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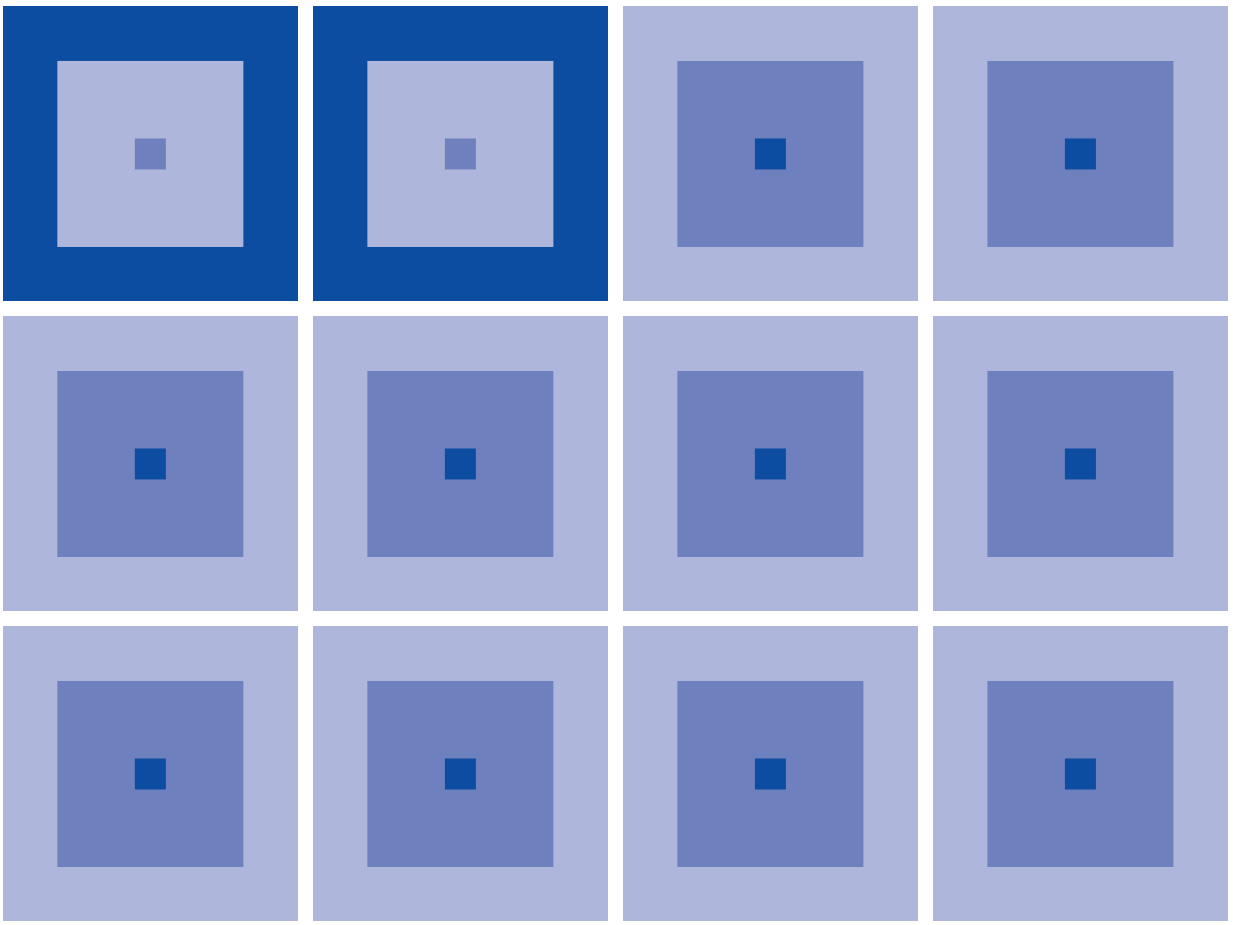
CMOS 8-BIT SINGLE CHIP MICROCOMPUTER

S5U1C8F360Z1 Manual

(Adapter Board for S1C8F360/8F361)



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New configuration of product number

Starting April 1, 2001, the configuration of product number descriptions will be changed as listed below. To order from April 1, 2001 please use these product numbers. For further information, please contact Epson sales representative.

