

32-bit, 1536 kHz Sampling Stereo Audio D/A Converter

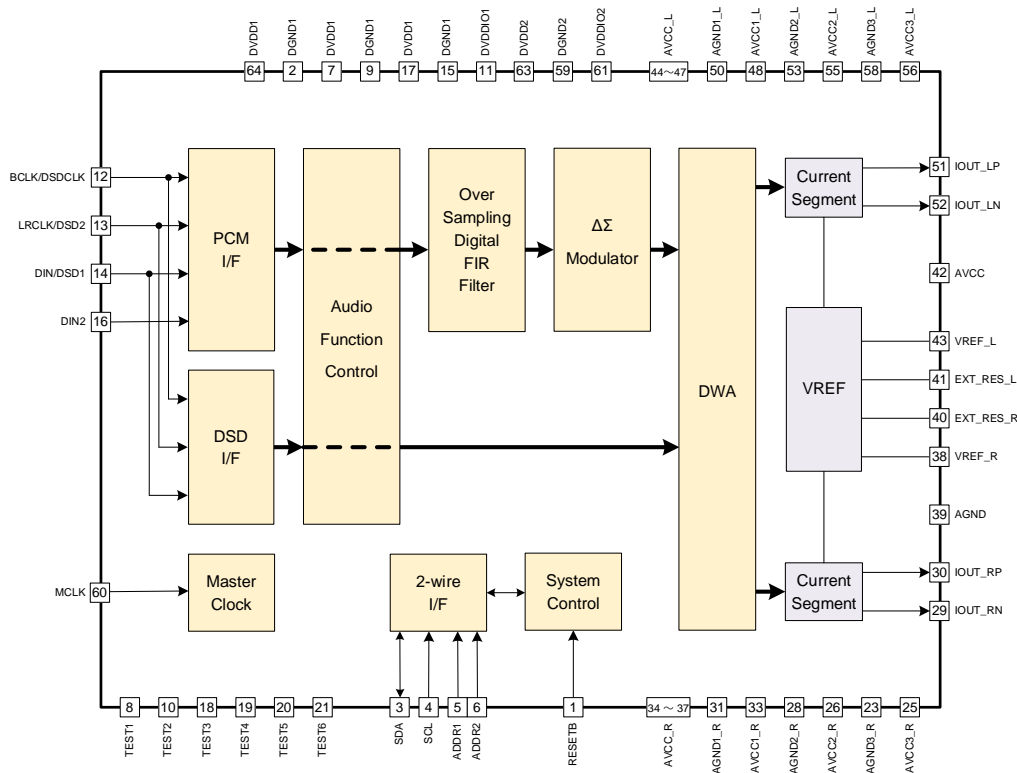
BD34302EKV Evaluation Board (Hardware)

(BD34302EKV-EVK-001)

IC Introduction

BD34302EKV is a D/A converter for high-quality audio that incorporates ROHM's unique sound quality design technology. The newly developed DWA improves THD performance and provides higher resolution and more natural sound quality with HD (High Definition) monaural mode. In addition, an automatic mode switching function makes it possible to easily switch between PCM/DSD and different sampling frequencies.

BD34302EKV Block Diagram



Recommended Operating Conditions

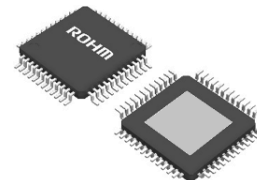
Item	Symbol	Scope	Unit
Power Supply Voltage	AVCC*1	4.5 to 5.5	V
	DVDDIO	3.0 to 3.6	
	DVDD	1.4 to 1.6	
Operating Temperature	Topr	-40 to +85	°C

*1 Applicable to AVCC, AVCC_L, and AVCC_R in BD34302EKV block diagram

Package

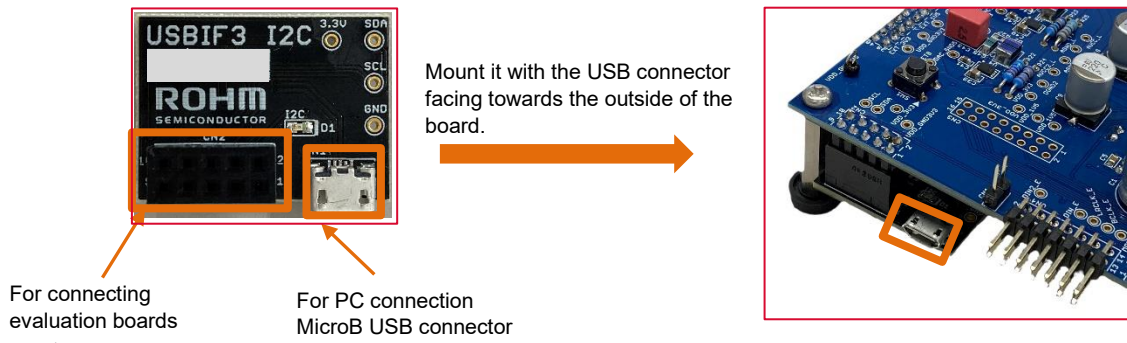
HTQFP64BV (64 pin, 0.5 mm pitch)

W(Typ) D(Typ) H(Max)
12.0 mm x 12.0 mm x 1.00 mm



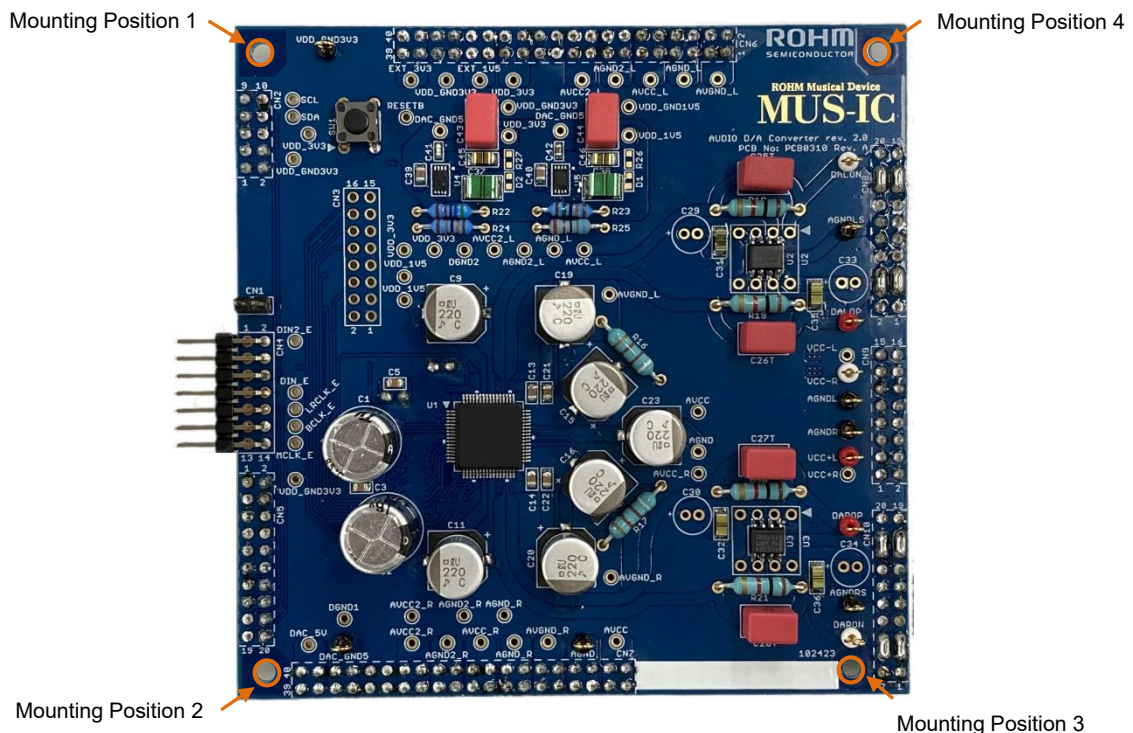
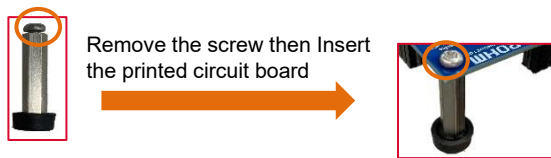
Accessories

