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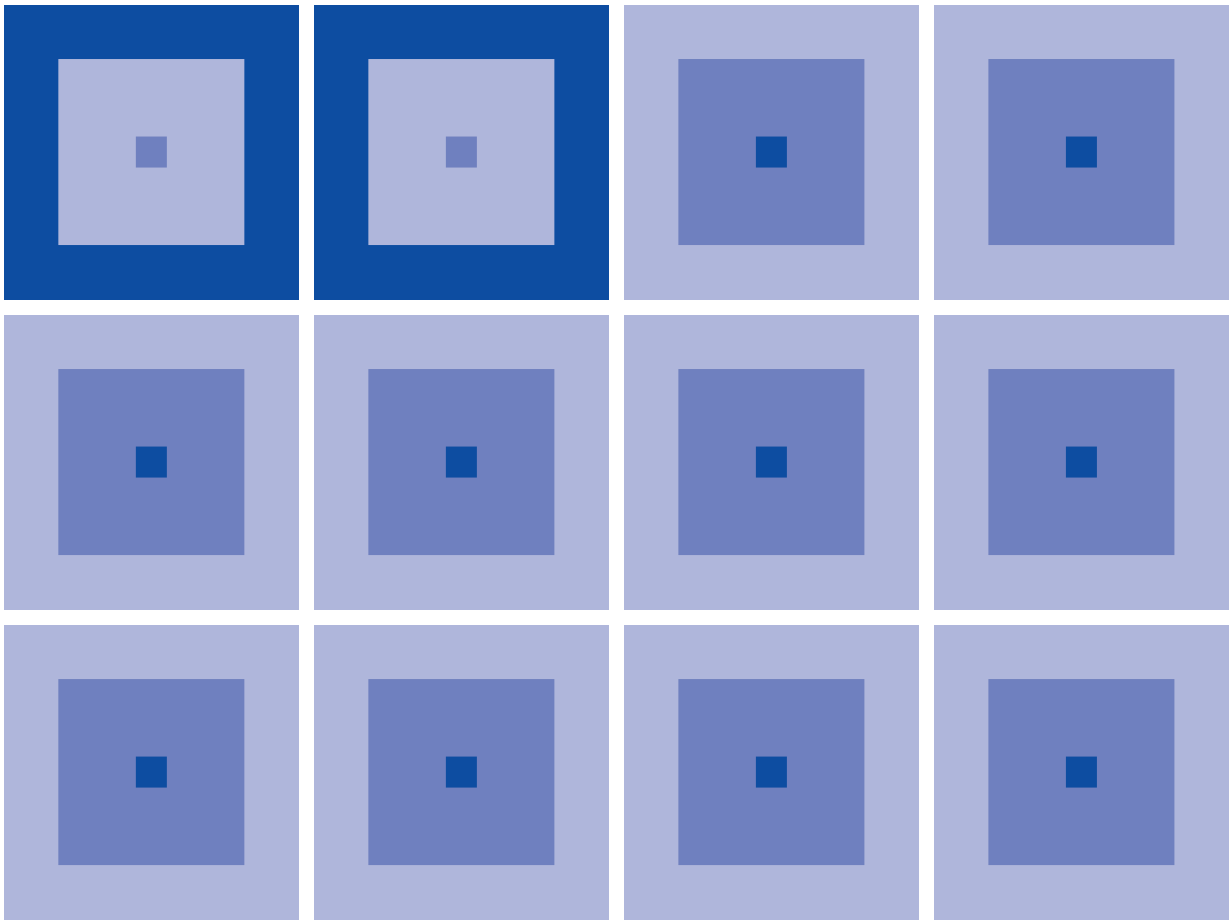
CMOS 4-BIT SINGLE CHIP MICROCOMPUTER

S5U1C6F666T11 Manual

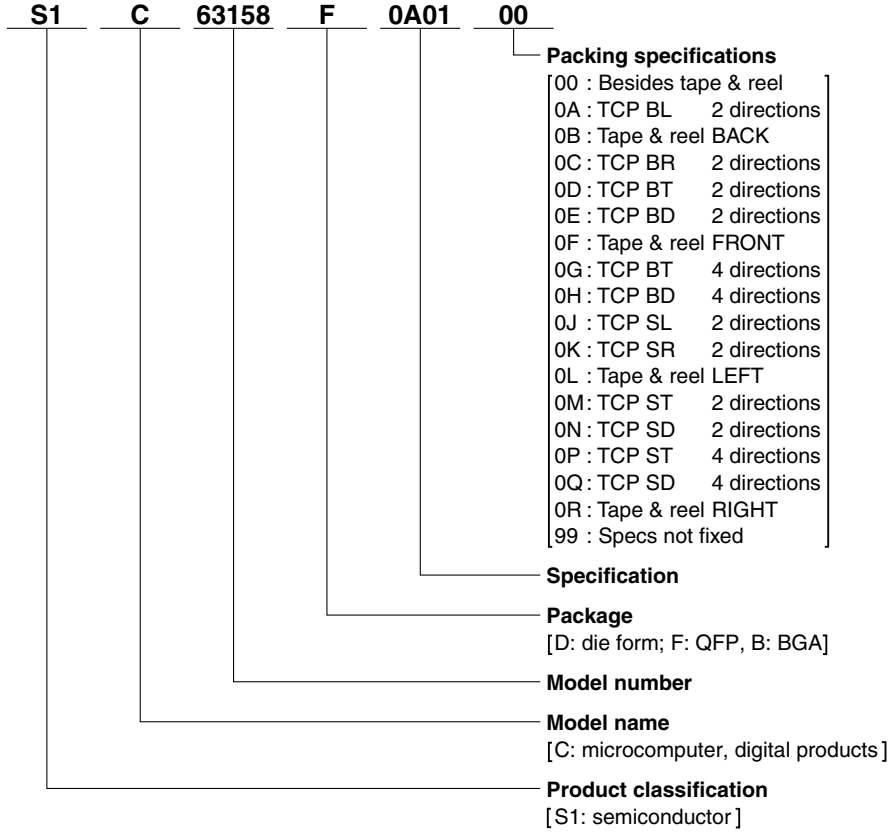
(S1C6F666/S1C05112 Demonstration Tool)



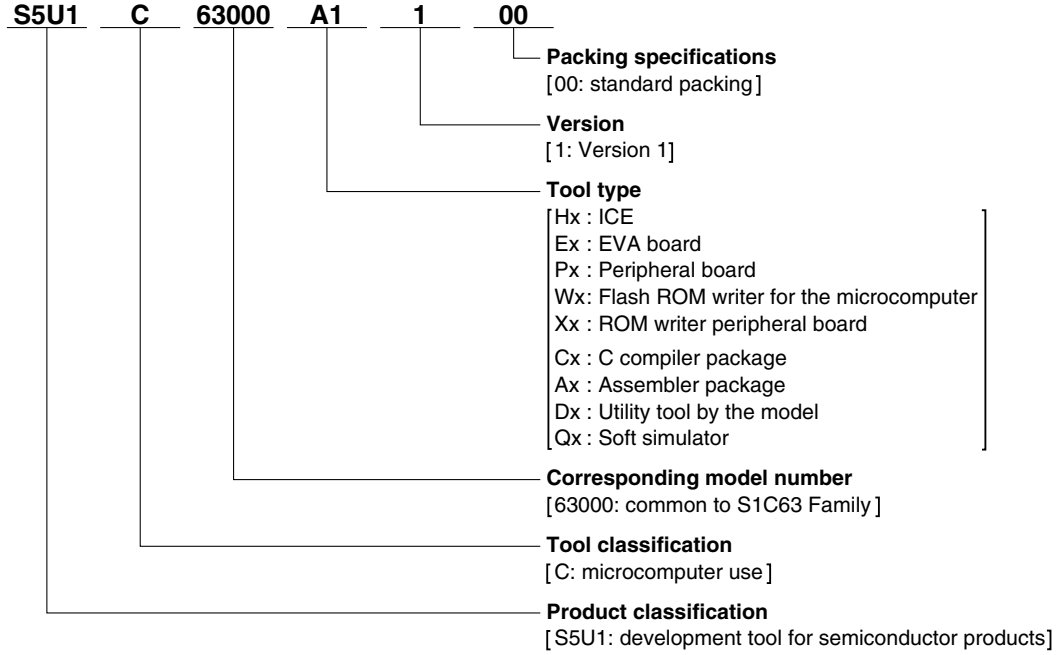
SEIKO EPSON CORPORATION

Configuration of product number

Devices



Development tools



- PREFACE -

The S5U1C6F666 is a demonstration tool for the SEIKO EPSON S1C63 Family 4-bit single chip microcomputers. This manual explains the hardware specifications and how to use the S5U1C6F666.

