

VOICE & SOUND LSI

S5U1V3F351T1100 Manual

(S1V3F351 Evaluation Board)

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1. Overview

S5U1V3F351T1100 (S1V3F351 Evaluation Board) is an evaluation board for the Seiko Epson voice & sound LSI S1V3F351.

Figure 1.1 shows the external view of S5U1V3F351T1100.

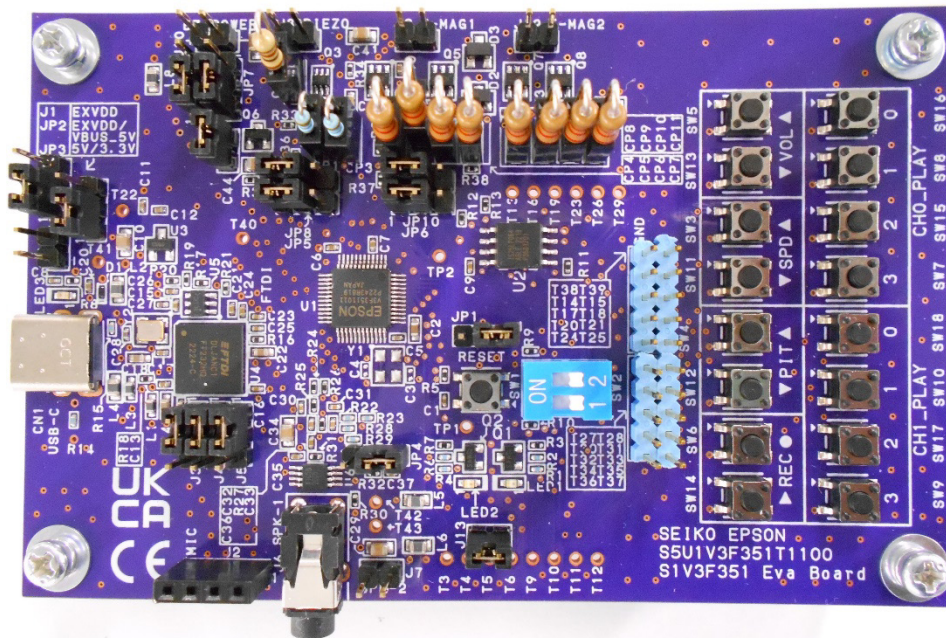


Figure 1.1 S5U1V3F351T1100 External View

2. Name and Function of Each Part

Table 2.1 lists the main parts on S5U1V3F351T1100. Also Figure 2.1 shows the layout of the parts on the board.

Table 2.1 Main Parts Description

Part Name	Part Number	Description	Remarks
S1V3F351	U1	Sound & voice LSI	
64Mbit/8Mbyte QSPI flash memory	U2	For storing a sound ROM data	
USB to Serial Converter	U4	For communication with PC (For writing sound data)	
USB Type-C connector	CN1	For power supply from USB-VBUS and for connecting PC	
Jumper for switching power	JP2	Switching USB-VBUS↔External power	
Jumper for switching operating voltage	JP3	Switching 5V↔3.3V	
Jumper for switching buzzer	JP5, JP6, JP8, JP10	For switching buzzer	
Audio jack	J6	Audio jack	
Speaker connector	J7	For connecting speaker	
Piezoelectric buzzer connector	J8	For connecting Piezoelectric buzzer	
Electromagnetic buzzer connector for 4-pin output	J9	For connecting Electromagnetic buzzer	
Electromagnetic buzzer connector for 2-pin output	J12	For connecting Electromagnetic buzzer	
Microphone connector	J2	For connecting Microphone	
External power connector	J1	For connecting with an external power such as stabilized power supply.	+ input – GND
External power connector for Piezoelectric buzzer	J10	For power supply to Piezoelectric buzzer	+ input – GND
Socket for connecting resistor (Electromagnetic buzzer)	CP4, CP5, CP6, CP7	Connecting resistor for Electromagnetic buzzer	
Socket for connecting resistor (Piezoelectric buzzer)	CP1, CP2, CP3	Connecting resistor for Piezoelectric buzzer	
Reset switch	SW1	For reset hardware	
Dip switch for setting host interface	SW2	For setting host interface	
Tactile switch for control sound	SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10, SW11, SW12, SW13 SW14, SW15, SW16, SW17, SW18	For controlling sound in standalone	