- USB 2-Wire Conversion Board (attached on the evaluation board)



- Four Spacers for Evaluation Board

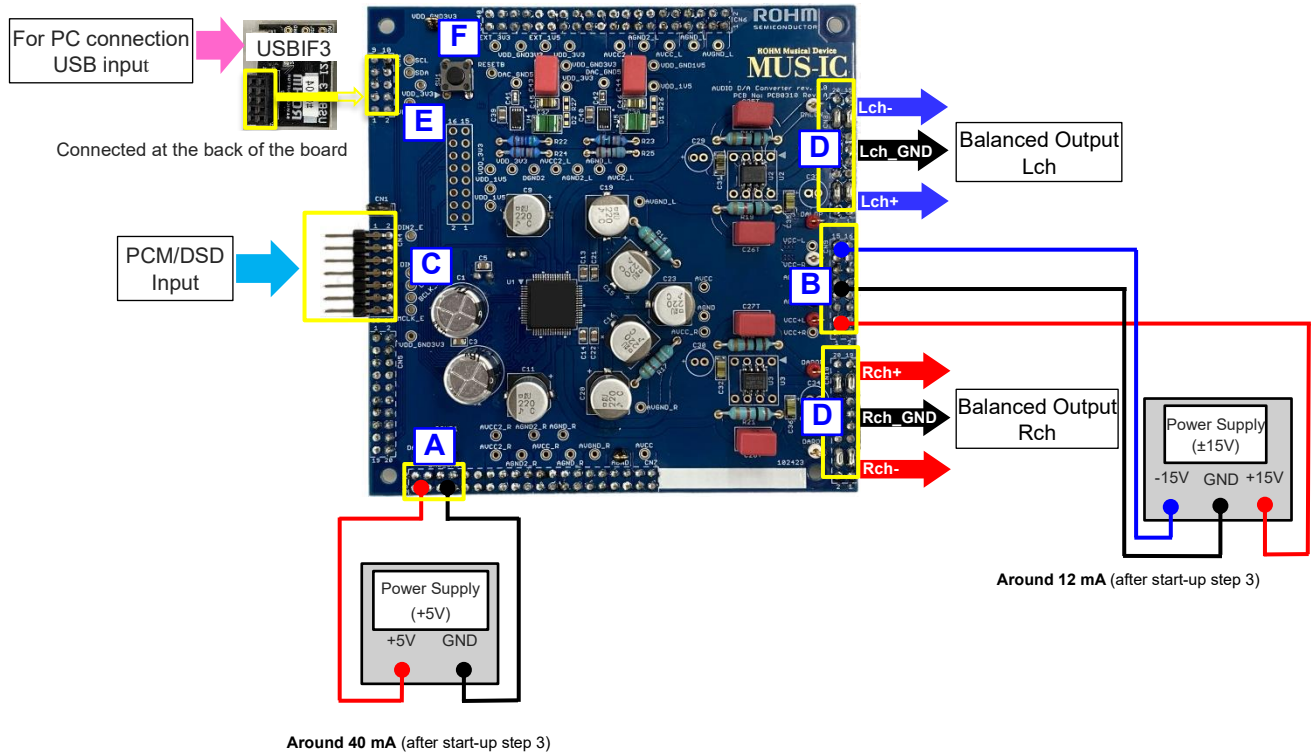
Before using, attach the provided spacers to mounting positions 1 to 4 of the evaluation board shown in the figure below.



- **CD-ROM**
Control software and manuals
- **Quick Manual**
- **Precautions**

Connection Method (Set up "A" to "F" in the following order)

- 1) Connect +5 V to the "A" power supply terminals.
- 2) Connect ± 15 V to the "B" power supply terminals.
- 3) Input the PCM/DSD signal to the "C" input terminals.
- 4) Connect the "D" output terminals (Balance-Lch/Rch).
- 5) Connect the USB 2-wire conversion board (USBIF3) to the "E" connector at the back side of the board.
- 6) Press the "F" reset switch.



Startup/Shutdown Procedures

Start-up Procedure

- 1) Turn ON the +5 V power supply.
- 2) Turn ON the ± 15 V power supply.
- 3) Connect the USB 2-wire conversion board ("E") to the PC using a MicroB to USB cable.
- 4) Press the reset switch ("F").
- 5) Using the control software ^{*1} installed on a PC, send sample scripts for each mode.
- 6) Signals are output from the output terminal.

*1 For details, refer to the control software included with the evaluation board kit (BD34302EKV-EVK-001) and User's Guide (Software).

Shutdown Procedure

- 1) Turn OFF the ± 15 V power supply.
- 2) Turn OFF the +5 V power supply.

Mode Selection

The control software included with the evaluation board contains sample scripts that allow the user to configure 15 modes.

The following modes can be easily set by using the sample script for each mode setting in the control software.

The user can also send commands without using the sample scripts by creating and using their own command scripts.

Sample Script Name	Automatic mode switching (PCM/DSD)	Input Format		DWA Algorithm	FIR Filter Type	DSD Output Level	Over Sampling Rate
		PCM(I2S)	DSD				$\Delta\Sigma$ (PCM)
MODE0 ^{*1}	OFF	44.1 kHz/48 kHz	-	Type 1	Sharp ^{*4}	-	x8
MODE1		88.2 kHz/96 kHz					x16
MODE2		176.4 kHz/192 kHz					x16
MODE3		-	2.8 MHz	Bypass	-	Normal	-
MODE5	ON	32 kHz~768 kHz	2.8 MHz~22.4 MHz	Type 1 ^{*3}	Sharp ^{*4}	Normal	x32 / x16 ^{*5}
MODE6 ^{*2}				Type 2 ^{*3}			
MODE7				Type 1 ^{*3}	Slow ^{*4}		
MODE8				Type 2 ^{*3}			
MODE9				Type 1	Sharp ^{*4}	Double	
MODEA				Type 2			
MODEB	OFF	1536 kHz	-	Type 1	Bypass	-	x8
MODEC				Type 2			

*1 Mode 0 is the setting used when doing function tests of BD34302EKV data sheet (DWA Algorithm 1).

*2 Mode 6 is the setting used when doing function tests of BD34302EKV data sheet (DWA Algorithm 2).

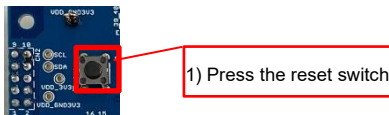
*3 The DWA function is disabled when using DSD input format.

*4 For PCM and DSD with f_s exceeding 192kHz, the FIR filter is bypassed.

