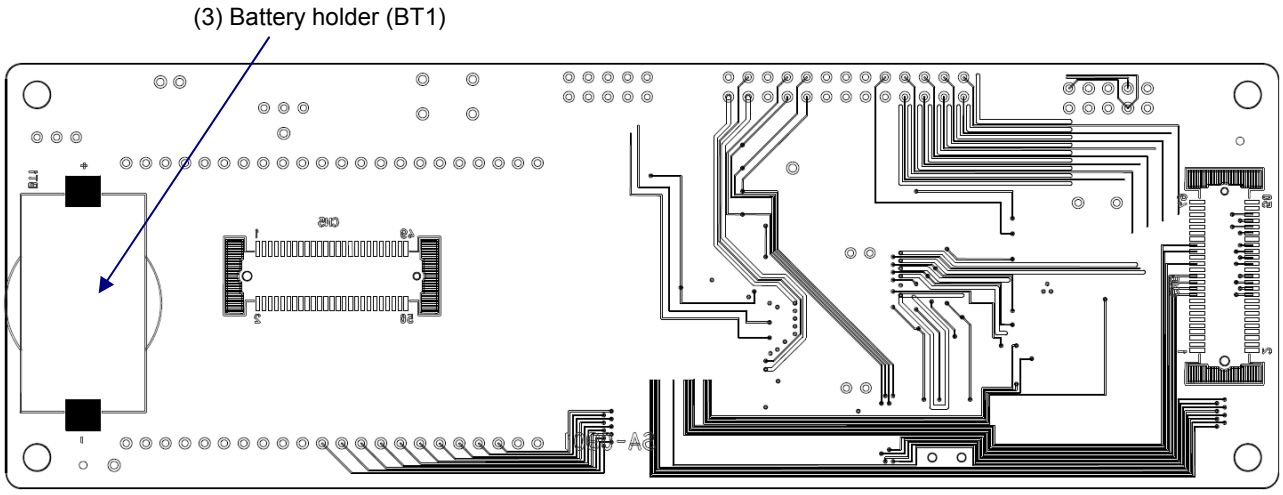


Figure 2.2 Names of Components on the Reverse Side of S5U1C6F016T1

2.2 Individual Component Functions

(1) Power selection jumper (JP1)

Power is supplied from internal coin battery if JP1 is connected to B side, and from external power source if connected to E side.

(2) External power connector (CN3)

This is used when power (5.0 V±0.5 V) is supplied externally such as using a stable power source. For the accessory cable, red is connected to + and black is connected to -(GND).

(3) Battery holder (BT1)

The reverse side of this board is equipped with coin battery (CR2032) holder.

Note:

The coin battery is placed with the + side facing upward into the battery holder on the reverse side of this board.

(4) Power switch (SW3)

This is the switch for turning on the power to the internal circuit of this board.

(5) DIP switch (SW1/SW4)

This switches the serial interface connection of S1C6F016. When connecting to the pressure sensor and acceleration sensor mounted on this board, set to the “SEN” side. When connecting to the expansion connector, set to the “EXT” side.

Note:

When switching the serial interface connection, always set SW1 and SW4 to the same direction.

(6) USB-Serial on Board Writer connector (CN2)

This is used when writing program/data to the flash memory built into S1C6F016. Connect the USB-Serial on Board Writer to this connector, and transfer the program/data from PC.

Note:

For the power when writing program/data to flash memory, an external power supply that uses a stable source is recommended.

(7) Expansion connector (CN1/CN4)

This is used when making a connection to expand to a customer's own board or the likes. For details, refer to “4. Expansion Connector.”

(8) Reset switch (SW2)

Pressing this switch initializes S1C6F016 and the peripheral devices of this board.

Note:

When connected to PC through the USB-Serial on Board Writer, it is prohibited to use the reset control for S1C6F016.

(9) Power jumper (JP2) for S1C6F016

It is possible to measure the consumption current of S1C6F016 by removing JP2 and inserting an ammeter within this terminal. Normally, use with JP2 set in place.

(10) VDD, VSS pins (TP1/TP2)

This is the terminal used for monitoring the VDD and VSS power supplied to S1C6F016.

(11) Push lever switch (SW5)

The push lever switch is connected to S1C6F016 ports P00, P01, and P02. It is normally at LOW level, and it can be made to go to HIGH level (input=1) by operating the push lever switch.

(12) Piezobuzzer (BZ1)

The piezobuzzer can be driven by using the sound generator built into S1C6F016. The driving capability can be increased by externally connecting a transistor.

(13) Thermistor (R14) for temperature measurement

This is the thermistor for temperature measurement and it uses the R/F converter built into S1C6F016.

(14) Humidity sensor (R9)

This is the sensor for humidity measurement and it uses the R/F converter built into S1C6F016.

Note:

S1C6F016 uses both P50-P53 ports and R/F converter, and the P50-P53 ports can also be used as general-purpose I/O ports by switching the terminal function through software. If P50-P53 is used as general-purpose I/O ports, using by shorting the PAD1-PAD4 solder bridge on the board and removing the installed resistor.

(15) Pressure sensor (U3)

SVT6F016 is installed with pressure sensor. It is possible to measure pressure by using the serial interface (clock synchronization) built into S1C6F016.

(16) Acceleration sensor (U5)

SVT6F016 is installed with acceleration sensor. It is possible to measure acceleration by using the serial interface (clock synchronization) built into S1C6F016.

3. Block Diagram

The block diagram for S5U1C6F016T1 is shown below.

