32-bit, 768 kHz Sampling Stereo Audio D/A Converter

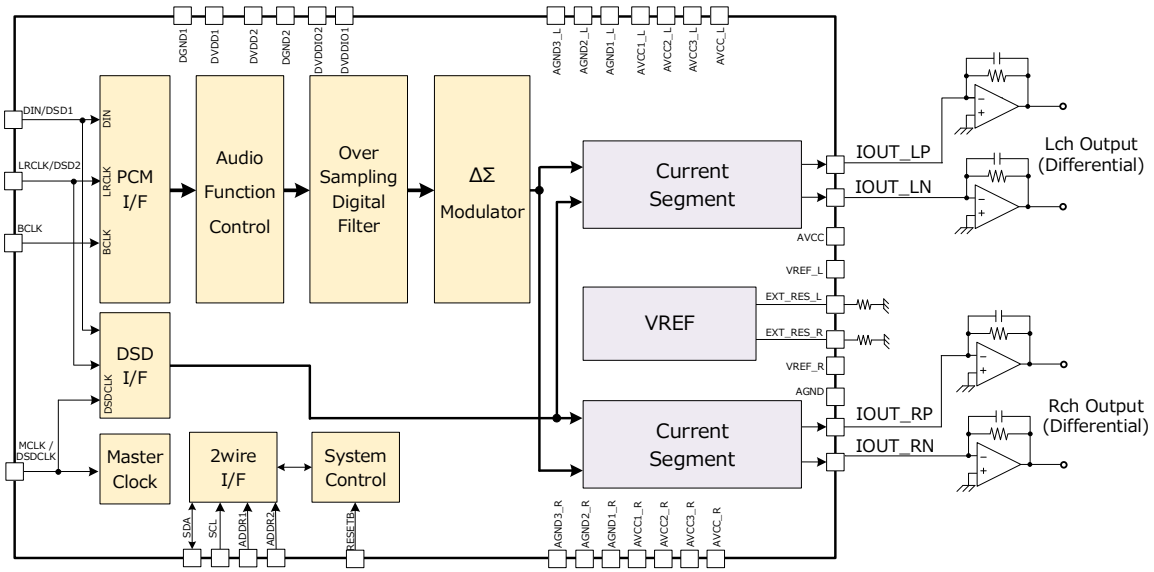
BD34301EKV Evaluation Board (Hardware)

(BD34301EKV-EVK-005)

IC Introduction

BD34301EKV is a 32-bit Stereo Audio D/A Converter with ROHM original sound quality design, realizing excellent performance (SNR: 130 dB (Typ), THD+N: -115 dB (Typ))*1 suitable for high-end audio. Different type sound is realized by selecting 2 kinds of digital FIR filters (Sharp Roll-Off, Slow Roll-Off). PCM I/F supports up to 768 kHz and DSD I/F supports up to 22.4 MHz.

BD34301EKV Block Diagram



Recommended Operating Conditions

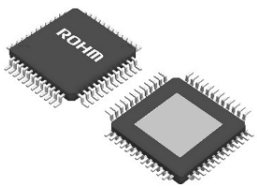
Item	Symbol	Scope	Unit
Power Supply Voltage	AVCC*1	4.5 to 5.5	V
	DVDDIO	3.0 to 3.6	
	DVDD	1.4 to 1.6	
Operating Temperature	Topr	-25 to +85	°C

*1 Applicable to AVCC, AVCC_L, and AVCC_R in BD34301EKV block diagram

Package

HTQFP64BV (64 pin, 0.5 mm pitch)

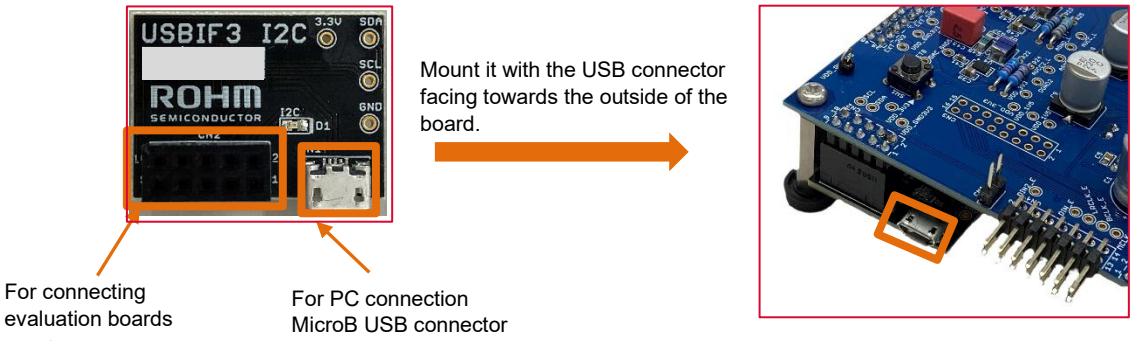
W(Typ) D(Typ) H(Max)
12.0 mm x 12.0 mm x 1.00 mm



No. 67UG122E Rev.001
FEB.2025

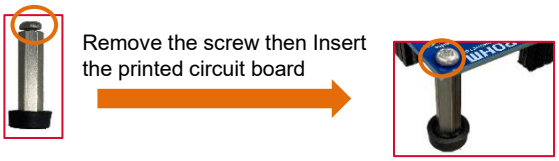
Accessories

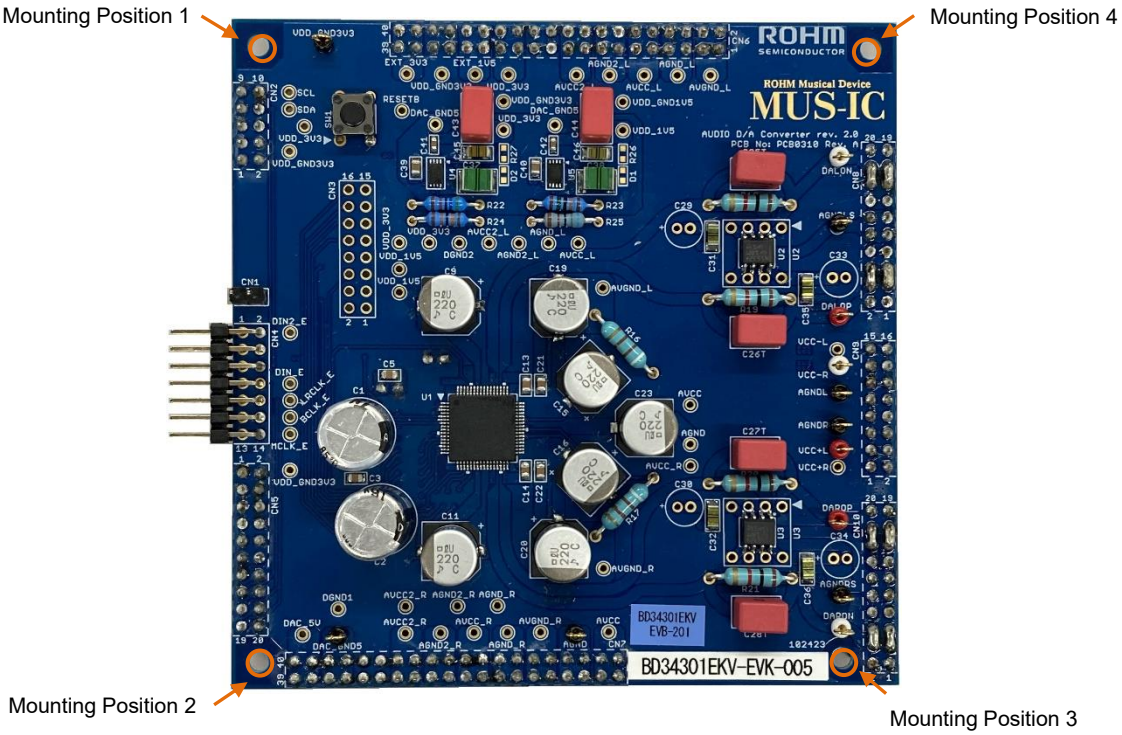
- **USB 2-Wire Conversion Board (attached on the evaluation board)**



- **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.





