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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 S5U1C17656T (SVT17656: Software Evaluation Tool for S1C17656) is an evaluation board for the Seiko Epson single-chip microcontroller S1C17656. This board includes an S1C17656, an LCD panel, touch keys, and a piezoelectric buzzer.

1) CPU
   S1C17656 (TQFP14-80pin)

2) Power supply voltage
   Coin type battery (CR2032, 3.0 V) *1

3) CPU clock
   OSC1A: 32.768 kHz crystal resonator
   OSC3B: S1C17656 internal oscillator

4) Devices mounted
   S1C17656 (16-bit MCU)
   Crystal resonator (32.768 kHz)
   LCD panel (7 SEG × 6 digits, 30 segments × 2 commons)
   12 touch keys
   Piezoelectric buzzer
   Coin type battery holder
   Jumper patterns for current consumption measurement
   Through-hole patterns for debug interface
   Through-hole patterns for UART communication

5) Operating temperature range
   5 °C to 35 °C

6) Operating voltage range
   2.2 V to 3.6 V

*1 Note that no coin type battery is included.

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 S1C17656 software debugging and evaluation environment can be constructed with the procedure shown below.

<When performing software debugging>

(1) The S5U1C17656T has through hole electrodes for the debug signals but does not provide components required for the debug interface such as connectors to connect with the 4-pin target interface cable and 4-pin flash programming power supply cable supplied with the S5U1C17001H (ICDmini).

To perform software debugging using this board, prepare the components required for connecting with the ICDmini.

(2) Supply power to the S5U1C17656T by putting a coin type battery (CR2032, 3.0V) into the battery holder, or connecting the power supply cable of the S5U1C17001H2 (ICDmini Ver. 2) or a stabilized power supply to the terminals of the battery holder. The power supply voltage must be within the S1C17656 operating voltage range (1.8 V to 3.6 V when programming the flash memory embedded in the S1C17656).

(3) 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.

![Connections for Software Debugging](image)

Figure 1.1.1 Connections for Software Debugging
2. Name and Function of Each Part

2.1 Name of Each Part

The figure below shows the name of each part.

![Diagram of part names](image)

Figure 2.1.1 Part Names on Front Side of S5U1C17656T
2. Name and Function of Each Part

Figure 2.1.2  Part Names on Back Side of S5U1C17656T

- Battery holder (BT1)
- Jumper switch for current consumption measurement (JP1)
2. Name and Function of Each Part

2.2 Function of Each Part

2.2.1 Function of Jumper Switch

Table 2.2.1.1  Jumper Switch Function

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Function</th>
<th>Factory setting</th>
<th>Optional setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1</td>
<td>Soldered</td>
<td>S1C17656 current consumption measurement (Vss)</td>
<td>Short-circuited</td>
<td>Open</td>
</tr>
</tbody>
</table>

*1 To measure current consumption of the S1C17656, insert an ammeter between the jumper terminals.

2.2.2 Functions of Parts

Table 2.2.2.1  List of Major Parts and Their Function

<table>
<thead>
<tr>
<th>Part name</th>
<th>Location</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC</td>
<td>U1</td>
<td>S1C17656 (16-bit MCU)</td>
</tr>
<tr>
<td>LCD</td>
<td>LCD1</td>
<td>TN 30 segments × 2 commons, 1/3 bias, 1/2 duty</td>
</tr>
<tr>
<td>Coin type battery holder</td>
<td>BT1</td>
<td>CR2032 coin type battery holder</td>
</tr>
<tr>
<td>Crystal resonator</td>
<td>X1</td>
<td>32.768 kHz, MC-146 (7 pF)</td>
</tr>
<tr>
<td>Piezoelectric buzzer</td>
<td>BZ1</td>
<td>Ø = 12.2 mm</td>
</tr>
<tr>
<td>Resistors</td>
<td>R1–R6</td>
<td>5.6 MΩ, for charging/discharging touch keys</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>Vdd</td>
<td>Through hole for debug interface Group 1</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>#RESET</td>
<td>Through hole for debug interface Group 1</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>GND_2</td>
<td>Through hole for debug interface Group 1</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>Vpp</td>
<td>Through hole for debug interface Group 1</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>DCLK</td>
<td>Through hole for debug interface Group 2</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>GND_3</td>
<td>Through hole for debug interface Group 2</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>DST2</td>
<td>Through hole for debug interface Group 2</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>P00/SIN0</td>
<td>Through hole for connecting a serial communication device</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>P01/SOUT0</td>
<td>Through hole for connecting a serial communication device</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>GND_1</td>
<td>Through hole for connecting a serial communication device</td>
</tr>
</tbody>
</table>
3. Block Diagram

