EPSON

CMOS 16-BIT DMM MICROCONTROLLER BOARD

S5U1C17M03T Manual

(Software Evaluation Tool for S1C17M03)

SEIKO EPSON CORPORATION

Rev.1.1

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Table of Contents

1. Overview

The S5U1C17M03T (SVT board) is equipped with a 16-bit MCU S1C17M03 for Seiko Epson digital multimeters (DMM).

The SVT board is equipped with the functions required for a DMM and can measure voltage, current, resistance, capacitance, continuity check, diodes, and frequencies.

1.1 Board external view

Figuer1.1.1 shows an external view of the SVT board.

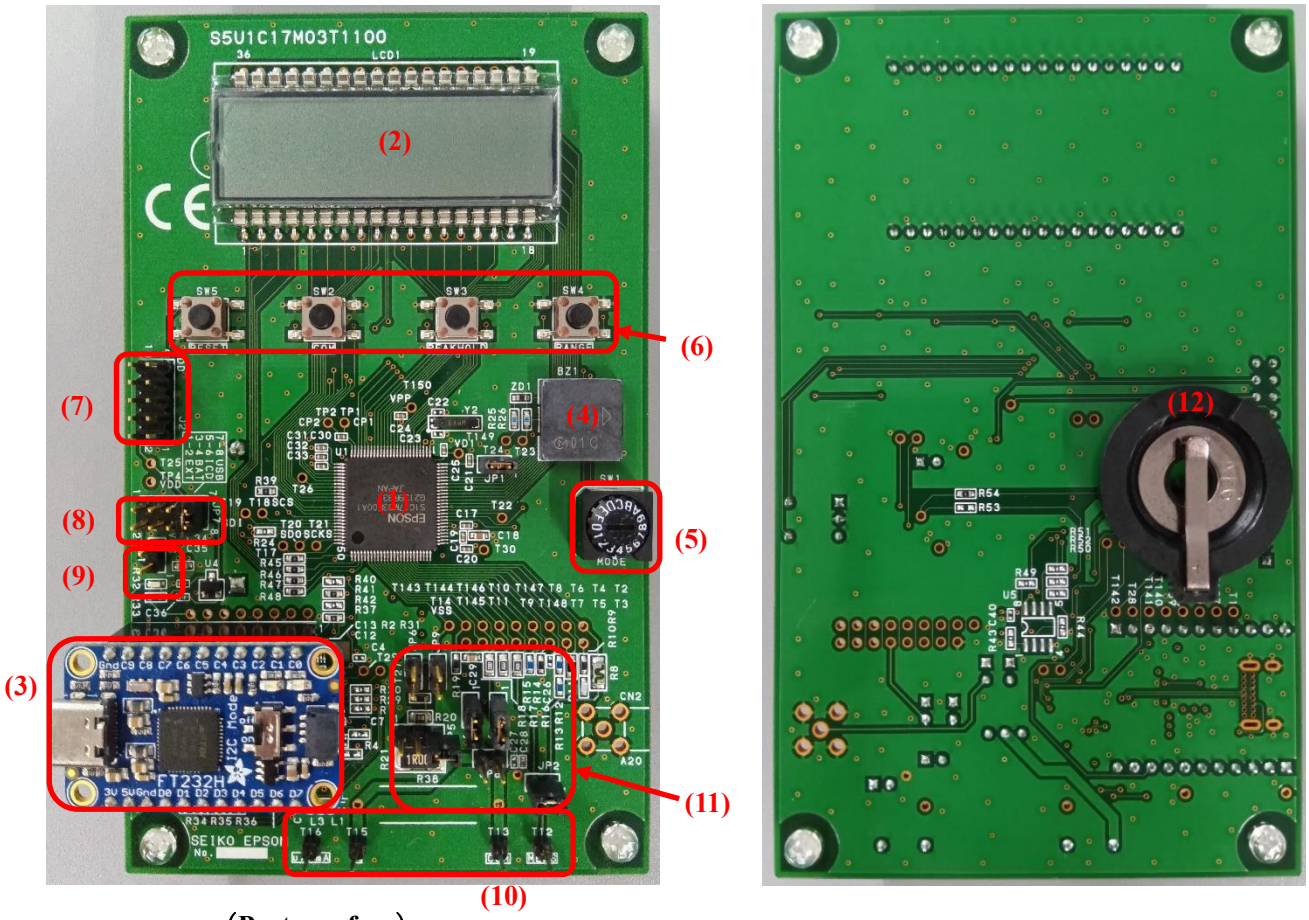


Figure1.1.1 SVT board external view

(1) S1C17M03 16-bit MCU

(2) LCD module (8digits、14segments / digit)