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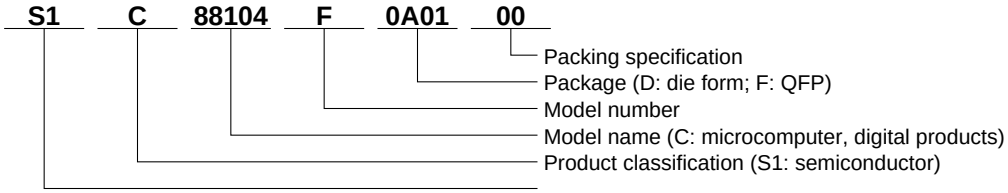
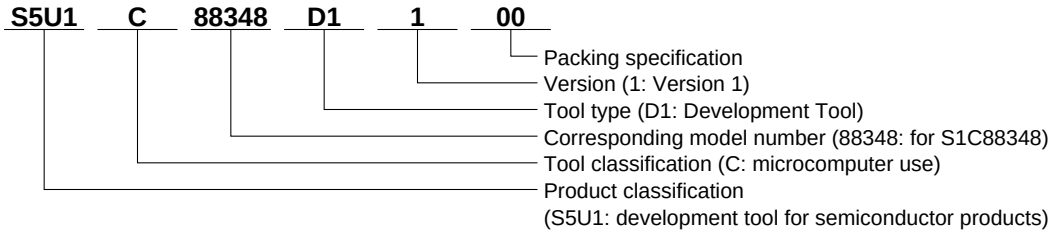


Development tools



S5U1C8F360Z1 Manual (Adapter Board for S1C8F360/8F361)

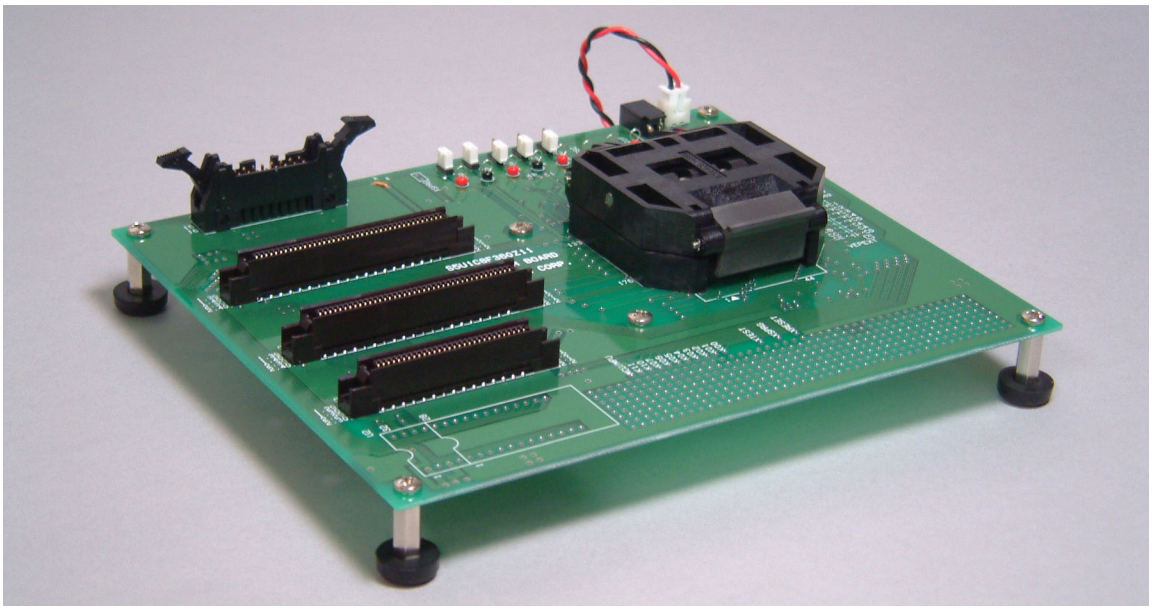
This manual describes how to use the Adapter Board (S5U1C8F360Z1) that is a PROM writing and evaluation tool for the 8-bit Single Chip Microcomputer S1C8F360 / 8F361.