2. Name and Function of Each Part

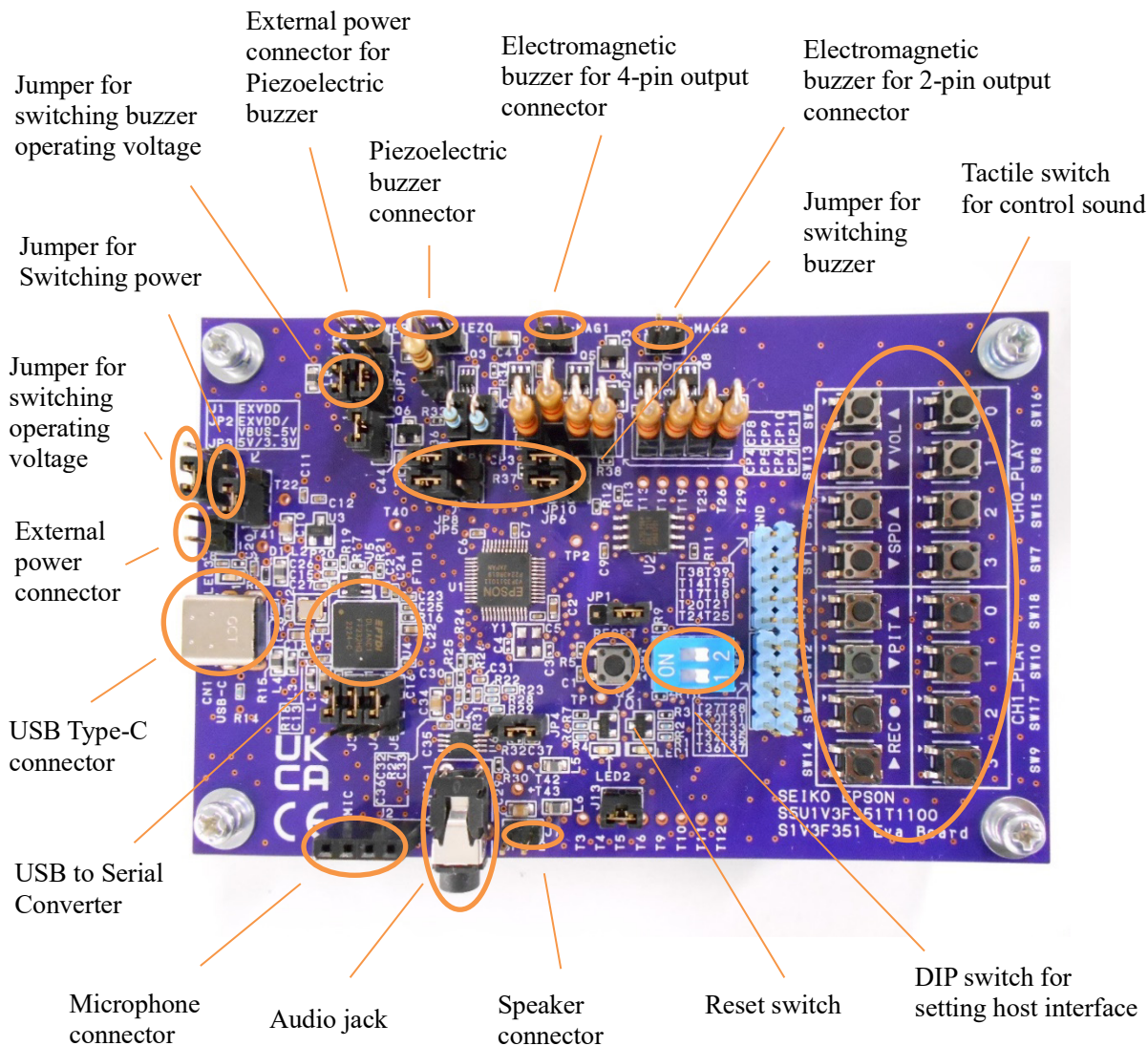


Figure 2.1 Layout of Main Parts

3. Settings

3.1 Power Supply

The power supply can be selected from following two sources by JP2 jumper setting.

- VBUS(CN1) : Supplied from USB-VBUS to CN1
- EXVDD : Supplied from an external power to J1

Table 3.1.1 shows the jumper setting of power supply.

Table 3.1.1 Power Supply Switching

Power Supply	JP2 Settings	Remarks
VBUS(CN1)	1-2 Short	Connect Micro-USB to CN1
EXVDD	2-3 Short	Connect DC +5V to J1 (+ input, - GND)

Table 3.1.2 shows the jumper setting of operating voltage for S1V3F351.

Table 3.1.2 Operating Voltage Switching

Operating Voltage	JP3 Settings
5V	1-2 short
3.3V	2-3 short

Table 3.1.3 shows the jumper setting for oscillation circuit.

表 3.1.3 Oscillation Circuit Switching

Oscillation Circuit	JP1 Setting
Internal oscillation	1-2 short
External oscillation (crystal / ceramic)	2-3 short

Note) The evaluation board does not mount an external oscillator. If you select external oscillation, please use it after mounting an external oscillator on the board.

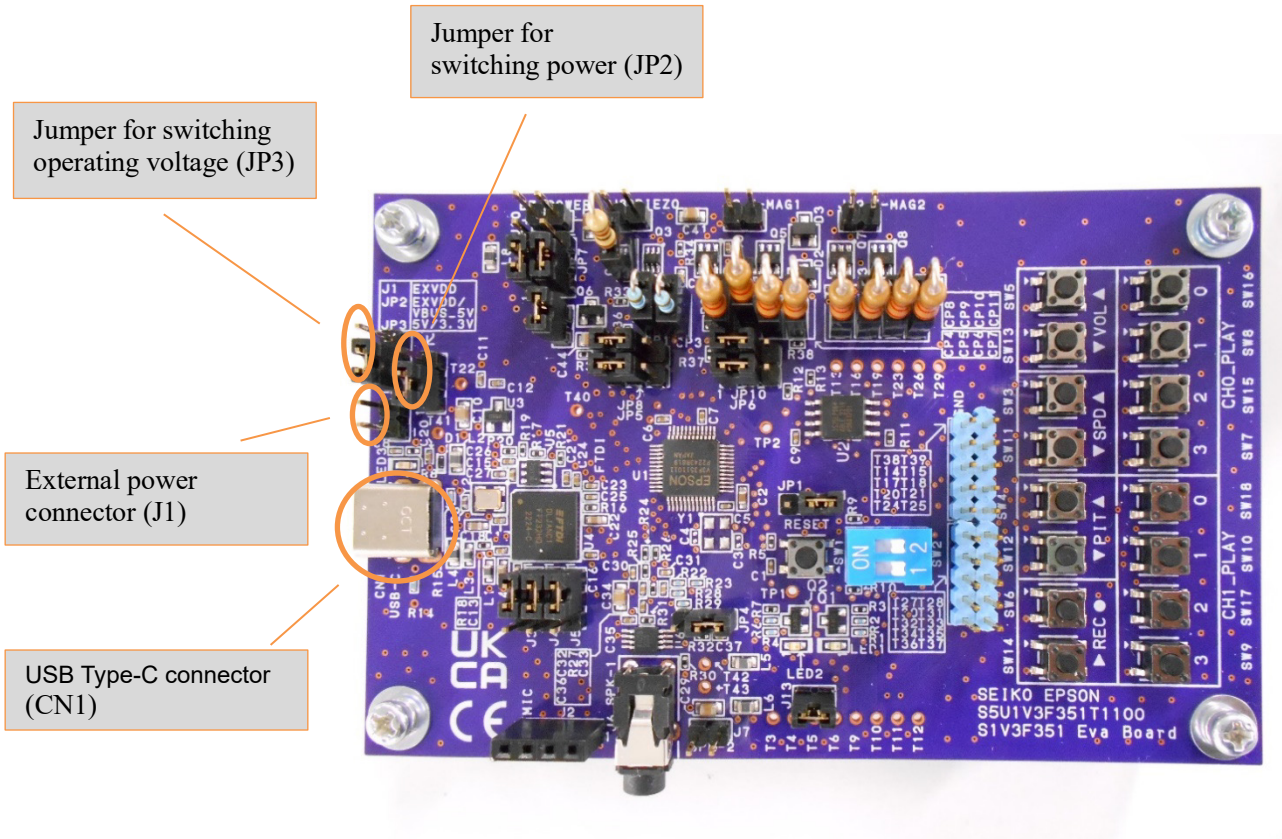


Figure 3.1.1 Layout of parts for Power Supply

3.2 Audio device

S5U1V3F351T1100 can output and input sound by four types of audio devices.

- Played by speaker
- Played by Electromagnetic buzzer
- Played by Piezoelectric buzzer (Power is supplied from an internal power or an external power)
- Recorded by Microphone

Table 3.2.1 shows the jumper settings and connection terminals for each device.