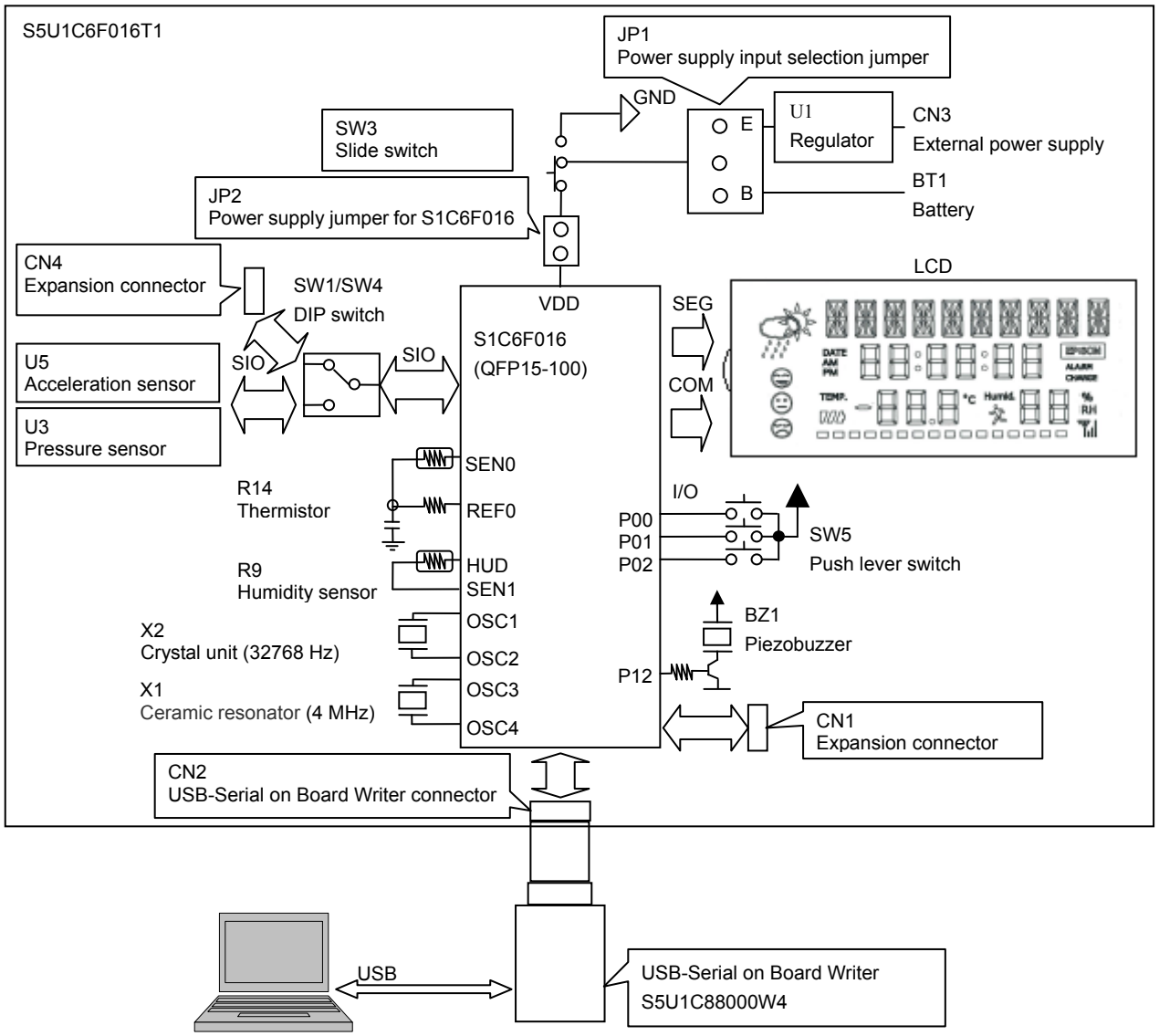


Figure 3.1 S5U1C6F016T1 Block Diagram

4. Expansion Connector

4.1 Expansion Connector (CN1)

The pin layout of CN1 connector is shown below.

Table 4.1 CN1 Connector Pin Layout Table

No.	Port	I/O	Function
1	P00	I	Used (push lever switch)
2	P01	I	Used (push lever switch)
3	P02	I	Used (push lever switch)
4	P03	O	Used (pressure sensor interface)
5	P10	I/O	Used (acceleration sensor interface)
6	P11	I/O	Used (acceleration sensor interface)
7	P12	O	Used (buzzer)
8	P13	O	Used (acceleration sensor interface)
9	P20	O	Used (pressure sensor interface)
10	P21	O	Used (acceleration sensor power control)
11	P22	I/O	General-purpose port
12	P23	I/O	General-purpose port
13	P40	I/O	General-purpose port
14	P41	I/O	General-purpose port
15	P42	I/O	General-purpose port
16	P43	I/O	General-purpose port
17	P50	-	Unconnected
18	P51	-	Unconnected
19	P52	-	Unconnected
20	P53	-	Unconnected
21	VDD	-	Power terminal (+)
22	VDD	-	Power terminal (+)
23	RESET	O	Reset output (positive logic)
24	VSS	-	Power terminal (-)
25	VSS	-	Power terminal (-)
26	VSS	-	Power terminal (-)

4.2 Expansion Connector (CN4)

The pin layout of CN4 connector is shown below.

Table 4.2 CN4 Pin Layout Table

No.	Port	I/O	Function
1	P30_EXT	I/O	General-purpose port / serial interface port*1
2	P31_EXT	I/O	General-purpose port / serial interface port*2
3	P32_EXT	I/O	General-purpose port / serial interface port*2
4	P33_EXT	I/O	General-purpose port / serial interface port*1
5	P03	I/O	General-purpose port
6	P13	I/O	General-purpose port
7	VSS	-	Power terminal (-)
8	VSS	-	Power terminal (-)
9	NC	-	Unconnected
10	NC	-	Unconnected

*1 Only when SW1 is set to the “EXT” side. It is unconnected when set to the “SEN” side.
*2 Only when SW4 is set to the “EXT” side. It is unconnected when set to the “SEN” side.

5. S5U1C6F016T2

S5U1C6F016T2 is a board that makes it possible to debug the software by connecting to ICE63 mounted on standard peripheral board (S5U1C63000P6) and add-on board (S5U1C6F016P2).

5.1 Connecting the S5U1C6F016T2

Connect the respective connectors of S5U1C6F016T2 ports P1, P2, P5, P6 and P3 to the respective connectors CN1-2, CN1-1, CN4-2, CN4-1 and CN3 of ICE63 (S5U1C63000H). The ICE63 connector names (CN1-1, CN1-2, CN4-1, CN4-2, CN3) are also found on the S5U1C6F016T2 board, and make the connection in accordance to these. For I/O cable, use the one that comes with the add-on board and standard peripheral board used by incorporating into ICE63. Furthermore, for the standard peripheral board built into ICE63, write the circuit data for S1C6F016 in advance.

A connection example of S5U1C6F016T2 and ICE63 is shown below.

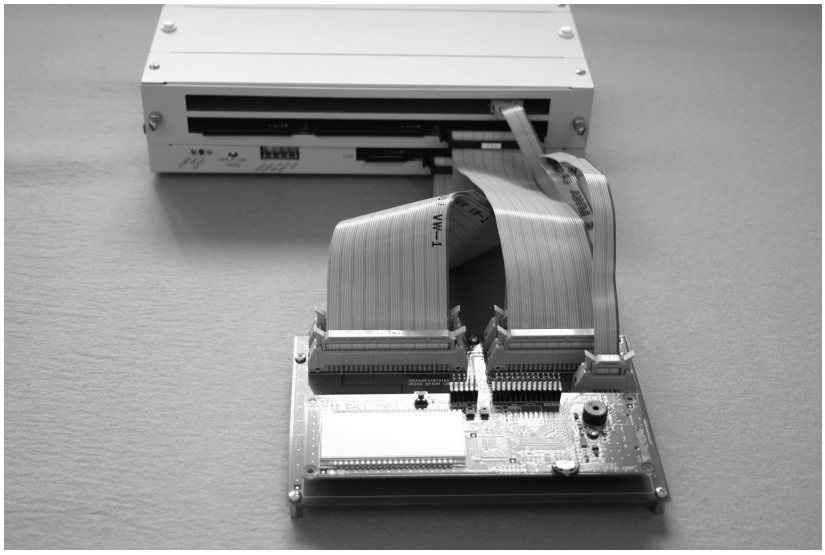


Figure 5.1 Connection of S5U1C6F016T2 and ICE63

5.2 Block Diagram

The block diagram for S5U1C6F016T2 is shown below.