Contents

CHAPTER 1 INTRODUCTION

1.1 Outline of S1C8F360 Adapter Board (S5U1C8F360Z1)

The S5U1C8F360Z1 board (hereafter Adapter Board) is a PROM writing tool for the 8-bit Single Chip Microcomputers S1C8F360 and S1C8F361. The Adapter Board connected to the On Board Programming Writer (S5U1C88000W3) allows writing user data to the Flash EEPROM built into the S1C8F360/8F361 (package model) placed on its IC socket using the On Board Programming Writer Control Software (S5U1C8F360Y3).
The Adapter Board can also be used as a software evaluation board by mounting peripheral circuits on the board.



S5U1C8F360Z1

1.2 Components of S1C8F360 Adapter Board (S5U1C8F360Z1)

After unpacking the S5U1C8F360Z1 package, check to see that all of the following components are included.

(1) S5U1C8F360Z1 board 1
(2) I/O cable (80-pin/40-pin × 2 flat type) 2
(3) I/O cable (60-pin/30-pin × 2 flat type) 1
(4) I/O connector for target system (40 pins) 4
(5) I/O connector for target system (30 pins) 2
(6) Power cable 1
(7) S5U1C8F360Z1 Manual (this manual) 1
(8) Warranty card 1
(9) User registration card 1
(10) Note for use 1

CHAPTER 2 PRECAUTIONS

The connectors CN1, CN2 and CN3 have the same pin layout as the Peripheral Circuit Board for S1C88816/8F360 (S5U1C88816P). This allows connection between the user target system for the S5U1C88816P and the Adapter Board.

Take the following precautions when using the S1C8F360 Adapter Board (S5U1C8F360Z1):

2.1 Precautions for Operation

(1) Turn the power of all equipment off before connecting or disconnecting cables.

(2) Do not turn the power on while the input ports (K00–K03) are all set to low level. It may cause a simultaneous key input reset.

2.2 Differences from the ICE88UR (S5U1C88000H5) + PRC88816 (S5U1C88816P)

The emulation system using the Adapter Board with an actual IC differs in terms of functionality and characteristics from the S5U1C88816P emulation system, a fact which requires your attention. If these differences are ignored, there is a possibility that your circuit will not operate properly on an actual IC even though it might have performed well on the S5U1C88000H5 with the S5U1C88816P.

(1) Power supply differences

To operate the actual IC on the Adapter Board, an external power source voltage must be applied. Refer to "Electrical Characteristics" chapter in the "S1C8F360 Technical Manual" for the supply voltage.

(2) I/O differences

The output drive capability and pull up resistance are different.
The input setup time is different therefore, when a circuit requiring consideration of the input response time, such as a key matrix, is used, the system and the software should be designed according to the specifications for the actual IC.

(3) LCD differences

The output drive capability is different.
Since there will be differences with the actual IC even for the drive voltage, the system and the software should be designed in order to adjust the characteristics.

(4) Analog comparator differences

The response time and characteristics of the analog comparator are different. Consequently, the system and the software should be designed according to the specifications for the actual IC.

(5) Functional differences

<Oscillation circuit>

- The Adapter Board does not contain oscillator parts. Mount the parts according to the selected mask option for the actual IC.
- The OSC3 oscillation stability time of the S5U1C88816P is shorter than that of the actual IC. Therefore, the application program must take enough of interval (more than the oscillation stability time in the actual IC) between starting the OSC3 oscillation and switching the system clock to OSC3.
- The logic level is different and it makes different oscillation timings such as the start and stop times.
- When switching the operating clock from OSC3 to OSC1, be sure to switch OSC3 oscillation off with separate instructions. Using a single instruction to process simultaneously may cause a malfunction of the CPU.

- Do not turn the OSC3 oscillation circuit on in the low power mode.
  Do not switch over the operating mode (normal mode ↔ high speed mode) when the OSC3 oscillation circuit is on, as this will cause a malfunction.