Table 3.2.1 Audio Device Settings

	Speaker	Electromagnetic Buzzer (2-pin output)	Electromagnetic Buzzer (4-pin ouotput)	Piezoelectric Buzzer (Internal power)	Piezoelectric Buzzer (External power)	Microphone
JP4	1-2 short	Don't care	Don't care	Don't care	Don't care	-
JP5	Don't care	2-3 short	2-3 short	1-2 short	1-2 short	-
JP6	Don't care	2-3 short	2-3 short	1-2 short	1-2 short	-
JP7	Don't care	1-2 short	2-3 short	Don't care	Don't care	-
JP8	Don't care	2-3 short	1-2 short	Don't care	Don't care	-
JP9	Don't care	Don't care	Don't care	1-2 short	2-3 short	-
JP10	Don't care	2-3 short	1-2 short	Don't care	Don't care	-
J11	Open	Short	Open	Open	Open	-
External power connection	-	-	-	-	J10	-
Device connection	J6, J7	J12	J9	J8	J8	J2

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) If you use J11 with short when using other than electromagnetic buzzer (2-pin output), transistors Q7 and Q8 may generate heat, so be sure to use J11 with open.

Note 3: 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 [-]. Please refer to Appendix D.

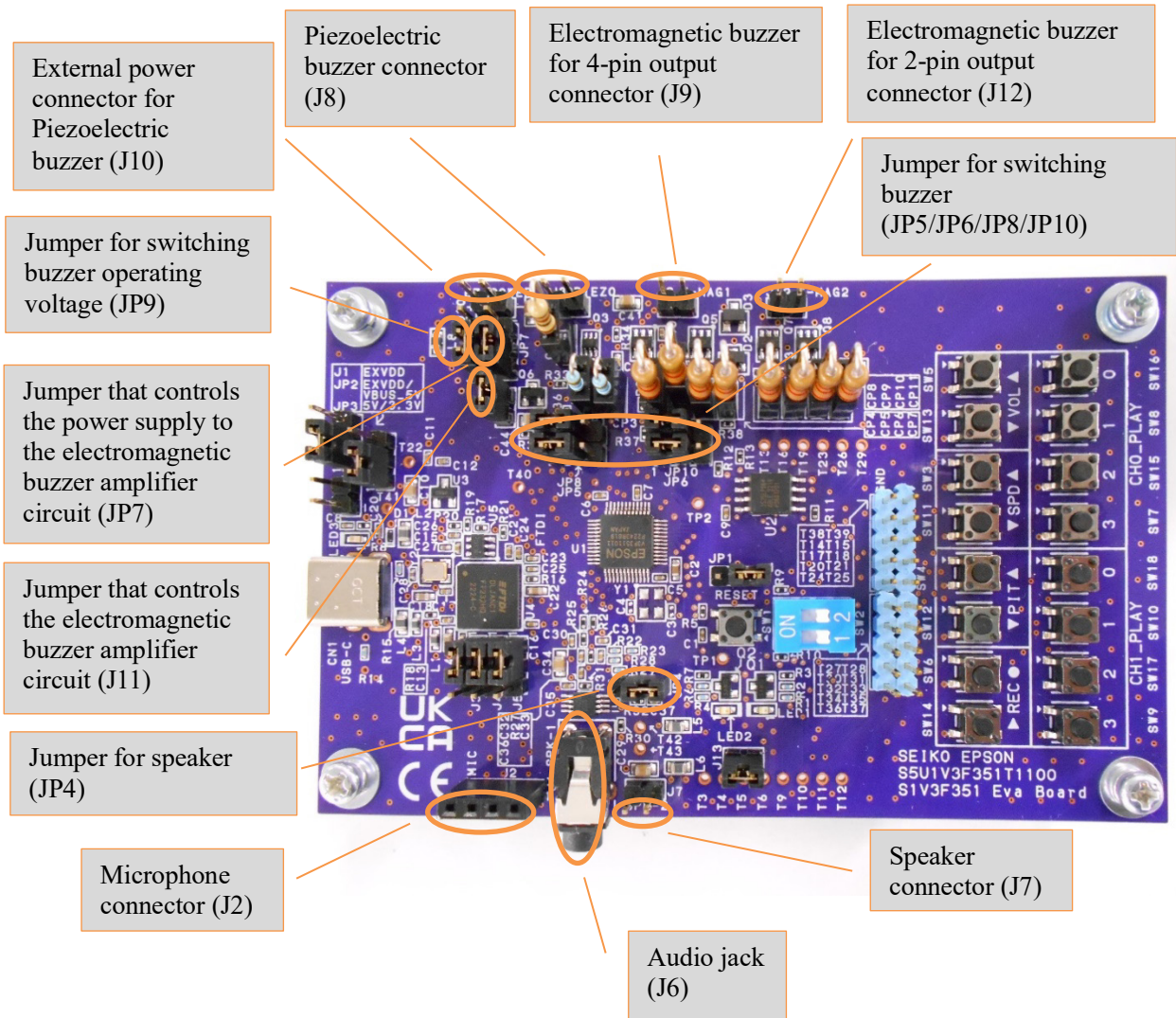


Figure 3.2.1 Layout of parts for setting audio devices

3.3 Resistors

Table 3.3.1 shows the initial value of the resistors mounted in the buzzer circuit.

Table 3.3.1 Resistors

Socket: CP1/CP2/CP3/CP4/CP5/CP6/CP7						
For Piezoelectric buzzer drive			For Electromagnetic buzzer drive			
CP1	CP2	CP3	CP4	CP5	CP6	CP7
180ohm	100ohm	180ohm	2.2kohm	2.2kohm	2.2kohm	2.2kohm

Note: Please be sure to change/adjust the resistance value from CP1 to CP7 and power (supplied from J10) when using a buzzer. Note that the board may be damaged by a large current if it is driven by an incorrect resistance value or incorrect power supply.

Please refer to Appendix C for the resistance value and power supply adjustment when using a buzzer.

3.4 Host Interface

S5U1V3F351T1100 can be used with one of the following four host interfaces.

- SPI For communication with PC / For communication with external host interface
- I2C For communication with PC / For communication with external host interface
- UART For communication with PC / For communication with external host interface
- Standalone Controlled by Tactile switch

Table 3.4.1 shows the jumper settings of each host interface.

Table 3.4.1 Jumper Settings for Host Interface Switching

	J3	J4	J5	J13
For communication with PC	1-2 short	1-2 short	1-2 short	Don't care
For communication with external host interface	2-3 short	2-3 short	2-3 short	Short
Standalone	2-3 short	2-3 short	2-3 short	Short

Note: Please refer to “3.5 Through Hole” for communication with external host interface.

