

C-MOS 32-BIT SINGLE CHIP MICROCONTROLLER

S5U1C31D41T Manual
(S1C31D41 Evaluation Board)

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1. Overview

S5U1C31D41T (S1C31D41 Evaluation Board) is an evaluation board for the Seiko Epson single-chip microcontroller S1C31D41. This board is equipped with Electromagnetic buzzer for developing the sound and with debugger function (DAPLink) which connects to PC directly via Micro-USB.

Figure 1.1 shows the S5U1C31D41T evaluation board.

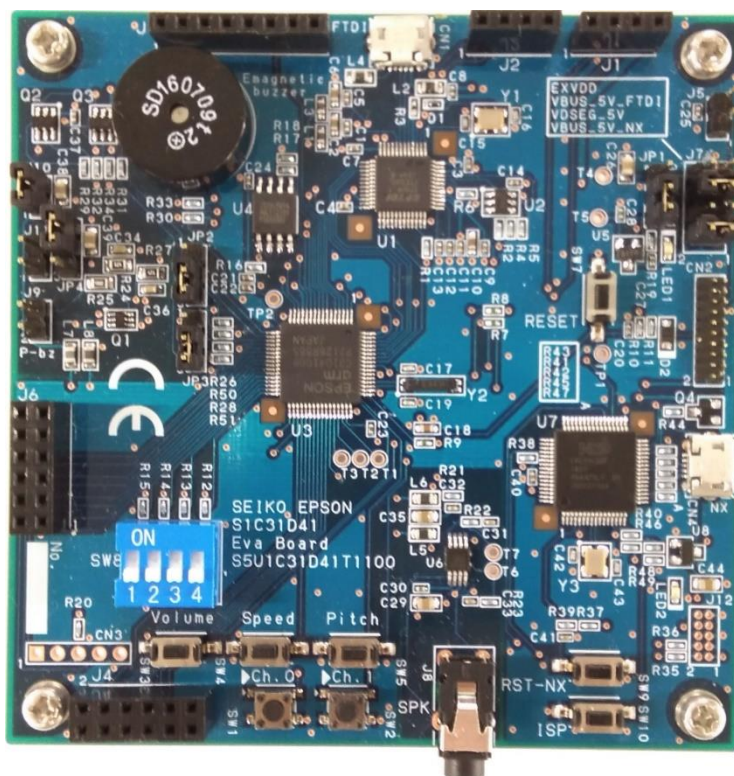


Figure 1.1 S5U1C31D41T Evaluation Board

2. Name and Function of Each Part

2. Name and Function of Each Part

Table 2.1 lists the main parts on S5U1C31D41T, and Figure 2.1 shows the parts layout.

Table 2.1 Main Parts Description

Name	Part Number	Description	Remarks
S1C31D41	U3	MCU(Cortex-M0+)	
Electromagnetic buzzer	B1	Sound output device	
USB to Serial Converter	U1	For communication with PC (For writing sound data)	
64Mbit/8Mbyte QSPI flash memory	U4	For storing a sound ROM data	
Debug IC	U7	For debugging by DAPLink	
Micro-USB connector (TypeB)	CN1	For power supply from USB- VBUS and for connecting PC when write sound data	
Micro-USB connector (TypeB)	CN4	For power supply from USB- VBUS and for connecting PC when debug software	
Debug probe I/F connector	CN2	For connecting debug probe	
External power connector	J5	For connecting with an external power such as stabilized power supply.	+input - GND
Jumper for switching power	J7		
Jumper for switching operating voltage	JP1	Switching 5V↔3.3V	
Audio jack	J8	For connecting speaker	
Piezoelectric buzzer connector	J9	For connecting Piezoelectric buzzer	
External power connector for Piezoelectric buzzer	J11	For power supply to Piezoelectric buzzer	+input - GND
Reset switch	SW7/SW9	SW7 : For reset hardware SW9 : For reset debug IC	
Dip switch	SW8	For setting software	
Push switch	SW1/SW2/SW3/SW4/SW5	For operating software	
External connector	J1/J2/J3/J4/J6	For connecting sensor module	