<Internal power supply circuit>

The actual IC on the Adapter Board can change over the internal power voltage (set by VDC2, VDC1 and VDC0), but the S5U1C88816P cannot change the actual power voltage, because only the VDC2, VDC1 and VDC0 values are changed.
For this reason, since the S5U1C88816P will operate, even if the stable time required for changeover is not taken, be sure that the stable time is provided by the software.
Also, since the usable frequency of OSC1 and OSC3 depends on the internal power voltage, refer to the technical manual for the S1C8F360 or S1C8F361 and take care so as not to operate it with an inappropriate combination.
When turning the OSC3 oscillation circuit on after switching the operating voltage, the software must take a voltage stabilization wait time of 5 msec.

<LCD drive power>

To drive an LCD using the Adapter Board, mount the parts required for V_{C1} to V_{C5} and CA to CE (CA to CG in the S1C8F361) on the board or supply an external LCD power.

Note: The S1C8F360 Adapter Board supports the S1C8F361 as well. When using the board for the S1C8F361, the AV_{DD} and AV_{SS} pins on the board must be changed to the CF and CG pins, respectively, using the jumper and mount a capacitor to the holes indicated as C1.

<Reset circuit>

Mount parts such as a switch and a capacitor at the $\overline{\text{RESET}}$ pin on the Adapter Board.

CHAPTER 3 CONFIGURATION FOR THE S1C8F361

The S1C8F360 Adapter Board (S5U1C8F360Z1) supports the S1C8F361 as well as the S1C8F360. In this case, the pins listed in the table below change their functions.

Table 3.1 Pin function for S1C8F361

Print	S1C8F360	S1C8F361
AVDD	AVDD	CF
AVSS	AVSS	CG

When using the S1C8F361, open the AVDD and AVSS jumpers and mount the booster capacitor for the CF and CG at C1.

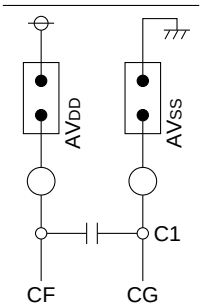


Fig. 3.1 CF and CG for the S1C8F361

CHAPTER 4 NAME AND FUNCTION OF EACH PART

This chapter describes the name and function of each part of the S1C8F360 Adapter Board (S5U1C8F360Z1).

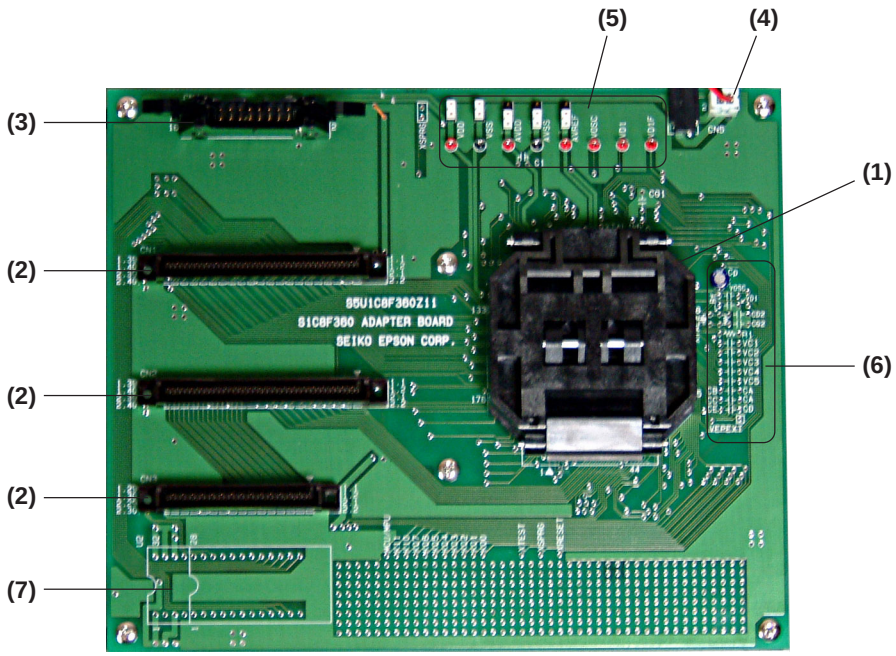


Fig. 4.1 Top view of the S5U1C8F360Z1 board

(1) IC socket

Insert an actual IC. Align Pin 1 with the bottom left corner of the socket (in top view) and insert IC.