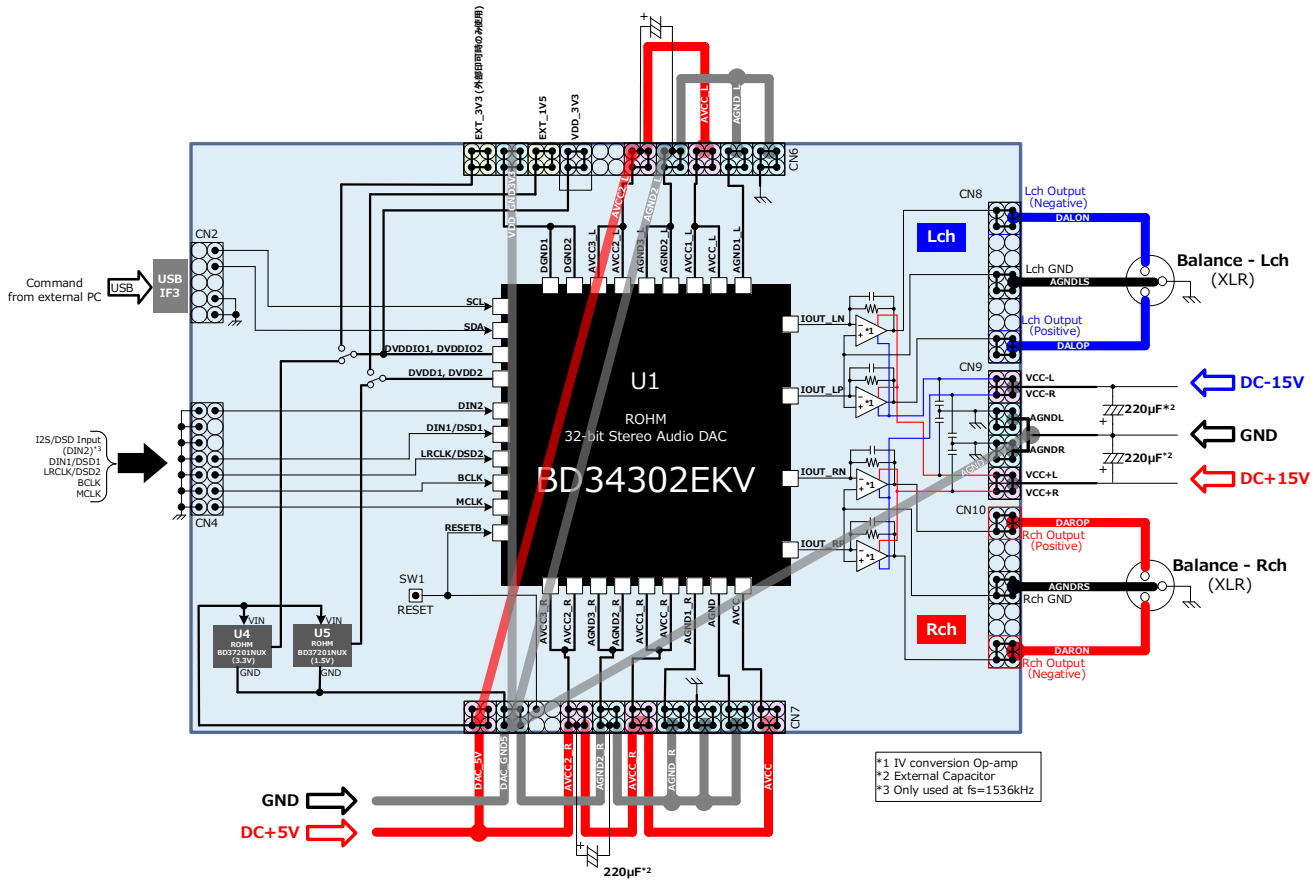
- **CD-ROM**

  Control software and manuals

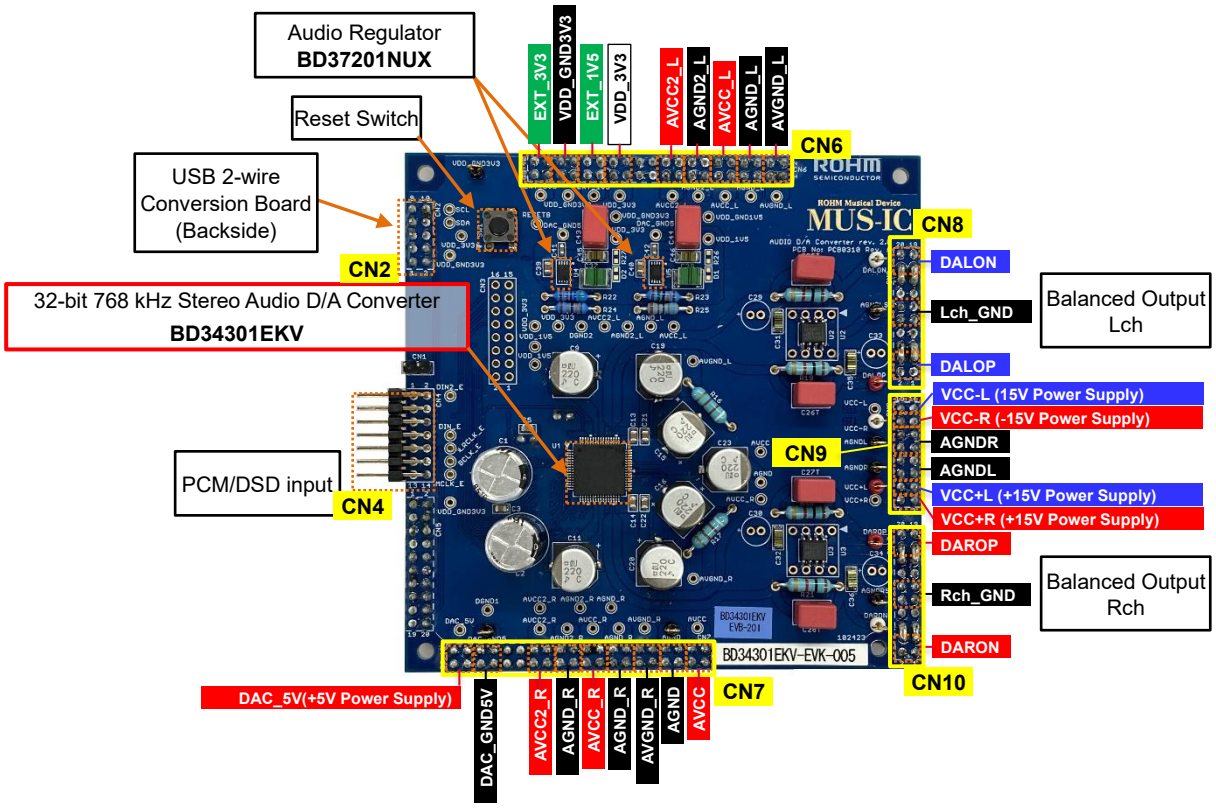
- **Quick Manual**
- **Precautions**

Evaluation Board Block Diagram and Recommended Peripheral Circuit

It is recommended to connect the power supply of the evaluation board and the wiring of the output circuit as shown below in red, blue, and gray. It is also recommended to connect 220 μF electrolytic capacitors to each of the four locations in *2.