The figure below shows the block diagram of the S5U1C17656T.

![Block Diagram of S5U1C17656T](image)

Figure 3.1  S5U1C17656T Block Diagram
### 4. Connection Terminals (Through Holes)

#### Table 4.1 List of Debug Interface Group 1 Connection Terminals

<table>
<thead>
<tr>
<th>No.</th>
<th>Terminal name</th>
<th>I/O</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vdd</td>
<td>I/O</td>
<td>Target operating voltage input/output</td>
</tr>
<tr>
<td>2</td>
<td>#RESET</td>
<td>I</td>
<td>Target reset signal input</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>–</td>
<td>Power supply (GND)</td>
</tr>
<tr>
<td>4</td>
<td>Vpp</td>
<td>I</td>
<td>Flash programming voltage input</td>
</tr>
</tbody>
</table>

#### Table 4.2 List of Debug Interface Group 2 Connection Terminals

<table>
<thead>
<tr>
<th>No.</th>
<th>Terminal name</th>
<th>I/O</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCLK</td>
<td>O</td>
<td>Clock signal output for debugging</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>–</td>
<td>Power supply (GND)</td>
</tr>
<tr>
<td>3</td>
<td>DSIO</td>
<td>I/O</td>
<td>Serial communication signal input/output for debugging</td>
</tr>
<tr>
<td>4</td>
<td>DST2</td>
<td>O</td>
<td>Debug status signal output</td>
</tr>
</tbody>
</table>

#### Table 4.3 List of Serial Communication Signal Connection Terminals

<table>
<thead>
<tr>
<th>No.</th>
<th>Terminal name</th>
<th>I/O</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P00/SIN0</td>
<td>I</td>
<td>Serial communication (UART) signal input</td>
</tr>
<tr>
<td>2</td>
<td>P01/SOUT0</td>
<td>O</td>
<td>Serial communication (UART) signal output</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>–</td>
<td>Power supply (GND)</td>
</tr>
</tbody>
</table>
A 9 pF capacitor is used for C4 and C5 so that the OSC1 oscillation frequency measured value is adjusted as close to 32.768 kHz as possible.
### Table C.1  S5U1C17656T1100 Parts List *1