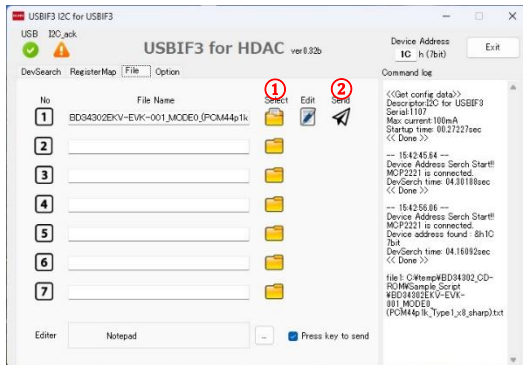
*5 At $f_s=705.6\text{kHz}/768\text{kHz}$, the oversampling rate is x16 (DWA algorithm 1) and x32 (DWA algorithm 2).

Setting Up Modes

- 1) Press the reset switch.



- 2) Set the sample script for each mode in the included control software*1.



- ① Click Select to select the sample script.
- ② Click Send to run the sample script.

*1 For details of the control software, refer to the manual of the attached CD-ROM.

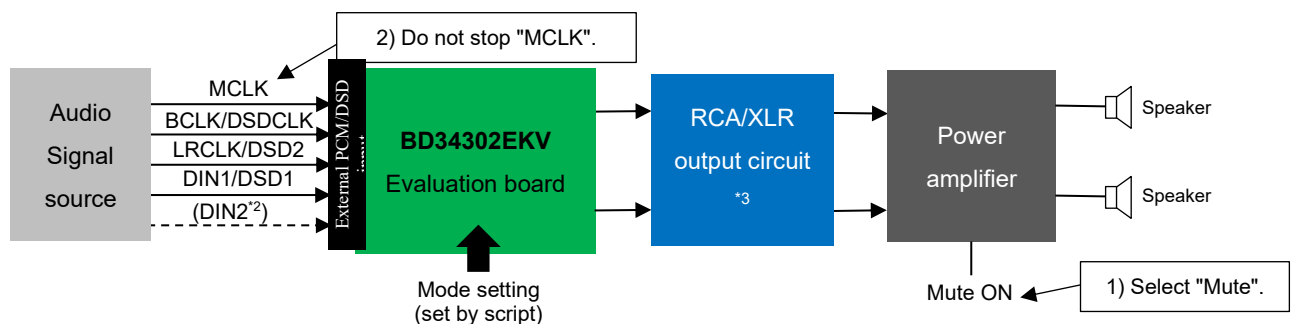
Script setting screen of the control software

List of sample scripts provided:

Mode	File name
MODE0	BD34302EKV-EVK-001_MODE0 (PCM44p1k_Type1_x8_sharp).txt
MODE1	BD34302EKV-EVK-001_MODE1 (PCM96k_Type1_x16_sharp).txt
MODE2	BD34302EKV-EVK-001_MODE2 (PCM192k_Type1_x16_sharp).txt
MODE3	BD34302EKV-EVK-001_MODE3 (DSD2.8M_Type1_x32_52k).txt
MODE5	BD34302EKV-EVK-001_MODE5 (Auto_Type1_x32_Sharp_0dB).txt
MODE6	BD34302EKV-EVK-001_MODE6 (Auto_Type2_x32_Sharp_0dB).txt
MODE7	BD34302EKV-EVK-001_MODE7 (Auto_Type1_x32_Slow_0dB).txt
MODE8	BD34302EKV-EVK-001_MODE8 (Auto_Type2_x32_Slow_0dB).txt
MODE9	BD34302EKV-EVK-001_MODE9 (Auto_Type1_x32_Sharp_6dB).txt
MODEA	BD34302EKV-EVK-001_MODEA (Auto_Type2_x32_Sharp_6dB).txt
MODEB	BD34302EKV-EVK-001_MODEB (PCM1536k_Type1_x8).txt
MODEC	BD34302EKV-EVK-001_MODEC (PCM1536k_Type2_x8).txt

Changing Modes when connected Power amplifier

- 1) When changing modes, mute the power amplifier connected to the output of the evaluation board first to avoid Pop sounds.
- 2) When using an external PCM/DSD input, there must be a MCLK input when changing modes.

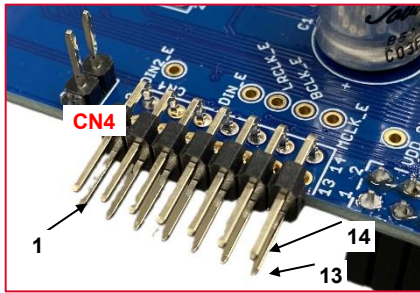


*2 Connect at fs=1536kHz
 *3 Refer to page 9

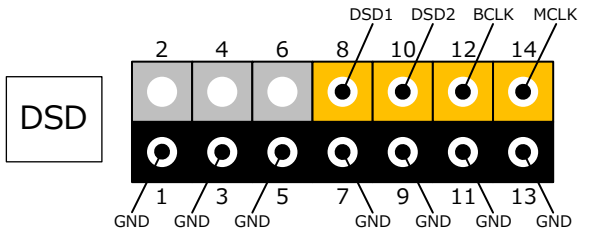
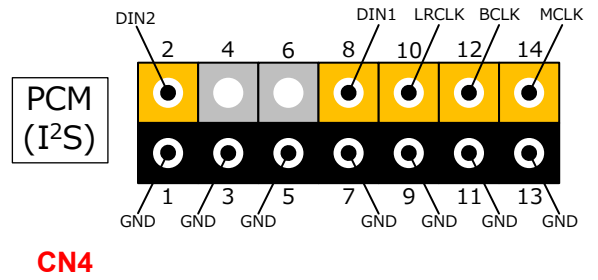
Input Ports

PCM (I²S)/DSD Input (Audio Signal)

Enter the following signals for each pin.

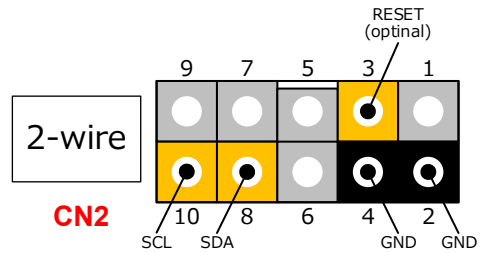
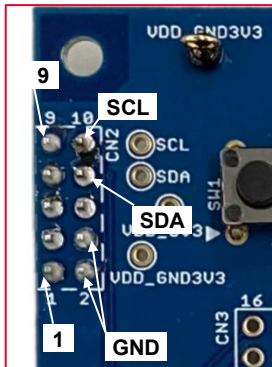


- *1 Connect "DSDCLK" input for pins 12 and 14 of CN14.
- *2 Since register 13h = 1h is set in the sample script, The DSD1 and DSD2 inputs are SWAPPED.