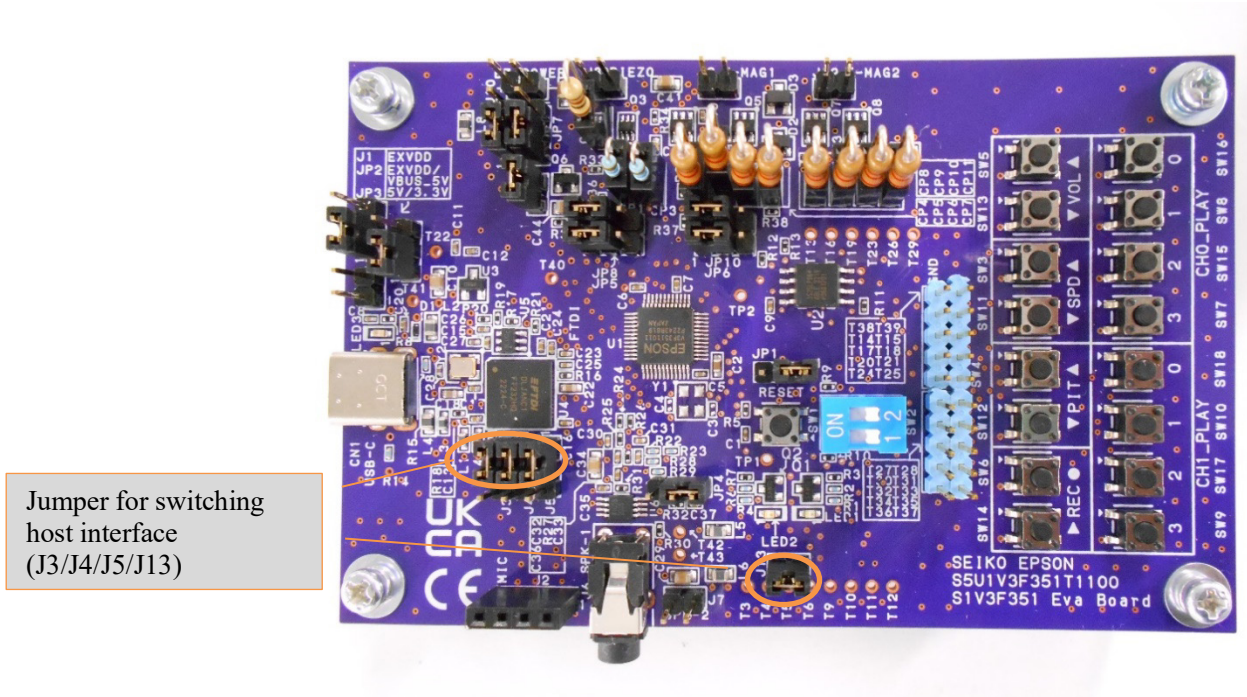






Figure 3.4.1 Layout of Jumper for setting Host interface

The host interface can be selected by controlling the DIP switch (SW2).

Table 3.4.2 shows the switch settings of SW2.

Table 3.4.2 DIP switch (SW2) settings

SW2	Host interface
	SPI
	UART
	I2C
	Standalone

S5U1V3F351T1100 can be controlled by Tactile switch (SW3 - SW18) when in Standalone.

Table 3.4.3 shows the Tactile switch (SW3 – SW18) setting.

Table 3.4.3 Tactile switch (SW3 – SW18) settings

Switch name	Connecting IC pin name	Silk	Remarks
SW3	#SPEED_UP	SPD ▲	Speed up
SW4	#PITCH_UP	PIT ▲	Pitch up
SW5	#VOLUME_UP	VOL ▲	Volume up
SW6	#SOUND_REC	REC ●	Record sound
SW7	SIS/RXD/SDA/#CH0_PLAY3	CH0_PLAY 3	Select CH0_PLAY3
SW8	SOS/TXD/-/#CH0_PLAY1	CH0_PLAY 1	Select CH0_PLAY1
SW9	#CH1_PLAY3	CH1_PLAY 3	Select CH1_PLAY3
SW10	#CH1_PLAY1	CH1_PLAY 1	Select CH1_PLAY1
SW11	#SPEED_DOWN	▼ SPD	Speed down
SW12	#PITCH_DOWN	▼ PIT	Pitch down
SW13	#VOLUME_DOWN	▼ VOL	Volume down
SW14	#REC_SOUND_PLAY	▶ REC	Play recorded sound
SW15	SCKS/-/SCL/#CH0_PLAY2	CH0_PLAY 2	Select CH0_PLAY2
SW16	#NSCSS/-/#CH0_PLAY0	CH0_PLAY 0	Select CH0_PLAY0
SW17	#CH1_PLAY2	CH1_PLAY 2	Select CH1_PLAY2
SW18	#CH1_PLAY0	CH1_PLAY 0	Select CH1_PLAY0

Note: For more information, please refer to “S1V3F351 / S1V3F352 technical manual”.