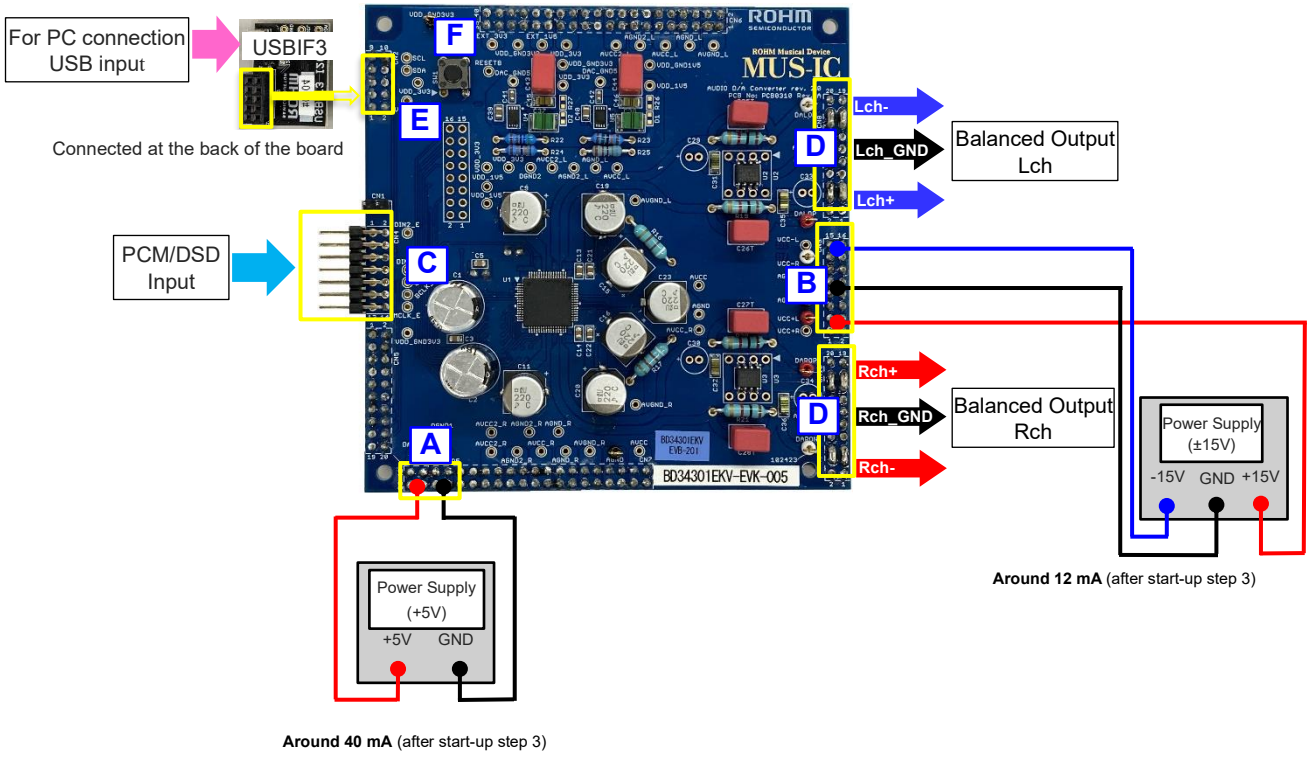


Appearance of the Evaluation Board



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.



Around 12 mA (after start-up step 3)

Around 40 mA (after start-up step 3)

Startup/Shutdown Procedures

Start-up Procedure

1) Turn ON the +5 V power supply.
2) Turn ON the ±15V 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 (BD34301EKV-EVK-005) 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.

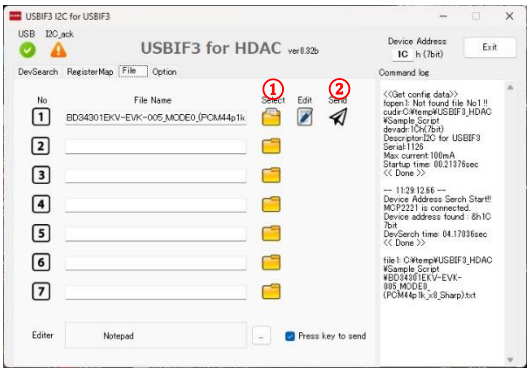
Sample Script Name	Format	MCLK	Input Format		Fir Filter*4		FIR Filter Type	Over Sampling
			PCM(I2S)	DSD	FirAlgo [3:0]	FirCoef [2:0]		ΔΣ(PCM)
MODE0*1	PCM (I^2S)	22.579 MHz/ 24.576 MHz	44.1 kHz/48 kHz	–	1h	0h	Sharp1	x8
MODE1			88.2 kHz/96 kHz		2h	1h		x16
MODE2			176.4 kHz/192 kHz		4h	2h		x16
MODE3			705.6 kHz/768 kHz		8h	0h	–	x8
MODE5*2	PCM (I^2S)	22.579 MHz/ 24.576 MHz	44.1 kHz/48 kHz	–	1h	0h	Sharp2	x32
MODE6*2			88.2 kHz/96 kHz		2h	1h		
MODE7*2			176.4 kHz/192 kHz		4h	2h		
MODE8*2*3			44.1 kHz/48 kHz		1h	3h	Slow	
MODE9*2			88.2 kHz/96 kHz		2h	4h		
MODEA*2			176.4 kHz/192 kHz		4h	5h		
MODEB*2			352.8kHz/384kHz		8h	0h	Bypass	x32
MODEC*2			705.6 kHz/768 kHz		8h	0h		x16
					DSD Filter[1:0]*5			
MODED*2	DSD	–	–	DSD64(2.82 M)	2h		Bypass	–
MODEE*2				DSD128(5.64 M)	1h			
MODEF*2				DSD256(11.28 M)/ DSD512(22.56 M)	0h			

*1 BD34301EKV datasheet meausurement condition
*2 BD34301EKV datasheet Recommended condition
*3 Although Recommended condition is HpcMode = 1, Mode 8 uses HpcMode = 0.
*4 Refer to BD34301EKV Datasheet P28 [18. Address 30h, 31h (FIR Filter 1, FIR Filter 2)]
*5 Refer to BD34301EKV Datasheet P23 [11. Address 16h (DSD Filter)]

Setting Up Modes

1) Press the reset switch.

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



Script setting screen of the control software

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

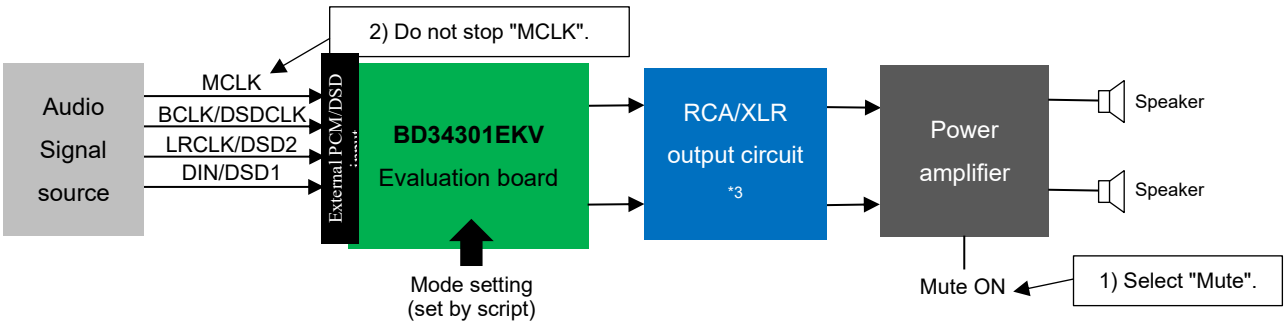
*1 For details of the control software, refer to the manual of the attached CD-ROM.