(3) USB⇔SPI bridge IC module USB Type-C connector

(4) Piezo electric buzzer

(5) Mode switching rotary switch

(6) Tactile switch

(7) S5U1C17001H3 (ICDmini Ver.3 Emulator connector

(8) Power selection connector

(9) External power input connector

(10) Voltage, current, resistance, capacitance, continuity check, diodes, and frequencies measurement terminal

(11) Setting jumper pins

(12) CR2032 button battery holder

2. Specification

The product specifications of the SVT board are shown in Table2.1, and the measurement specifications are in Table2.2.

Table 2.1 Product specifications

Model	S5U1C17M03T
Power	EXT : External BAT : CR2032 (3V) Lithium battery x1 ICD : Emulator USB: USB VBUS
Size	W80×H130×D17.1 (Without spacers)
Weight	60g (Without battery and spacers)

Table 2.2 Measurement specification

Measurement mode	Measurement range
DC voltage	600m/6/60V *
AC voltage	600m/6/60V *
DC current	600u/6m/60mA*
AC current	600u/6m/60mA*
Resistance	600/6k/60k/600k/6M/60MΩ
Capacitance	10n/100n/1u/10u/100u/1000uF
Frequencies	5Hz - 100kHz
Continuity check	Buzzer sound below 50Ω
Diode test	Vf measurement

* The maximum input should be less than twice each measurement range.

3. Function

3.1 Power selection connector

The power supply can be set with JP7. Choose from the following four ways.

- EXT : External power is supplied from J1.
- BAT : Power is supplied from the BT1 button battery CR2023.
- ICD : Power is supplied from the emulator connector J2.
- USB : Power is supplied from the USB VBUS.

Table 3.1.1 JP7 Power jumper setting

Power selection	Jumper settings	Other comments
EXT	1-2 Short	DC+3V±10%, Others should be open.
BAT	3-4 Short	CR2032 x1, Others should be open.
ICD	5-6 Short	Others should be open.
USB	7-8 Short	Others should be open.

3.2 External power input connector

External power input from JP1. The power supply is DC+3.0V±10%.

Table 3.2.1 JP1 External power input

JP1 Pin No.	Signal name
1	DC+3V±10%
2	GND

3.3 Mode switching rotary switch

The rotary switch SW1 can switch the measurement mode. (Table 3.3.1） For details on the functions, refer to another “S1C17M02/M03 Application Note”.

Table 3.3.1 Mode switching rotary switch setting

SW1 No.	Measurement mode	Default range	Mode name
0	DC voltage	6V	DCV
1	AC voltage	6V	ACV
2	DC current	6mA	DCI
3	AC current	6mA	ACI
4	Resistance value (CC method)	600Ω	OHM CC
5	Resistance value (CV method)	600Ω	OHM CV
6	Continuity check	CV	CONT
7	Capacitance (CC method)	1uF	CAP CC
8	Capacitance (CV method)	10nF	CAP CV
9	Diode VF	-	DIODE
A	AC voltage frequency	6V	FREQ ACV
B	AC current frequency	6mA	FREQ ACI
C	Internal temperature	-	TEMP

※ If an unused SW1 number is selected, it will not be measured. “NOFUNC” is displayed on the LCD.

3.4 Tactile switch

The tactile switches SW2 to SW5 have the following function. (Table 3.4.1） For details on the functions, refer to another “S1C17M02/M03 Application Note”.

Table 3.4.1 Tactile switch

Switch	Function
SW2	Communication mode: Start/End
SW3	Peak hold setting switching
SW4	Measurement range setting switching
SW5	Perform a hardware reset

3.5 Jumper settings

The measurement mode is set in JP2,JP3,JP4,JP5,JP6,JP8,JP9. Table 3.5.1 shows the jumper setting table.