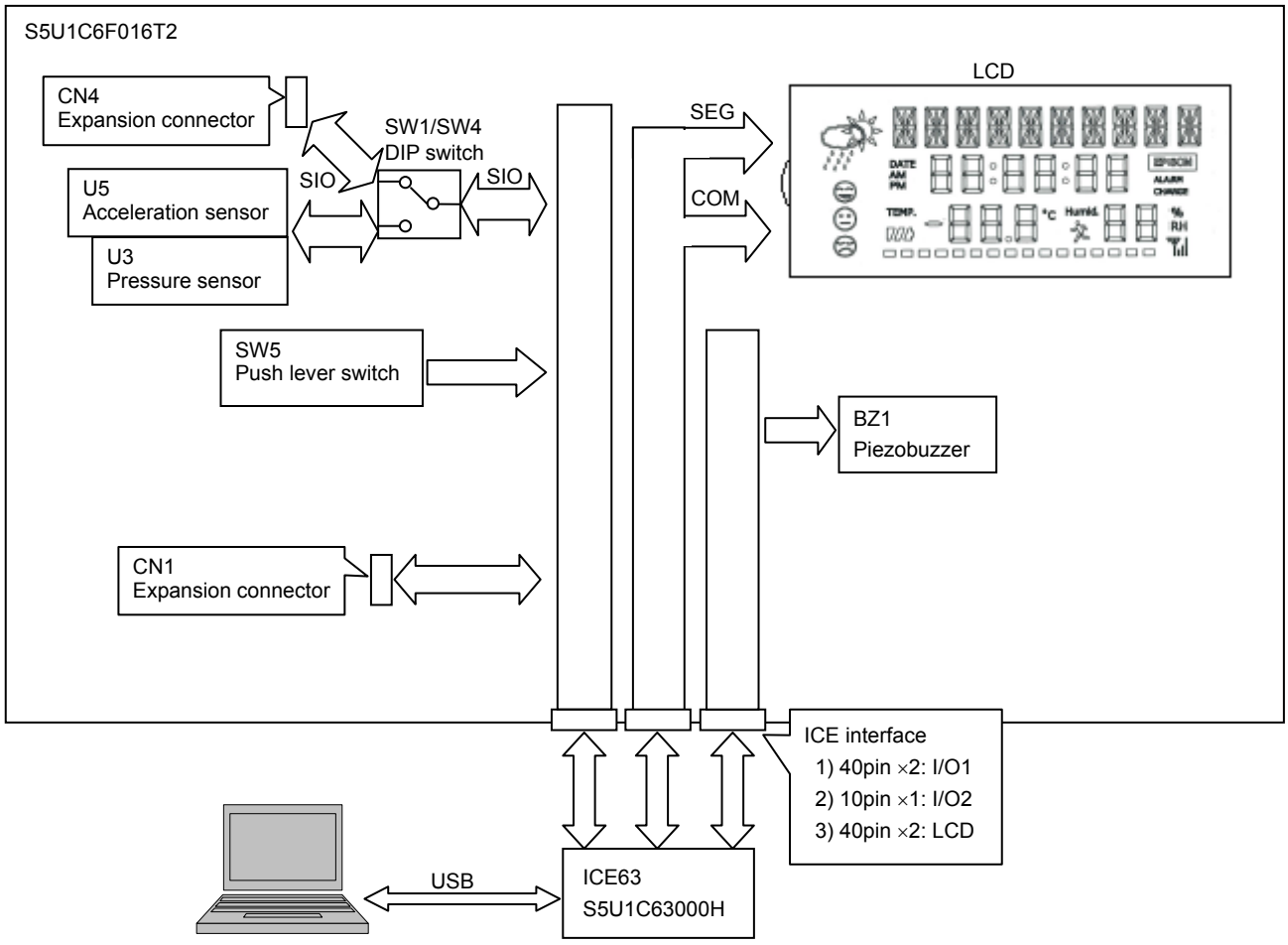


Figure 5.2 S5U1C6F016T2 Block Diagram

6. Sample Software Operation

The S5U1C6F016T1 implements sample software as shipped.

This section describes how to use the software.

The sample software can be used to check the S5U1C6F016T built-in functions.

For further details of the sample software, refer to the source code.

For further details of the sample software development requirements, refer to the "S5U1C63000A Manual."

For further details of each peripheral of the S1C6F016, refer to the "S1C6F016 Technical Manual."

6.1 Jumpers and DIP Switches

JP1 should be switched as desired for use.

SW1 and SW4 should be set to "SEN" when launching the sample program.

6.2 Basic Functions

The following basic functions are implemented.

Table 6.1 Sample Software Basic Functions

No.	Function	Description
1	Power supply voltage detection circuit	Detects the power supply voltage.
2	Oscillator circuit	Controls the oscillator circuit.
3	Key input	Determines key input.
4	LCD driver	Controls the LCD driver.
5	Buzzer output	Outputs the buzzer signal.
6	Applied DC/AC R/F converter	Outputs the applied DC/AC R/F converter count.
7	Pressure sensor	Outputs the pressure sensor measurement.
8	Acceleration sensor	Outputs the acceleration sensor measurement.
9	Expansion connectors	Controls the expansion connectors.
10	Serial interface	Controls the serial interface.
11	Consumption current measurement	Measures the current at HALT and SLEEP.

6.3 Launching Program

Turn on the power for the S5U1C6F016T1. The START screen is displayed on the LCD panel once power is supplied to the S5U1C6F016T1.

Rotating the Push lever switch to the right selects the power supply voltage detection circuit function, and pressing PUSH selects the consumption current measuring function.

Functions No. 1 to No. 10 in Table 6.1 operate in sequence. With the exception of No. 4, rotating the push lever switch to the right selects the next function in sequence.

Functions No. 1 to No. 9 switch automatically to the next function after 10 seconds have elapsed.

Press PUSH on the push lever switch to select the next function while the consumption current measuring function is selected.

Figure 6.1 Sample Software Start Screen

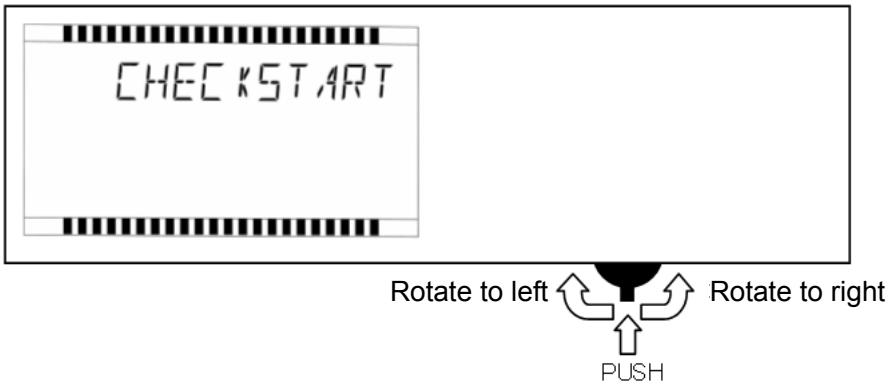


Figure 6.2 Push Lever Switch

6.4 Power Supply Voltage Detection Circuit

This detects and displays the power supply voltage on the LCD panel.

When the power supply voltage is 2.7 V or greater, “O270” is displayed on the LCD panel.
When the power supply voltage is less than 2.7 V, “U269” is displayed on the LCD panel.

6.5 Oscillator Circuit

This controls the oscillator circuit and outputs the oscillator waveform via the FOUT (P13) expansion connector.

6.6 Key Input

This determines the key input displayed on the LCD panel.

It determines the key input in the sequence rotate right → press PUSH → rotate left as indicated on the LCD.

6.7 LCD Driver

This controls the LCD driver.

The LCD panel fully illuminates.

6.8 Buzzer Output

This outputs the buzzer signal.

The buzzer sound is output from the piezo-buzzer at 1-second intervals.

6.9 Applied DC/AC R/F Converter

This carries out R/F conversion of the applied DC/AC.

The applied DC R/F converter measurement is displayed on the LCD panel at 1-second intervals.

The applied AC R/F converter measurement is displayed on the LCD panel at 1-second intervals.

6.10 Pressure Sensor

This controls the pressure sensor.

The pressure sensor measurement is displayed on the LCD panel at 1-second intervals.

6.11 Acceleration Sensor

This controls the acceleration sensor.

The acceleration sensor measurement is displayed on the LCD panel at 1-second intervals.

6.12 Expansion Connectors

Outputs signals from the expansion connectors.

Port P2 outputs “High” for CN1 in the sequence P22→P23→P22… at 1-second intervals.