List of sample scripts provided:

Mode	File name
MODE0	BD34301EKV-EVK-005_MODE0_(PCM44p1k_x8_Sharp).txt
MODE1	BD34301EKV-EVK-005_MODE1_(PCM96k_x16_Sharp).txt
MODE2	BD34301EKV-EVK-005_MODE2_(PCM192k_x16_Sharp).txt
MODE3	BD34301EKV-EVK-005_MODE3_(PCM768k_x8_Sharp).txt
MODE5	BD34301EKV-EVK-005_MODE5_(PCM44p1k_x32_Sharp).txt
MODE6	BD34301EKV-EVK-005_MODE6_(PCM96k_x32_Sharp).txt
MODE7	BD34301EKV-EVK-005_MODE7_(PCM192k_x32_Sharp).txt
MODE8	BD34301EKV-EVK-005_MODE8_(PCM44p1k_x32_Slow).txt
MODE9	BD34301EKV-EVK-005_MODE9_(PCM96k_x32_Slow).txt
MODEA	BD34301EKV-EVK-005_MODEA_(PCM192k_x32_Slow).txt
MODEB	BD34301EKV-EVK-005_MODEB_(PCM384k_x32).txt
MODEC	BD34301EKV-EVK-005_MODEC_(PCM768k_x16).txt
MODED	BD34301ELV-EVK-005_MODED_(DSD2.8M)
MODEE	BD34301EKV-EVK-005_MODEE_(DSD5.6M)
MODEF	BD34301EKV-EVK-005_MODEF_(DSD11.2M/22.4M)

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.

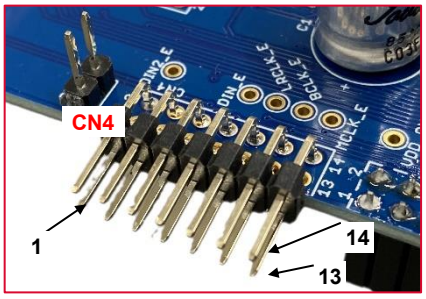


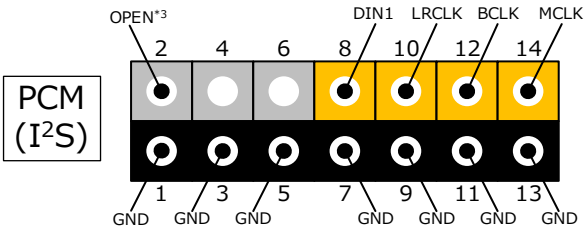
*3 Refer to page 9

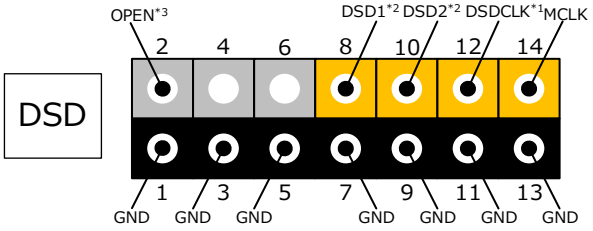
Input Ports

PCM (I^2S)/DSD Input (Audio Signal)

Enter the following signals for each pin.



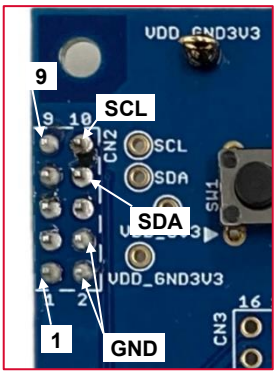


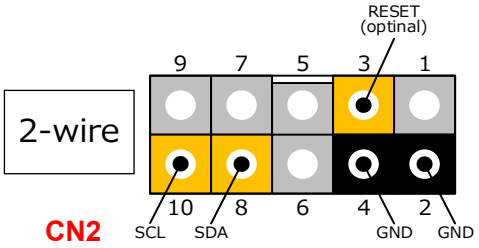


*1 Connect "DSDCLK" input for pins 12 and 14 of CN14.
*2 Since register 13h = 1h is set in the sample script,
The DSD1 and DSD2 inputs are SWAPPED.
*3 Don't connect anything.

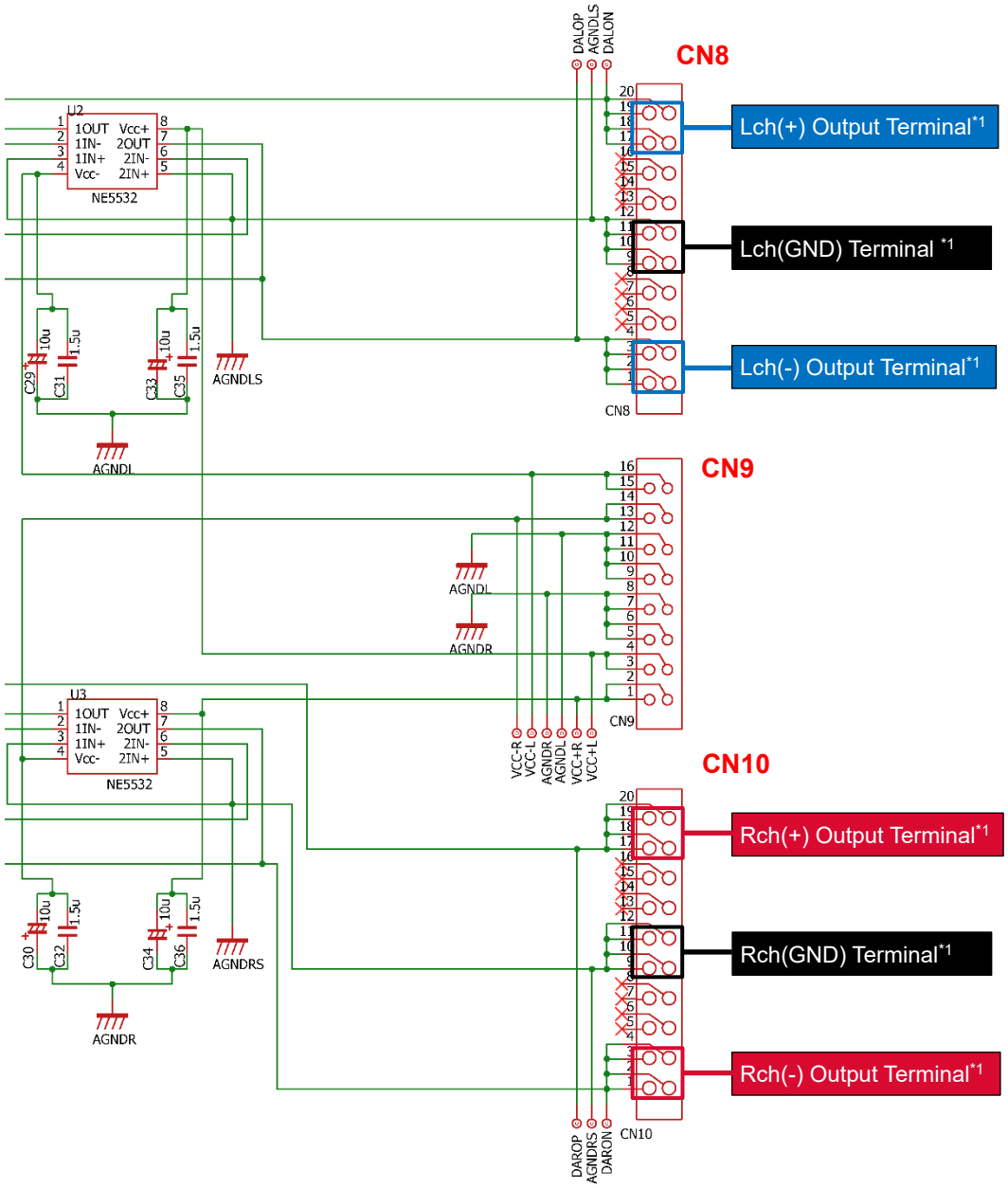
2-wire Input (Control Terminal)