Table 3.5.1 Jumper settings

Measurement mode	Mode	SW1	Measurement range	JP2	JP3	JP4	JP5	JP6	JP8	JP9
DC voltage	DCV	0	600mV	short	short	short	open	open	open	open
			6V	open						
			60V							
AC voltage	ACV	1	600mV	short	short	short	open	open	open	open
			6V	open						
			60V							
DC current	DCI	2	600uA	open	short	short	2-3short	short	short	open
			6mA				1-2short			
			60mA							
AC current	ACI	3	600uA	open	short	short	2-3short	short	short	open
			6mA				1-2short			
			60mA							
Resistance value (CC method)	OHM_CC	4	600Ω	short	short	short	open	open	open	open
			6kΩ							
			60kΩ							
			600kΩ							
			6MΩ							
			60MΩ							
Resistance value (CV method)	OHM_CV	5	600Ω	short	short	short	open	open	open	open
			6kΩ							
			60kΩ							
Continuity check	CONT	6	CV	short	short	short	open	open	open	open
			CC							
Capacitance (CC method)	CAP_CC	7	1uF	short	short	short	open	open	open	open
			10uF							
			100uF							
			1000uF							
Capacitance (CV method)	CAP_CV	8	10nF	short	short	short	open	open	open	open
			100nF							
Diode VF	Diode	9	-	short	short	short	open	open	open	open
AC voltage frequency	Freq_ACV	a	600mV	short	short	short	open	open	open	open
			6V	open						
			60V							
AC current frequency	Freq_ACI	b	600uA	open	short	short	2-3short	short	short	open
			6mA				1-2short			
			60mA							
Temperature	Temp	c	-	open	short	short	open	open	open	open