Port P4 outputs “High” for CN1 in the sequence P40→P41→P42→P43→P40… at 1-second intervals.

6.13 Serial Interface

This controls the serial interface.

Set SW1 and SW4 to “EXT” as indicated on the LCD panel.

Rotate the push lever switch to the right to select the next function.

The clock is output from expansion connector CN4 SCLK (P30), and 0x5A is output from SOUT (P31).

Rotate the push lever switch to the right to select the next function.

Set SW1 and SW4 to “SEN” as indicated on the LCD panel.

Rotate the push lever switch to the right to select the next function.

6.14 Ending Operation

The END screen is displayed.

Rotate the push lever switch to the right to select the Start screen.

6.15 Consumption Current Measurement

The consumption current can be measured while in HALT and SLEEP modes.

Press the push lever switch PUSH at the Start screen to select SLEEP mode.

Press the push lever switch PUSH in SLEEP mode to select HALT mode.

Press the push lever switch HALT in SLEEP mode to select the Start screen.

Appendix A LCD Panel

S1C6F016 has a built-in segment LCD driver that can drive black-and-white LCD panel with a maximum of 288 segments (36SEG x 8COM) (mask option specification: standard TYPE B). For the terminal correspondence between S1C6F016/ICE63 and the LCD panel mounted on S5U1C6F016T1/T2, refer to "Table A.1 Terminal Connection Table."

Table A.1 Terminal Connection Table

LCD Panel Terminal No.	S1C6F016 Terminal Name	LCD Panel Terminal No.	S1C6F016 Terminal Name
1	COM0	23	SEG14
2	COM1	24	SEG15
3	COM2	25	SEG16
4	COM3	26	SEG17
5	COM4	27	SEG18
6	COM5	28	SEG19
7	COM6	29	SEG20
8	COM7	30	SEG21
9	SEG0	31	SEG22
10	SEG1	32	SEG23
11	SEG2	33	SEG24
12	SEG3	34	SEG25
13	SEG4	35	SEG26
14	SEG5	36	SEG27
15	SEG6	37	SEG28
16	SEG7	38	SEG29
17	SEG8	39	SEG30
18	SEG9	40	SEG31
19	SEG10	41	SEG32
20	SEG11	42	SEG33
21	SEG12	43	SEG34
22	SEG13	44	SEG35

In addition, the relation between LCD panel terminals and display segments are shown below.

Table A.2 LCD Panel Terminals and Display Segments Assignment Table

PIN	COM1	COM2	COM3	COM4	COM5	COM6	COM7	COM8	PIN	COM1	COM2	COM3	COM4	COM5	COM6	COM7	COM8
1	COM1	/	/	/	/	/	/	/	23	3A	3G	3F	3N	3E	11F	11E	/
2	/	COM2	/	/	/	/	/	/	24	/	3I	3H	3L	3M	11A	11G	11D
3	/	/	COM3	/	/	/	/	/	25	3B	3J	3C	3K	3D	11B	11C	/
4	/	/	/	COM4	/	/	/	/	26	4A	4G	4F	4N	4E	12F	12E	/
5	/	/	/	/	COM5	/	/	/	27	/	4I	4H	4L	4M	12A	12G	12D
6	/	/	/	/	/	COM6	/	/	28	4B	4J	4C	4K	4D	12B	12C	/
7	/	/	/	/	/	/	COM7	/	29	5A	5G	5F	5N	5E	13F	13E	COL.1
8	/	/	/	/	/	/	/	COM8	30	/	5I	5H	5L	5M	13A	13G	13D
9	S3	S4	S7	X1	X2	X3	X4	X5	31	5B	5J	5C	5K	5D	13B	13C	/
10	S2	S1	S5	S6	S8	17F	17E	X6	32	6A	6G	6F	6N	6E	14F	14E	/
11	/	/	AM	T1	T2	17A	17G	17D	33	/	6I	6H	6L	6M	14A	14G	14D
12	/	/	DATE	PM	T3	17B	17C	X7	34	6B	6J	6C	6K	6D	14B	14C	/
13	1A	1G	1F	1N	1E	18F	18E	X8	35	7A	7G	7F	7N	7E	15F	15E	COL.2
14	/	1I	1H	1L	1M	18A	18G	18D	36	/	7I	7H	7L	7M	15A	15G	15D
15	1B	1J	1C	1K	1D	18B	18C	DP	37	7B	7J	7C	7K	7D	15B	15C	X12
16	2A	2G	2F	2N	2E	19F	19E	X9	38	8A	8G	8F	8N	8E	16F	16E	T4
17	/	2I	2H	2L	2M	19A	19G	19D	39	/	8I	8H	8L	8M	16A	16G	16D
18	2B	2J	2C	2K	2D	19B	19C	X10	40	8B	8J	8C	8K	8D	16B	16C	/
19	/	/	/	/	ALARM	CHARGE	S9	X11	41	9A	9G	9F	9N	9E	20F	20E	X13
20	Y4	/	/	/	Y3	/	Y2	Y1	42	/	9I	9H	9L	9M	20A	20G	20D
21	10B	10J	10C	10K	10D	21B	21C	X16	43	9B	9J	9C	9K	9D	20B	20C	X14
22	/	10I	10H	10L	10M	21A	21G	21D	44	10A	10G	10F	10N	10E	21F	21E	X15

The symbols in Table A.2 correspond to the numbers/symbols in the LCD panel's segment assignment diagram below. The LCD panel's segment assignment diagram is shown below.