2. Name and Function of Each Part

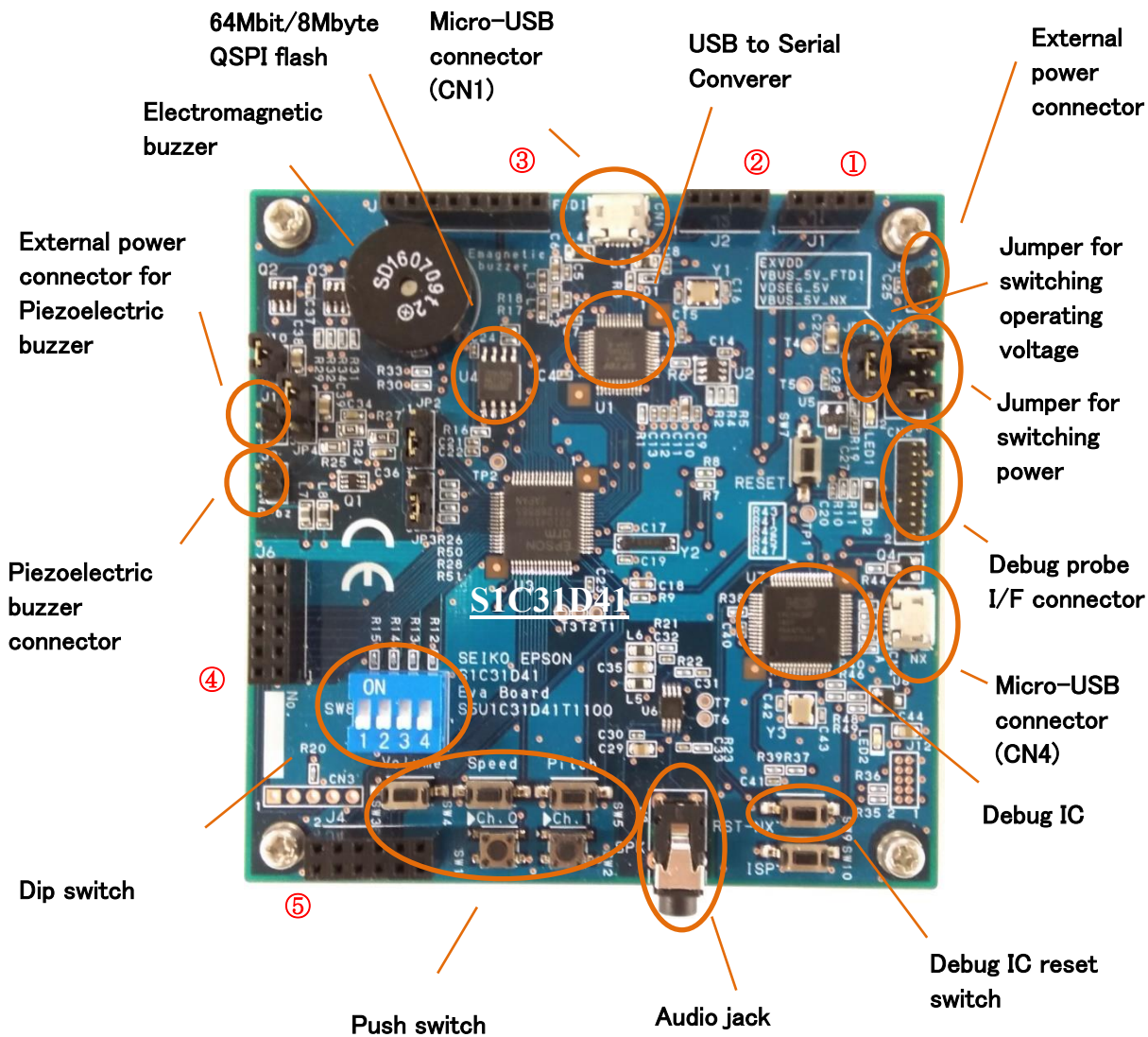


Figure 2.1 Parts Layout

※①～⑤ : External connector

3. Settings

3. Settings

3.1 Power Supply

The power supply can be selected from following four sources by J7 jumper setting.

- VBUS(CN4) : Supplied from USB-VBUS to CN4
- VDSEG : Supplied from debug probe to CN2
- VBUS(CN1) : Supplied from USB-VBUS to CN1
- EXVDD : Supplied from an external power to J5

Table 3.1.1 shows the jumper setting of power supply.

Table 3.1.1 Power Supply Switching

Power Supply	J7 Settings	Remarks
VBUS(CN4)	1-2 Short	Connect Micro-USB to CN4
VDSEG	1-2 Short, 3-4 Short	Connect debug probe to CN2
VBUS(CN1)	1-2 Short, 5-6 Short	Connect Micro-USB to CN1
EXVDD	1-2 Short, 7-8 Short	Connect DC +5V to J5 (+ input, - GND)

Table 3.1.2 shows the jumper setting of operating voltage for S1C31D41.

Table 3.1.2 Operating Voltage Switching

Operating Voltage	JP1 Settings
5V	2-3 Short
3.3V	1-2 Short

*For the connection and jumper settings during debugging, refer to "4 Debugging Software".