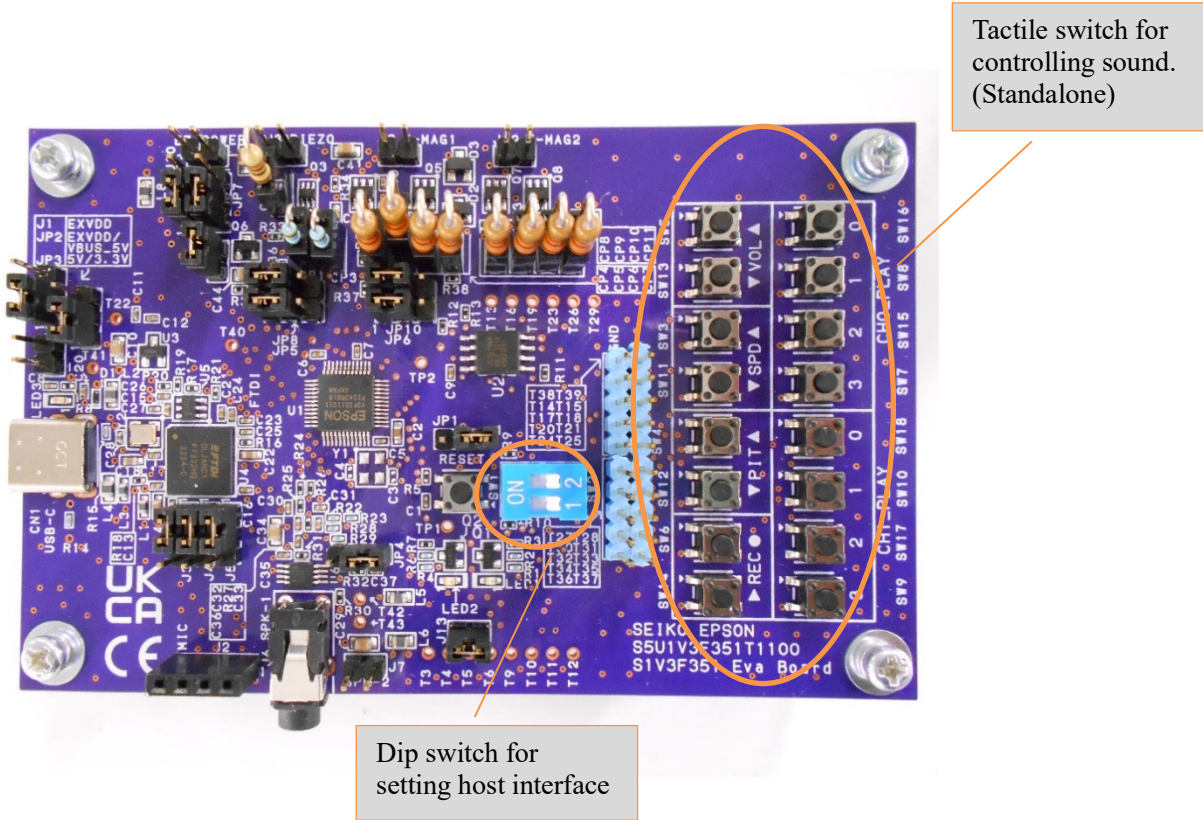


Figure 3.4.2 Layout of switch for setting host interface, and controlling sound

3.5 Through Hole

Table 3.5.1 shows the through holes for external host connections and external direct writing to QSPI-flash memory.

Table 3.5.1 Through hole

Through hole name	Connecting IC pin name	Remarks
T3	#NSCSS/-/#CH0_PLAY0	For connecting with external host interface
T4	SOS/TXD/-/#CH0_PLAY1	
T5	SCKS/-/SCL/#CH0_PLAY2	
T6	SIS/RXD/SDA/#CH0_PLAY3	
T9	ERROR	
T10	STATUS	
T11	GND	
T12	VDD_3_3V_5V	For connecting with QSPI flash memory
T13	QSPICK	
T16	QSDIO0	
T19	QSDIO1	
T23	QSDIO2	
T26	QSDIO3	
T29	#QSPISS	
T40	VDD_3.3V	