- CONTENTS -

1 Overview

The S5U1C6F666 is a demonstration tool for the SEIKO EPSON S1C63 Family 4-bit single chip microcomputers. The CPU board on the S5U1C6F666 is equipped with the S1C6F666. Thus user application programs can be run on the S5U1C6F666 by writing the program and data into the on-chip Flash memory of the S1C6F666. Furthermore, the connector from which the CPU board is disconnected can be used to connect the S5U1C6F666 to the PRC board (S5U1C63000P1) installed in the ICE63 (S5U1C63000H1/S5U1C63000H2), this makes it possible to use the S5U1C6F666 for debugging application programs.
All the S1C6F666 I/O signals are provided through the connectors and pads allowing connection of external parts or a user circuit board. The S5U1C6F666 supports development of various applications with flexibility.
The following shows the S5U1C6F666 system configuration at shipment:

CPU: S1C6F666
Internal PROM = 16K words (An operation-check program is included.)
Internal RAM = 5K words

OSC1 clock: Crystal oscillation 32.768 kHz

OSC3 clock: Ceramic oscillation 2.00 MHz

LCD panel: 8-digit 7-segment LCD
Can be driven by the S1C6F666 on-chip LCD driver.

EPD driver: S1C05112
A 124-segment EPD panel can be driven.
A DC-DC converter (3 V to 18 V) is built in.

Buzzer: A piezoelectric buzzer is mounted.
Can be driven by the S1C6F666 BZ and $\overline{BZ}$ output ports.

Temperature and humidity measurement circuit:
Can be measured by the S1C6F666 on-chip R/f converter. (External sensors are required.)

2 Names and Functions of Each Part

The S5U1C6F666 consists of four boards: main board, CPU board, EPD board and LCD board.

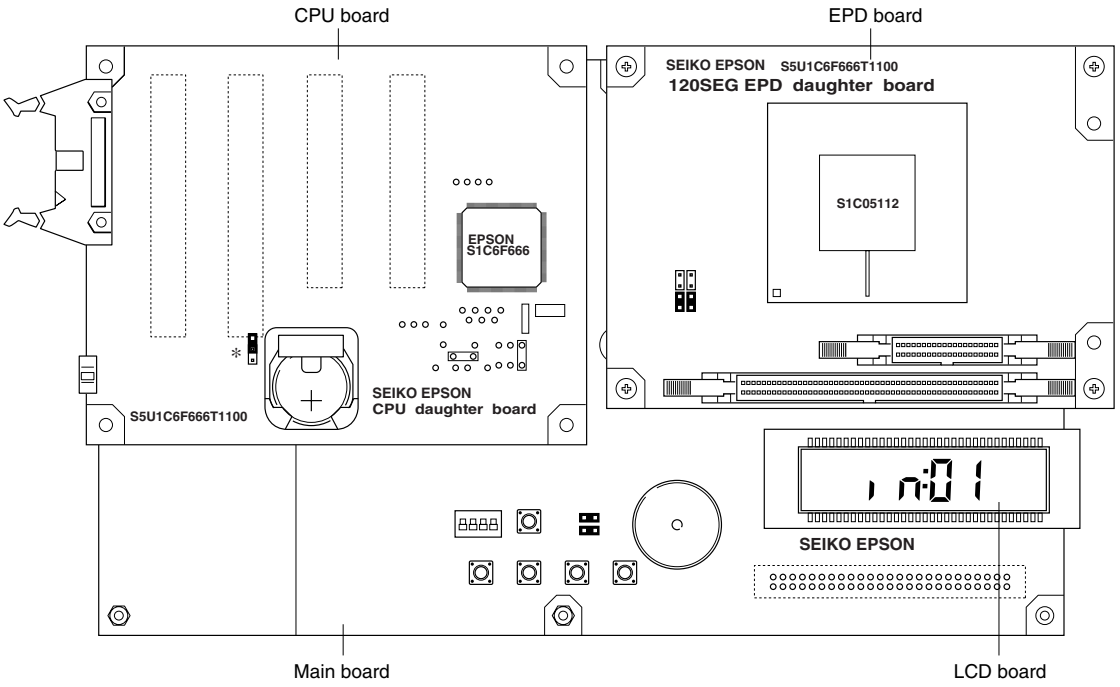


Figure 2.1 S5U1C6F666

* The J4 jumper is set to OFF at shipment, change it to ON (short circuit) before using the S5U1C6F666.

2.1 S5U1C6F666 Main Board

This is the motherboard for mounting other daughter boards. The following shows the primary components that have been contained on the board.

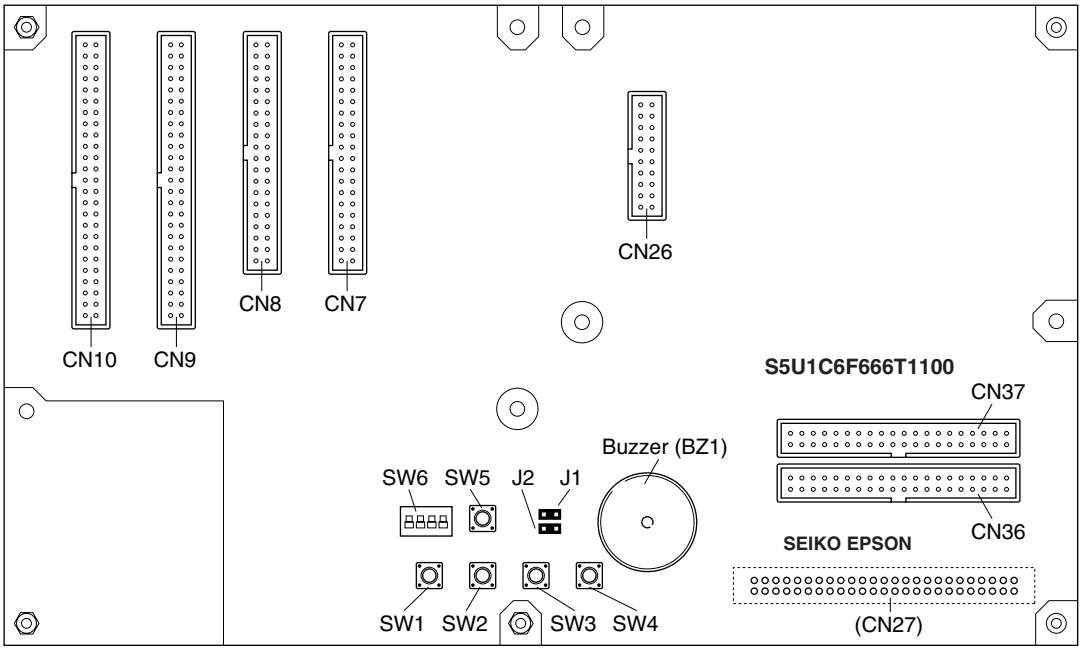


Figure 2.1.1 Main Board

ICE interface connectors (CN1–CN4)

The CPU board is inserted in these connectors at shipment.

The connectors can also be used to connect the S5U1C6F666 to the ICE63. In this case, remove the CPU board and connect between this connector and the I/O connector on the PRC board that has been installed in the ICE63 using the interface cable included with the PRC board. For the pin assignment of the connector, see Section 5.1, "Main Board - CPU Board Interface Connectors." For how to connect to the ICE63, see Section 4.2, "Connecting to ICE63."

EPD driver interface connector (CN26)

The EPD board is inserted in this connector at shipment.

The S1C6F666 I/O signals are assigned to the connector pins. For the pin assignment of the connector, see Section 5.2, "Main Board - Peripheral Board Interface Connectors."

LCD interface connectors (CN36, CN37)

The LCD board is inserted in these connectors at shipment.

The S1C6F666 LCD driver signals are assigned to the connector pins. Maximum 64 SEG × 8 COM of an LCD panel can be driven through these connectors. For the pin assignment of the connector, see Section 5.2, "Main Board - Peripheral Board Interface Connectors."

Switches

The switches are connected to the S1C6F666 K00–K03, K10–K12 and RESET pins through the ICE interface connector.

SW1–SW4

These push switches are connected to the K00–K03 ports.

SW1 → K00, SW2 → K01, SW3 → K02, SW4 → K03

The switch is normally in open status and the input port is pulled down to low (VSS). The input port is set to high (VDD) while the switch is being pressed.

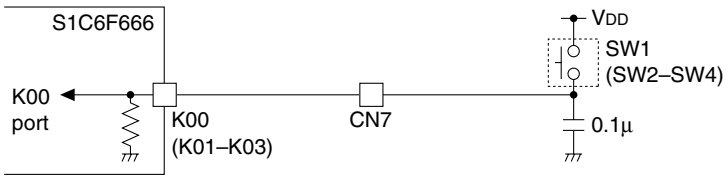


Figure 2.1.2 Switch Input Circuit (SW1–SW4)

SW5

This push switch is connected to the RESET pin of the S1C6F666.

Pressing this switch sets the RESET pin to high to reset the S1C6F666 on the CPU board or ICE63.

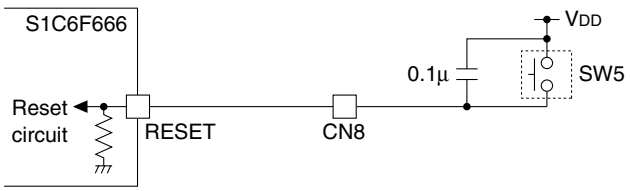


Figure 2.1.3 Reset Input Circuit

SW6

This DIP switch is connected to the K10–K12 ports.