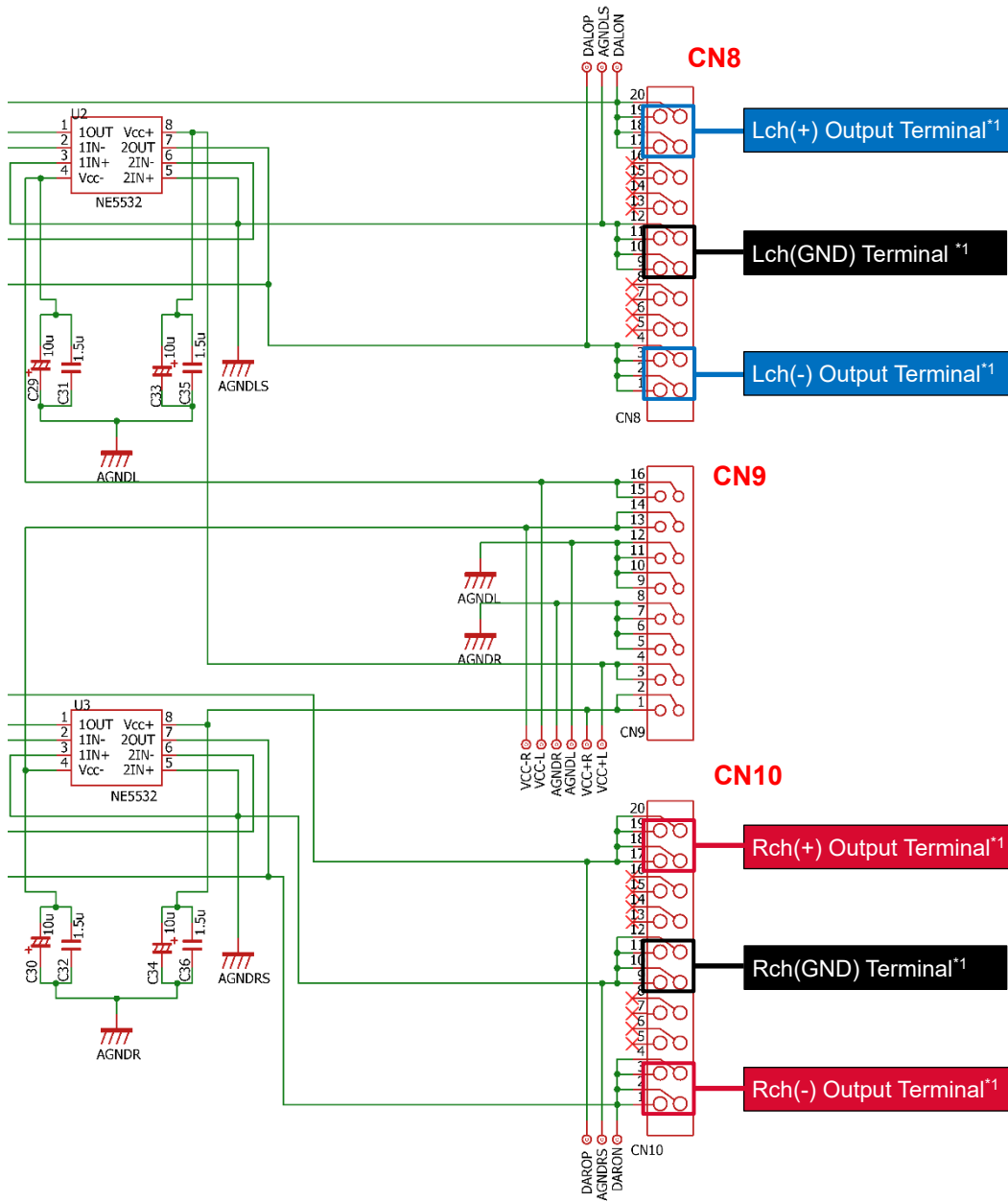


2-wire Input (Control Terminal)

Connect SCL and SDA inputs at the backside of the PCB.

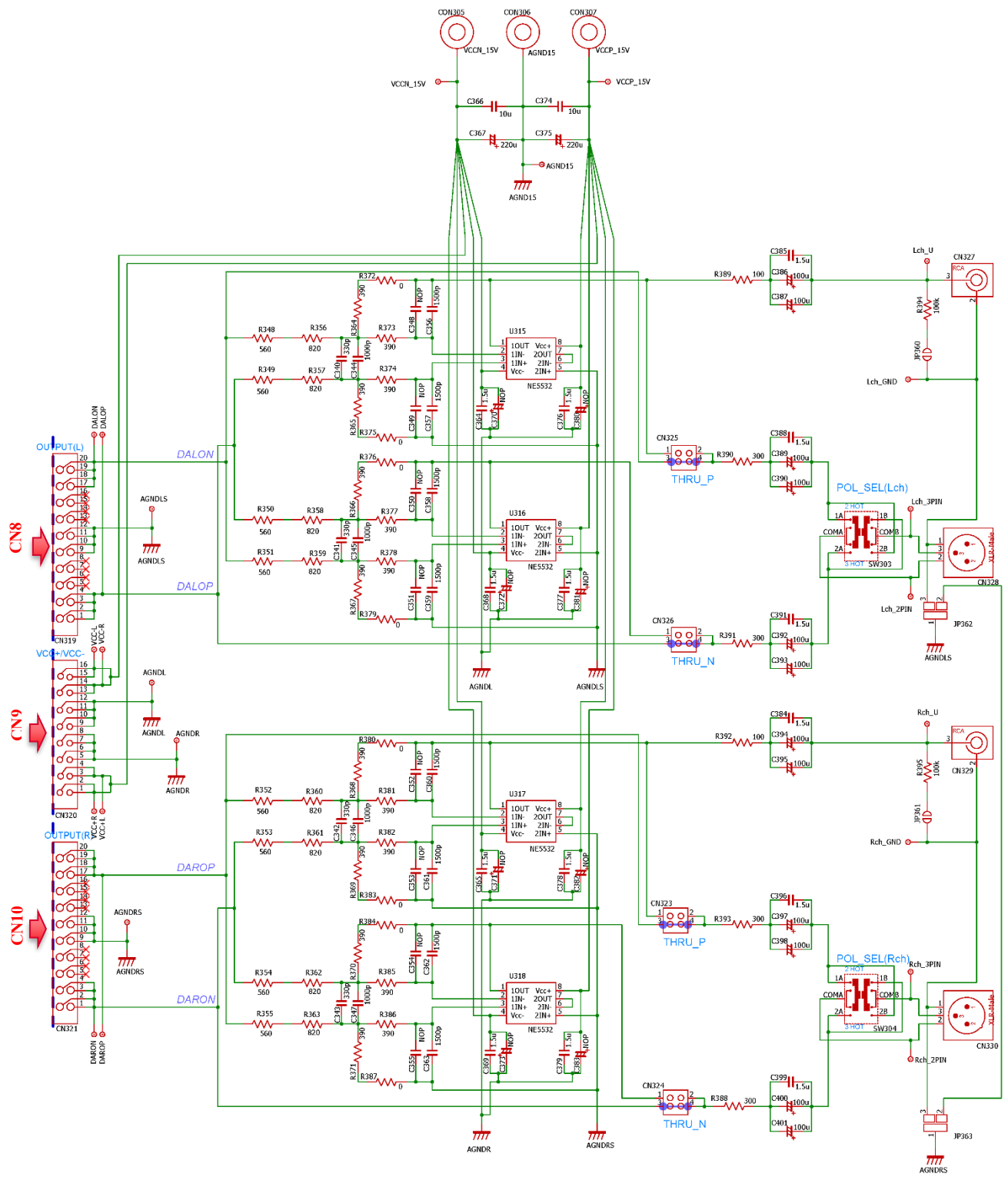


Output Terminals (Audio Signal)