(2) Connectors for target system (CN1, CN2, CN3)

These connectors are used to connect the I/O and LCD. Connect the target system using the I/O cables (80-pin/40-pin × 2 flat type and 60-pin/30-pin × 2 flat type).
The pin assignment is the same as the S5U1C88816P connectors.
Refer to Chapter 6, "Connecting with the Target System", for the pin assignment.

(3) Connector for serial programming (CN4)

This connector is used to connect the On Board Programming Writer (S5U1C88000W3). Use this connector when writing user data to the Flash EEPROM built into the microcomputer on the IC slot. Refer to Chapter 5, "Serial Programming", for the pin assignment. For how to use the On Board Programming Writer, refer to the "S1C8F360 Technical Manual".

(4) Power connector (CN5)

This connector is used to supply power to the S1C8F360 Adapter Board.
Use the supplied power cable for connection.

(5) Power system jumpers and check pins

Set according to the power supply conditions.

(6) Through holes for oscillator, LCD drive power and LCD voltage booster

Use them to mount the parts such as oscillator parts, capacitors and resistors. Refer to "Basic External Wiring Diagram" in the "S1C8F360 Technical Manual" for the basic parts to be mounted.

(7) IC socket pattern

Cannot be used.

CHAPTER 5 SERIAL PROGRAMMING

The S1C8F360 Adapter Board (S5U1C8F360Z1) connected to the On Board Programming Writer (S5U1C88000W3) allows writing user data to the Flash EEPROM built into the S1C8F360/8F361 (package model) placed on its IC socket using the On Board Programming Writer Control Software (S5U1C8F360Y3).
Refer to "Appendix PROM programming" in the "S1C8F360 Technical Manual" for the programming procedure.

5.1 Setting the Jumpers

Before performing serial programming, set the jumpers for the power unit as shown in Table 5.1.1.

Note: Be aware that the configuration is different between the S1C8F360 and the S1C8F361.

Table 5.1.1 Jumper settings for serial programming

Jumper	S1C8F360	S1C8F361
VDD	short	short
VSS	short	short
AVDD	short	open
AVSS	short	open
AVREF	short	short

5.2 Connecting the Power Cable

Serial programming needs external power to be supplied to the CN5 connector on the S1C8F360 Adapter Board (S5U1C8F360Z1) using the supplied power cable.

Table 5.2.1 Pin assignment of the CN5 power connector

CN5	Power cable	Power supply
1	Red	VDD
2	Black	VSS

5.3 Pin Assignment of the CN4 Connector for Serial Programming

The CN4 connector is used to connect the SIO cable from the On Board Programming Writer (S5U1C88000W3).

Table 5.3.1 Pin assignment of the CN4 connector for serial programming

CN4		Function
No.	Pin name	
1	VD1F	Programming power supply pin
2	VDD	Power supply pin
3	CLKW	System clock output pin
4	VSS	GND pin
5	SCLK	Serial I/F clock output pin
6	VSS	GND pin
7	TXD	Serial I/F data output pin
8	VSS	GND pin
9	RXD	Serial I/F data input pin
10	VSS	GND pin
11	$\overline{\text{RESET}}$	Initial reset output pin
12	VSS	GND pin
13	$\overline{\text{SPRG}}$	Programming mode setup output pin
14	VSS	GND pin
15	N.C.	
16	N.C.	

CHAPTER 6 CONNECTING WITH THE TARGET SYSTEM

The Adapter Board (S5U1C8F360Z1) can be used as an evaluation board by connecting it with the user target board.

(1) To operate the microcomputer on the Adapter Board, the user must provide the peripheral circuits. Refer to "Basic External Wiring Diagram" in the "S1C8F360 Technical Manual" for the required circuits.

(2) Use the supplied I/O cables (80-pin/40-pin × 2 flat type and 60-pin/30-pin × 2 flat type) for connecting between the S1C8F360 Adapter Board (S5U1C8F360Z1) and the target system.