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



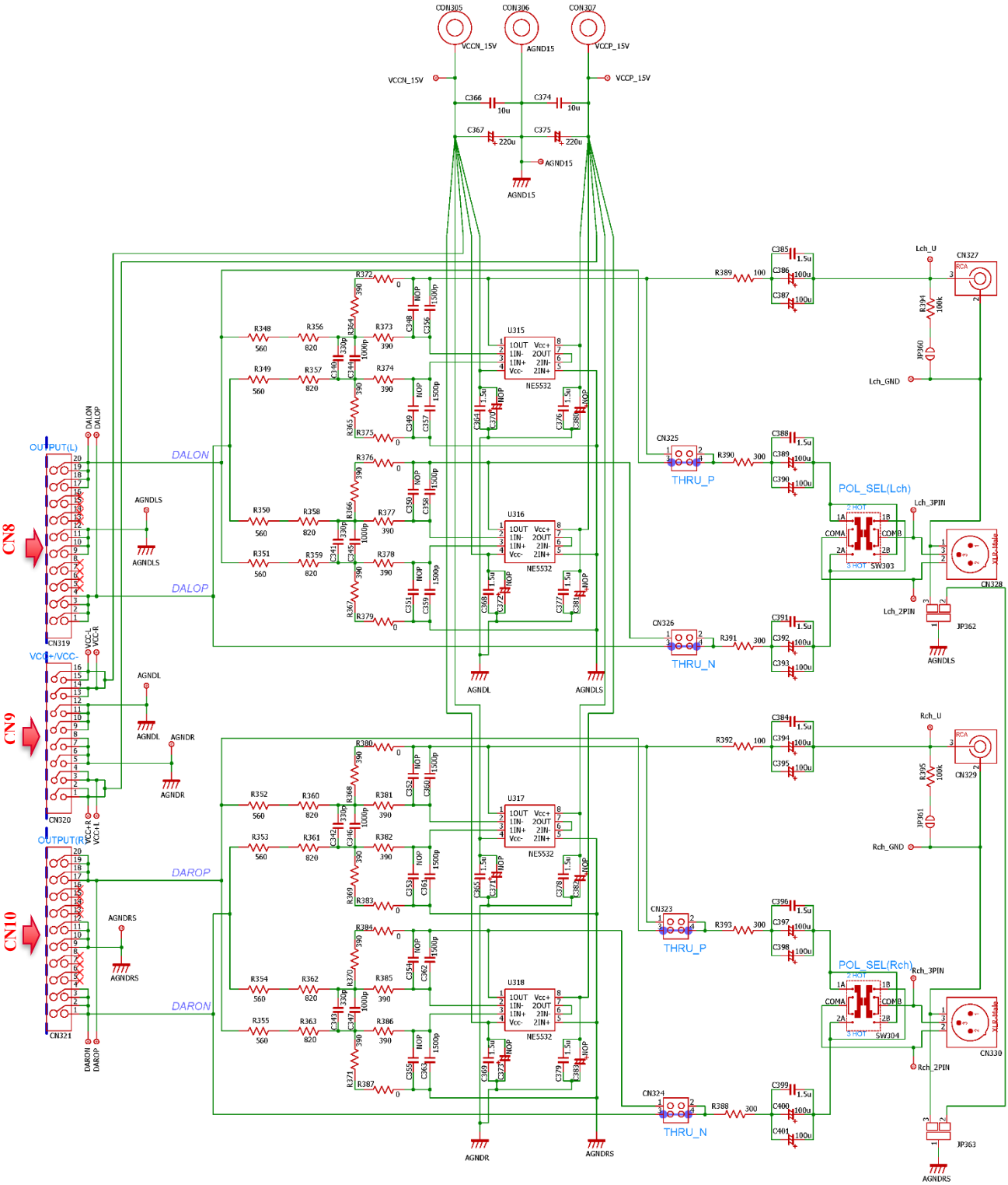


Output Terminals (Audio Signal)



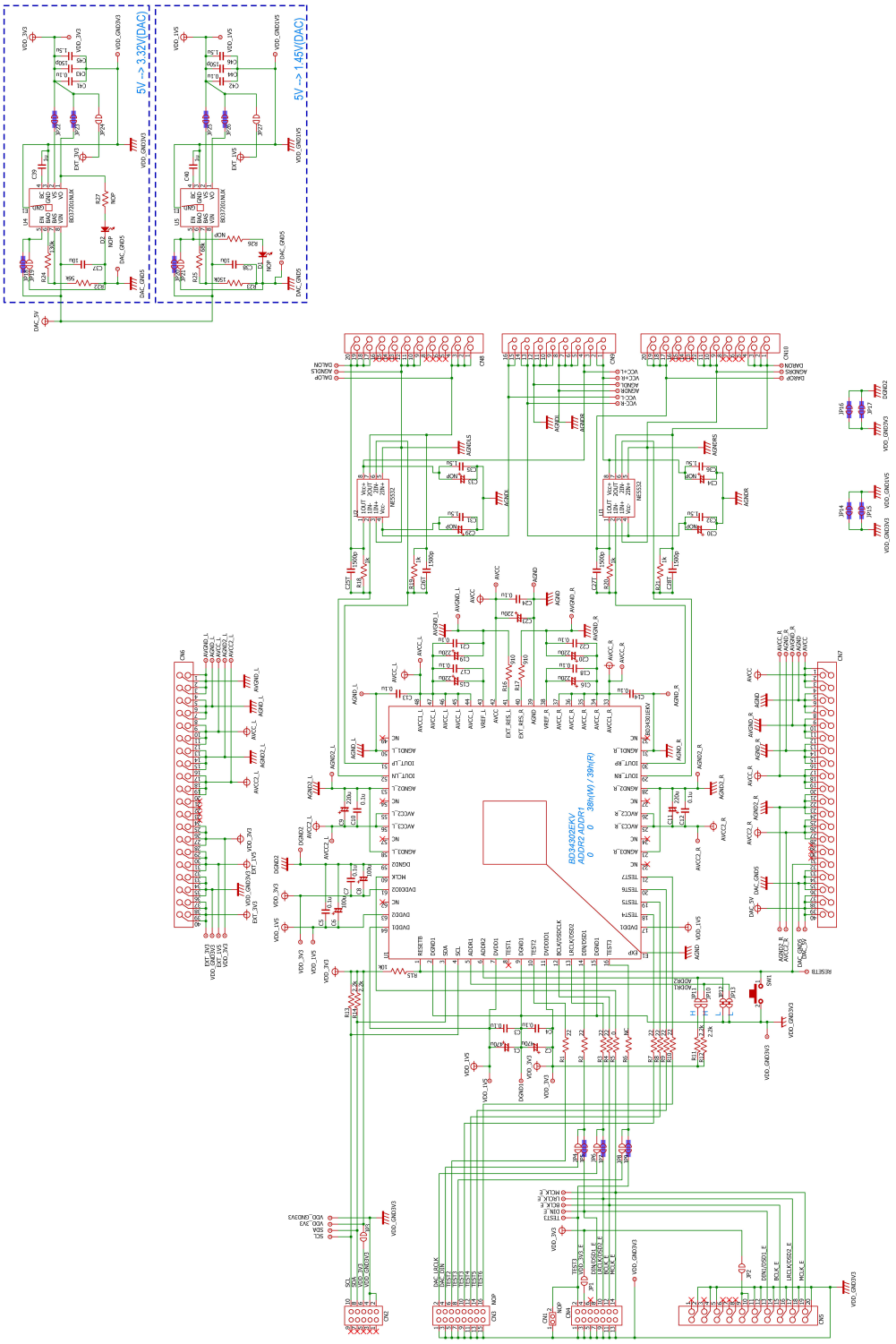
*1 The output terminals are connected to four pins each at the connector. When connecting a differential single transducer amplifier, connect all four pins on each terminal to reduce contact resistance.