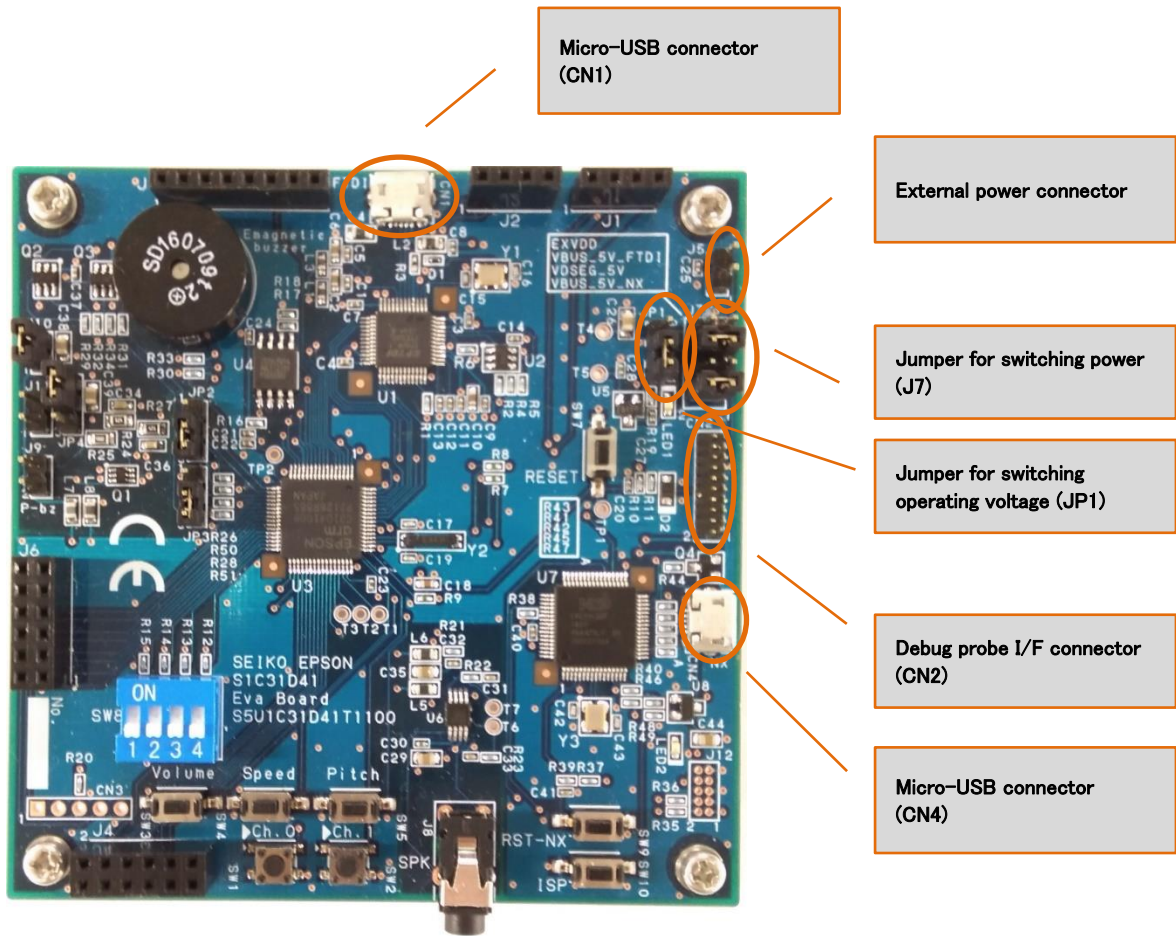


Figure 3.1.1 Layout of parts for Power Supply

3. Settings

3.2 Audio device

S5U1C31D41T can output sound by three types of audio devices.

- Played by speaker
- Played by Electromagnetic buzzer
- Played by Piezoelectric buzzer whose power is supplied from an internal power
- Played by Piezoelectric buzzer whose power is supplied from an external power

Table 3.2.1 shows the jumper settings of each device.

Table 3.2.1 Audio Device Switching

Device	JP2	JP3	JP4	J10	J11	Connector
Speaker	Don't care	Don't care	Don't care	Don't care	—	J8
Electromagnetic buzzer	2-3 Short	2-3 Short	1-2-3 Open	Short	—	Mounted on the board
Piezoelectric buzzer (internal power)	1-2 Short	1-2 Short	1-2 Short	Open	—	J9
Piezoelectric buzzer (external power)	1-2 Short	1-2 Short	2-3 Short	Open	+input -GND	J9

Note 1: Jumper settings should not be done during power is supplied. The parts mounted on the board such as amplifier may be damaged. Please switch the jumper with the power off.

Note 2: Please decide the voltage of external power supply which is input to Piezoelectric buzzer by referring the rated value of the buzzer, and follow the silk on the board to connect input to [+] and GND to [-].