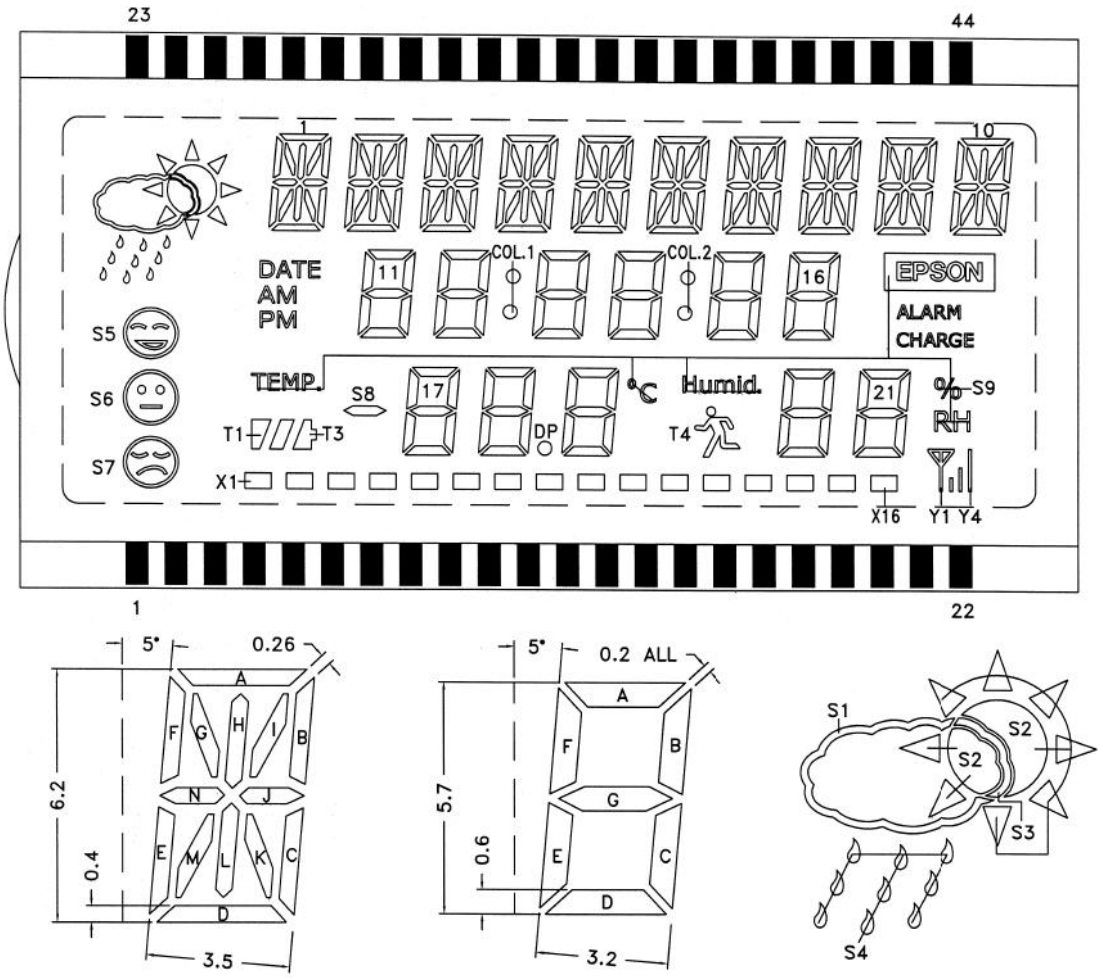
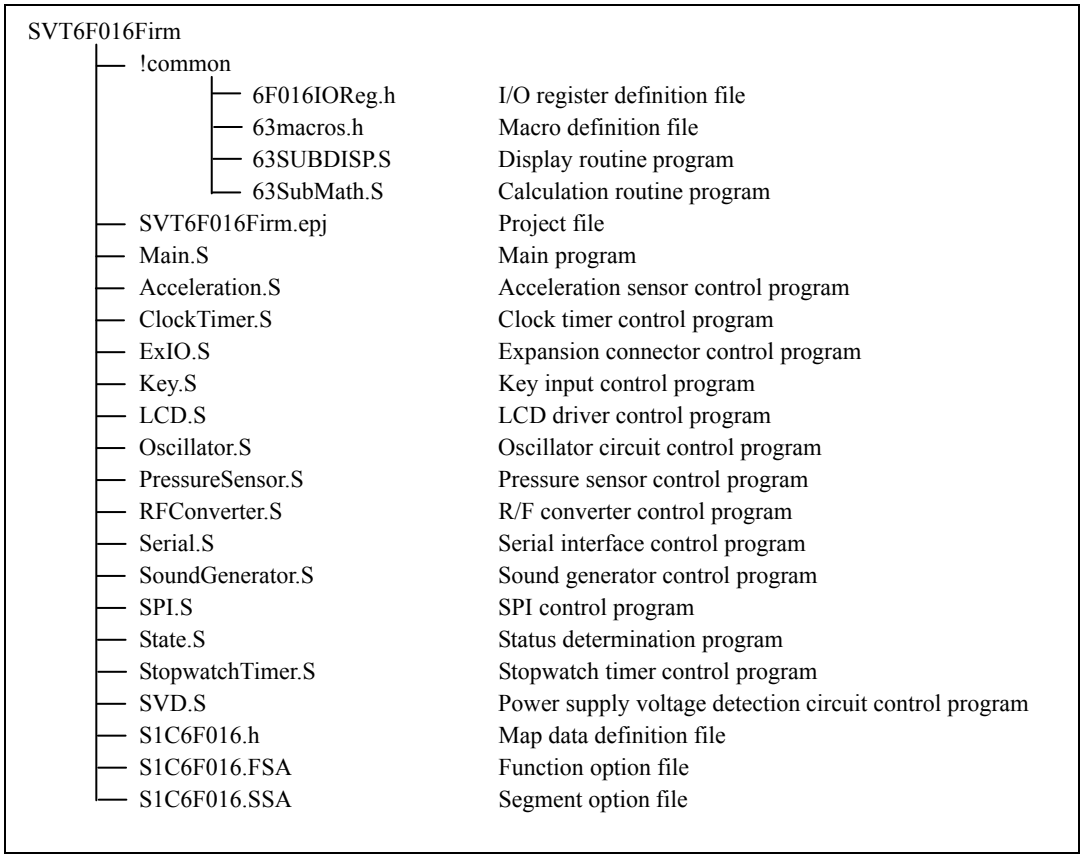


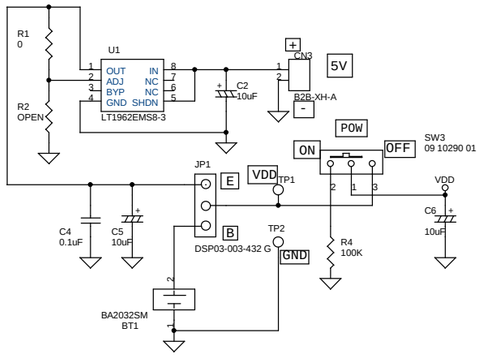
Figure A.1 LCD Panel Segment Assignment Diagram

Taking the example of “ALARM” on the LCD panel of Figure A.1, “ALARM” corresponds to Pin19 (S1C6F016 SEG10 terminal) and COM5. In addition, 7-segment and 14-segment displays are shown in Table A.2 as [Table position(1-21)+Lit segment(A-N)].

Appendix B Sample Software File Configuration

The sample software is configured as shown below.

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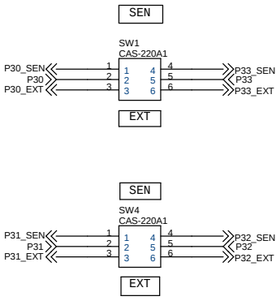
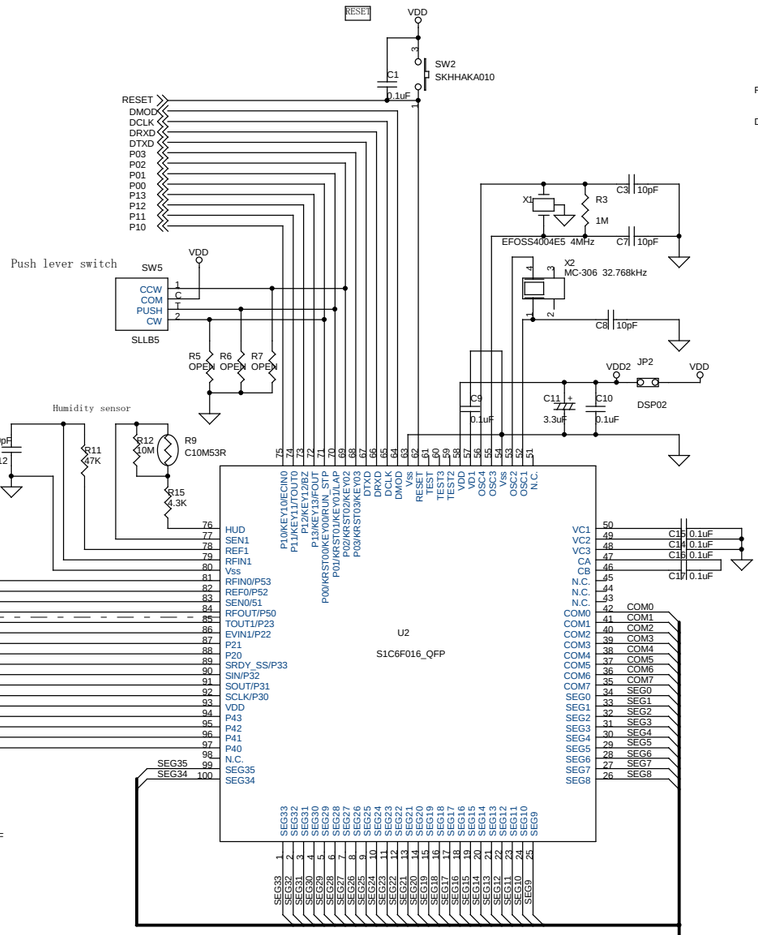
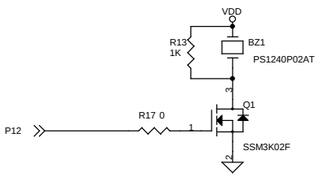
0
R2
OPEN
U1
OUT
ADJ
BYP
GND
IN
NC
NC
SHDN
LT1962EMS8-3
C2
10uF
CN3
B2B-XH-A
5V
POW
ON
OFF
SW3
09 10290 01
JP1
E
B
VDD
TP1
TP2
GND
DSP03-003-432 G
C4
0.1uF
C5
10uF
R4
100K
C6
10uF
BA2032SM
BT1