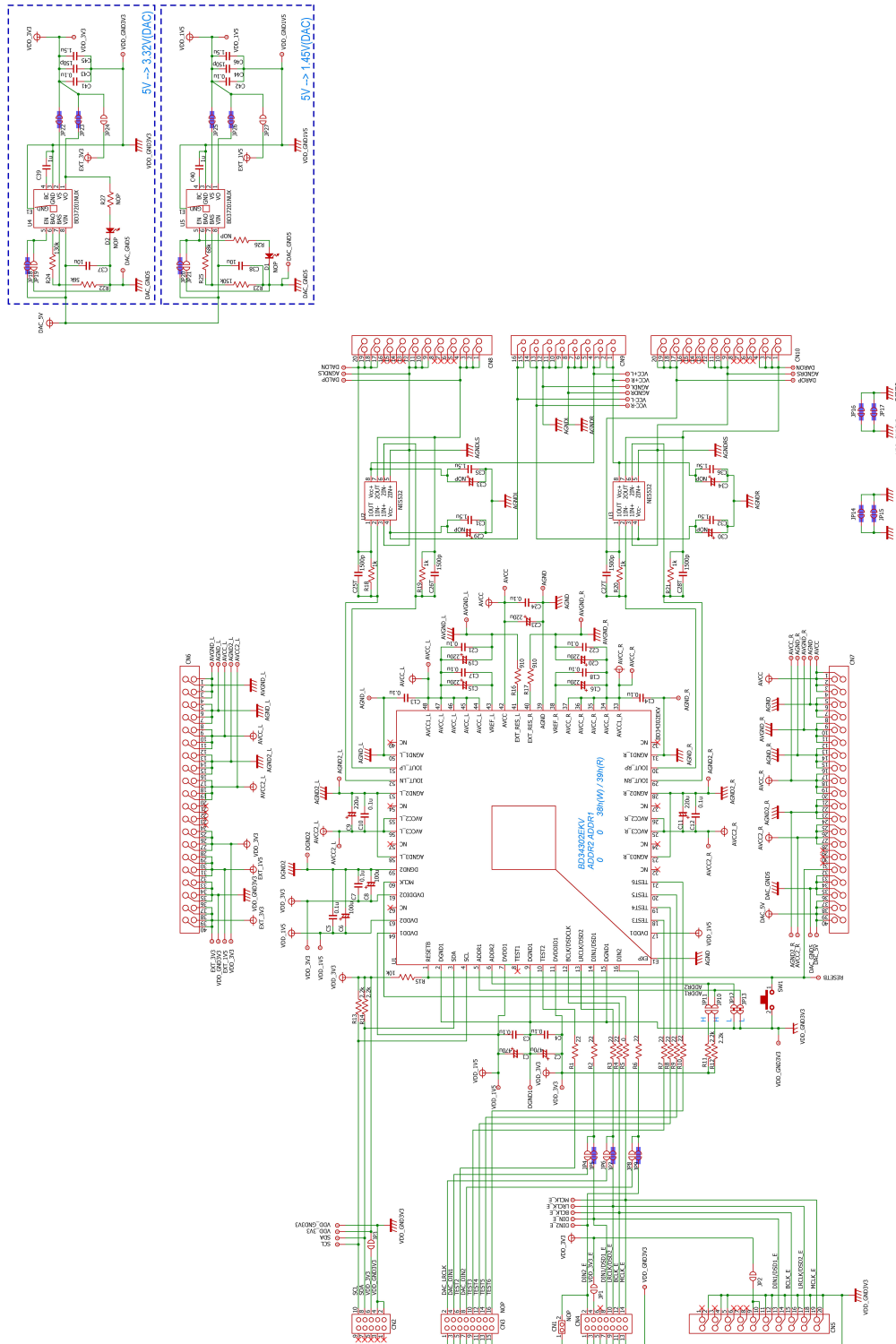
*1 The output terminals are connected to four pins each at the connector. When connecting a differential single transducer amplifier, connect all four pins on each terminal to reduce contact resistance.

RCA/XLR Output Circuit (Audio Signal)



Evaluation Board Circuit Diagram

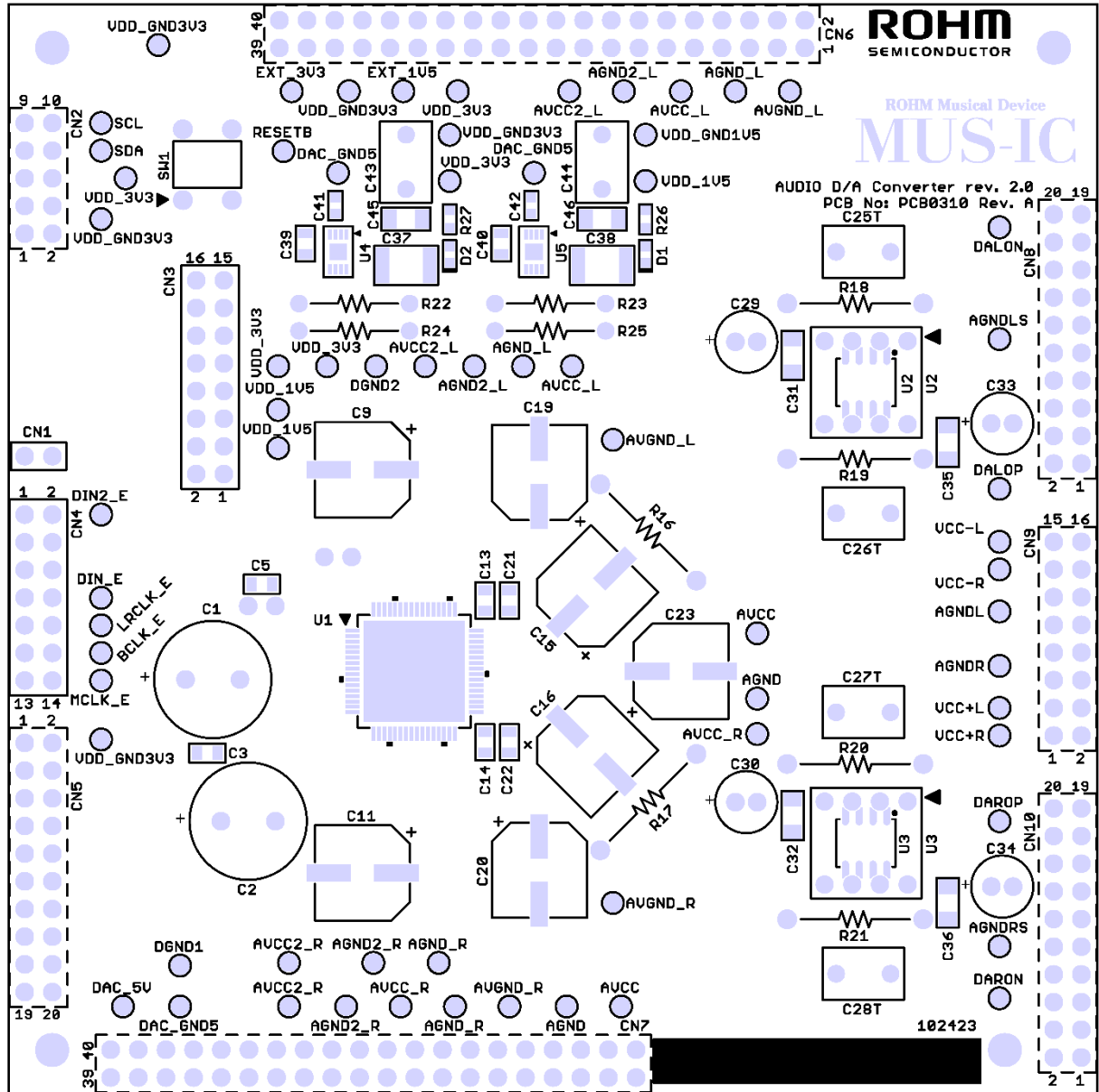
Click on the circuit diagram to open a detailed circuit diagram.