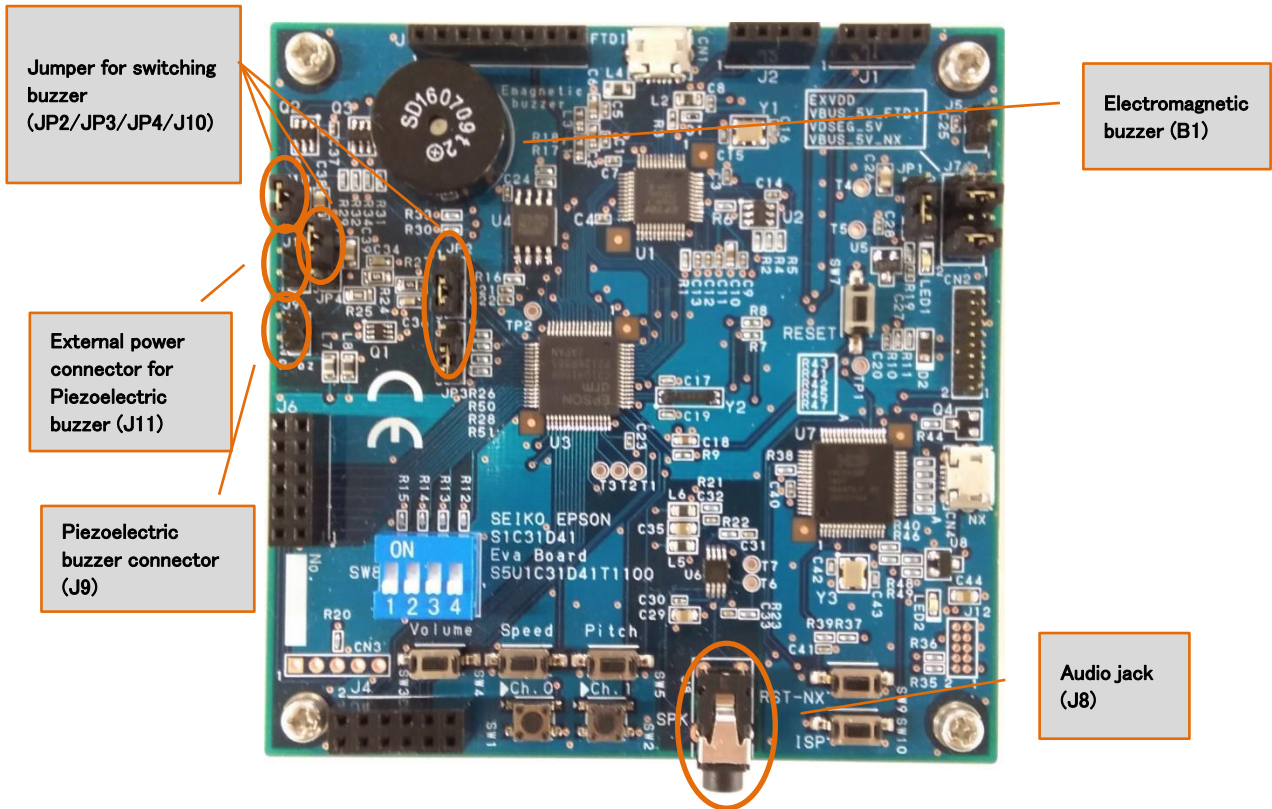


Figure 3.2.1 Layout of parts for setting audio devices

4. Debugging Software

4. Debugging Software

S5U1C31D41T has three types of connection for software debug.

- Connect PC to the S5U1C31D41T board via IAR Systems debug probe I-jet
- Connect PC to the S5U1C31D41T board via SEGGER debug probe J-Link
- Connect PC to the S5U1C31D41T board via Micro-USB

The following 4.1 and 4.2 show the method of debug by each connection.