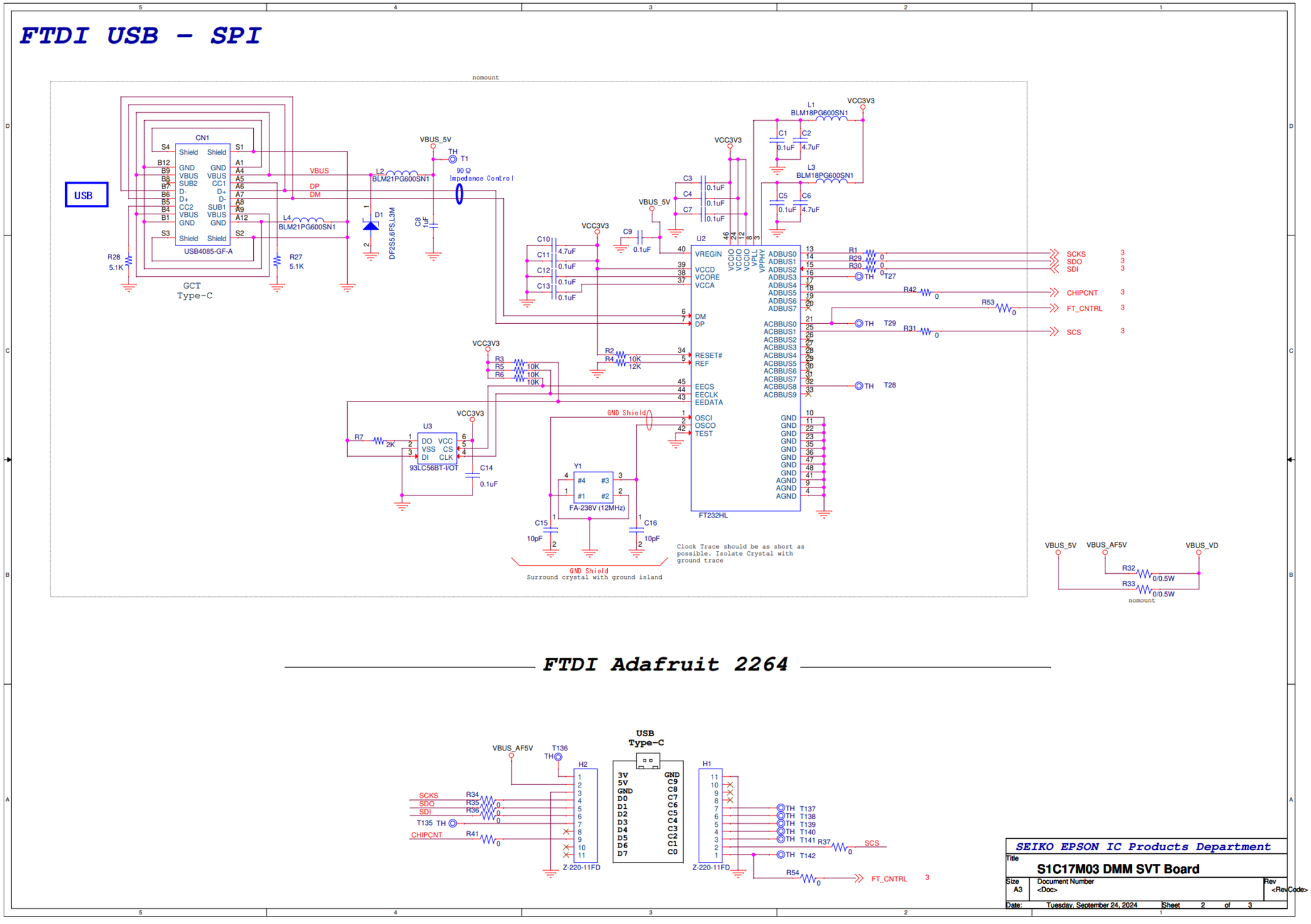
3.6 Emulator connector

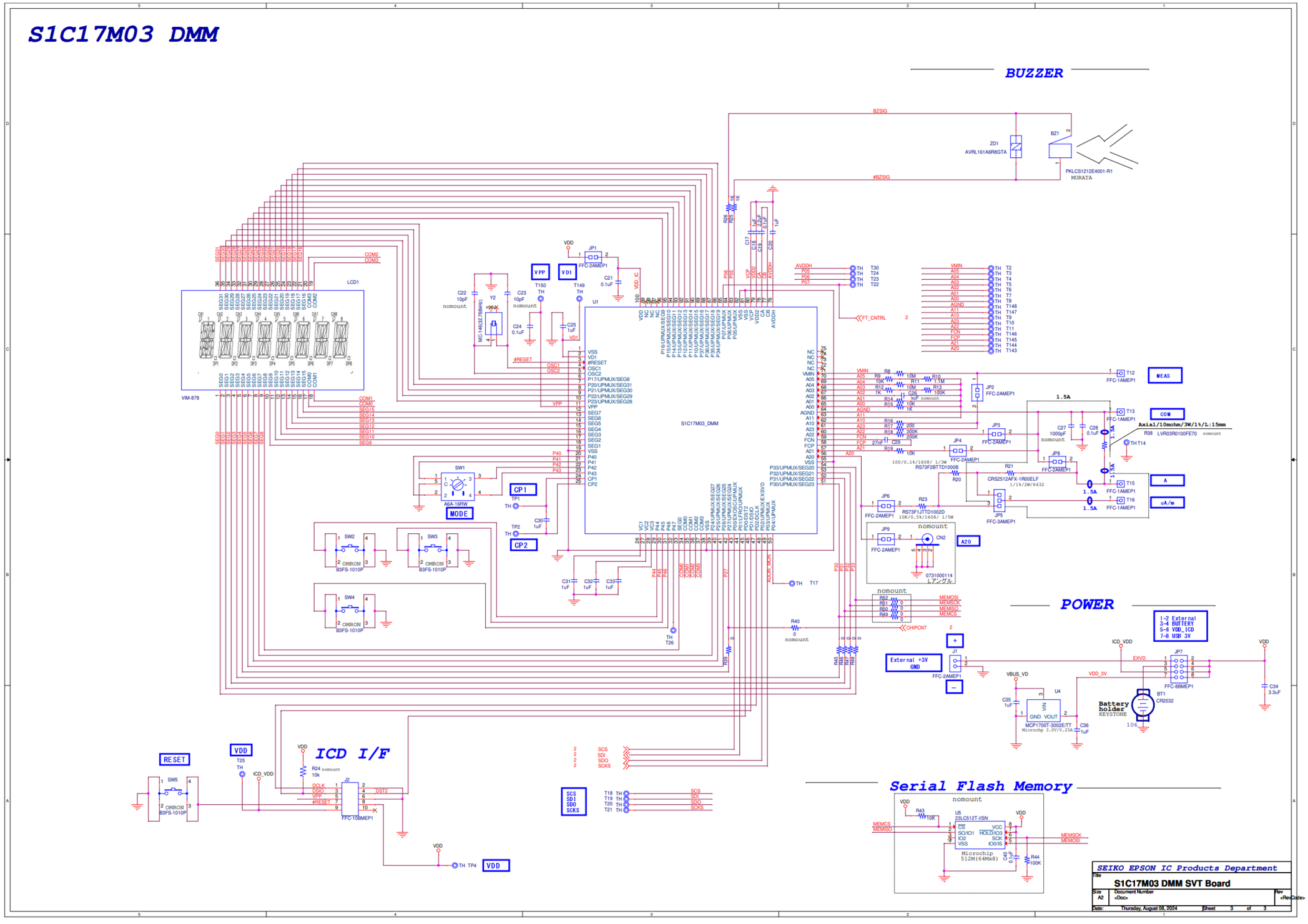
J2 is the S5U1C17001H3 ICDmini Ver.3 emulator "S5U1C17001H3" connector.