SEN
SW1
CAS-220A1
P30_SEN
P30
P30_EXT
P33_SEN
P33
P33_EXT
EXT
SEN
SW4
CAS-220A1
P31_SEN
P31
P31_EXT
P32_SEN
P32
P32_EXT
EXT


RESET
VDD
SW2
SKHHAKA010
C1
0.1uF
RESET
DMOX
DCLK
DRXD
DTXD
P03
P02
P01
P00
P13
P12
P11
P10
Push lever switch
SW5
CCW
COM
PUSH
CW
SLLB5
R5
OPEN
R6
OPEN
R7
OPEN
Humidity sensor
Thermistor
R8
10K
R10
OPEN
103KT1005
R14
R16
0
1000pF
C12
R11
47K
R12
10M
R9
C10M53R
R15
4.3K
1000pF
C13
RFOUT
TP3
P53
P52
P51
P50
PAD_A
PAD_A
PAD_A
PAD_A
P23
P22
P21
P20
P33
P32
P31
P30
P43
P42
P41
P40
SEG35
SEG34
U2
S1C6F016_QFP
P10/KEY10/ECIN0
P11/KEY11/TOUT0
P12/KEY12/SIN2
P13/KEY13/FOUT
P00/KRST00/KEY00/RUN_STP
P01/KRST01/KEY01/LAP
P02/KRST02/KEY02/SOUT2
P03/KRST03/KEY03
DTXD
DRXD
DCLK
DMOD
Vss
RESET
TEST3
TEST2
VDD
OSC4
OSC3
Vss
OSC2
OSC1
N.C.
HUD
SEN1
REF1
RFIN1
Vss
RFIN0/P53
REF0/P52
SEN0/51
RFOUT/P50
TOUT1/P23
EVIN1/P22
P21
P20
SRDY_SS/P33
SIN/P32
SOUT/P31
SCLK/P30
VDD
P43
P42
P41
P40
N.C.
SEG35
SEG34
SEG33
SEG32
SEG31
SEG30
SEG29
SEG28
SEG27
SEG26
SEG25
SEG24
SEG23
SEG22
SEG21
SEG20
SEG19
SEG18
SEG17
SEG16
SEG15
SEG14
SEG13
SEG12
SEG11
SEG10
SEG9
X1
EFOSS4004E5 4MHz
C3
10pF
R3
1M
C7
10pF
X2
MC-306 32.768kHz
C8
10pF
C9
0.1uF
C11
3.3uF
C10
0.1uF
VDD2
JP2
VDD
DSP02
C15
0.1uF
C14
0.1uF
C13
0.1uF
C17
0.1uF
VC1
VC2
VC3
CA
CB
N.C.
N.C.
N.C.
COM0
COM1
COM2
COM3
COM4
COM5
COM6
COM7
SEG0
SEG1
SEG2
SEG3
SEG4
SEG5
SEG6
SEG7
SEG8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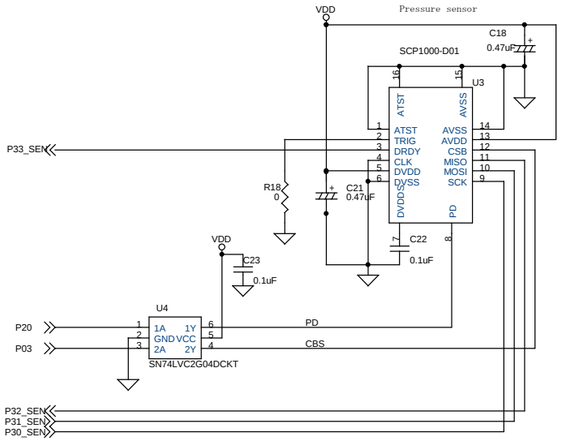
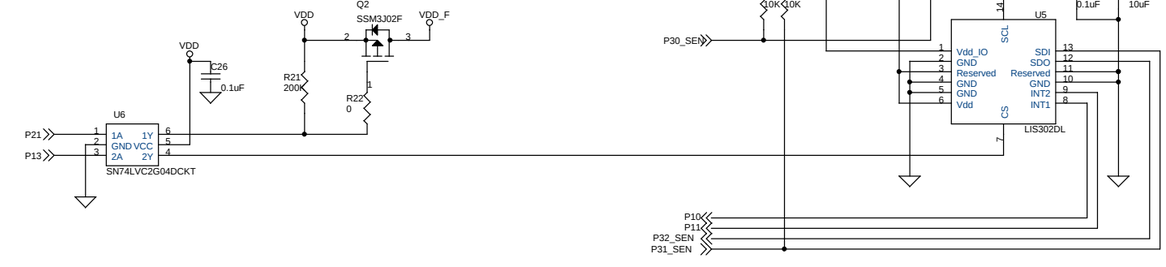
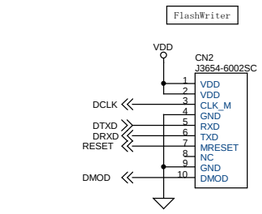
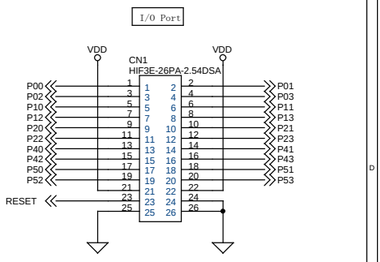
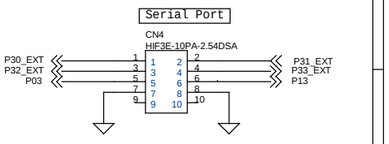
R13
1K
BZ1
PS1240P02AT
Q1
SSM3K02F
P12
R17 0

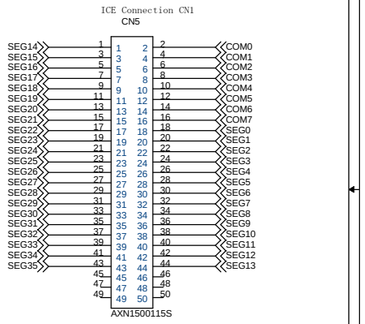

VDD
Pressure sensor
C18
0.47uF
SCP1000-D01
U3
ATST
TRIG
DRDY
CLK
DVDD
DVSS
DVDD2
AVSS
AVDD
CSB
MISO
MOSI
SCK
PD
P33_SEN
R18
0
C21
0.47uF
C22
0.1uF
C23
0.1uF
U4
1A
GND
2A
1Y
VCC
2Y
P20
P03
PD
CBS
SN74LVC2G04DCKT
P32_SEN
P31_SEN
P30_SEN