SW6-1 → K10, SW6-2 → K11, SW6-3 → K12, SW6-4 → Unused

When the switch is set to the on position, the corresponding input port is set to high (VDD); when it is set to the off position, the input port is set to low (VSS).

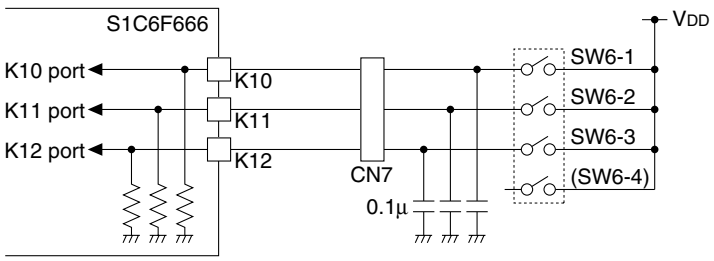


Figure 2.1.4 Switch Input Circuit (SW6)

Buzzer

The buzzer (BZ1) is connected to the S1C6F666 BZ and $\overline{BZ}$ pins through the ICE interface connector.

The buzzer (BZ1) can be disconnected by removing the jumper block (J1, J2) when it is not used or connecting another buzzer to the BZ and $\overline{BZ}$ pins.

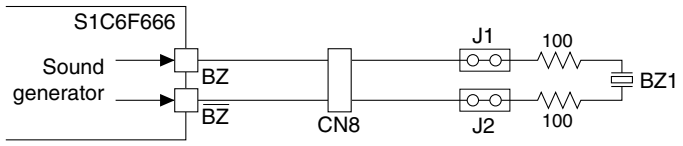
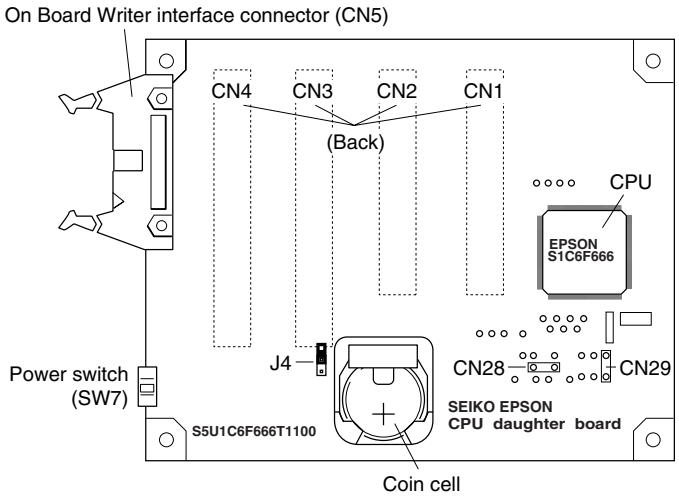


Figure 2.1.5 Buzzer Circuit

2.2 S5U1C6F666 CPU Board

The CPU board is equipped with S1C6F666 and oscillation circuits. Also the board has ICE63 interface connectors for installing it to the main board.



∗ The J4 jumper is set to OFF at shipment, change it to ON (short circuit) before using the S5U1C6F666.

Figure 2.2.1 CPU Board

CPU

The SEIKO EPSON 4-bit single-chip microcomputer S1C6F666 is contained on the board. Refer to the "S1C6F666 Technical Manual" for details of the S1C6F666.

Oscillation circuits

The oscillator types and their frequencies are as follows:

OSC1: Crystal resonator 32.768 kHz OSC3: Ceramic resonator 2.00 MHz

Battery holder (BAT1)

Use a coin cell (2032 or 2016) as the power source.

R/f connectors (CN28, CN29)

CN28 is connected to the S1C6F666 R/f pins (RFIN0, REF0, SEN0). Insert a temperature sensor (thermistor) into this connector to configure a temperature measurement circuit. CN29 is connected to the S1C6F666 R/f pins (HUD, SEN1). Insert a humidity sensor into this connector to configure a humidity measurement circuit.

In order to customize the external R/f circuit according to the sensor to be used, pads are provided. For temperature/humidity sensors, contact SEIKO EPSON.

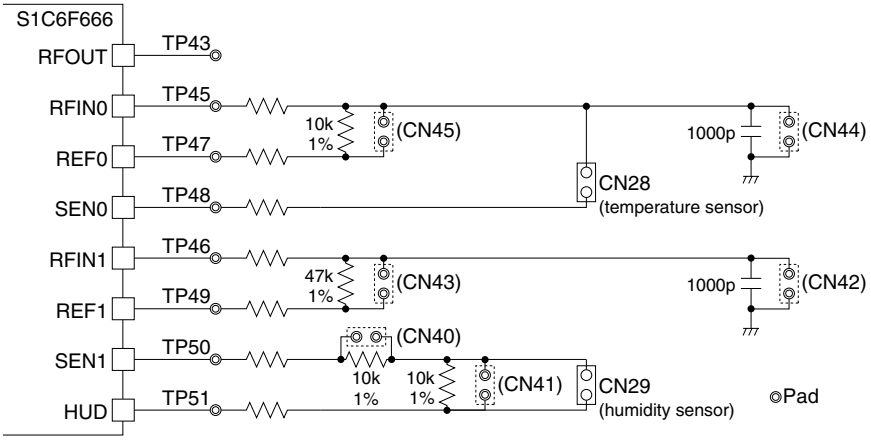


Figure 2.2.2 R/f Conversion Circuit

Power switch (SW7)

This slide switch is used to turn the S5U1C6F666 power on and off.

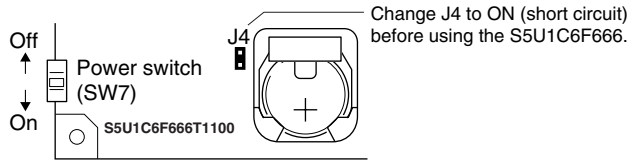


Figure 2.2.3 Power Switch

On Board Writer interface connector (CN5)

By connecting the On Board Writer (S5U1C88000W3) to this connector, the on-chip Flash memory of the S1C6F666 contained on the CPU board can be programmed from a PC.

SEIKO EPSON provides the On Board Writer (S5U1C88000W3) separately from S5U1C6F666. For the On Board Writer, contact SEIKO EPSON.

Note: The USB-Serial On Board Writer (S5U1C88000W4) with a USB interface cannot be used to program the S5U1C6F666.

Main board interface connectors (CN1–CN4)

These connectors are used to install the CPU board on the main board.

2.3 S5U1C6F666 EPD Board

The EPD board is equipped with an EPD driver IC.

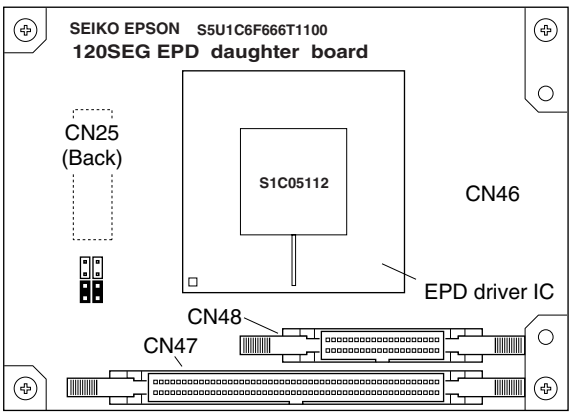


Figure 2.3.1 EPD Board

EPD driver IC

The EPD board is equipped with the SEIKO EPSON S1C05112 EPD driver. For details of the S1C05112, refer to the "S1C05112 Technical Manual."

EPD interface connectors (CN47, CN48)

The EPD driver output signals are assigned to the connector pins. For the pin assignment of the connector, see Section 5.3, "EPD Interface Connectors (EPD Board)."

EPD interface pads (CN46)

The EPD driver output signals are assigned to the pads. For the signal assignment of the pads, see Section 5.3, "EPD Interface Connectors (EPD Board)."

Main board interface connector (CN25)

This connector is used to install the EPD board on the main board.

2.4 S5U1C6F666 LCD Board

The LCD board is equipped with an LCD panel.

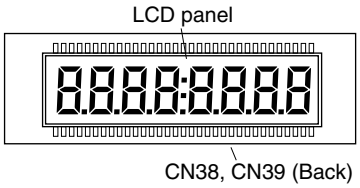


Figure 2.4.1 LCD Board

LCD panel

The LCD board is equipped with a seven-segment LCD panel (LUMEX LCD-S801C42TR) that can display eight-digit numbers by the outputs (COM0, SEG0–SEG63) from the S1C6F666 LCD driver. For the correspondence between the LCD segments and the LCD driver outputs, see Section 3.2.2, "LCD Segment Outputs." For the correspondence between the display memory bits and the LCD driver outputs, see Section 3.3, "Mask Option."

Main board interface connectors (CN38, CN39)

These connectors are used to install the LCD board on the main board.