Table 3.6.1 J2 pin assignment

Pin No.	Signal name	Other comments
1	DCLK	
2	GND	Ground
3	DSIO	
4	DST2	
5	FLASH VCC OUT	Flash memory, power output for programming
6	GND	Ground
7	RSTO	Target reset output
8	VCCIN	
9	3.3V	3.3V power supply
10	N.C.	N.C.

Appendix A S5U1C17M03T SVT Board schematic




S1C17M03 DMM
BUZZER
BZSIG
#BZSIG
ZD1
AVRL161A6R8GTA
BZ1
PKLCS1212E4001-R1
MURATA
LCD1
VIM-878
COM2
COM3
COM1
COM0
SEG15
SEG14
SEG13
SEG12
SEG11
SEG10
SEG9
U1
S1C17M03_DMM
VDD
VPP
VD1
VDD_IC
JP1
FFC-2AMEP1
C21
0.1uF
C22
10pF
nomount
C23
10pF
nomount
Y2
MC-146(32.768kHz)
C24
0.1uF
C25
1uF
#RESET
OSC1
OSC2
P17/UPMUX/SEG8
P20/UPMUX/SEG31
P21/UPMUX/SEG30
P22/UPMUX/SEG29
P23/UPMUX/SEG28
SEG7
SEG6
SEG5
SEG4
SEG3
SEG2
SEG1
P40
P41
P42
P43
CP1
CP2
SW1
A6A-16RW
MODE
SW2
SW3
SW4
OMRON
B3FS-1010P
TP1
TP2
C30
1uF
C31
1uF
C32
1uF
C33
1uF
R26
1K
R25
1K
C17
1uF
C18
0.1uF
C19
1uF
C20
1uF
AVDDH
VCP
VD2
CA
CB
AVDDH
P05
P06
P07
TH T30
TH T24
TH T23
TH T22
FT_CNTRL
VMIN
A05
A04
A03
A02
A01
A00
AGND
A11
A10
A23
A22
FCN
FCP
A21
A20
TH T2
TH T3
TH T4
TH T5
TH T6
TH T7
TH T8
TH T148
TH T147
TH T9
TH T10
TH T11
TH T146
TH T145
TH T144
TH T143
R9
10M
R10
1.1M
R11
10K
R12
10M
R13
100K
R14
10K
R15
1K
C26
nomount
JP2
FFC-2AMEP1
R16
200
R17
300K
R18
200K
C29
27nF
R19
10K
JP3
FFC-2AMEP1
JP4
FFC-2AMEP1
100/0.1%/1608/ 1/3W
RS73F2BTTD1000B
R21
R20
CRS2512AFX-1R00ELF
1/1%/2W/6432
JP6
FFC-2AMEP1
R23
RS73FLITTD1002D
10K/0.5%/1608/ 1/5W
JP5
FFC-3AMEP1
JP8
FFC-2AMEP1
JP9
FFC-2AMEP1
CN2
0731000114
A20
nomount
R52
R51
R50
R49
MEMOSI
MEMSCK
MEMSO
MEMCS
CHIPCNT
R40
0
nomount
T12
FFC-1AMEP1
MEAS
T13
FFC-1AMEP1
COM
Axial/10mohm/3W/1%/L:15mm
R38 LVR03R0100FE70 nomount
TH T14
T15
FFC-1AMEP1
A
T16
FFC-1AMEP1
uA/m
1.5A
C27
1000pF
nomount
C28
0.1uF
POWER
1-2 External
3-4 BUTTERY
5-6 VDD_ICD
7-8 USB 3V
External +3V
GND
J1
FFC-2AMEP1
ICD_VDD
EXVD
JP7
FFC-8BMEP1
VDD
VDD_3V
VBUS_VD
U4
MCP1700T-3002E/TT
Microchp 3.0V/0.25A
C35
1uF
C36
1uF
BT1
CR2032
Battery
holder
KEYSTONE
C34
3.3uF
ICD I/F
RESET
SW5
VDD
ICD_VDD
R24
10k
nomount
J2
FFC-10BMEP1
DCLK
DSIO
VPP
#RESET
DST2
TH TP4
SCS
SDI
SDO
SCKS
Serial Flash Memory
nomount
R43
10K
U5
23LC512T-ISN
Microchip
512M(64Mx8)
R44
100K
SEIKO EPSON IC Products Department
S1C17M03 DMM SVT Board
Size A2
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Rev <RevCode>
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Appendix B S5U1C17M03T SVT Board Parts List