4.1 Debugging by debug probe

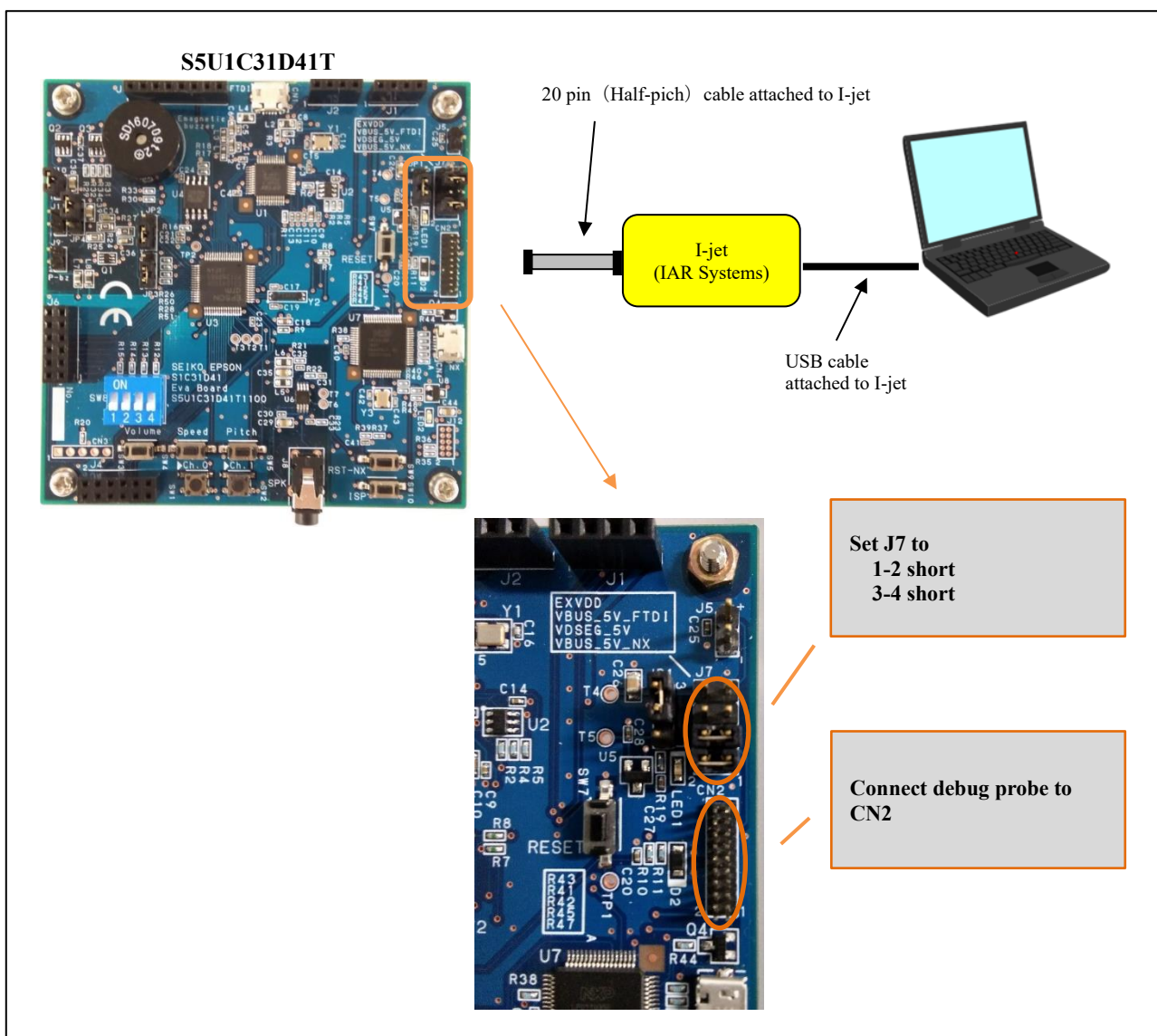


Figure 4.2.1 Connection Diagram of S5U1C31D41T and PC by I-jet

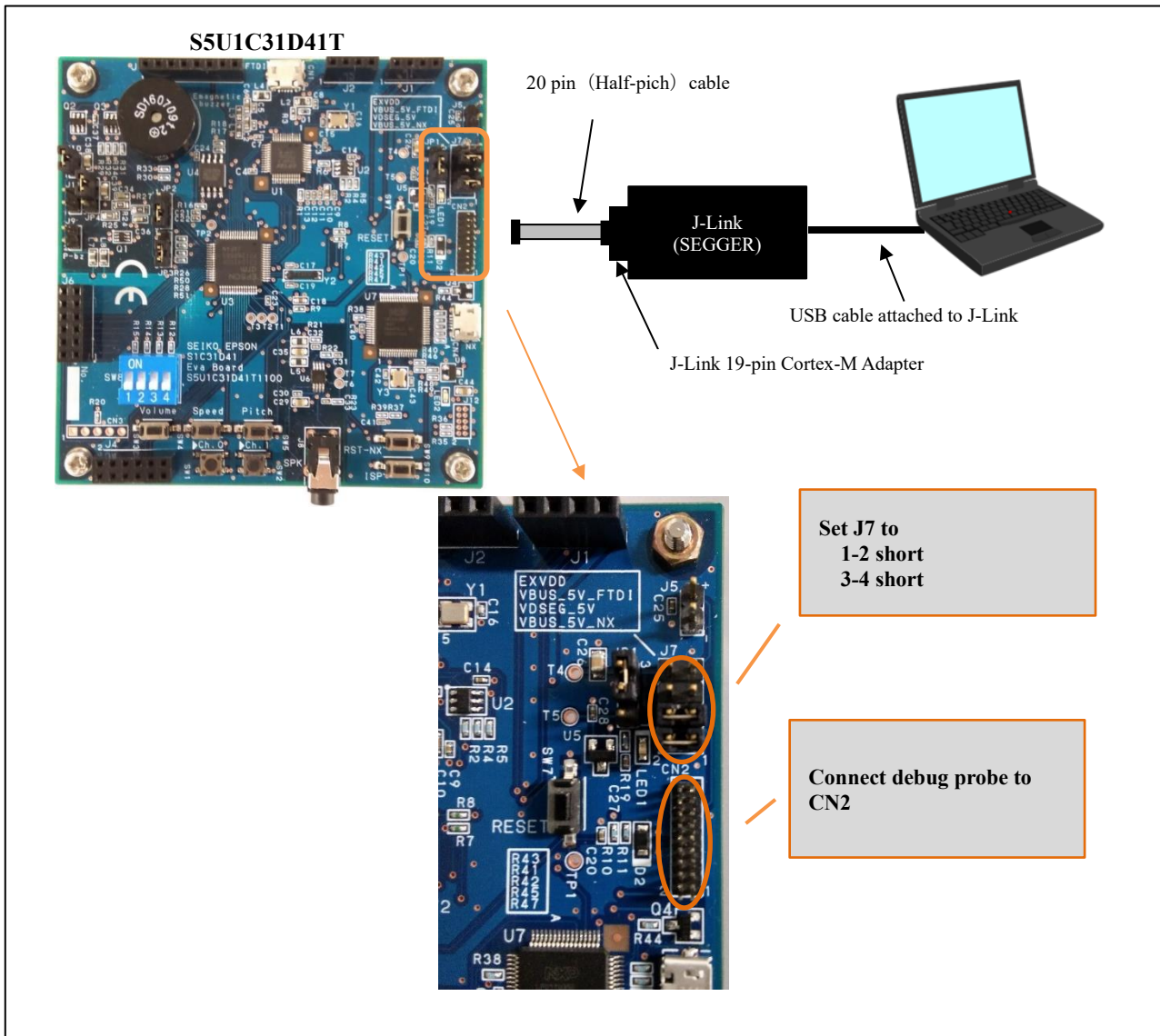


Figure 4.2.2 Connection Diagram of S5U1C31D41T and PC by J-Link

4. Debugging Software

Table 4.2.1 Terminal Layout Table for Debug I/F(CN2)

No	Name	IO	機能	No	Name	IO	機能
1	VTref	O	MCU reference voltage	11	+5V	I	DC +5V Power Input
2	SWDIO	IO	Serial wire data input/output	12	TRACECLK	-	NC
3	GND	P	GND	13	+5V	I	DC +5V Power Input
4	SWCLK	I	Serial wire clock input	14	TDATA0	-	NC
5	GND	P	GND	15	GND	P	GND
6	SWO	-	NC	16	TDATA1	-	NC
7	-	-	NC	17	GND	P	GND
8	TDI	-	NC	18	TDATA2	-	NC
9	NC	-	NC	19	GND	P	GND
10	nRESET	I	MCU Reset	20	TDATA3	-	NC

4.2 Debugging by Micro-USB

S5U1C31D41T enables software debug by on-board debugger function which allows to connect to PC directly via Micro-USB.