VDD
VDD_F
Acceleration senser
Q2
SSM3J02F
R21
200K
R22
0
C26
0.1uF
U6
P21
P13
SN74LVC2G04DCKT
R19
10K
R20
10K
C24
0.1uF
C25
10uF
U5
SCL
SDA
Vdd_IO
GND
Reserved
GND
GND
Vdd
SDI
SDO
Reserved
GND
INT2
INT1
CS
LIS302DL
P30_SEN
P10
P11
P32_SEN
P31_SEN


FlashWriter
VDD
CN2
J3654-6002SC
VDD
VDD
CLK_M
GND
RXD
TXD
MRESET
NC
GND
DMOD
DCLK
DTXD
DRXD
RESET
DMOD


I/O Port
VDD
VDD
CN1
HIF3E-26PA-2.54DSA
P00
P02
P10
P12
P20
P22
P40
P42
P50
P52
RESET
P01
P03
P11
P13
P21
P23
P41
P43
P51
P53


Serial Port
CN4
HIF3E-10PA-2.54DSA
P30_EXT
P32_EXT
P03
P31_EXT
P33_EXT
P13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CN5
SEG14
SEG15
SEG16
SEG17
SEG18
SEG19
SEG20
SEG21
SEG22
SEG23
SEG24
SEG25
SEG26
SEG27
SEG28
SEG29
SEG30
SEG31
SEG32
SEG33
SEG34
SEG35
COM0
COM1
COM2
COM3
COM4
COM5
COM6
COM7
SEG0
SEG1
SEG2
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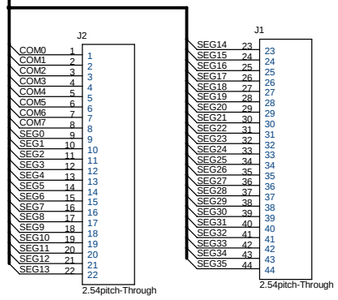
SEG10
SEG11
SEG12
SEG13
AXN1500115S


J2
COM0
COM1
COM2
COM3
COM4
COM5
COM6
COM7
SEG0
SEG1
SEG2
SEG3
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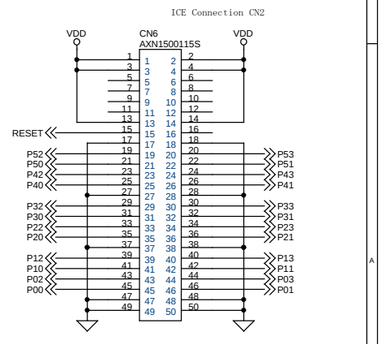
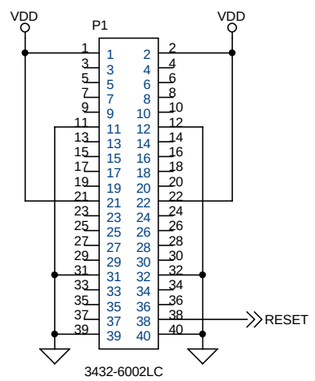
SEG5
SEG6
SEG7
SEG8
SEG9
SEG10
SEG11
SEG12
SEG13
2.54pitch-Through
J1
SEG14
SEG15
SEG16
SEG17
SEG18
SEG19
SEG20
SEG21
SEG22
SEG23
SEG24
SEG25
SEG26
SEG27
SEG28
SEG29
SEG30
SEG31
SEG32
SEG33
SEG34
SEG35
2.54pitch-Through


ICE Connection CN2
VDD
VDD
CN6
AXN1500115S
RESET
P52
P50
P42
P40
P32
P30
P22
P20
P12
P10
P02
P00
P53
P51
P43
P41
P33
P31
P23
P21
P13
P11
P03
P01

I/O CN1-2



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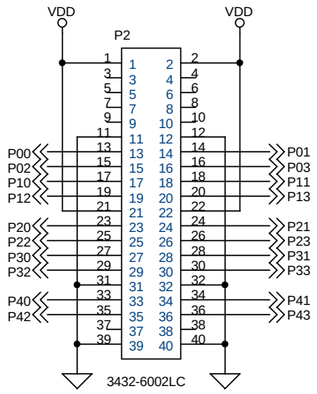
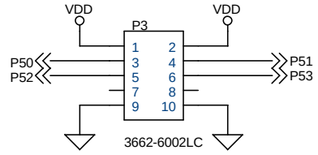
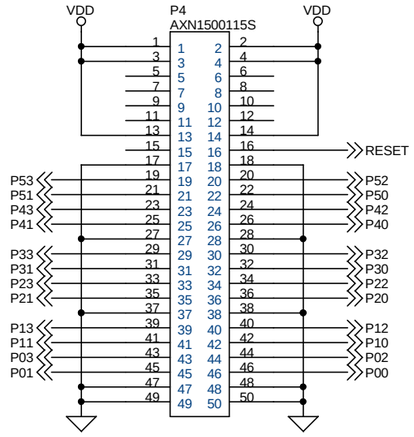
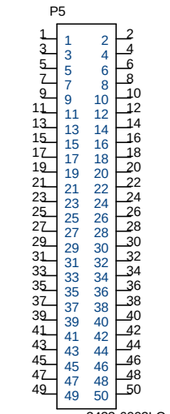