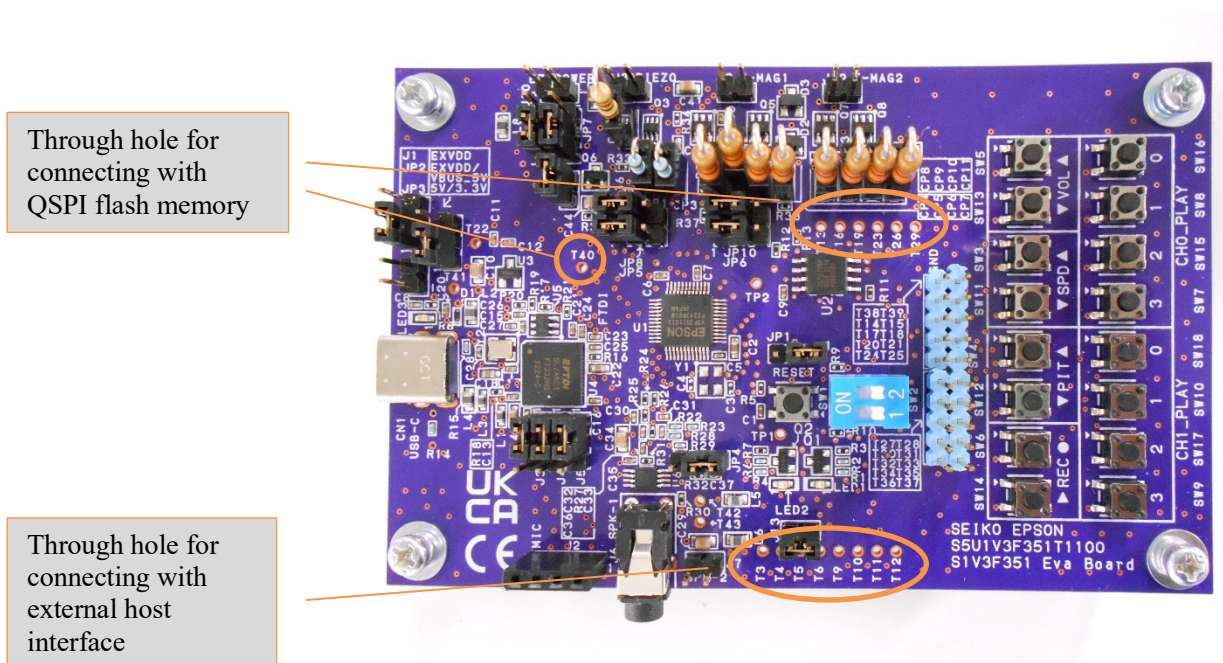
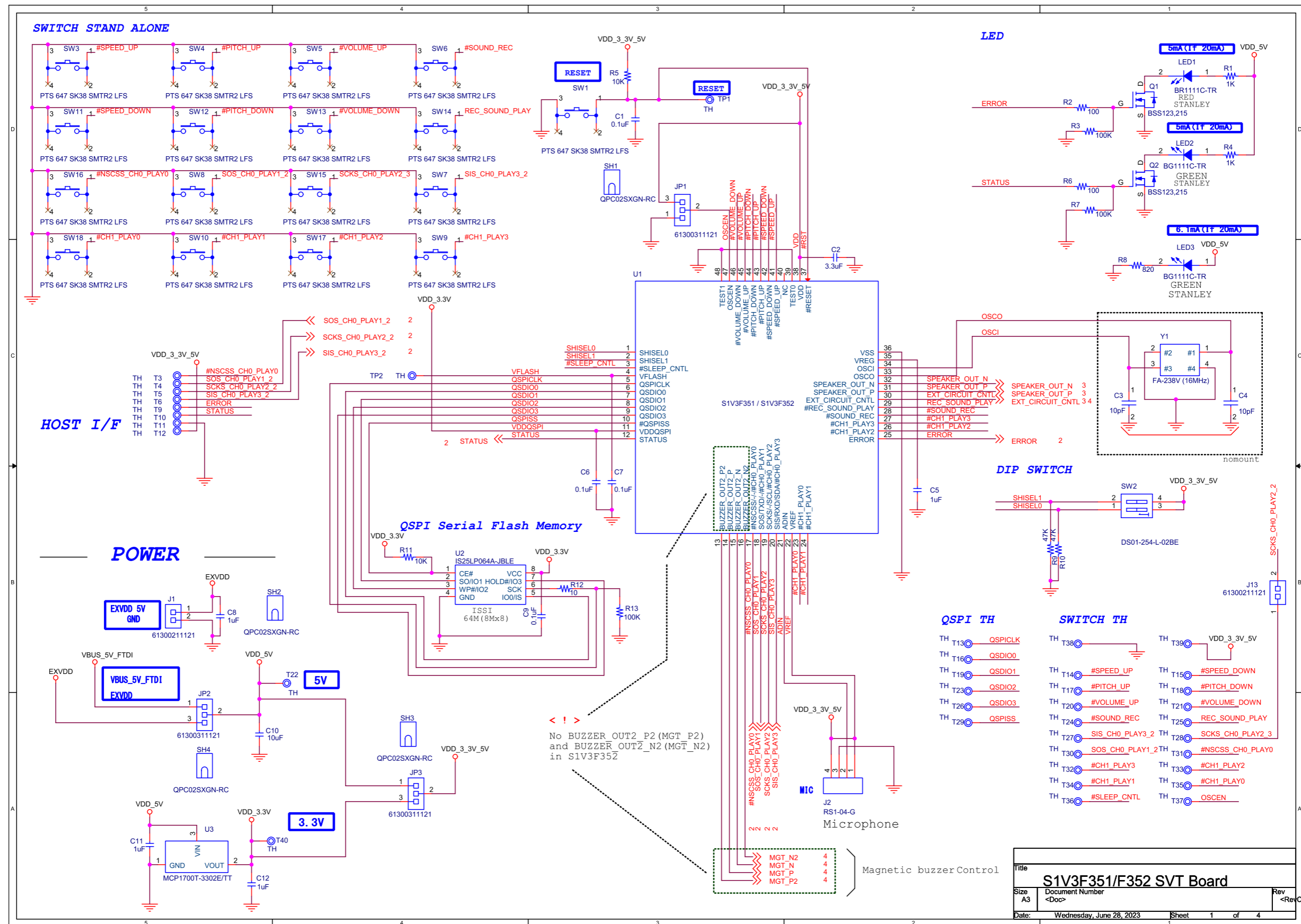
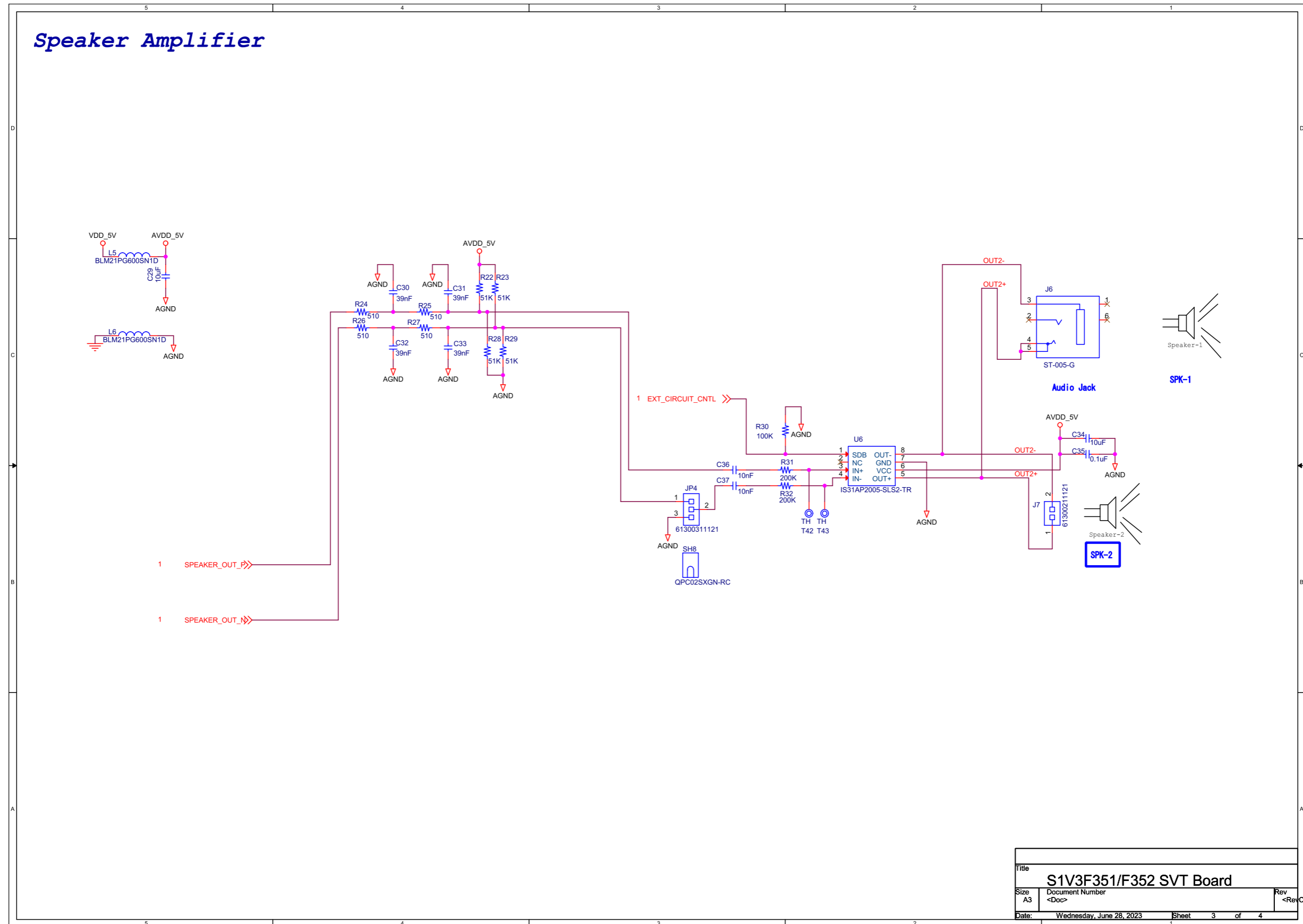
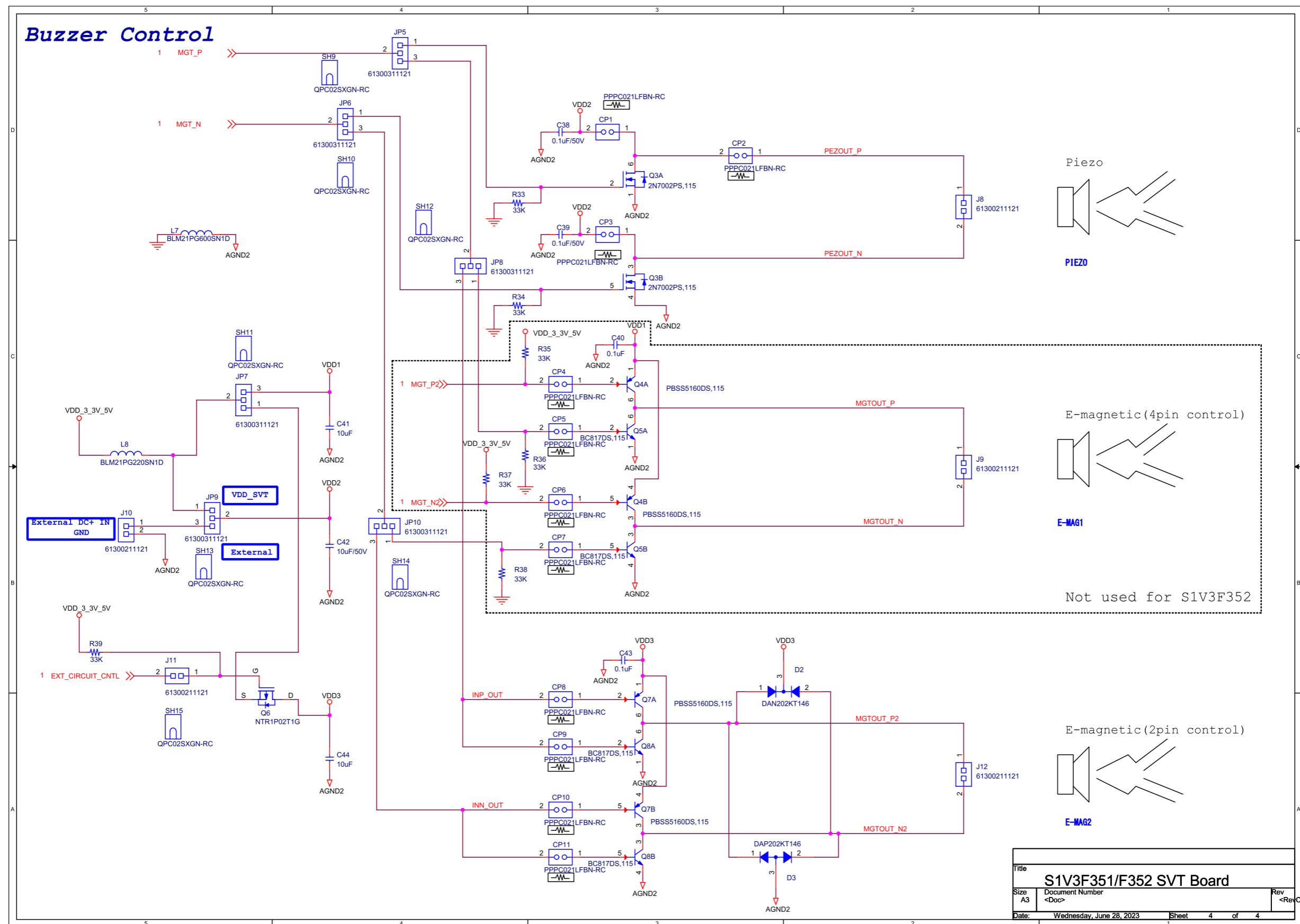