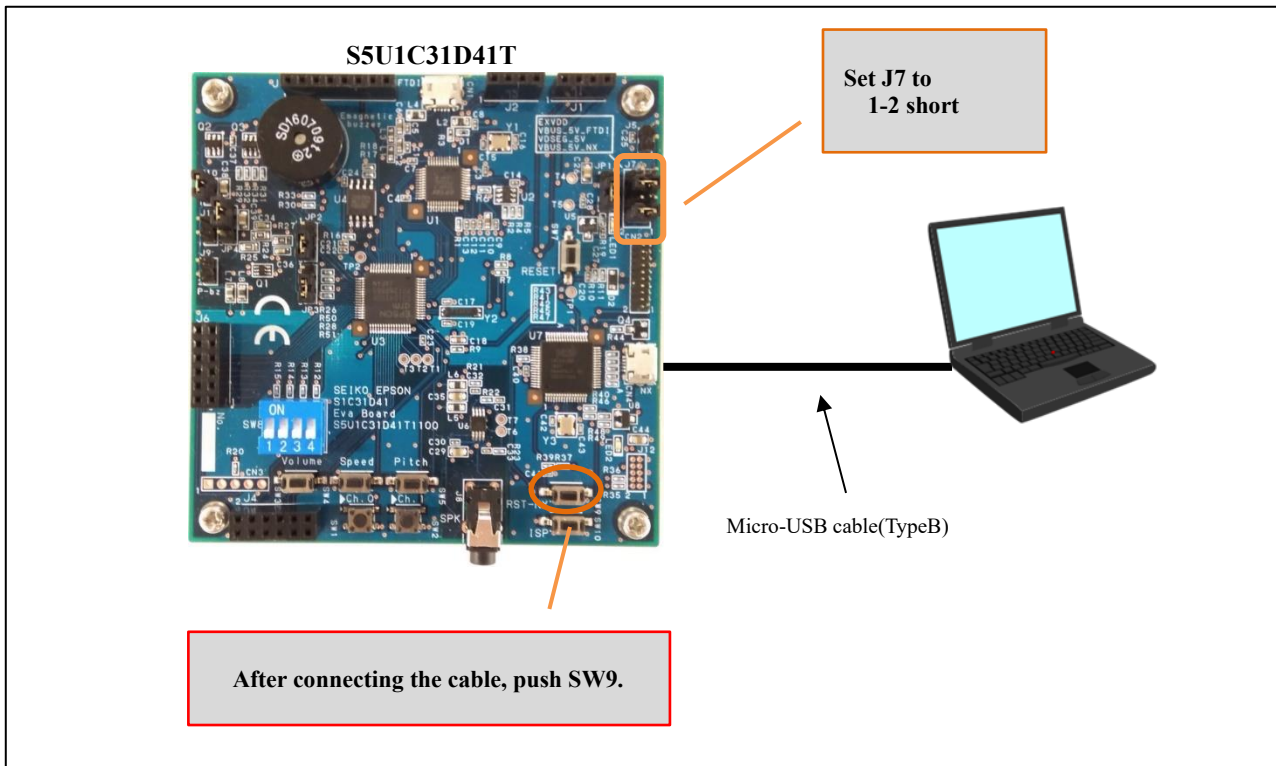
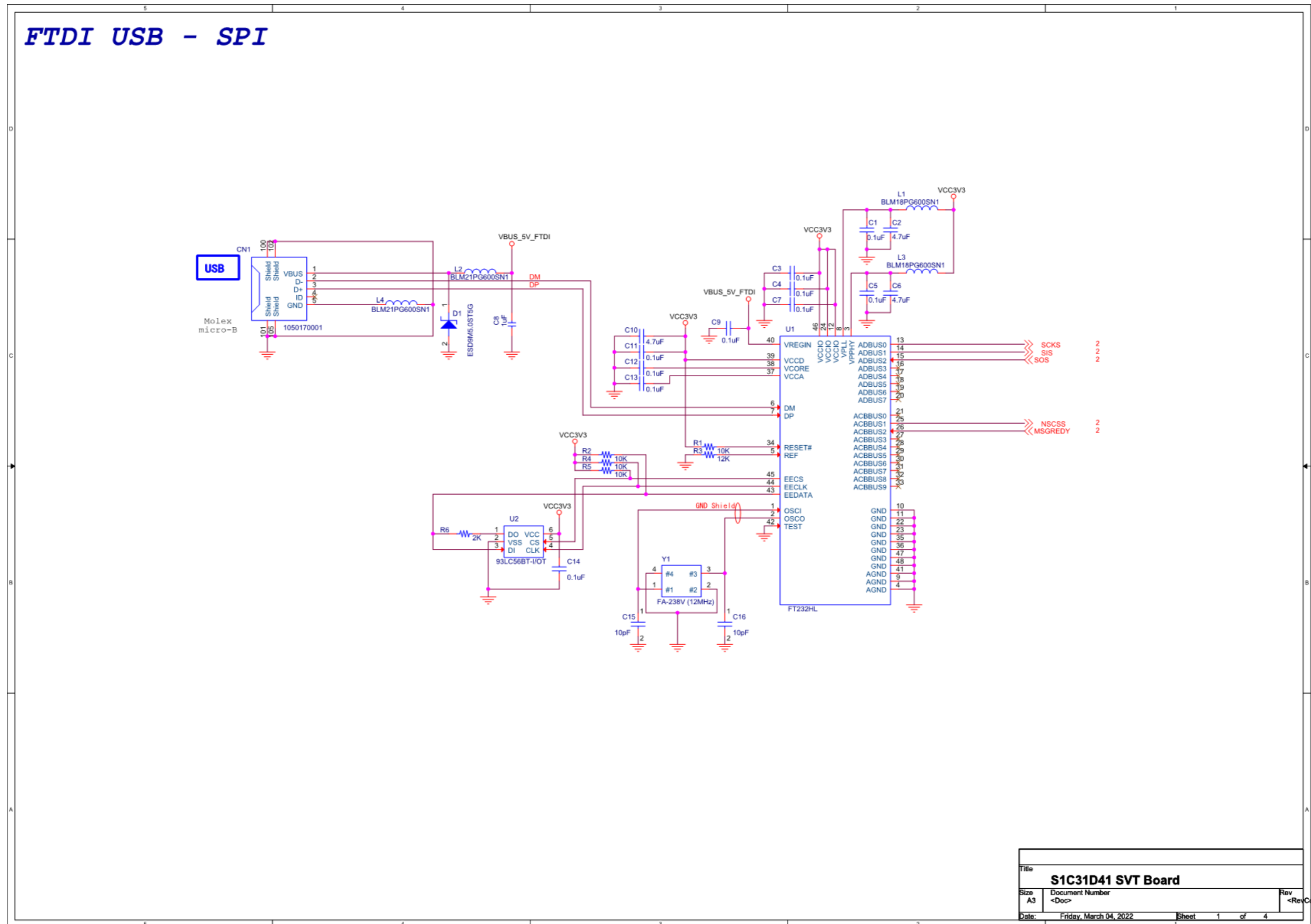