I/O CN 3

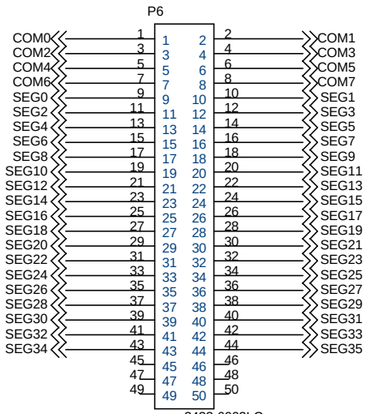




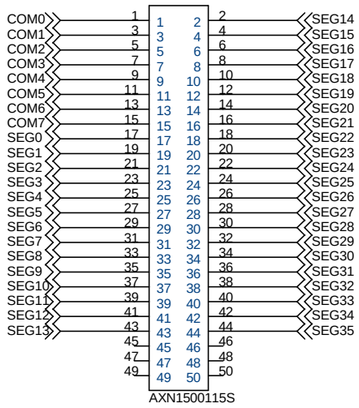
LCD CN4-2

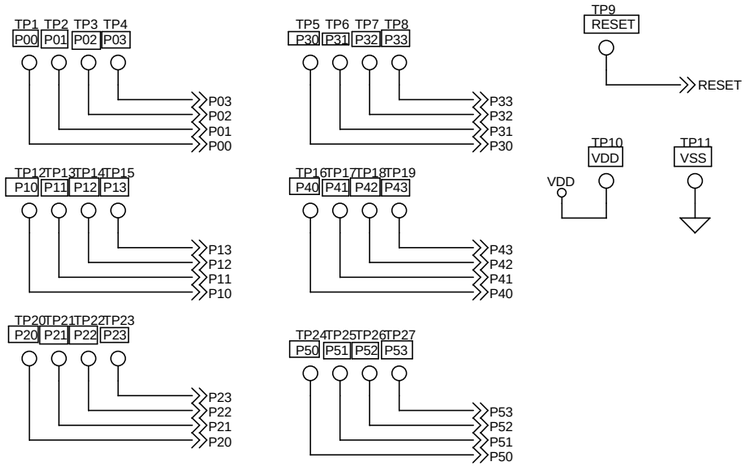


LCD CN4-1



P7





Appendix D Parts List

NO.	Part name	Location	Code	Specifications	Qty.	Manufacturer
1	Circuit board		SA-0901		1	Arm Electronics
2	Battery holder	BT1	BA2032SM	Surface mounted	1	Takachi
3	Piezo-buzzer	BZ1	PS1240P02AT		1	TDK
4	Connector (pin header)	CN1	HIF3E-26PA-2.54DSA		1	Hirose
5	Connector (pin header)	CN4	HIF3E-10PA-2.54DSA		1	Hirose
6	Connector	CN2	J3654-6002SC		1	3M
7	Connector	CN3	B2B-XH-A		1	JST
8	Connector	CN5, CN6	AXN1500115S		0	Matsushita
9	Laminated ceramic capacitor	C1, 4, 9, 10, 14, 15, 16, 17, 19, 22, 23, 24, 26	GRM219F11H104ZA01D	0.1 μF 2.0*1.25	13	Murata
10	Laminated ceramic capacitor	C3, C7, C8	GRM1882C1H100JA01D	10 pF 1.6*0.8	3	Murata
11	Laminated ceramic capacitor	C12, C13	GRM2195C2A102JA01D	1000 pF 2.0*1.25	2	Murata
12	Tantalum capacitor	C2, C5, C6, C25	TEESVA1C106M	10 μF/16 V 3.2*1.6	4	NEC Tokin
13	Tantalum capacitor	C11, C20	F931C335MAA	3.3 μF/16 V 3.2*1.6	2	Nichicon
14	Tantalum capacitor	C18, C21	CRS06(TE85L,Q)	1635, 1 A, 20 V, 0.36 V	2	Nichicon
15	DIP short plug	JP1	DSP03-003-432G		1	KEL
16	DIP short plug	JP2	DSP02-002-431G		1	KEL
17	LCD	J1, J2	C6155A	2.54 pitch-Through	1	Shikino
18	Transistor	Q1	SSM3K02F	SC-59	1	Toshiba
19	Transistor	Q2	SSM3K02J	SC-59	1	Toshiba
20	Resistor	R1, R16, R17, R18, R22	RK73Z2AT	0 Ω	5	KOA
21	Resistor	R2, R5, R6, R7, R10		OPEN	5	KOA
22	Resistor	R3	RK73H2ATTD1004F	1 MΩ	1	KOA
23	Resistor	R4	RK73H2ATTD1003F	100 kΩ	1	KOA
24	Resistor	R8, R19, R20	RK73H2ATTD1002F	10 kΩ	3	KOA
25	Humidity sensor	R9	C10M53R		1	Shinyei
26	Resistor	R11	RK73H2ATTD4702F	47 kΩ	1	KOA
27	Resistor	R12	RK73H2ATTD1005F	10 MΩ	1	KOA
28	Resistor	R13	RK73H2ATTD1001F	1 kΩ	1	KOA
29	Thermistor	R14	RK73H1JTTD1002F		1	Ishizuka Electronics
30	Resistor	R15	RK73H2ATTD4301F	4.3 kΩ	1	KOA

31	Resistor	R21	RK73H2ATTD2003F	200 kΩ	1	KOA
32	DIP switch	SW1, SW4	CAS-220A1		2	COPAL
33	Tactile switch	SW2	SKHHAKA010		1	ALPS
34	Slide switch	SW3	09 10290 01		1	SECME
35	Push lever switch	SW5	SLLB510100		1	ALPS
36	Check pin	TP1, TP3	LC-22-G Red		2	Mac-Eight
37	Check pin	TP2	LC-22-G Black		1	Mac-Eight
38	Regulator	U1	LT1962EMS8-3		1	LINEAR
39	IC	U2	S1C6F016	16*16	1	EPSON
40	Pressure sensor	U3	SCP1000-D01		1	VTI
41	Inverter	U4, U6	SN74LVC2G04DCKT		2	TI
42	Acceleration sensor	U5	LIS302DL		1	ST
43	Ceramic oscillator	X1	EFOSS4004E5	4 MHz	1	Matsushita
44	Crystal oscillator	X2	MC-308	32.768 kHz	1	Epson Toyocom
45	Button cell battery		CR2032		1	Toshiba
46	Screw		FB-0305N		4	Wilco
47	Stud		ASB-310E	10 mm	4	Hirosugi Keiki
48	DIP short plug socket		DSP01-002-430G-9		2	KEL
49	Housing		XHP-2		1	JST
50	Contact		SXH-001T-P0.6N		2	JST
51	Wire		AWM116-24(7)-SA RED		1	Junkosha
52	Wire		AWM116-24(8)-SA BLACK	1005	1	Junkosha

Appendix D Parts List

NO.	Part name	Location	Code	Specifications	Qty.	Manufacturer
Main board						
1	Circuit board		SA-0901		1	Arm Electronics
2	Piezo-buzzer	BZ1	PS1240P02AT		1	TDK
3	Connector (pin header)	CN1	HIF3E-26PA-2.54DSA		1	Hirose
4	Connector (pin header)	CN4	HIF3E-10PA-2.54DSA		1	Hirose
5	Connector	CN5, CN6	AXN1500115S		2	Matsushita
6	Laminated ceramic capacitor	C1, C22, C23, C24, C26	GRM219F11H104ZA01D	0.1 μF 2.0*1.25	5	Murata
7	Tantalum capacitor	C25	TEESVA1C106M	10 μF/16 V 3.2*1.6	1	NEC Tokin
8	Tantalum capacitor	C18, C21	CRS06(TE85L,Q)	1635, 1 A, 20 V, 0.36 V	2	Nichicon
9	LCD	J1, J2	C6155A	2.54 pitch-Through	1	Shikino
10	Transistor	Q1	SSM3K02F	SC-59	1	Toshiba
11	Transistor	Q2	SSM3K02J	SC-59	1	Toshiba
12	Resistor	R17, R18, R22	RK73Z2AT	0 Ω	0	KOA
13	Resistor	R2, R5, R6, R7, R10		OPEN	5	KOA
14	Resistor	R19, R20	RK73H2ATTD1002F	10 kΩ	2	KOA
15	Resistor	R13	RK73H2ATTD1001F	1 kΩ	1	KOA
16	Resistor	R21	RK73H2ATTD2003F	200 kΩ	1	KOA
17	DIP switch	SW1, SW4	CAS-220A1		2	COPAL
18	Tactile switch	SW2	SKHHAKA010		1	ALPS
19	Push lever switch	SW5	SLLB510100		1	ALPS
20	Pressure sensor	U3	SCP1000-D01		1	VTI
21	Inverter	U4, U6	SN74LVC2G04DCKT		2	TI
22	Acceleration sensor	U5	LIS302DL		1	ST
23	Screw		FB-0305N		5	Wilco
24	Stud		ASB-310E	10 mm	5	Hirosugi Keiki
25						
Interface board						
26	Circuit board		SA-0902		1	Arm Electronics
27	Connector	P1, P2	3432-6002LC		2	3M
28	Connector	P3	3662-6002LC		1	3M
29	Connector	P4, P7	AXN1500115S		2	Matsushita
30	Connector	P5, P6	3433-6002LC		2	3M

Revision History

Attachment-1

Code No.	Page	Contents
411801900	All	First edition
411801901	P9	Added section “6. Sample Software Operation.”
	P15	Added “Appendix B Sample Software File Configuration.”
	P16	Added “Appendix C Circuit Diagrams.”
	P18	Added “Appendix D Parts List.”

EPSON

International Sales Operations

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

Document Code: 411801901
First Issue September 2009 in JAPAN Ⓥ
Revised April 2010 in JAPAN ⓓ