3 CPU System Configuration

3.1 Memory Map

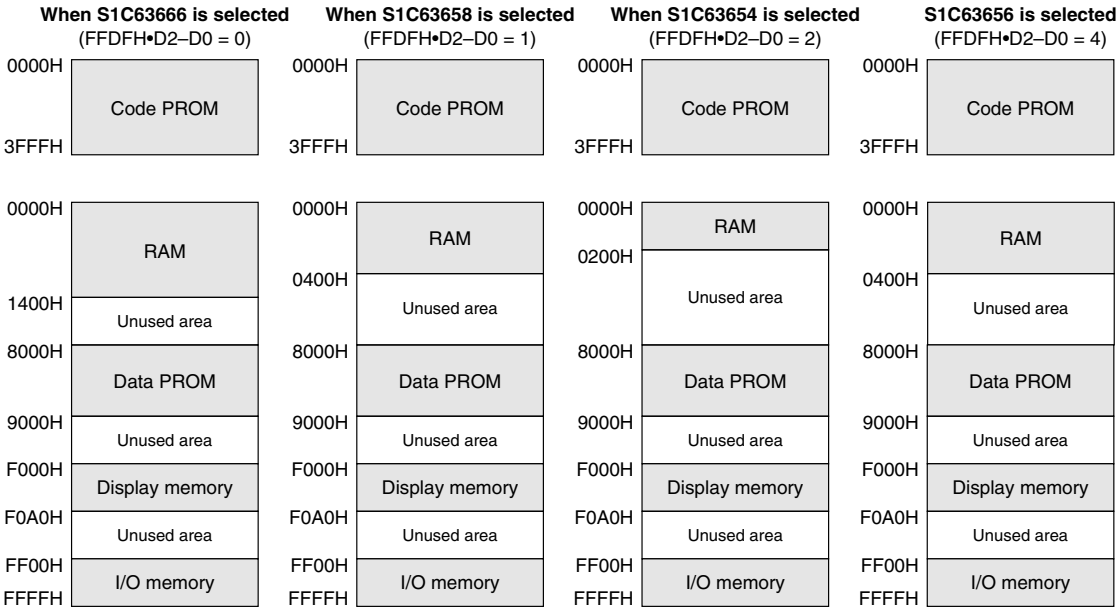


Figure 3.1.1 Memory Map

The code PROM size is 16,384 × 13 bits (16K words).
The data PROM size is 4,094 × 4 bits (4K words).
For details of the PROM, refer to the "S1C6F666 Technical Manual."

3.2 Input/Output Port Functions

3.2.1 Input/Output Ports

Table 3.2.1.1 lists the S1C6F666 input/output pins used in the S5U1C6F666 and their connection destinations. (See Section 3.2.2 for the LCD driver pins.)

Table 3.2.1.1 S1C6F666 Input/Output Pins Used

Pin No.	Port name	I/O	Connection destination
78	K00	I	SW1 (Main board)
79	K01	I	SW2 (Main board)
80	K02	I	SW3 (Main board)
81	K03	I	SW4 (Main board)
82	K10	I	SW6-1 (Main board)
83	K11	I	SW6-2 (Main board)
84	K12	I	SW6-3 (Main board)
102	BZ	O	Buzzer (pin 1) (Main board)
103	XBZ	O	Buzzer (pin 2) (Main board)
86	P00	O	SDAT0 (EPD board)
87	P01	O	SDAT1 (EPD board)
88	P02	O	SDAT2 (EPD board)
89	P03	O	SDAT3 (EPD board)
90	P10	O	SEN (EPD board)
91	P11	O	XCS (EPD board)
92	P12	O	SCK (EPD board)
93	P13	O	DIV (NC)
94	R00	O	LO_ACT (EPD board)
95	R01	O	DD_ACT (EPD board)
97	R03/FOUT	O	DCK (EPD board)
98	R10	O	DD0: Fix at Vss (EPD board)*
99	R11	O	DD1: Fix at Vss (EPD board)*
21	SEN1	O	Humidity sensor (CPU board)
22	HUD	O	Humidity sensor (CPU board)
19	SEN0	O	Temperature sensor (CPU board)
18	REF0	O	Temperature sensor (CPU board)
16	RFIN0	I	Temperature sensor (CPU board)
36	RESET	I	SW5 (Main board)

* The R10 and R11 ports must be fixed at low (Vss).

For how to control the input/output ports and R/f converter, refer to the “S1C6F666 Technical Manual.” For how to control the EPD driver, refer to the “S1C05112 Technical Manual.”

3.2.2 LCD Segment Outputs

The LCD panel is driven with the COM0 and SEG0–SEG63 outputs. The S5U1C6F666 LCD board does not use the COM1–COM7 outputs.

Figure 3.2.2.1 shows the correspondence between the segment output signals and the LCD segments. For the correspondence between the segment outputs and the display memory bits, see "Segment option" in Section 3.3, "Mask Option."

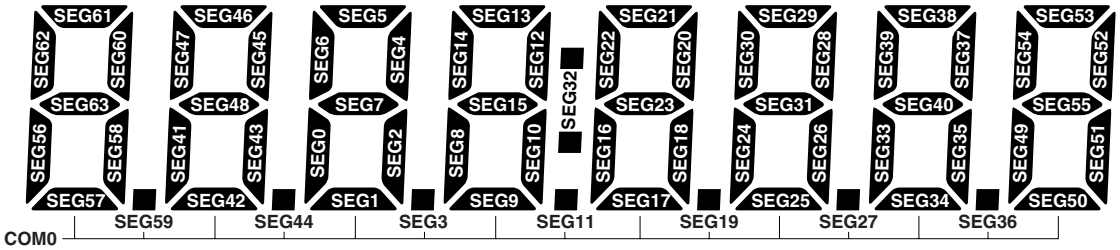


Figure 3.2.2.1 Correspondence between Segment Outputs and LCD Segments

When using the S5U1C6F666 LCD board, set up the S1C6F666 as below.

Target model: S1C63666 (FFDFH•D0–D2 = 000)

LCD drive duty: 1/4 duty (FF60H•D2, D3 = 00)

3.3 Mask Option

The S1C6F666 contained on the CPU board is the Type B standard mask option model.

Standard mask option (Type B)

1. OSC1 SYSTEM CLOCK
   ■ 1. Crystal
2. OSC3 SYSTEM CLOCK
   ■ 2. Ceramic
3. SVD EXTERNAL VOLTAGE DETECTION
   ■ 1. Not Use
4. INPUT PORT PULL DOWN RESISTOR
   - K00 .....■ 1. With Resistor
   - K01 .....■ 1. With Resistor
   - K02 .....■ 1. With Resistor
   - K03 .....■ 1. With Resistor
   - K10 .....■ 1. With Resistor
   - K11 .....■ 1. With Resistor
   - K12 .....■ 1. With Resistor
   - K13 .....■ 1. With Resistor
5. RESET PORT PULL DOWN RESISTOR
   - RESET .....■ 1. With Resistor
6. I/O PORT PULL DOWN RESISTOR
   - P00 .....■ 1. With Resistor
   - P01 .....■ 1. With Resistor
   - P02 .....■ 1. With Resistor
   - P03 .....■ 1. With Resistor
   - P10 .....■ 1. With Resistor
   - P11 .....■ 1. With Resistor
   - P12 .....■ 1. With Resistor
   - P13 .....■ 1. With Resistor
7. OUTPUT PORT OUTPUT SPECIFICATION
   - R00 .....■ 1. Complementary
   - R01 .....■ 1. Complementary
   - R02 .....■ 1. Complementary
   - R03 .....■ 1. Complementary
   - R10 .....■ 1. Complementary
   - R11 .....■ 1. Complementary
   - R12 .....■ 1. Complementary
   - R13 .....■ 1. Complementary
8. I/O PORT OUTPUT SPECIFICATION
   - P00 .....■ 1. Complementary
   - P01 .....■ 1. Complementary
   - P02 .....■ 1. Complementary
   - P03 .....■ 1. Complementary
   - P10 .....■ 1. Complementary
   - P11 .....■ 1. Complementary
   - P12 .....■ 1. Complementary
   - P13 .....■ 1. Complementary
9. MULTIPLE KEY ENTRY RESET COMBINATION
   ■ 1. Not Use
10. MULTIPLE KEY ENTRY RESET TIME AUTHORIZE
    ■ 1. Not Use
11. LCD DRIVING POWER
    ■ 1. Internal Power (3.0 V panel)