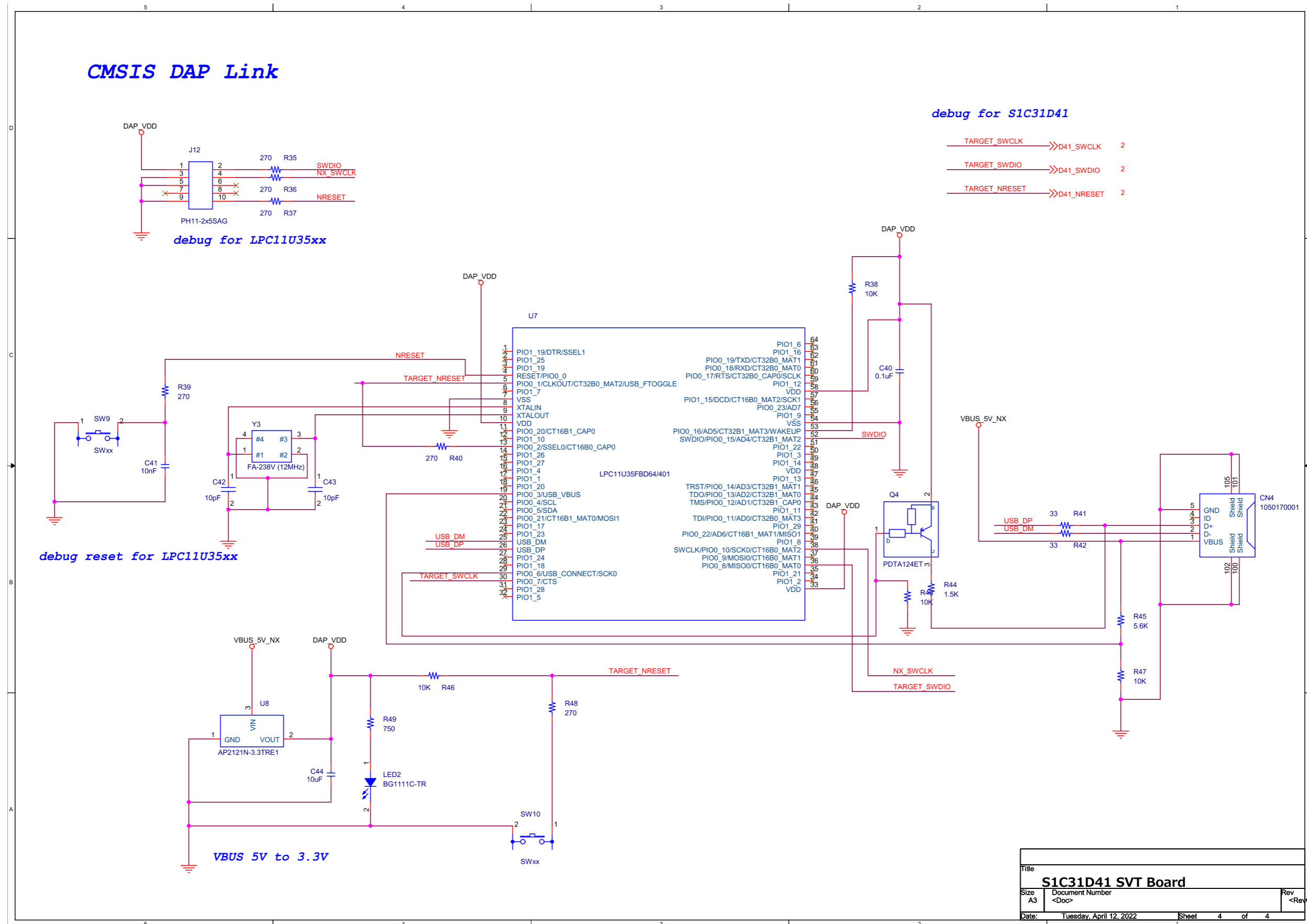