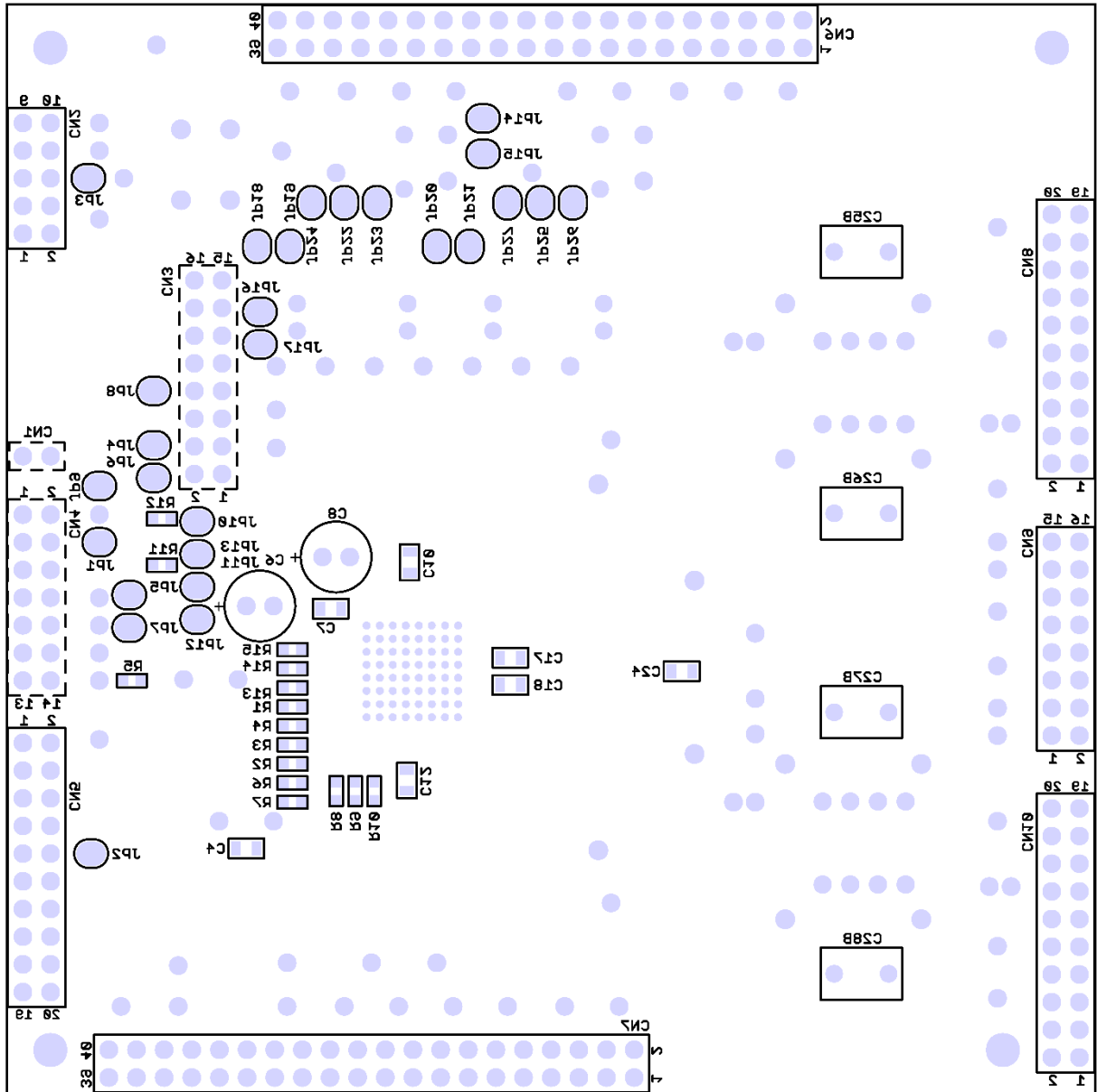
Note) The value and number of external capacitors differ from those in the basic application circuit in the datasheet. However, the number of capacitors has been reduced by changing the capacitance from 100 μ F to 220 μ F.