12. SEGMENT OPTION

Pin name	Address (F0xx)																							
	COM0			COM1			COM2			COM3			COM4			COM5			COM6			COM7		
	H	L	D	H	L	D	H	L	D	H	L	D	H	L	D	H	L	D	H	L	D	H	L	D
SEG0	0	0	0	0	0	1	0	0	2	0	0	3	0	1	0	0	1	1	0	1	2	0	1	3
SEG1	0	2	0	0	2	1	0	2	2	0	2	3	0	3	0	0	3	1	0	3	2	0	3	3
SEG2	0	4	0	0	4	1	0	4	2	0	4	3	0	5	0	0	5	1	0	5	2	0	5	3
SEG3	0	6	0	0	6	1	0	6	2	0	6	3	0	7	0	0	7	1	0	7	2	0	7	3
SEG4	0	8	0	0	8	1	0	8	2	0	8	3	0	9	0	0	9	1	0	9	2	0	9	3
SEG5	0	A	0	0	A	1	0	A	2	0	A	3	0	B	0	0	B	1	0	B	2	0	B	3
SEG6	0	C	0	0	C	1	0	C	2	0	C	3	0	D	0	0	D	1	0	D	2	0	D	3
SEG7	0	E	0	0	E	1	0	E	2	0	E	3	0	F	0	0	F	1	0	F	2	0	F	3
SEG8	1	0	0	1	0	1	1	0	2	1	0	3	1	1	0	1	1	1	1	1	2	1	1	3
SEG9	1	2	0	1	2	1	1	2	2	1	2	3	1	3	0	1	3	1	1	3	2	1	3	3
SEG10	1	4	0	1	4	1	1	4	2	1	4	3	1	5	0	1	5	1	1	5	2	1	5	3
SEG11	1	6	0	1	6	1	1	6	2	1	6	3	1	7	0	1	7	1	1	7	2	1	7	3
SEG12	1	8	0	1	8	1	1	8	2	1	8	3	1	9	0	1	9	1	1	9	2	1	9	3
SEG13	1	A	0	1	A	1	1	A	2	1	A	3	1	B	0	1	B	1	1	B	2	1	B	3
SEG14	1	C	0	1	C	1	1	C	2	1	C	3	1	D	0	1	D	1	1	D	2	1	D	3
SEG15	1	E	0	1	E	1	1	E	2	1	E	3	1	F	0	1	F	1	1	F	2	1	F	3
SEG16	2	0	0	2	0	1	2	0	2	2	0	3	2	1	0	2	1	1	2	1	2	2	1	3
SEG17	2	2	0	2	2	1	2	2	2	2	2	3	2	3	0	2	3	1	2	3	2	2	3	3
SEG18	2	4	0	2	4	1	2	4	2	2	4	3	2	5	0	2	5	1	2	5	2	2	5	3
SEG19	2	6	0	2	6	1	2	6	2	2	6	3	2	7	0	2	7	1	2	7	2	2	7	3
SEG20	2	8	0	2	8	1	2	8	2	2	8	3	2	9	0	2	9	1	2	9	2	2	9	3
SEG21	2	A	0	2	A	1	2	A	2	2	A	3	2	B	0	2	B	1	2	B	2	2	B	3
SEG22	2	C	0	2	C	1	2	C	2	2	C	3	2	D	0	2	D	1	2	D	2	2	D	3
SEG23	2	E	0	2	E	1	2	E	2	2	E	3	2	F	0	2	F	1	2	F	2	2	F	3
SEG24	3	0	0	3	0	1	3	0	2	3	0	3	3	1	0	3	1	1	3	1	2	3	1	3
SEG25	3	2	0	3	2	1	3	2	2	3	2	3	3	3	0	3	3	1	3	3	2	3	3	3
SEG26	3	4	0	3	4	1	3	4	2	3	4	3	3	5	0	3	5	1	3	5	2	3	5	3
SEG27	3	6	0	3	6	1	3	6	2	3	6	3	3	7	0	3	7	1	3	7	2	3	7	3
SEG28	3	8	0	3	8	1	3	8	2	3	8	3	3	9	0	3	9	1	3	9	2	3	9	3
SEG29	3	A	0	3	A	1	3	A	2	3	A	3	3	B	0	3	B	1	3	B	2	3	B	3
SEG30	3	C	0	3	C	1	3	C	2	3	C	3	3	D	0	3	D	1	3	D	2	3	D	3
SEG31	3	E	0	3	E	1	3	E	2	3	E	3	3	F	0	3	F	1	3	F	2	3	F	3
SEG32	4	0	0	4	0	1	4	0	2	4	0	3	4	1	0	4	1	1	4	1	2	4	1	3
SEG33	4	2	0	4	2	1	4	2	2	4	2	3	4	3	0	4	3	1	4	3	2	4	3	3
SEG34	4	4	0	4	4	1	4	4	2	4	4	3	4	5	0	4	5	1	4	5	2	4	5	3
SEG35	4	6	0	4	6	1	4	6	2	4	6	3	4	7	0	4	7	1	4	7	2	4	7	3
SEG36	4	8	0	4	8	1	4	8	2	4	8	3	4	9	0	4	9	1	4	9	2	4	9	3
SEG37	4	A	0	4	A	1	4	A	2	4	A	3	4	B	0	4	B	1	4	B	2	4	B	3
SEG38	4	C	0	4	C	1	4	C	2	4	C	3	4	D	0	4	D	1	4	D	2	4	D	3
SEG39	4	E	0	4	E	1	4	E	2	4	E	3	4	F	0	4	F	1	4	F	2	4	F	3
SEG40	5	0	0	5	0	1	5	0	2	5	0	3	5	1	0	5	1	1	5	1	2	5	1	3
SEG41	5	2	0	5	2	1	5	2	2	5	2	3	5	3	0	5	3	1	5	3	2	5	3	3
SEG42	5	4	0	5	4	1	5	4	2	5	4	3	5	5	0	5	5	1	5	5	2	5	5	3
SEG43	5	6	0	5	6	1	5	6	2	5	6	3	5	7	0	5	7	1	5	7	2	5	7	3
SEG44	5	8	0	5	8	1	5	8	2	5	8	3	5	9	0	5	9	1	5	9	2	5	9	3
SEG45	5	A	0	5	A	1	5	A	2	5	A	3	5	B	0	5	B	1	5	B	2	5	B	3
SEG46	5	C	0	5	C	1	5	C	2	5	C	3	5	D	0	5	D	1	5	D	2	5	D	3
SEG47	5	E	0	5	E	1	5	E	2	5	E	3	5	F	0	5	F	1	5	F	2	5	F	3
SEG48	6	0	0	6	0	1	6	0	2	6	0	3	6	1	0	6	1	1	6	1	2	6	1	3
SEG49	6	2	0	6	2	1	6	2	2	6	2	3	6	3	0	6	3	1	6	3	2	6	3	3
SEG50	6	4	0	6	4	1	6	4	2	6	4	3	6	5	0	6	5	1	6	5	2	6	5	3
SEG51	6	6	0	6	6	1	6	6	2	6	6	3	6	7	0	6	7	1	6	7	2	6	7	3
SEG52	6	8	0	6	8	1	6	8	2	6	8	3	6	9	0	6	9	1	6	9	2	6	9	3
SEG53	6	A	0	6	A	1	6	A	2	6	A	3	6	B	0	6	B	1	6	B	2	6	B	3
SEG54	6	C	0	6	C	1	6	C	2	6	C	3	6	D	0	6	D	1	6	D	2	6	D	3
SEG55	6	E	0	6	E	1	6	E	2	6	E	3	6	F	0	6	F	1	6	F	2	6	F	3
SEG56	7	0	0	7	0	1	7	0	2	7	0	3	7	1	0	7	1	1	7	1	2	7	1	3
SEG57	7	2	0	7	2	1	7	2	2	7	2	3	7	3	0	7	3	1	7	3	2	7	3	3
SEG58	7	4	0	7	4	1	7	4	2	7	4	3	7	5	0	7	5	1	7	5	2	7	5	3
SEG59	7	6	0	7	6	1	7	6	2	7	6	3	7	7	0	7	7	1	7	7	2	7	7	3
SEG60	7	8	0	7	8	1	7	8	2	7	8	3	7	9	0	7	9	1	7	9	2	7	9	3
SEG61	7	A	0	7	A	1	7	A	2	7	A	3	7	B	0	7	B	1	7	B	2	7	B	3
SEG62	7	C	0	7	C	1	7	C	2	7	C	3	7	D	0	7	D	1	7	D	2	7	D	3
SEG63	7	E	0	7	E	1	7	E	2	7	E	3	7	F	0	7	F	1	7	F	2	7	F	3

S1C63654
S1C63656
S1C63658
S1C63666

H: RAM data high-order address (0–9) L: RAM data low-order address (0–F) D: Data bit (0–3)

4 How to Use the S5U1C6F666

4.1 Operating the S5U1C6F666 On a Stand-Alone Basis

The S5U1C6F666 can be operated on a stand-alone basis by the program that is written in the on-chip PROM of the S1C6F666 contained on the CPU board. An operation check program that was written into the PROM at shipment can be executed. Furthermore, user programs can be written to the PROM using the On Board Writer (S5U1C88000W3) to execute. The following explains how to control stand-alone operations.

4.1.1 Turning Power On/Off

The S5U1C6F666 operates with the battery on the CPU board. Set a coin cell (2032 or 2016) into the battery holder. Use the power switch (SW7) on the CPU board to turn the power on and off.