Figure 3.5.1 Layout of Through hole

Appendix A Circuit Diagrams







Appendix B Parts List

Note! Parts are subject to change without notice.

Item	Quantity	Reference	Part	Manufacture	Mount	Other comment
1	1	CN1	USB4085-GF-A	GCT		
2	11	CP1,CP2,CP3,CP4,CP5,CP6,CP7,CP8,CP9,CP10,CP11	PPPC021LFBN-RC			
3	17	C1,C6,C7,C9,C13,C15,C16,C17,C19,C21,C23,C24,C25,C26,C35,C40,C43	0.1uF			
4	1	C2	3.3uF			
5	2	C27,C28	10pF			
6	5	C5,C8,C11,C12,C20	1uF			
7	5	C10,C29,C34,C41,C44	10uF			
8	3	C14,C18,C22	4.7uF			
9	4	C30,C31,C32,C33	39nF			
10	2	C36,C37	10nF			
11	2	C38,C39	0.1uF/50V			
12	1	D1	DF2S5.6CT,L3F	TOSHIBA		
13	1	D2	DAN202KT146	Rohm Semiconductor		
14	1	D3	DAP202KT146	Rohm Semiconductor		
15	13	JP1,JP2,JP3,JP4,JP5,JP6,JP7,JP8,JP9,JP10,JP3,JP4,JP5	61300311121	Würth Elektronik		
16	8	J1,J7,J8,J9,J10,J11,J12,J13	61300211121	Würth Elektronik		
17	1	J2	RS1-04-G	Adam Tech		
18	1	J6	ST-005-G	Switronic Industrial Corp.		
19	1	LED1	BR1111C-TR	STANLEY		
20	2	LED2,LED3	BG1111C-TR	STANLEY		
21	2	L1,L3	BLM18PG600SN1D	MURATA		
22	5	L2,L4,L5,L6,L7	BLM21PG600SN1D	MURATA		
23	1	L8	BLM21PG220SN1D	MURATA		
24	2	Q1,Q2	BSS123,215	Nexperia		
25	1	Q3	2N7002PS,115	Nexperia		
26	2	Q4,Q7	PBSS5160DS,115	Nexperia		
27	2	Q5,Q8	BC817DS,115	Nexperia		
28	2	R1,R4	1K			
29	2	R2,R6	100			
30	4	R3,R7,R13,R30	100K			
31	6	R5,R11,R16,R17,R19,R20	10K			
32	1	R8	820			
33	2	R9,R10	47K			
34	1	R12	10			
35	2	R14,R15	5.1K			
36	1	R18	12K			
37	1	R21	2K			
38	4	R22,R23,R28,R29	51K			
39	4	R24,R25,R26,R27	510			
40	2	R31,R32	200K			
41	7	R33,R34,R35,R36,R37,R38,R39	33K			
42	15	SH1,SH2,SH3,SH4,SH5,SH6,SH7,SH8,SH9,SH10,SH11,SH12,SH13,SH14,SH15	QPC02SXGN-RC	Sullins Connector Solutions		
43	17	SW1,SW3,SW4,SW5,SW6,SW7,SW8,SW9,SW10,SW11,SW12,SW13,SW14,SW15,SW16,SW17,SW18	PTS 647 SK38 SMTR2 LFS	C&K		
44	1	SW2	DS01-254-L-02BE	CUI Devices		
45	41	TP1,TP2,T3,T4,T5,T6,T9,T10,T11,T12,T13,T14,T15,T16,T17,T18,T19,T20,T21,T22,T23,T24,T25,T26,T27,T28,T29,T30,T31,T32,T33,T34,T35,T36,T37,T38,T39,T40,T41,T42,T43	TH			
46	1	U1	S1V3F351	EPSON		
47	1	U2	IS25LP064A-JBLE	Integrated Silicon Solution Inc		
48	1	U3	MCP1700T-3302E/TT	Microchip Technology		
49	1	U4	FT232HQ	Future Technology Devices International Ltd		
50	1	U5	93AA66BT-I/OT	Microchip Technology		
51	1	U6	IS31AP2005-SLS2-TR	Lumissil		
52	1	Y1	FA-238V (1.6 MHz)	EPSON	no mount	
53	1	Y2	FA-238V 12.0000MB-K3	EPSON		
54	2	C3,C4	10pF		no mount	
55	2	CP1,CP3	180			
56	1	CP2	100			
57	8	CP4,CP5,CP6,CP7,CP8,CP9,CP10,CP11	2.2K			
58	1	C42	10uF/50V			
59	1	Q6	NTR1P02T1G	onsemi		