PCB Patterns

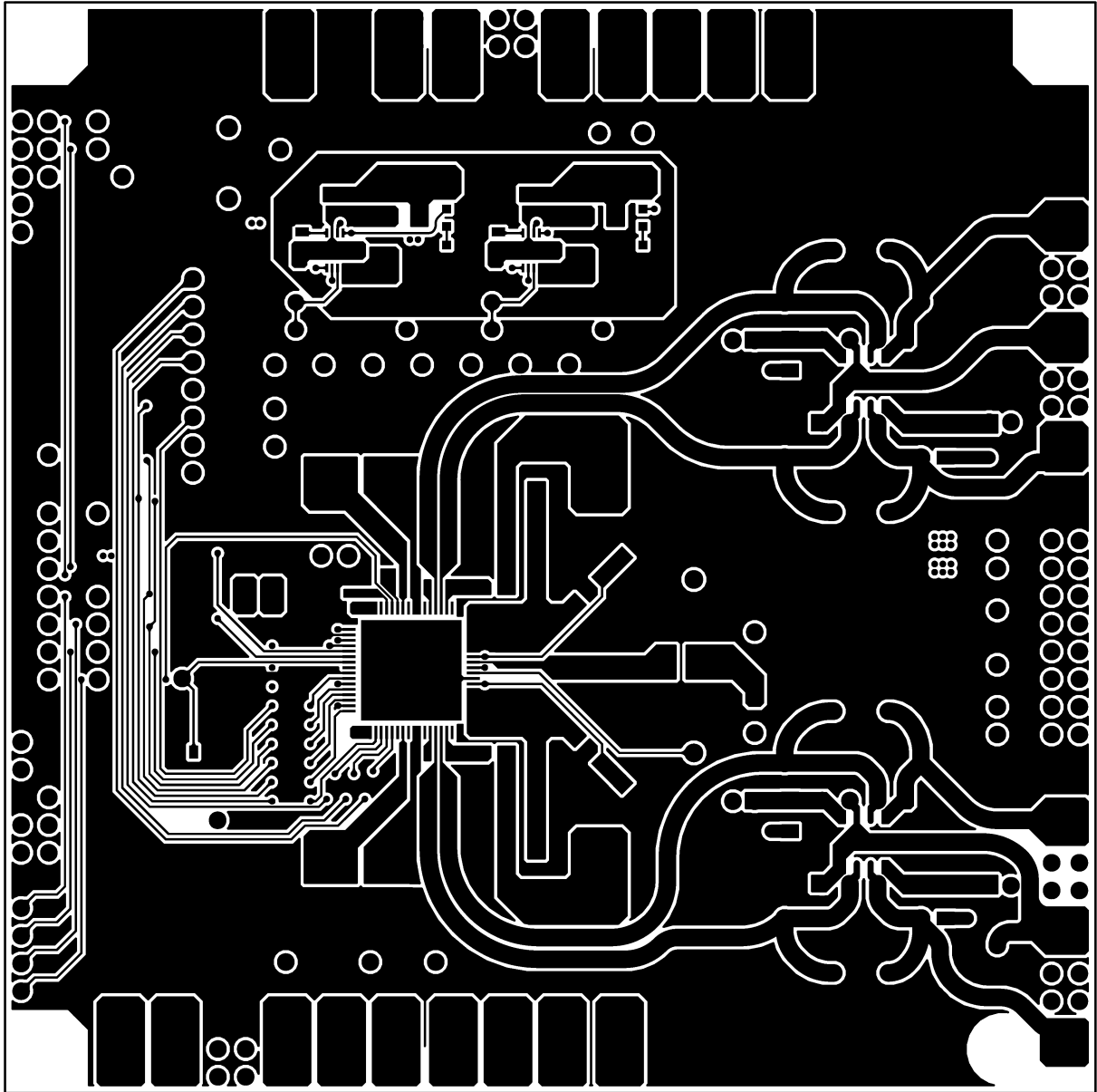
Top Silkscreen Overlay



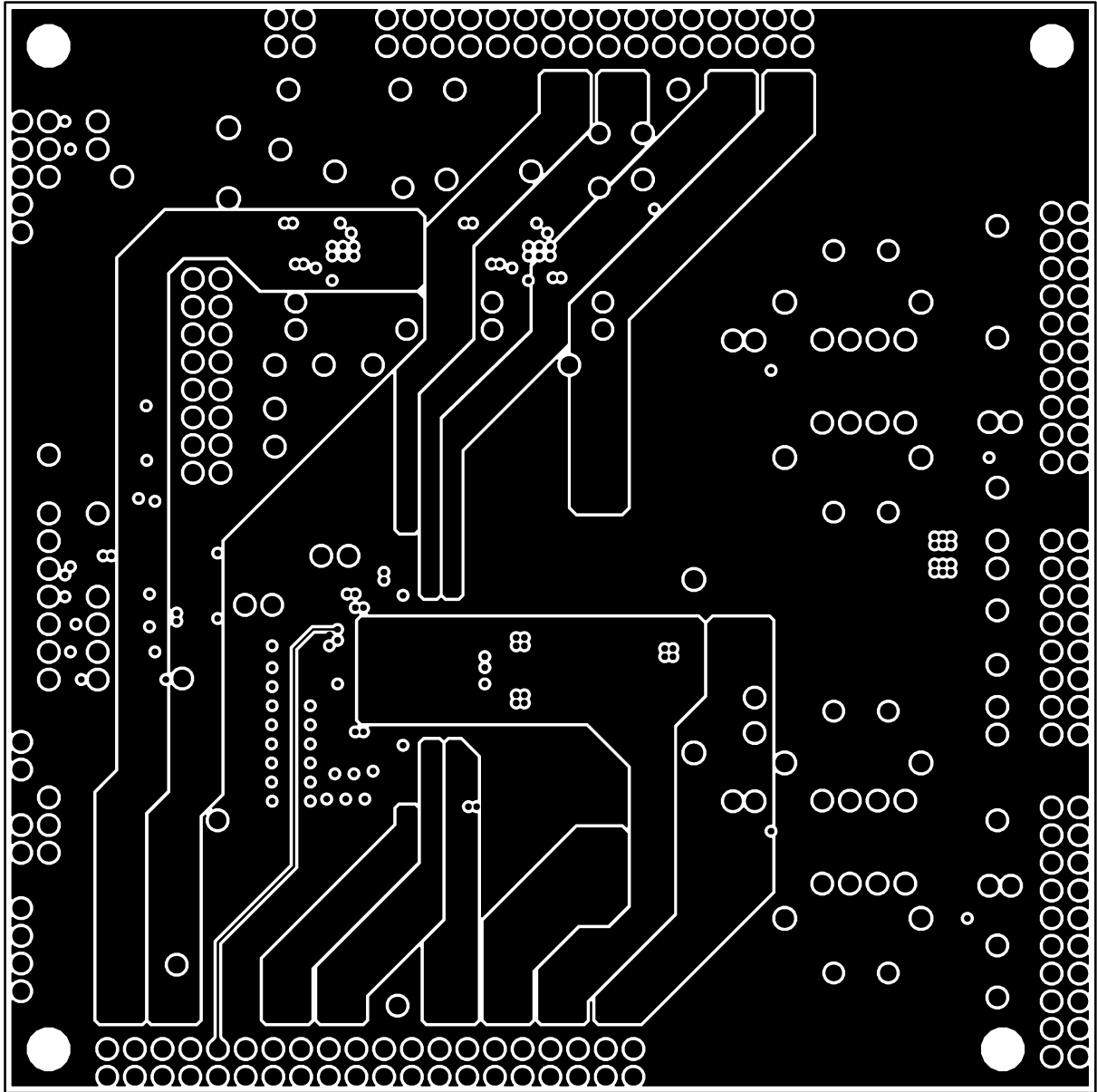
Bottom Silkscreen Overlay



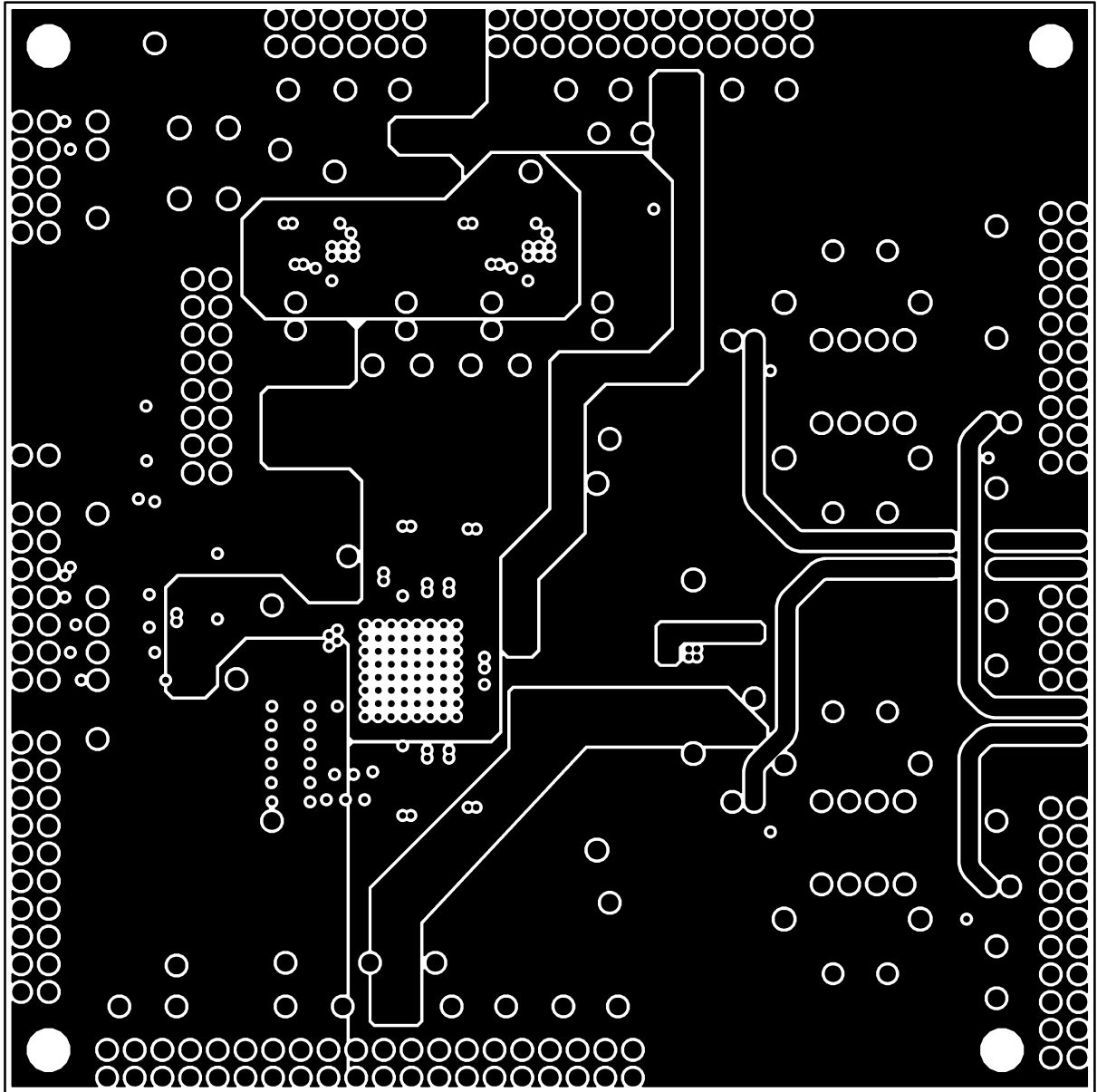
TOP Layer



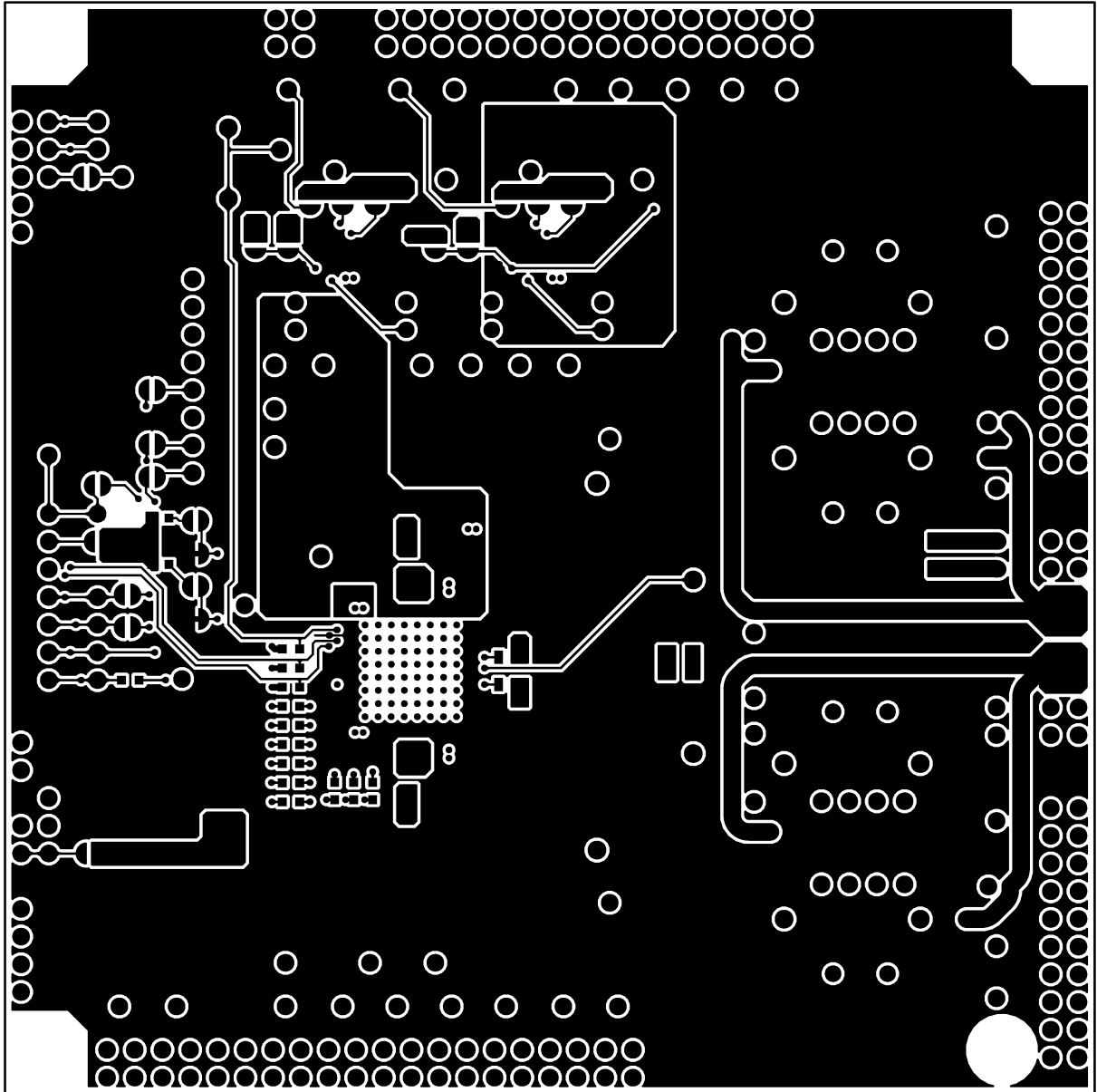
M1 Layer



M2 Layer



Bottom Layer



Bill of Materials

	Quantity	Value	Component No.	Manufacturer	Product No.
Capacitor	13	0.1μF	C3,C4,C5,C7,C10,C12,C13,C14,C17, C18,C21,C22,C24	TDK	C2012X7R1H104K085AA
	2	0.1μF	C41,C42	MURATA	GCM188L81H104KA57D
	2	100μF	C6,C8	Nichicon	PLF1C101MDL4TD
	7	220μF	C9,C11,C15,C16,C19,C20,C23	NIPPON CHEMI-CON	EMAR160ARA221MHA0G
	2	10μF	C37,C38	Rubycon	16MU106MC44532
	2	470μF	C1, C2	Toshin Kogyo	1CUTSJ471M0
	2	1μF	C39,C40	MURATA	GRM21BB31E105KA98L
	2	150pF	C43,C44	WIMA	FKP2D001501D00
	6	1.5μF	C31,C32,C35,C36,C45,C46	Rubycon	16MU155MA23216
4	1500pF	C25T,C26T,C27T,C28T	WIMA	FKP2D011501D00	