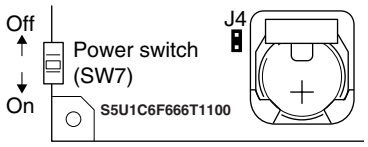


Figure 4.1.1.1 Power On/Off

When the power is turned on, the program written in the S1C6F666 PROM starts running.

Notes: • The J4 jumper is set to OFF at shipment, change it to ON (short circuit) before using the S5U1C6F666.

• Make sure that the S5U1C6F666 boards are installed properly before turning the S5U1C6F666 on.

4.1.2 Operation Check

This section describes how to use the operation check program that was written into the S1C6F666 PROM at shipment.
Although a factory inspection has been performed, run this program to check whether the S5U1C6F666 operates normally or not before rewriting the program in the S1C6F666 PROM.

The operation-check program performs an input test using SW1–4. (SW5 is the reset switch.)
When a switch is pressed, the switch number is displayed on the LCD panel and at the same time the buzzer sounds.
The following is the operation procedure:

(1) Turning power on
The LCD panel displays “in: ”.

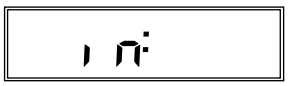


Figure 4.1.2.1 LCD Display at Power On (Initial Screen)

(2) Switch operation (port input) and buzzer output check

When SW1 is pressed, the LCD panel displays “in:01” and the buzzer sounds.
When SW2 is pressed, the LCD panel displays “in:02” and the buzzer sounds.
When SW3 is pressed, the LCD panel displays “in:03” and the buzzer sounds.
When SW4 is pressed, the LCD panel displays “in:04” and the buzzer sounds.

Figure 4.1.2.2 LCD Display when a Switch is Pressed (SW1)

Check to see if the pressed switch number is displayed properly.
After SW1, SW2 or SW3 is pressed, the EPD driver check (step 3 below) can be performed.
After SW4 is pressed, the LCD display check (step 4 below) can be performed.
The R/f operation check (step 5 below) can be performed regardless of the switch pressed.

(3) EPD driver check

Press SW1, SW2 or SW3 and then monitor the signal on the EPD driver’s segment pin (pin 124) using measuring equipment such as an oscilloscope.
The table below lists the relationship between the switch and the segment output status.

Table 4.1.2.1 EPD Driver Check

Switch	EPD segment output status
SW1	All segment outputs go high.
SW2	All segment outputs go low.
SW3	Toggles between high and low.

(4) LCD display check

Check the display contents on the LCD panel after pressing SW4. The LCD panel displays the numbers below. Each digit shifts to the left in 1-second cycles.

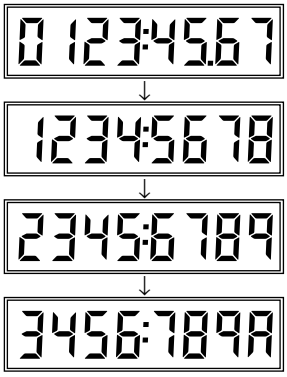


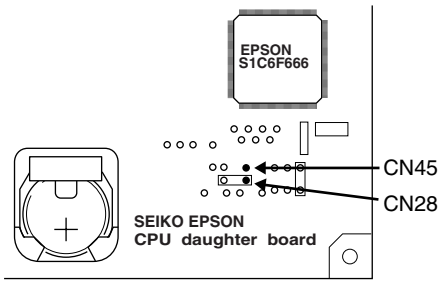
Figure 4.1.2.3 LCD Display Check

Check to see if the numbers are displayed properly.
To quit the check, press the RESET switch (SW5). The LCD display goes back to the initial screen.

(5) R/f operation check

The R/f operation check can be performed regardless of the switch pressed.

Monitor the SEN0 and REF0 signals using measuring equipment such as an oscilloscope, and check to see if rectangular wave signals are being output.



(Monitor the right pins on CN28 and CN45.)

Figure 4.1.2.4 Monitor Position for R/f Operation Check

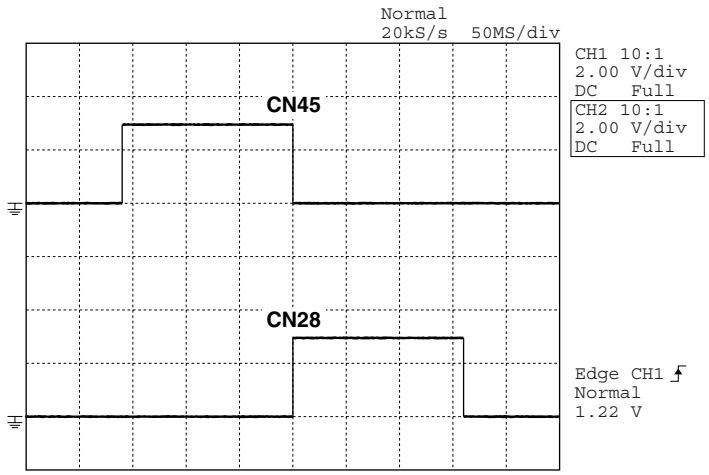


Figure 4.1.2.5 Monitored Signals During R/f Operation Check

(6) To finish the operation check

Turn the power off.

4.1.3 Programming the PROM

The CPU board provides the connector to connect the S5U1C6F666 to the On Board Writer (S5U1C88000W3) allowing the user to program the S1C6F666 PROM.

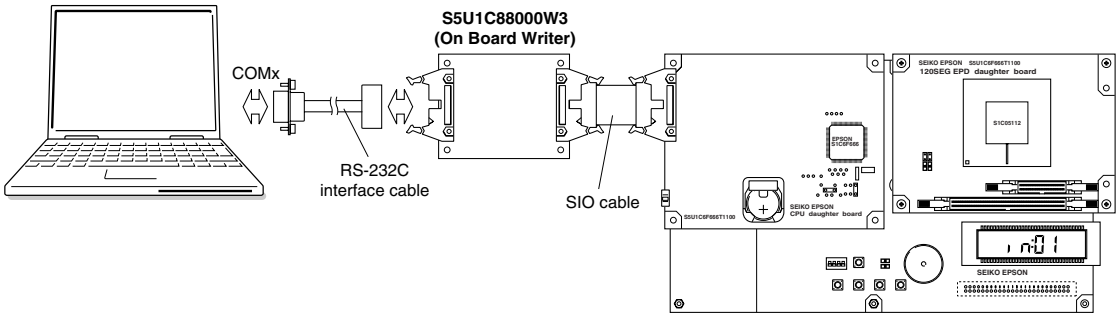


Figure 4.1.3.1 PROM Programming System

Notes: • The S5U1C6F666 supports only the On Board Writer (S5U1C88000W3) with an RS-232C interface.
The USB-Serial On Board Writer (S5U1C88000W4) with a USB interface cannot be used.

• The target board must supply a 4.5 V to 5.0 V operating voltage to the On Board Writer (S5U1C88000W3) when programming the PROM. Supply a 4.5 V to 5.0 V operating voltage to the terminal of the battery holder. Be sure to remove the battery from the CPU board before supplying the operating voltage.

The tools below are required for PROM programming.
• On Board Writer (S5U1C88000W3)
• On Board Writer Control Software (OBPW63.EXE, RW6F666.INI) *

* The On Board Writer Control Software is included in the S1C63 Family Assembler Package 2 (S5U1C63000A2) or later.

After the program has been completed, execute the HEX converter HX63 to create the HEX data files (C3xxxyyy.HSA, C3xxxyyy.LSA, C3xxxyyy.CSA) from the object file (C3xxxyyy.ABS). Then write the created HEX data files into the S1C6F666 using the On Board Writer Control Software.
Refer to the "S1C6F666 Technical Manual" for more information on the PROM programming.

4.2 Connecting to ICE63

The S5U1C6F666 from which the CPU board was removed can be connected to an ICE63 (S5U1C63000H1/ S5U1C63000H2) as a target board and used for debugging programs.

Note: Be sure to turn the S5U1C6F666 and ICE63 off before connecting/disconnecting the CPU board and I/O cables.

Use the I/O cables (80pin - 40pin × 2, 100pin - 50pin × 2, flat type) supplied with the S5U1C63000P1 (installed in the ICE63) for the connection.
Connect the CN7–CN10 connectors on the S5U1C6F666 main board to the CN1 and CN2 connectors on the S5U1C63000P1 as shown in Figure 4.2.1.