(3) Be sure to turn the power off before connecting the target system because the I/O cable includes a power line (V_{DD}).

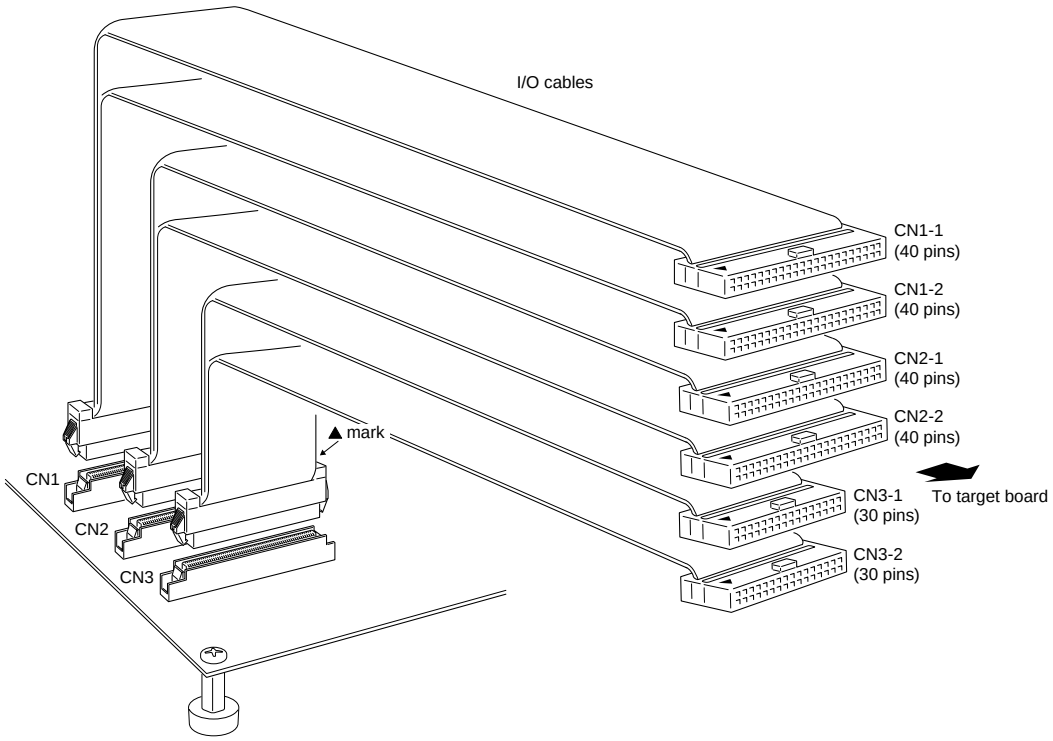


Fig. 6.1 Connecting with the target system

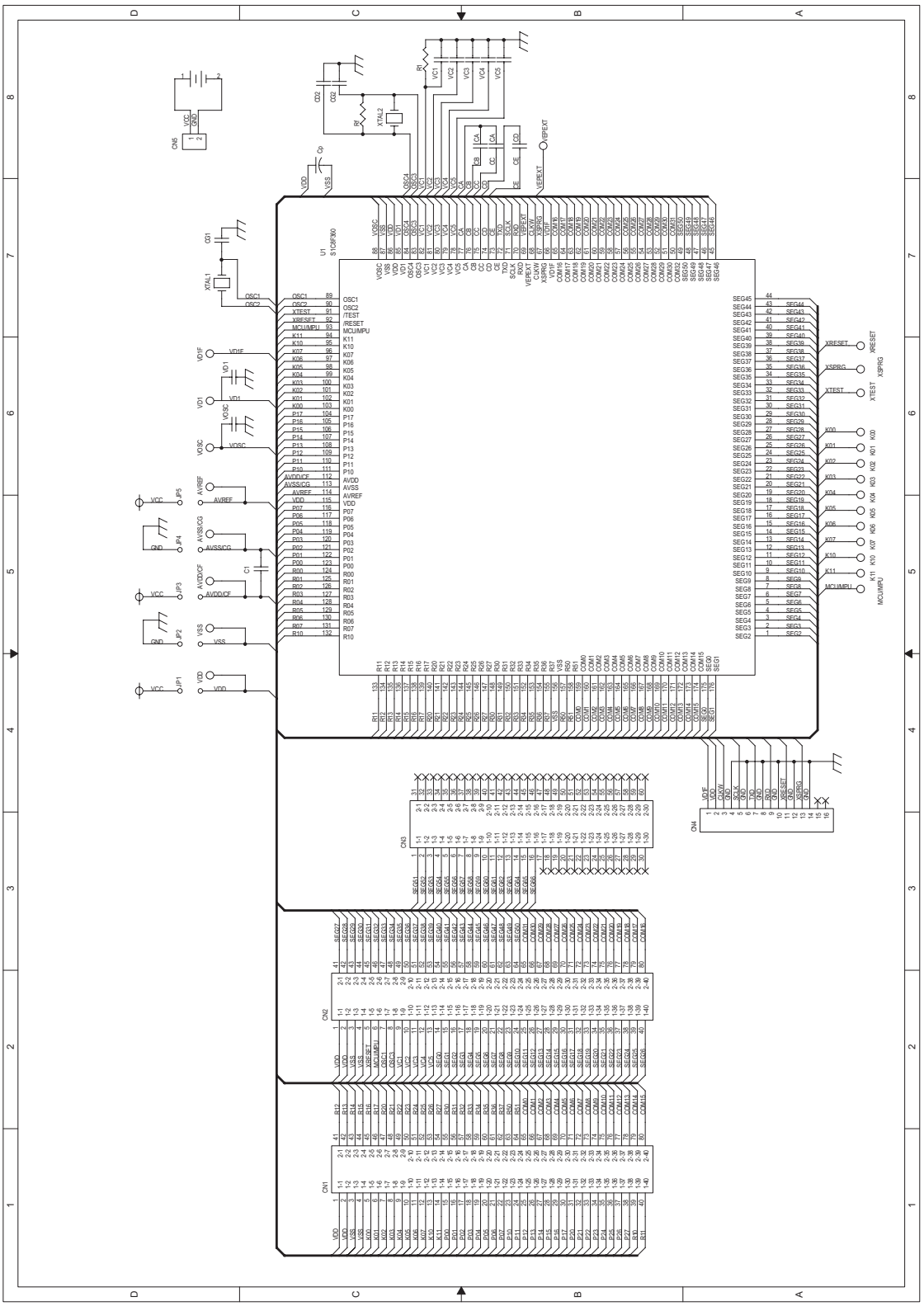
Table 6.1 Pin assignment of the I/O connectors

CN1			
40-pin CN1-1		40-pin CN1-2	
No.	Pin name	No.	Pin name
1	V_{DD}	1	R12
2	V_{DD}	2	R13
3	V_{SS}	3	R14
4	V_{SS}	4	R15
5	K00	5	R16
6	K01	6	R17
7	K02	7	R20
8	K03	8	R21
9	K04	9	R22
10	K05	10	R23
11	K06	11	R24
12	K07	12	R25
13	K10	13	R26
14	K11	14	R27
15	P00	15	R30
16	P01	16	R31
17	P02	17	R32
18	P03	18	R33
19	P04	19	R34
20	P05	20	R35
21	P06	21	R36
22	P07	22	R37
23	P10	23	R50
24	P11	24	R51
25	P12	25	COM0
26	P13	26	COM1
27	P14	27	COM2
28	P15	28	COM3
29	P16	29	COM4
30	P17	30	COM5
31	R00	31	COM6
32	R01	32	COM7
33	R02	33	COM8
34	R03	34	COM9
35	R04	35	COM10
36	R05	36	COM11
37	R06	37	COM12
38	R07	38	COM13
39	R10	39	COM14
40	R11	40	COM15