Connector	1	CONNECTOR 2x5	CN2	Hirose Electric	HIF3H-10PB-2.54DSA(61)
	1	CONNECTOR 2x8	CN9	Hirose Electric	HIF3H-16DA-2.54DSA(61)
	1	CONNECTOR 2x7	CN4	Samtec	TSW-120-08-G-D-RA
	3	CONNECTOR 2x10	CN5,CN8,CN10	Hirose Electric	HIF3H-20DA-2.54DSA(61)
	2	CONNECTOR 2x20	CN6,CN7	Hirose Electric	HIF3H-40DA-2.54DSA(61)
Resistor	4	1kΩ	R18,R19,R20,R21	Am Transformer	AMRT 1/2W 1kΩ
	1	0Ω	R5	KOA	RK73Z1JTTD
	1	10kΩ	R15	KOA	RK73B1JTTD103J
	4	2.2kΩ	R11,R12,R13,R14	KOA	RK73B1JTTD222J
	9	22Ω	R1,R2,R3,R4,R6,R7,R8,R9,R10	KOA	RK73B1JTTD220J
	1	56kΩ	R22	Yageo	MFR-25F(B)RF52-56K
	1	130kΩ	R24	Yageo	MFR-25FBF52-130K
	2	910Ω	R16,R17	Am Transformer	AMRT 1/2W 910Ω
	1	150kΩ	R23	Yageo	MFR-25FBF52-150K
1	68kΩ	R25	KOA	MF1/4CC 6802F	
Switch	1	Tactile Switch	SW1	Alps Alpine	SKHHAJA010
IC	1	BD34302EKV	U1	ROHM	BD34302EKV
	4	BD37201NUX	U4,U5	ROHM	BD37201NUX
	4	NE5532	U2,U3	TI	NE5532ADR

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