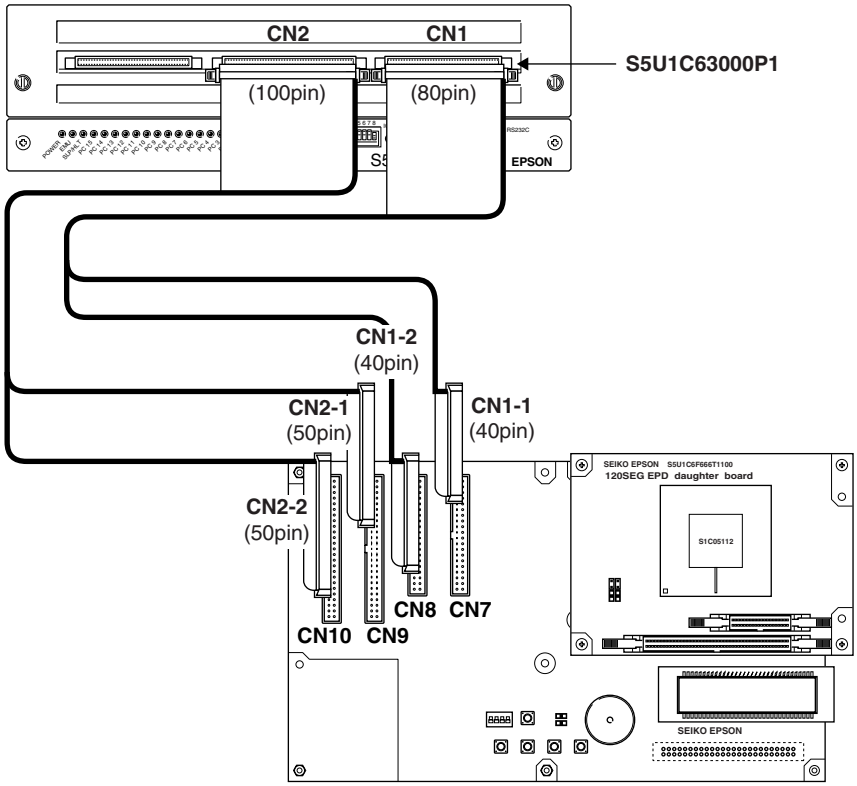


Figure 4.2.1 Connecting to ICE63 (S5U1C63000P1)

When an ICE63 is connected, the ICE63 supplies the power to the S5U1C6F666.

Note: The S1C6F666 functions that are not supported by the target model cannot be used when the S5U1C6F666 is being operated with an ICE63.

S1C63666/63808	The R/f converter does not supports AC bias operation.
S1C63654	The integer multiplier is not available.
S1C63808	The LCD driver is not available.

For more information, refer to the technical manual for the target model.

4.3 Customization

The S5U1C6F666 can also be used as a tool for developing user programs. In order to configure the system required for the application, the S5U1C6F666 allows customization by using the pads or replacing the peripheral board.
However customization should be performed at user's own risk.

Note: Be sure to remove the battery before reconfiguration or modification of the boards is performed. Make sure that the power is off when changing the jumper settings.

Input/output ports and comparator inputs

The main board provides the pads (CN27) for a 50-pin connector. Connect the user input/output signals to these pads or mount a connector to install the user I/O circuit board.
For the signal assignment of the pads, see Section 5.2, "Main Board - Peripheral Board Interface Connectors."

Note: As described in Section 3.2.1, "Input/Output Ports," the P00–P03, P10–P13, R00, R01, R03, R10, and R11 ports are used for the EPD driver. Therefore, these ports cannot be used when the EPD board is used. When the application requires these ports, the EPD board must be removed.

Motor driver outputs

The CPU board provides the pads (TP38–TP41) to pull out the motor driver output from the S1C6F666.
AO1 → TP41, AO2 → TP40, BO1 → TP39, BO2 → TP38

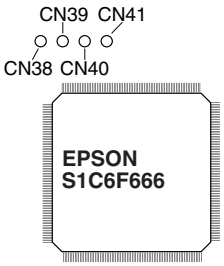


Figure 4.3.1 Motor Driver Output Pads

R/f conversion circuit

CN28 on the CPU board is connected to the S1C6F666 R/f pins (RFIN0, REF0, SEN0). Insert a temperature sensor (thermistor) into this connector to configure a temperature measurement circuit. CN29 is connected to the S1C6F666 R/f pins (HUD, SEN1). Insert a humidity sensor into this connector to configure a humidity measurement circuit.
In order to customize the external R/f circuit according to the sensor to be used, pads are provided.

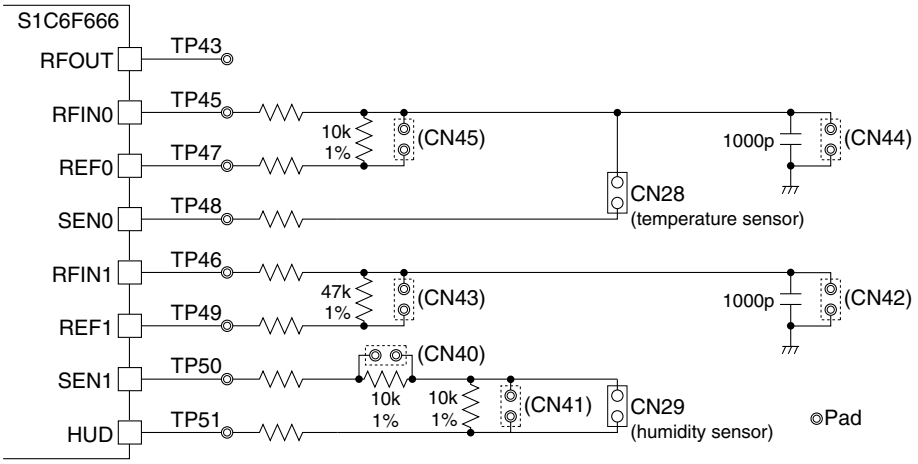


Figure 4.3.2 R/f Conversion Circuit

LCD panel

The S1C6F666 LCD driver output signals are assigned to CN36 and CN37 on the main board. When replacing the LCD panel, remove the S5U1C6F666 LCD board from these connectors and install the user LCD board.
For the pin assignment of the connectors, see Section 5.2, “Main Board - Peripheral Board Interface Connectors.”

5 Connector Pin Assignment

5.1 Main Board - CPU Board Interface Connectors

Note: Some “NC” pins are connected on the main board.

CN7	
No.	Pin name
1	V_{DD}
2	V_{DD}
3	K00
4	K01
5	K02
6	K03
7	K10
8	K11
9	K12
10	K13
11	V_{SS}
12	V_{SS}
13	P00
14	P01
15	P02
16	P03
17	P10
18	P11
19	P12
20	P13
21	V_{DD}
22	V_{DD}
23	NC
24	NC
25	NC
26	NC
27	CMPP0
28	CMPM0
29	NC
30	NC
31	V_{SS}
32	V_{SS}
33	NC
34	NC
35	NC
36	NC
37	NC
38	NC
39	V_{SS}
40	V_{SS}

CN8	
No.	Pin name
1	V_{DD}
2	V_{DD}
3	R00
4	R01
5	R02
6	R03
7	R10
8	R11
9	R12
10	R13
11	V_{SS}
12	V_{SS}
13	BZ
14	$\overline{BZ}$
15	NC
16	NC
17	NC
18	NC
19	NC
20	NC
21	V_{DD}
22	V_{DD}
23	NC
24	NC
25	NC
26	NC
27	NC
28	NC
29	NC
30	NC
31	V_{SS}
32	V_{SS}
33	NC
34	NC
35	NC
36	NC
37	NC
38	RESET
39	V_{SS}
40	V_{SS}

CN9	
No.	Pin name
1	COM0
2	COM1
3	COM2
4	COM3
5	COM4
6	COM5
7	COM6
8	COM7
9	SEG0
10	SEG1
11	SEG2
12	SEG3
13	SEG4
14	SEG5
15	SEG6
16	SEG7
17	SEG8
18	SEG9
19	SEG10
20	SEG11
21	SEG12
22	SEG13
23	SEG14
24	SEG15
25	SEG16
26	SEG17
27	SEG18
28	SEG19
29	SEG20
30	SEG21
31	SEG22
32	SEG23
33	SEG24
34	SEG25
35	SEG26
36	SEG27
37	SEG28
38	SEG29
39	SEG30
40	SEG31
41	SEG32
42	SEG33
43	SEG34
44	SEG35
45	SEG36
46	SEG37
47	SEG38
48	SEG39
49	SEG40
50	SEG41

CN10	
No.	Pin name
1	SEG42
2	SEG43
3	SEG44
4	SEG45
5	SEG46
6	SEG47
7	SEG48
8	SEG49
9	SEG50
10	SEG51
11	SEG52
12	SEG53
13	SEG54
14	SEG55
15	SEG56
16	SEG57
17	SEG58
18	SEG59
19	SEG60
20	SEG61
21	SEG62
22	SEG63
23	SEG64
24	SEG65
25	SEG66
26	SEG67
27	SEG68
28	SEG69
29	SEG70
30	SEG71
31	SEG72
32	SEG73
33	SEG74
34	SEG75
35	SEG76
36	SEG77
37	SEG78
38	SEG79
39	NC
40	NC
41	NC
42	NC
43	NC
44	NC
45	NC
46	NC
47	NC
48	NC
49	NC
50	NC