RCA/XLR Output Circuit (Audio Signal)



Evaluation Board Circuit Diagram

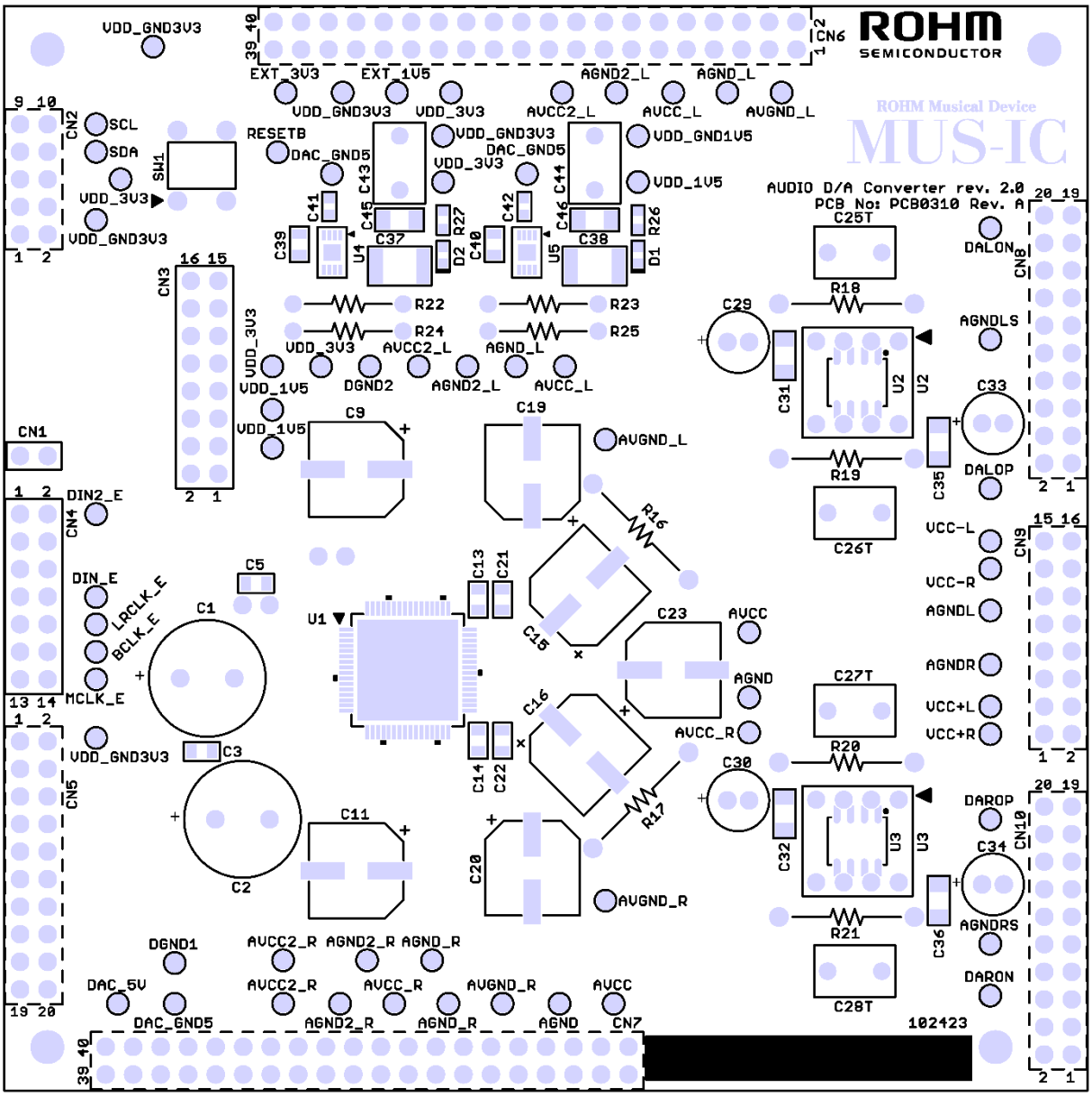
Click on the circuit diagram to open a detailed circuit diagram.



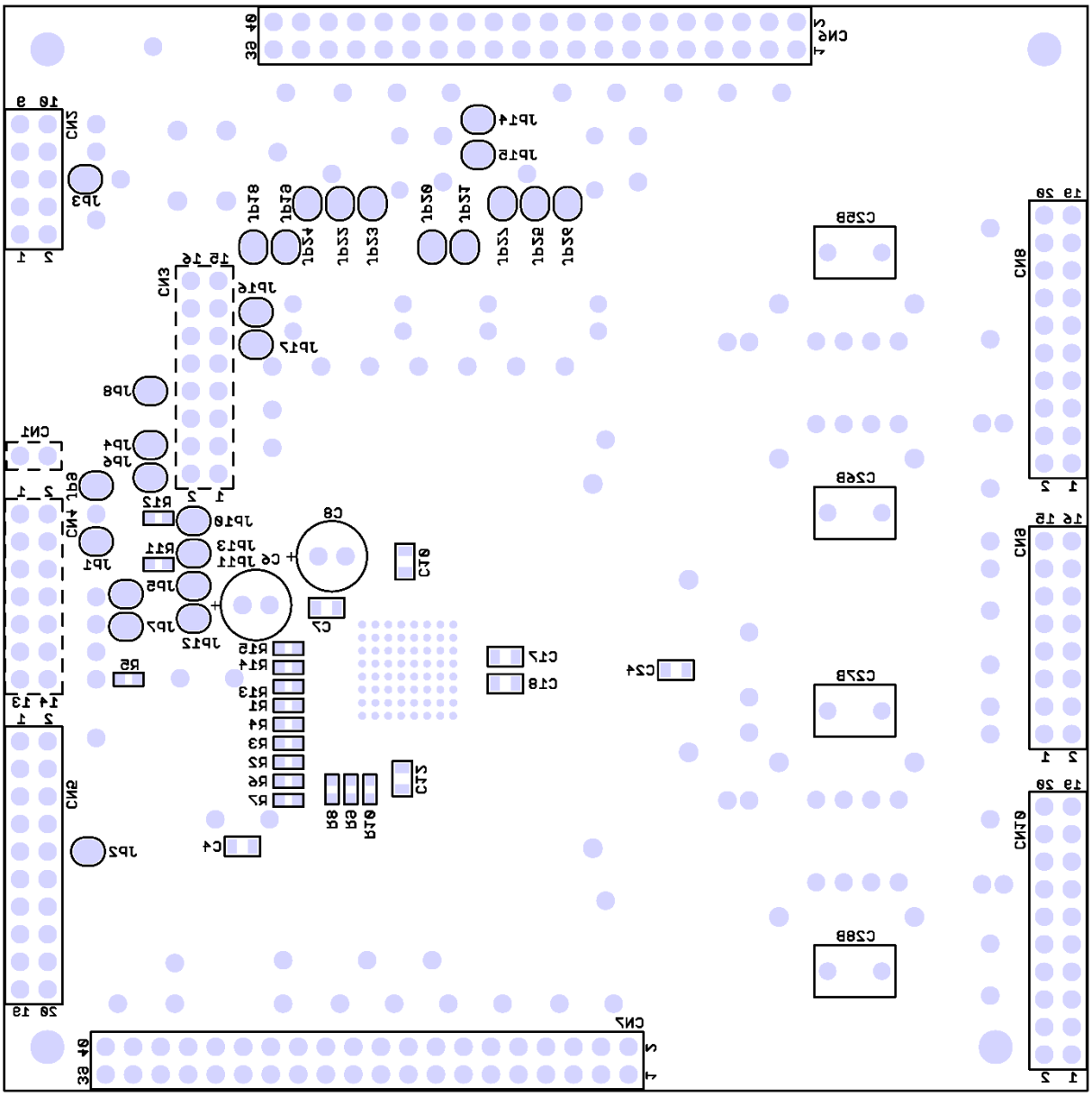
Note) The value and number of external capacitors differ from those in the basic application circuit in the datasheet. However, the number of capacitors has been reduced by changing the capacitance from 100 µF to 220 µF.