Note! Parts are subject to change without notice.

Table B.1 S5U1C17M03T SVT Board Parts List

Item	Manufacture	Part Type	Part	Reference	Quantity	mount	Other Commennt
1	KEYSTONE	Battery holder	106	BT1	1		
2	MURATA	Buzzer	PKLCS1212E4001-R1	BZ1	1		
3	GCT	Connector	USB4085-GF-A	CN1	1	nomount	
4	HIROSE	Connector	A2-2PA-2.54DSA(71)	J1,JP1,JP2,JP3,JP4, JP6,JP8,JP9	8		
5	HIROSE	Connector	A2-3PA-2.54DSA(71)	JP5	1		
6	HIROSE	Connector	A1-8PA-2.54DSA(71)	JP7	1		
7	Würth Elektronik	Connector	61301021121	J2	1		
8	TE	Tactile switchi	FSM4JSMATR	SW2,SW3,SW4,SW5	4		
9	OMRON	Rotary switch	A6A-16R	SW1	1		
10	EPSON	IC chip	S1C17M02_DMM	U1	1		
11	FTDI	IC chip	FT232HL	U2	1	nomount	
12	Microchip	IC chip	93LC56BT-I/OT	U3	1	nomount	
13	EPSON	Crystal	FA-238V 12.0000MB-W3	Y1	1	nomount	
14	EPSON	Crystal	MC-146 32.7680KA-AC0:RoHS	Y2	1		
15	VARITRONIX	LCD	VIM-878	LCD1	1		
16	TDK	Varistor	AVRL161A6R8GTA	ZD1	1		
17	MURATA	Ferrite bead	BLM18PG600SH1D	L1,L3	2	nomount	
18	MURATA	Ferrite bead	BLM21PG600SZ1D	L2,L4	2	nomount	
19	TOSHIBA	Diode	DF2S5.6CT,L3F	D1	1	nomount	
20	TE	Chip resistors	2-2176091-4	R20	1		
21	Bourns	Chip resistors	CRM2512-FX-1R00ELF	R21	1		
22		Chip resistors	CRHV1206AF10M0FKFT	R8	1		
23	Panasonic	Chip resistors	ERJ-PA3F1002V	R9,R14,R19R23	4		
24	KOA	Chip resistors	RK73Z1JTTD	R34,R35,R36,R37,R39, R41,R45,R46,R47,R48, R54	11		
25	KOA	Chip resistors	RK73H1JTTD1002F	R2,R3,R5,R6	4	nomount	
26	KOA	Chip resistors	RK73H1JTTD1202F	R4	1	nomount	
27	KOA	Chip resistors	RK73B1JTTD202J	R7	1	nomount	
28	KEYSTONE	Chip resistors	5111	R33	1	nomount	
29	KOA	Chip resistors	MCT06030C1104FP500	R10	1		
30	KOA	Chip resistors	MCT0603PD1001DP500	R12,R15	2		
31	KOA	Chip resistors	MCT0603PD1003DP500	R13	1		
32	KOA	Chip resistors	ERJ-PB6B2000V	R16	1		
33	KOA	Chip resistors	ERJ-PB6D3003V	R17	1		
34	KOA	Chip resistors	ERJ-PB6D2003V	R18	1		
35	KOA	Chip resistors	RK73H1JTTD5101F	R27,R28	2	nomount	
36	MURATA	Chip capacitor	GRM155B31C104K	C19,C21,C24,C28	4		
37	YAGEO	Chip capacitor	CC0402KRX5R5BB475	C2,C6,C10	3	nomount	
38	MURATA	Chip capacitor	GRM155B30J105K	C17,C20,C25,C30,C31, C32,C33,C35,C36	9		
39	MURATA	Chip capacitor	GRM1552C1H100J	C15,C16	2	nomount	
40	TDK	Chip capacitor	C1608X7R1A225K080AC	C18	1		
41	MURATA	Chip capacitor	GRM1552C1H100J	C22,C23	2	nomount	
42		Chip capacitor		C26	1	nomount	
43	MURATA	Chip capacitor	GRM1552C1H102J	C27	1	nomount	
44	YAGEO	Chip capacitor	CC0603KRX7R9BB273	C29	1		
45	Samsung	Chip capacitor	CL10A335KP8NNNC	C34	1		
46	Diodes	Regulator	AP2138N-3.0TRG1	U4	1		
47		Connector		TP1,T1,TP2,T2,T3,TP4 T4,T5,T6,T7,T8,T9,T10 T11,T14,T17,T18,T19, T20,T21,T22,T23,T24, T25,,T26,T27,T28,T29 T30,T135,T136,T137, T138,T139,T140,T141, T142,T143,T144,T145, T146,T147,T148,T149, T150	45		ϕ 1.0
48	Molex	Connector	0731000114	CN2	1	nomount	
49	Sullins	Connector	PPPC111LFBN-RC	H1,H2	2		
50	AKIZUKI	Connector	PH-1x40SG	T12,T13,T15,T16	4		
51	Vishay	Chip resistors	RCC080510M0FKEA	R11	1		
52	Vishay	Chip resistors	LVR03R0100FE70	R38	1	nomount	
53	KOA	Chip resistors	RK73H1JTTD1002F	R24,R43	2	nomount	
54	MURATA	Chip capacitor	GRM155B31C104K	C40	1	nomount	
55	KOA	Chip resistors	RK73Z1JTTD	R40,R49,R50,R51,R52	5	nomount	
56	KOA	Chip resistors	RK73H1JTTD1003F	R44	1	nomount	
57	Microchip	IC chip	23LC512T-I/SN	U5	1	nomount	
58		Chip capacitor		C8	1	nomount	
59		Chip capacitor		C1,C5,C3,C4,C7,C9, C11,C12,C13,C14	10	nomount	
60		Chip resistors		R1,R29,R30,R31,R42, R53	6	nomount	
61	KEYSTONE	Chip resistors	5111	R32	1		
62		Chip resistors	RK73H1JTTD1001F	R25,R26	2		
63	Adafruit	Bridge board	2264	Adafruit 2264	1		

Revision History

Attachment－1

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Rev 1.1	2024/09/24	P1 P7-P8	revise	Figure1.1.1　SVT board external view Appendix A　S5U1C17M03T SVT Board schematic

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