5.2 Main Board - Peripheral Board Interface Connectors

Main board - LCD board interface

CN36	
No.	**Pin name**
1	VDD
2	VDD
3	COM0
4	COM1
5	COM2
6	COM3
7	COM4
8	COM5
9	COM6
10	COM7
11	SEG0
12	SEG1
13	SEG2
14	SEG3
15	SEG4
16	SEG5
17	SEG6
18	SEG7
19	SEG8
20	SEG9
21	SEG10
22	SEG11
23	SEG12
24	SEG13
25	SEG14
26	SEG15
27	SEG16
28	SEG17
29	SEG18
30	SEG19
31	SEG20
32	SEG21
33	SEG22
34	SEG23
35	SEG24
36	SEG25
37	SEG26
38	SEG27
39	VSS
40	VSS

CN37	
No.	**Pin name**
1	VDD
2	VDD
3	SEG28
4	SEG29
5	SEG30
6	SEG31
7	SEG32
8	SEG33
9	SEG34
10	SEG35
11	SEG36
12	SEG37
13	SEG38
14	SEG39
15	SEG40
16	SEG41
17	SEG42
18	SEG43
19	SEG44
20	SEG45
21	SEG46
22	SEG47
23	SEG48
24	SEG49
25	SEG50
26	SEG51
27	SEG52
28	SEG53
29	SEG54
30	SEG55
31	SEG56
32	SEG57
33	SEG58
34	SEG59
35	SEG60
36	SEG61
37	SEG62
38	SEG63
39	VSS
40	VSS

Main board - EPD board interface

CN26	
No.	**Pin name**
1	VDD
2	VDD
3	VDD
4	DIV
5	DD1
6	DD0
7	DCK
8	DD_ACT
9	LO_ACT
10	SCK
11	XCS
12	SEN
13	VSS
14	VSS
15	SDAT3
16	SDAT2
17	SDAT1
18	SDAT0
19	VSS
20	VSS

Pads (No connector mounted)

CN27	
No.	**Pin name**
1	VDD
2	VDD
3	K00
4	K01
5	K02
6	K03
7	K10
8	K11
9	K12
10	K13
11	VSS
12	VSS
13	P00
14	P01
15	P02
16	P03
17	P10
18	P11
19	P12
20	P13
21	VSS
22	VSS
23	NC
24	NC
25	NC
26	NC
27	COMPP0
28	COMPM0
29	NC
30	NC
31	NC
32	NC
33	NC
34	NC
35	VSS
36	VSS
37	R00
38	R01
39	R02
40	R03
41	R10
42	R11
43	R12
44	R13
45	VSS
46	VSS
47	NC
48	NC
49	VSS
50	VSS

5.3 EPD Interface Connectors (EPD Board)

Driver output pin assignment

CN47			
No.	**Pin name**	**No.**	**Pin name**
1	EO 000	2	EO 049
3	EO 001	4	EO 050
5	EO 002	6	EO 051
7	EO 003	8	EO 052
9	EO 004	10	EO 053
11	EO 005	12	EO 054
13	EO 006	14	EO 055
15	EO 007	16	EO 056
17	EO 008	18	EO 057
19	EO 009	20	EO 058
21	EO 010	22	EO 059
23	EO 011	24	EO 060
25	EO 012	26	EO 061
27	EO 013	28	EO 062
29	EO 014	30	EO 063
31	EO 015	32	EO 064
33	EO 016	34	EO 065
35	EO 017	36	EO 066
37	EO 018	38	EO 067
39	EO 019	40	EO 068
41	EO 020	42	EO 069
43	EO 021	44	EO 070
45	EO 022	46	EO 071
47	EO 023	48	EO 072
49	EO 024	50	EO 073
51	EO 025	52	EO 074
53	EO 026	54	EO 075
55	EO 027	56	EO 076
57	EO 028	58	EO 077
59	EO 029	60	EO 078
61	EO 030	62	EO 079
63	EO 031	64	EO 080
65	EO 032	66	EO 081
67	EO 033	68	EO 082
69	EO 034	70	EO 083
71	EO 035	72	EO 084
73	EO 036	74	EO 085
75	EO 037	76	EO 086
77	EO 038	78	EO 087
79	EO 039	80	EO 088
81	EO 040	82	EO 089
83	EO 041	84	EO 090
85	EO 042	86	EO 091
87	EO 043	88	EO 092
89	EO 044	90	EO 093
91	EO 045	92	EO 094
93	EO 046	94	EO 095
95	EO 047	96	EO 096
97	EO 048	98	EO 097
99	GND	100	GND

CN48			
No.	**Pin name**	**No.**	**Pin name**
1	EO 098	2	EO 111
3	EO 099	4	EO 112
5	EO 100	6	EO 113
7	EO 101	8	EO 114
9	EO 102	10	EO 115
11	EO 103	12	EO 116
13	EO 104	14	EO 117
15	EO 105	16	EO 118
17	EO 106	18	EO 119
19	EO 107	20	EO 120
21	EO 108	22	EO 121
23	EO 109	24	EO 122
25	EO 110	26	EO 123
27	GND	28	GND
29	GND	30	GND
31	GND	32	GND
33	GND	34	GND
35	GND	36	GND
37	GND	38	GND
39	GND	40	GND

EPD interface pads

CN46							
No.	**Pin name**	**No.**	**Pin name**	**No.**	**Pin name**	**No.**	**Pin name**
1	SEG0	32	SEG31	63	SEG62	94	SEG93
2	SEG1	33	SEG32	64	SEG63	95	SEG94
3	SEG2	34	SEG33	65	SEG64	96	SEG95
4	SEG3	35	SEG34	66	SEG65	97	SEG96
5	SEG4	36	SEG35	67	SEG66	98	SEG97
6	SEG5	37	SEG36	68	SEG67	99	SEG98
7	SEG6	38	SEG37	69	SEG68	100	SEG99
8	SEG7	39	SEG38	70	SEG69	101	SEG100
9	SEG8	40	SEG39	71	SEG70	102	SEG101
10	SEG9	41	SEG40	72	SEG71	103	SEG102
11	SEG10	42	SEG41	73	SEG72	104	SEG103
12	SEG11	43	SEG42	74	SEG73	105	SEG104
13	SEG12	44	SEG43	75	SEG74	106	SEG105
14	SEG13	45	SEG44	76	SEG75	107	SEG106
15	SEG14	46	SEG45	77	SEG76	108	SEG107
16	SEG15	47	SEG46	78	SEG77	109	SEG108
17	SEG16	48	SEG47	79	SEG78	110	SEG109
18	SEG17	49	SEG48	80	SEG79	111	SEG110
19	SEG18	50	SEG49	81	SEG80	112	SEG111
20	SEG19	51	SEG50	82	SEG81	113	SEG112
21	SEG20	52	SEG51	83	SEG82	114	SEG113
22	SEG21	53	SEG52	84	SEG83	115	SEG114
23	SEG22	54	SEG53	85	SEG84	116	SEG115
24	SEG23	55	SEG54	86	SEG85	117	SEG116
25	SEG24	56	SEG55	87	SEG86	118	SEG117
26	SEG25	57	SEG56	88	SEG87	119	SEG118
27	SEG26	58	SEG57	89	SEG88	120	SEG119
28	SEG27	59	SEG58	90	SEG89	121	SEG120
29	SEG28	60	SEG59	91	SEG90	122	SEG121
30	SEG29	61	SEG60	92	SEG91	123	SEG122
31	SEG30	62	SEG61	93	SEG92	124	COM0

6 Specifications

Main board

Dimension:	TBD mm (wide) × TBD mm (depth) × TBD mm (height)
Weight:	Approx. TBD g
CN7, CN8 40-pin connectors:	7640-6002SC (3M)
CN36, CN37 40-pin connectors:	7640-6002SC (3M)
CN9, CN10 50-pin connectors:	7650-6002SC (3M)
CN26 20-pin connector:	7620-6002SC (3M)

CPU board

Dimension:	TBD mm (wide) × TBD mm (depth) × TBD mm (height)
Weight:	Approx. TBD g
Microcomputer:	S1C6F666F00B TYPE-B (Ceramic oscillation) (SEIKO EPSON)
Crystal resonator:	32.768kHz, Q11C02RX100200 (EPSON TOYOCOM)
Ceramic resonator:	2MHz, CSTCC2M00G (Murata Manufacturing)
Battery:	CR2032 (Panasonic)
CN1, CN2 40-pin connectors:	9140-4500SC (3M)
CN3, CN4 50-pin connectors:	9150-4500SC (3M)
CN5 16-pin connector:	3408-5002LCFL (3M)

EPD board

Dimension:	TBD mm (wide) × TBD mm (depth) × TBD mm (height)
Weight:	Approx. TBD g
EPD driver IC:	S1C05112 (SEIKO EPSON)
CN25 20-pin connector:	9120-4500SC (3M)
CN47 100-pin connector:	HIF6H-100PA-1.27DSA (71) (Hirose)
CN48 40-pin connector:	HIF6H-40PA-1.27DSA (71) (Hirose)

LCD board

Dimension:	TBD mm (wide) × TBD mm (depth) × TBD mm (height)
Weight:	Approx. TBD g
LCD panel:	LCD-S801C42TR (LUMEX)
CN38, CN39 40-pin connectors:	9140-4500SC (3M)

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