PCB Patterns

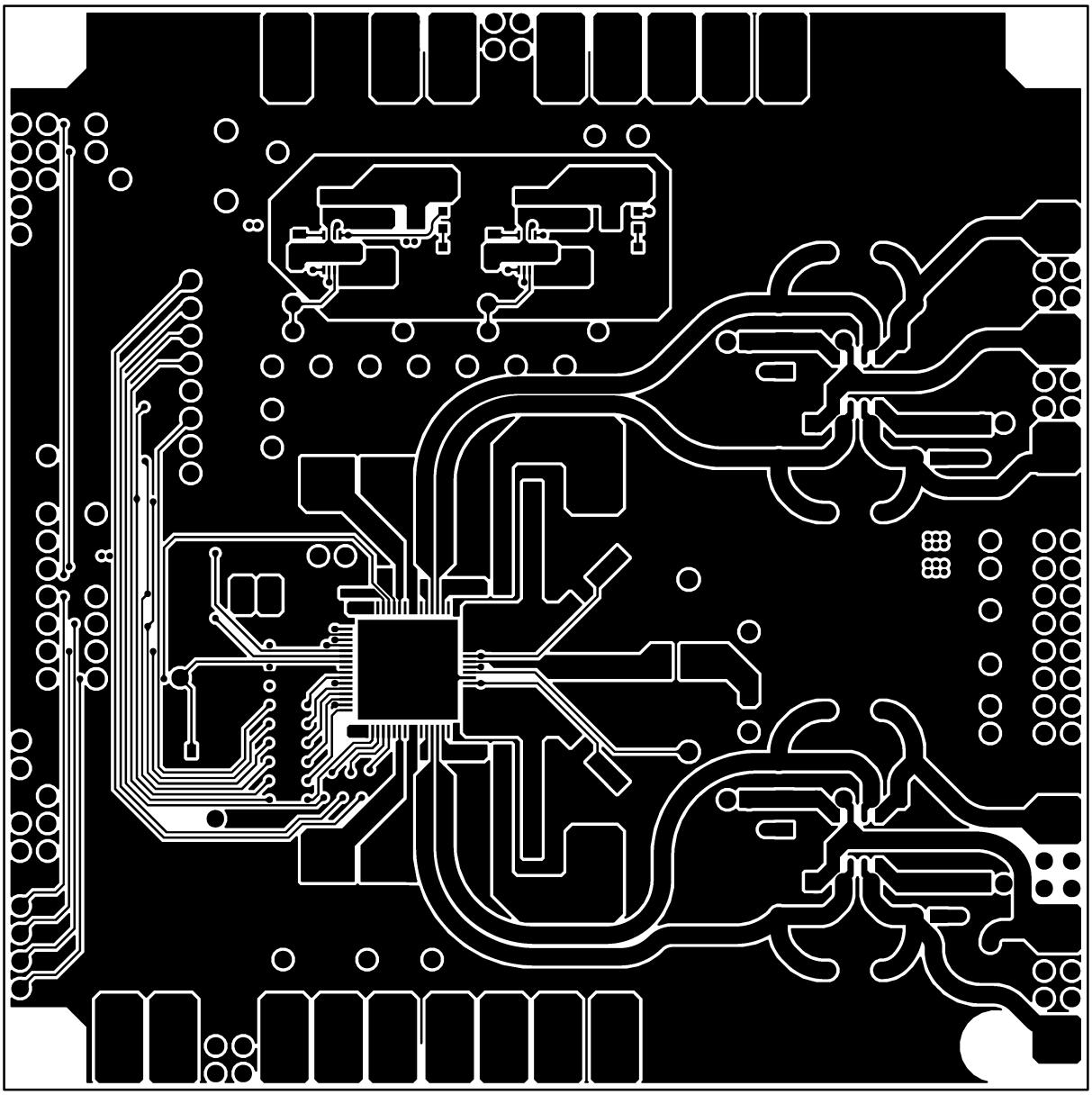
Top Silkscreen Overlay



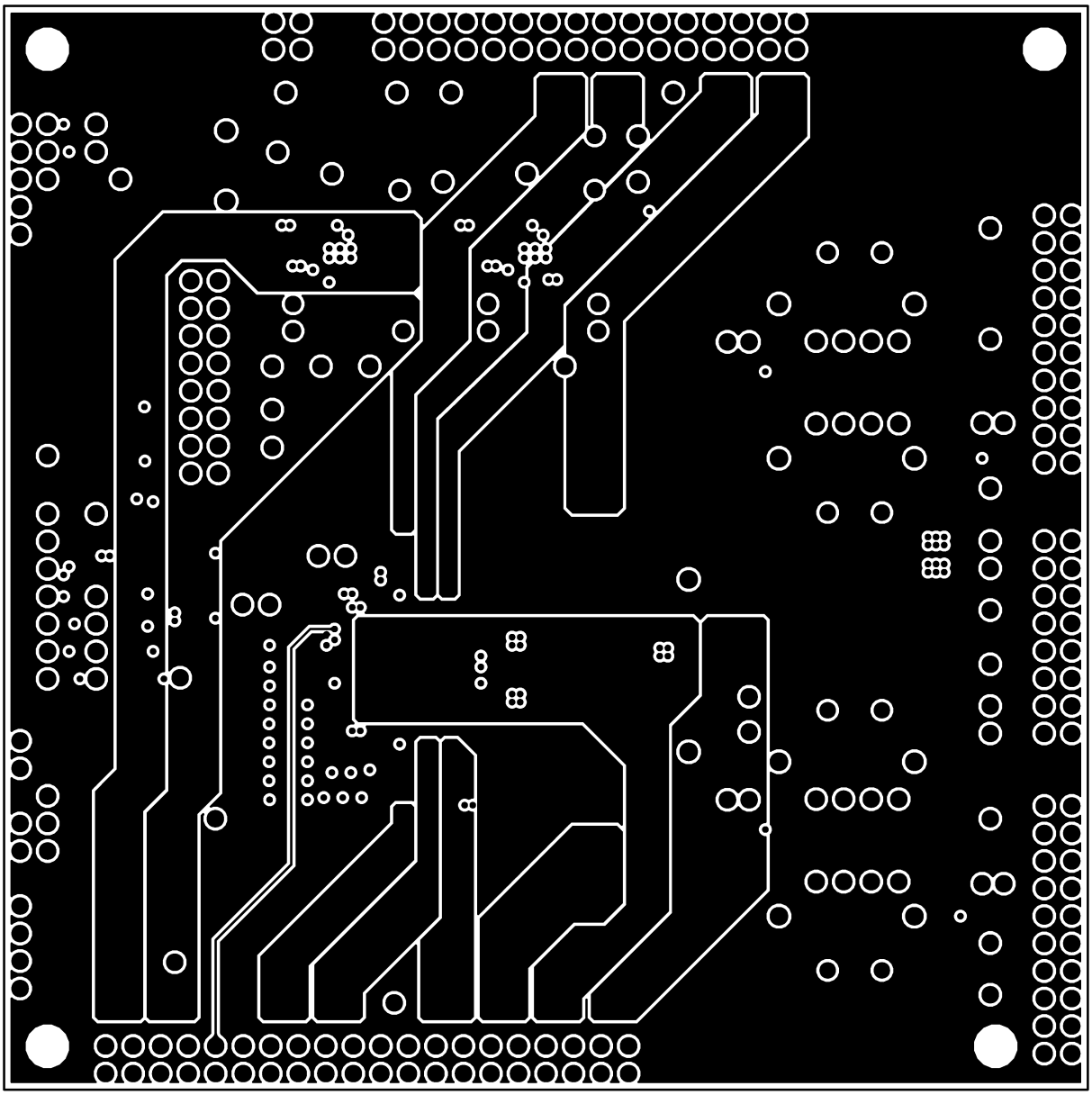
Bottom Silkscreen Overlay



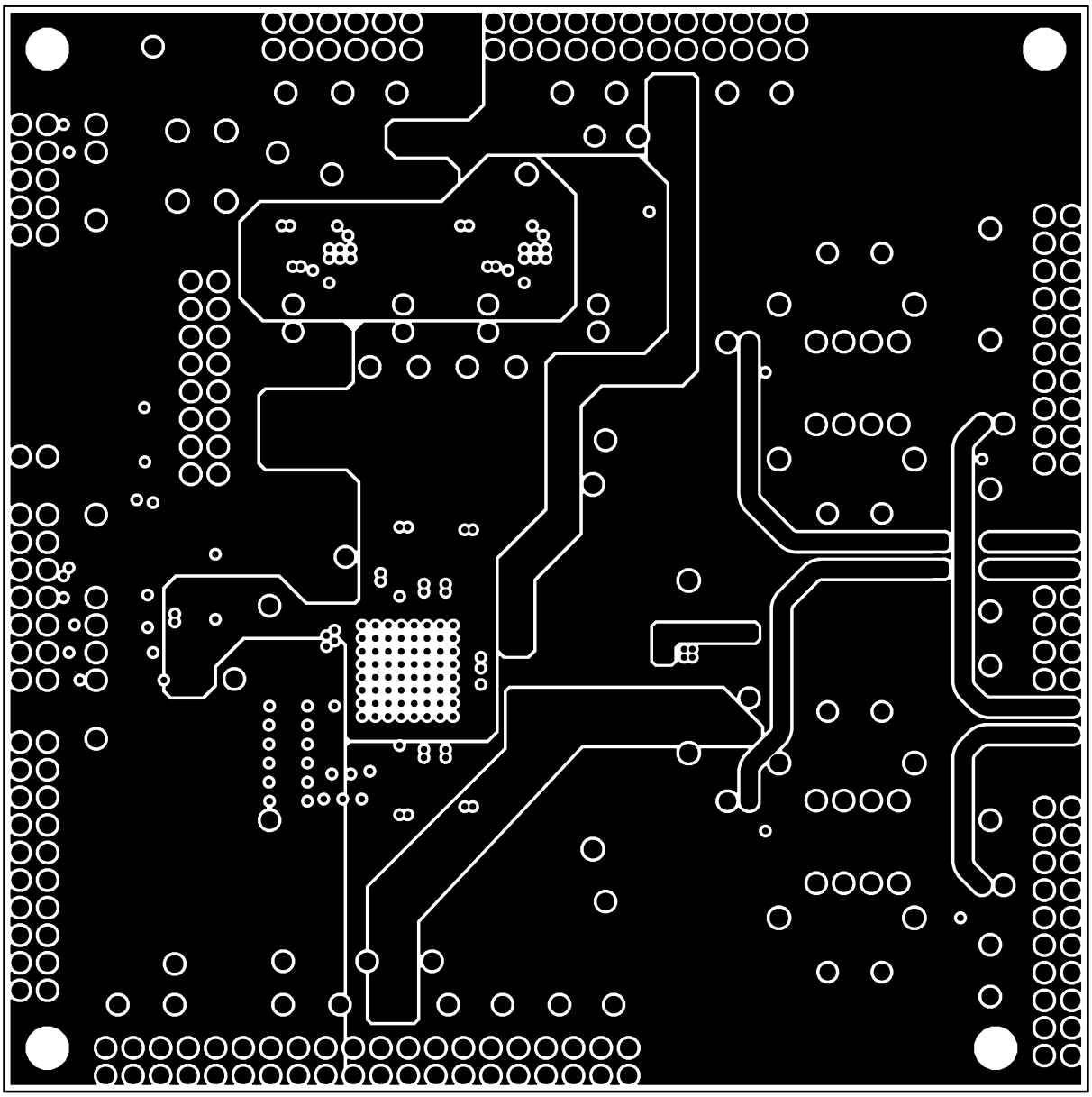
TOP Layer



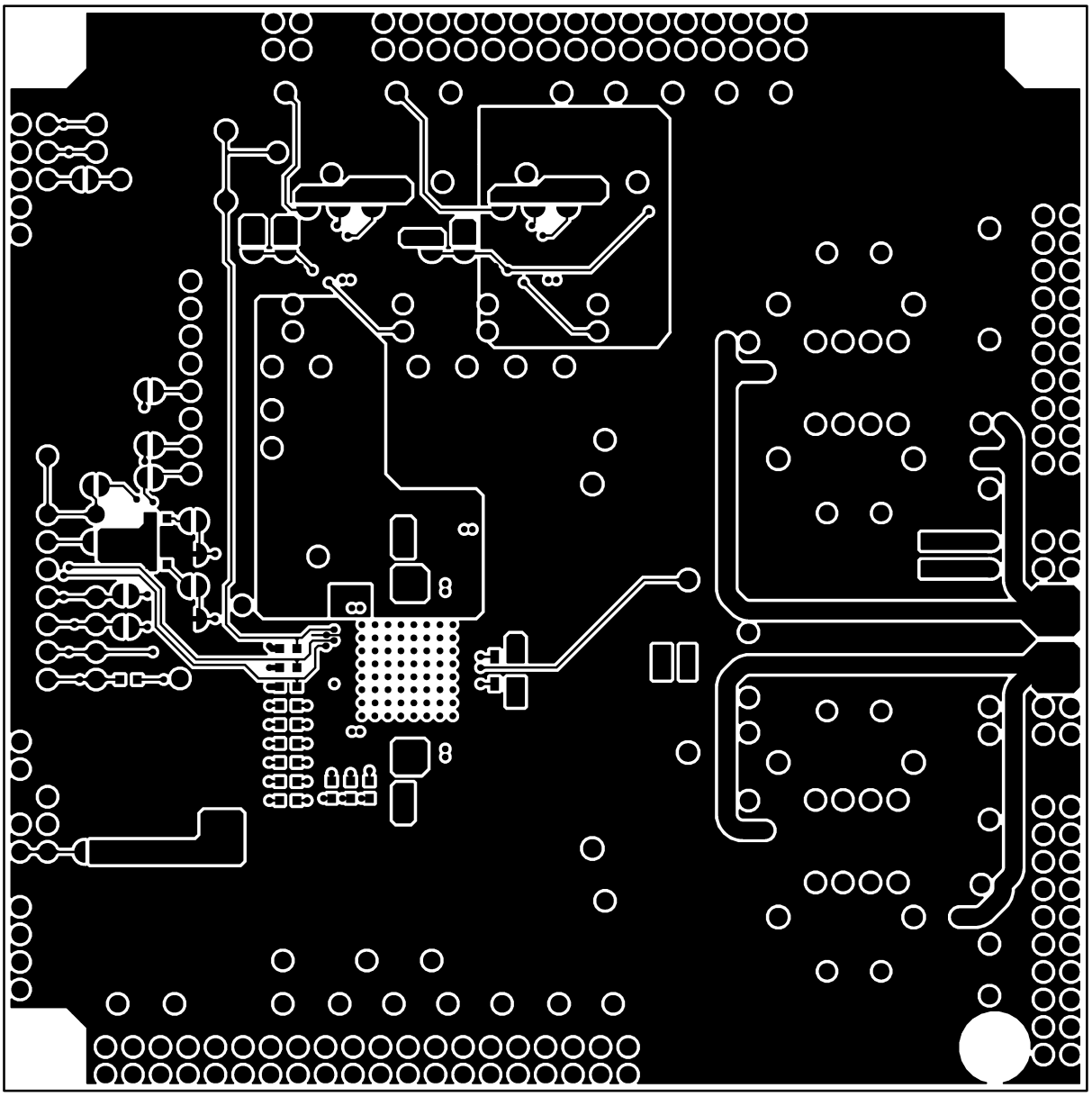
M1 Layer



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,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	BD34301EKV	U1	ROHM	BD34301EKV
	4	BD37201NUX	U4,U5	ROHM	BD37201NUX
	4	NE5532	U2,U3	TI	NE5532ADR

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ROHM SEMICONDUCTOR

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