Appendix C Resistors for Buzzer

C.1 Resistors for Electromagnetic Buzzer

Appendix A shows the circuit when connecting the electromagnetic buzzer. Select the resistance CP4 to CP7 so that they are optimized for the electromagnetic buzzer to be connected. Table C.1.1 shows the recommended resistance values for each electromagnetic buzzer made by TDK corporation. These values are calculated from the supply voltage to electromagnetic buzzer (VDD1) and specification of DC resistance, maximum current.

Table C.1.1 Recommended resistance for electromagnetic buzzer made by TDK

Buzzer Type	Power supply (VDD1 (V))	DC Resistance (Ohm)	Io-p(max) (mA)	Resistance CP4/CP5/CP6/CP7 (k Ohm)
SD160709	3	70	40	4.7
	5	70	70	2.2
SDR08540M3-01	3	16	85	6.8
	5	16	85	13
SD160701	3	50	60	2.7
SD1614T5-A1	5	70	80	4.7

C.2 Resistors for Piezoelectric buzzer

Appendix A shows the circuit when connecting the piezoelectric buzzer. Select the resistance CP1 to CP3 so that they are optimized for the piezoelectric buzzer to be connected. Table C.2.1 shows the recommended resistance values for supply voltage and target current.

Table C.2.1 Recommended resistance for supplied power and target current

VDD2 (V)	Target Current (mA)	CP1/CP3 (Ohm)	CP2(Ohm)	VDD2 (V)	Target Current (mA)	CP1/CP3 (Ohm)	CP2 (Ohm)
15	30	560	220	5	30	180	100
15	20	820	220	5	20	270	100
15	10	1.8 k	220	5	10	560	100
15	5	3.3 k	220	5	5	1.0 k	100
12	30	470	180	3	30	100	47
12	20	680	180	3	20	150	47
12	10	1.5 k	180	3	10	330	47
12	5	2.7 k	180	3	5	560	47

Appendix D Supplied External power for Piezoelectric buzzer

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 [-].

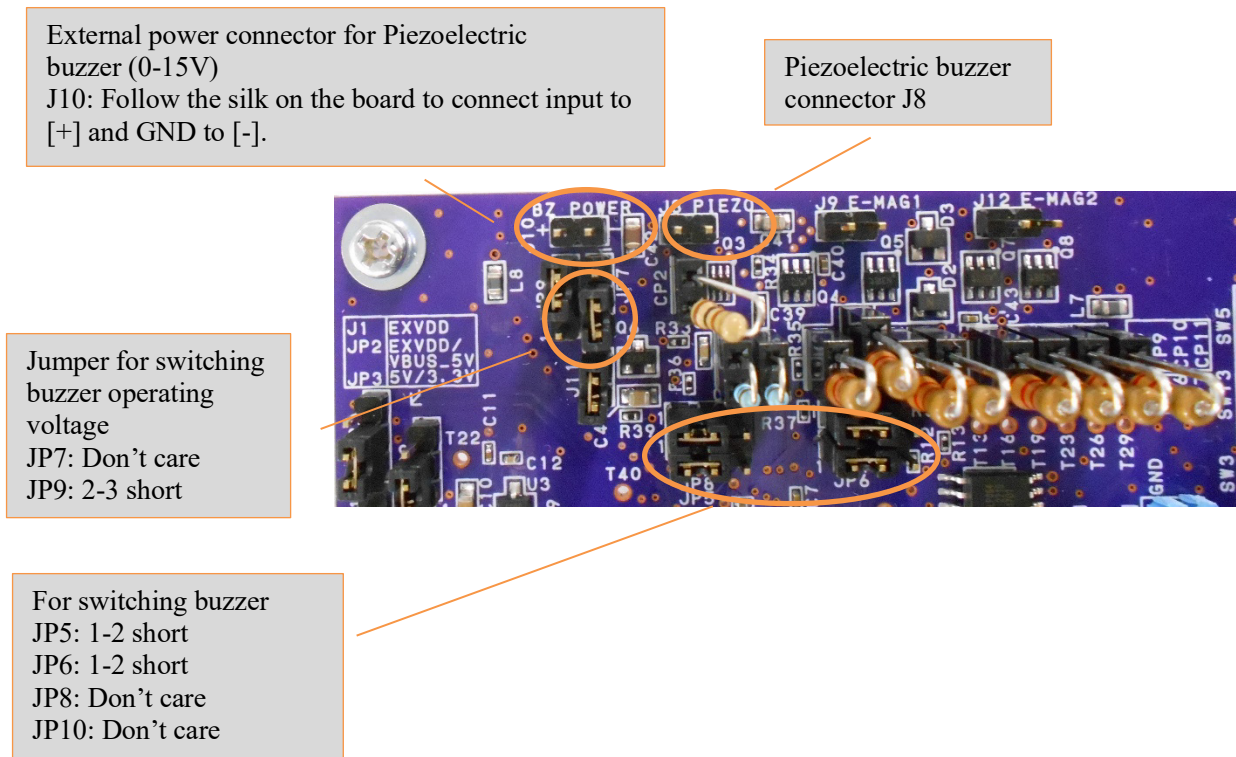


Figure D.1 Layout of parts for connecting external power for Piezoelectric buzzer

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