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Name</th>
<th>Product No.</th>
<th>Specification</th>
<th>Q'ty</th>
<th>Manufacture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U1</td>
<td>MCU</td>
<td>S1C17656</td>
<td>TQFP14-80pin</td>
<td>1</td>
<td>SEIKO EPSON CORPORATION</td>
</tr>
<tr>
<td>2</td>
<td>LCD1</td>
<td>LCD panel</td>
<td>Custom product</td>
<td>TN, driven with 3 V</td>
<td>1</td>
<td>MAP ELECTRONICS CO., LTD.</td>
</tr>
<tr>
<td>3</td>
<td>BT1</td>
<td>Coin battery holder</td>
<td>CH7410-2032LF</td>
<td>for CR2032</td>
<td>1</td>
<td>TAKACHI ELECTRONICS ENCLOSURE CO., LTD.</td>
</tr>
<tr>
<td>4</td>
<td>X1</td>
<td>Crystal resonator</td>
<td>MC-146 (CL = 7 pF)</td>
<td>32.768 kHz</td>
<td>1</td>
<td>SEIKO EPSON CORPORATION</td>
</tr>
<tr>
<td>5</td>
<td>BZ1</td>
<td>Piezoelectric buzzer</td>
<td>PS1240P02BT</td>
<td>Ø = 12.2 mm</td>
<td>1</td>
<td>TDK Corporation</td>
</tr>
<tr>
<td>6</td>
<td>R1, R2, R3, R4, R5, R6</td>
<td>Resistor</td>
<td>MCR03ERTJ565</td>
<td>5.6 MΩ 1608</td>
<td>6</td>
<td>ROHM Co., Ltd.</td>
</tr>
<tr>
<td>7</td>
<td>R7</td>
<td>Resistor</td>
<td>MCR03ERTJ103</td>
<td>10 kΩ 1608</td>
<td>1</td>
<td>ROHM Co., Ltd.</td>
</tr>
<tr>
<td>8</td>
<td>R8, R9</td>
<td>Resistor</td>
<td>MCR03ERTJ220</td>
<td>22 Ω 1608</td>
<td>2</td>
<td>ROHM Co., Ltd.</td>
</tr>
<tr>
<td>9</td>
<td>R10</td>
<td>Resistor</td>
<td>MCR03ERTJ330</td>
<td>33 Ω 1608</td>
<td>1</td>
<td>ROHM Co., Ltd.</td>
</tr>
<tr>
<td>10</td>
<td>C1, C6</td>
<td>Capacitor</td>
<td>GRM188R71C104KA01D</td>
<td>0.1 µF 16 V B 1608</td>
<td>2</td>
<td>Murata Manufacturing Co., Ltd.</td>
</tr>
<tr>
<td>11</td>
<td>C2</td>
<td>Capacitor</td>
<td>C1608X5R0J106M080AB</td>
<td>10 µF 6.3 V B 1608</td>
<td>1</td>
<td>TDK Corporation</td>
</tr>
<tr>
<td>12</td>
<td>C3</td>
<td>Capacitor</td>
<td>GRM188R71C474KA88D</td>
<td>0.47 µF 16 V 1608</td>
<td>1</td>
<td>Murata Manufacturing Co., Ltd.</td>
</tr>
<tr>
<td>13</td>
<td>C4, C5</td>
<td>Capacitor</td>
<td>GRM1885C1H9R0DZ01D</td>
<td>9 µF 50 V 1608</td>
<td>2</td>
<td>Murata Manufacturing Co., Ltd.</td>
</tr>
<tr>
<td>14</td>
<td>C7, C9, C10, C11, C12, C13</td>
<td>Capacitor</td>
<td>GRM188R61C105KA12D</td>
<td>1 µF 16 V B 1608</td>
<td>6</td>
<td>Murata Manufacturing Co., Ltd.</td>
</tr>
<tr>
<td>15</td>
<td>C8</td>
<td>Capacitor</td>
<td>GRM188R60J475KE19D</td>
<td>4.7 µF 6.3 V B 1608</td>
<td>1</td>
<td>Murata Manufacturing Co., Ltd.</td>
</tr>
</tbody>
</table>

*1 Parts are subject to change without notice.

### Table C.2  S5U1C17656T1100 Parts List (Installed Part, Attachments) *1

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Product No.</th>
<th>Specification</th>
<th>Q'ty</th>
<th>Manufacture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Polycarbonate plate</td>
<td>N144005-01 (custom product)</td>
<td>Transparent, t = 0.5 mm, 55 × 65 mm</td>
<td>2</td>
<td>Nissho Sangyo Co., Ltd.</td>
</tr>
<tr>
<td>2</td>
<td>Plastic screw</td>
<td>PC-0204</td>
<td>M2 4 mm, Material: PC</td>
<td>4</td>
<td>Hirosugi-Keiki Co., Ltd.</td>
</tr>
<tr>
<td>3</td>
<td>Plastic nut</td>
<td>PCNT-02</td>
<td>M2, Material: PC</td>
<td>4</td>
<td>Hirosugi-Keiki Co., Ltd.</td>
</tr>
</tbody>
</table>

*1 Parts are subject to change without notice.
<table>
<thead>
<tr>
<th>Rev. No.</th>
<th>Date</th>
<th>Page</th>
<th>Category</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev 1.0</td>
<td>2015/03/13</td>
<td>All</td>
<td>New</td>
<td>New establishment</td>
</tr>
</tbody>
</table>
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