Figure 4.2.3 Connection Diagram of S5U1C31D41T and PC by Micro-USB

Note : If you debug without pushing SW9 after connecting the cable, it may not work properly.

Appendix A Circuit Diagrams





Title			S1C31D41 SVT Board		
Size	Document Number	Rev			
A3	<Doc>	<Rev>			
Date:	Tuesday, April 12, 2022	Sheet	4	of	4

Appendix B Parts List

Appendix B Parts List

Note ! The parts are subject to be changed without notice.

Item	Quantity	Reference	Part	Manufacture
1	1	B1	SD160709	TDK Corporation
2	2	CN1, CN4	1050170001	Molex
3	1	CN2	PH11-2x10SAG	Chang Enn Co., Ltd.
4	17	C1,C3,C4,C5,C7,C9,C11,C12,C13,C14,C20,C21,C22,C24,C30,C37,C40	GRM155B31C104K	MURATA
5	3	C2,C6,C10	CL10A475KO8NNNC	Samsung Electro-Mechanics
6	5	C8,C23,C25,C27,C28	CL05A105KO5NNNC	Samsung Electro-Mechanics
7	6	C15,C16,C17,C19,C42,C43	GRM1552C1H100J	MURATA
8	1	C18	C1608X5R1C335K080AC	TDK Corporation
9	6	C26,C29,C35,C38,C39,C44	CL21A106KOQNNNG	Samsung Electro-Mechanics
10	3	C31,C33,C41	GRM155B11E103K	MURATA
11	1	C32	0402YC393KAT2A	AVX Corporation
12	2	C34,C36	CL10B104KB8NNNL	Samsung Electro-Mechanics
13	1	D1	ESD9M5.0ST5G	ONsemi
14	1	D2	RSX051VAM30TR	ROHM
15	4	JP1,JP2,JP3,JP4	61300311121	Würth Elektronik
16	2	J1,J2	PPPC041LFBN-RC	Sullins Connector Solutions
17	1	J3	RS1-08-G	Adam Tech
18	2	J4,J6	PPTC062LFBN-RC	Sullins Connector Solutions
19	4	J5,J9,J10,J11	61300211121	Würth Elektronik
20	1	J7	61300821121	Würth Elektronik
21	1	J8	ST-005-G	Switronic Industrial Corp.
22	2	LED1,LED2	BG1111C-TR	STANLEY
23	2	L1,L3	BLM18PG600SN1	MURATA
24	4	L2,L4,L5,L6,L8	BLM21PG600SN1	MURATA
25	1	L7	BLM21PG220SN1	MURATA
26	1	Q1	2N7002BKS,115	nexperia
27	1	Q2	BC807DS,115	nexperia
28	1	Q3	BC817DS,115	nexperia
29	1	Q4	PTA124ET	nexperia
30	11	R1,R2,R4,R5,R10,R16,R20,R38,R43,R46,R47	RK73B1ETTP103J	KOA
31	1	R3	RK73B1ETTP123J	KOA
32	1	R6	RK73B1ETTP202J	KOA
33	3	R7,R8,R9	RK73Z1ETTP	KOA
34	2	R11,R17	RK73B1ETTP100J	KOA
35	4	R12,R13,R14,R15	RK73B1ETTP473J	KOA
36	1	R18	RK73B1ETTP104J	KOA
37	1	R19	RK73B1ETTP821J	KOA
38	1	R21	RK73B1ETTP511J	KOA
39	2	R22,R23	RK73B1ETTP204J	KOA
40	2	R24,R27	ERJ-P06J471V	Panasonic Electronic Components
41	1	R25	ERJ-P06F1800V	Panasonic Electronic Components
42	6	R26,R28,R30,R33,R50,R51	RK73B1ETTP333J	KOA
43	4	R29,R31,R32,R34	RK73B1ETTP222J	KOA
44	6	R35,R36,R37,R39,R40,R48	RK73B1ETTP271J	KOA
45	2	R41,R42	RK73B1ETTP330J	KOA
46	1	R44	RK73B1ETTP152J	KOA
47	1	R45	RK73B1ETTP562J	KOA
48	1	R49	RK73B1ETTP751J	KOA
49	7	SH1,SH2,SH3,SH4,SH5,SH6,SH7	QPC02SXGN-RC	Sullins Connector Solutions
50	2	SW1,SW2	PTS 647 SK38 SMTR2 LFS	C&K
51	6	SW3,SW4,SW5,SW7,SW9,SW10	PTS636 SM43 SMTR LFS	C&K
52	1	SW8	DS01C-254-L-04BE	CUI Devices
53	9	TP1,T1,TP2,T2,T3,T4,T5,T6,T7	TH	
54	1	U1	FT232HL	Future Technology Devices International Ltd
55	1	U2	93LC56BT-I/OT	Microchip Technology
56	1	U3	SIC31D41 QFP-64	EPSON
57	1	U4	IS25LP064A-JBLE	Integrated Silicon Solution Inc
58	2	U5,U8	AP2121N-3.3TRE1	Diodes Incorporated
59	1	U6	IS31AP2005-SLS2-TR	Lumissil
60	1	U7	LPC11U35FBD64/401	NXP
61	2	Y1,Y3	FA-238V (12MHz)	EPSON
62	1	Y2	MC-146(32.768kHz)	EPSON

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