CN2			
40-pin CN2-1		40-pin CN2-2	
No.	Pin name	No.	Pin name
1	V_{DD}	1	SEG27
2	V_{DD}	2	SEG28
3	V_{SS}	3	SEG29
4	V_{SS}	4	SEG30
5	$\overline{RESET}$	5	SEG31
6	MCU/$\overline{MPU}$	6	SEG32
7	OSC1	7	SEG33
8	OSC3	8	SEG34
9	V_{C1}	9	SEG35
10	V_{C2}	10	SEG36
11	V_{C3}	11	SEG37
12	V_{C4}	12	SEG38
13	V_{C5}	13	SEG39
14	SEG0	14	SEG40
15	SEG1	15	SEG41
16	SEG2	16	SEG42
17	SEG3	17	SEG43
18	SEG4	18	SEG44
19	SEG5	19	SEG45
20	SEG6	20	SEG46
21	SEG7	21	SEG47
22	SEG8	22	SEG48
23	SEG9	23	SEG49
24	SEG10	24	SEG50
25	SEG11	25	COM31
26	SEG12	26	COM30
27	SEG13	27	COM29
28	SEG14	28	COM28
29	SEG15	29	COM27
30	SEG16	30	COM26
31	SEG17	31	COM25
32	SEG18	32	COM24
33	SEG19	33	COM23
34	SEG20	34	COM22
35	SEG21	35	COM21
36	SEG22	36	COM20
37	SEG23	37	COM19
38	SEG24	38	COM18
39	SEG25	39	COM17
40	SEG26	40	COM16

CN3			
30-pin CN3-1		30-pin CN3-2	
No.	Pin name	No.	Pin name
1	SEG51	1	N.C.
2	SEG52	2	N.C.
3	SEG53	3	N.C.
4	SEG54	4	N.C.
5	SEG55	5	N.C.
6	SEG56	6	N.C.
7	SEG57	7	N.C.
8	SEG58	8	N.C.
9	SEG59	9	N.C.
10	SEG60	10	N.C.
11	SEG61	11	N.C.
12	SEG62	12	N.C.
13	SEG63	13	N.C.
14	SEG64	14	N.C.
15	SEG65	15	N.C.
16	SEG66	16	N.C.
17	N.C.	17	N.C.
18	N.C.	18	N.C.
19	N.C.	19	N.C.
20	N.C.	20	N.C.
21	N.C.	21	N.C.
22	N.C.	22	N.C.
23	N.C.	23	N.C.
24	N.C.	24	N.C.
25	N.C.	25	N.C.
26	N.C.	26	N.C.
27	N.C.	27	N.C.
28	N.C.	28	N.C.
29	N.C.	29	N.C.
30	N.C.	30	N.C.

CHAPTER 7 S1C8F360 ADAPTER BOARD (S5U1C8F360Z1) SCHEMATIC DIAGRAM



CHAPTER 8 PRODUCT SPECIFICATIONS

The component specifications of the S1C8F360 Adapter Board (S5U1C8F360Z1) are listed below.

S5U1C8F360Z1

Dimensions:
183 mm (L) × 154 mm (W) × 48 mm (H)
Power supply:
Within the operating voltage range of the microcomputer

I/O cable (80-pin/40-pin × 2, 2 sets)

S5U1C8F360Z1 connector:
KEL 8830-80-170L or equivalent
Cable connector (80-pin):

KEL 8822E-080-171	×1 / 1 set

Cable connector (40-pin):

3M 7940-6500SC	×2 / 1 set

Cable:

40-pin flat cable	×2 / 1 set

Length:

Approx. 40 cm	(both cables are the same length)

I/O connection cable (60-pin/30-pin × 2, 1 set)

S5U1C8F360Z1 connector:
KEL 8830-60-170
Cable connector (60-pin):

KEL 8822E-060-171	×1 / 1 set

Cable connector (30-pin):

3M 7930-6500SC	×2 / 1 set

Cable:

30-pin flat cable	×2 / 1 set

Length:
Approx. 40 cm

Power cable

S5U1C8F360Z1 connector:
J.S.T. Mfg Co., Ltd B2B-XH-A
Cable connector:
J.S.T. Mfg Co., Ltd XHP-2
Contacts:
J.S.T. Mfg Co., Ltd SXH-001T-P0.6
Length:
Approx. 35 cm

Accessories

I / O connectors for the target system

(40-pin): 3M 3432-6002LCSC	×4
(30-pin): 3M 3440-6002LCSC	×2

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