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

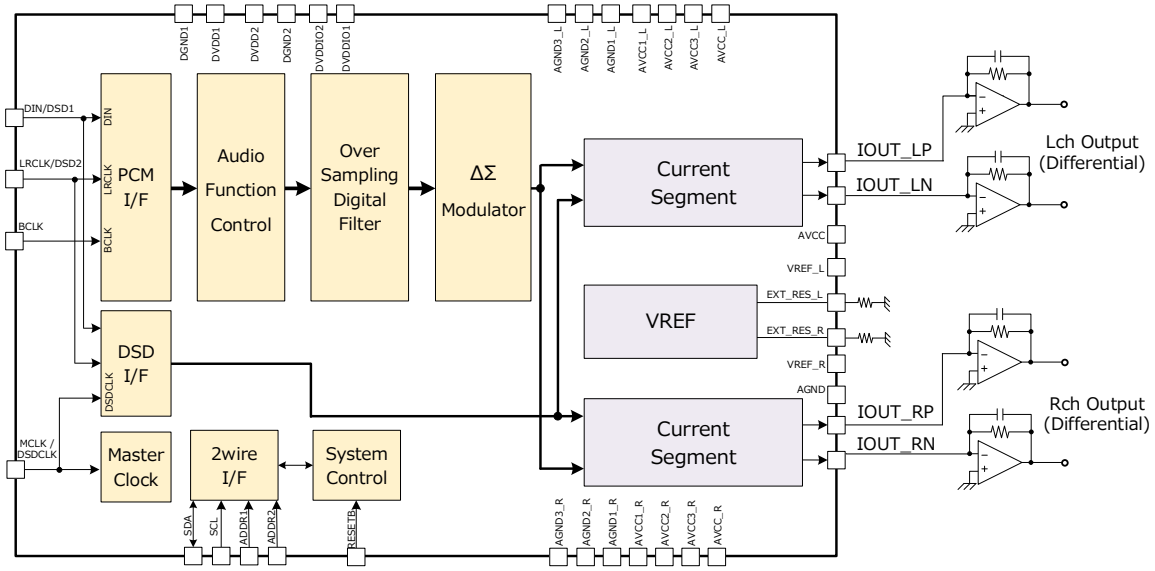
BD34352EKV Evaluation Board

(BD34352EKV-EVK-001)

IC Introduction

BD34352EKV is a 32-bit Stereo Audio D/A Converter with ROHM original sound quality design, realizing excellent performance (SNR: 126 dB (Typ), THD+N: -112 dB (Typ)) suitable for high-end audio. Different type of 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.

BD34352EKV Block Diagram



Recommended Operating Conditions

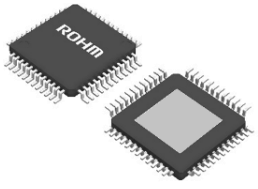
Item	Symbol	Ratings	Unit
Power Supply Voltage	AVCC*1	4.5 to 5.5	V
	DVDDIO	3.0 to 3.6	
	DVDD	1.4 to 1.6	
Operating Temperature	Topr	-25 to +85	°C

*1 AVCC, AVCC_R, AVCC_L in Block Diagram.

Package

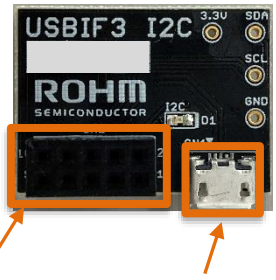
HTQFP64BV (64 pin, 0.5 mm pitch)

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



Accessories

・**USB 2-Wire Conversion board 1 pcs**

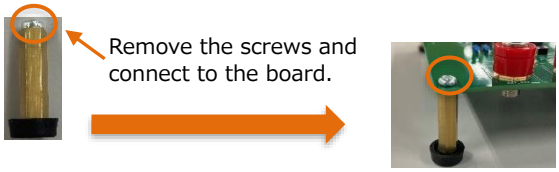


2x5 pin Connector
for connecting to evaluation board

Micro-USB Type B Connector
for connecting to PC

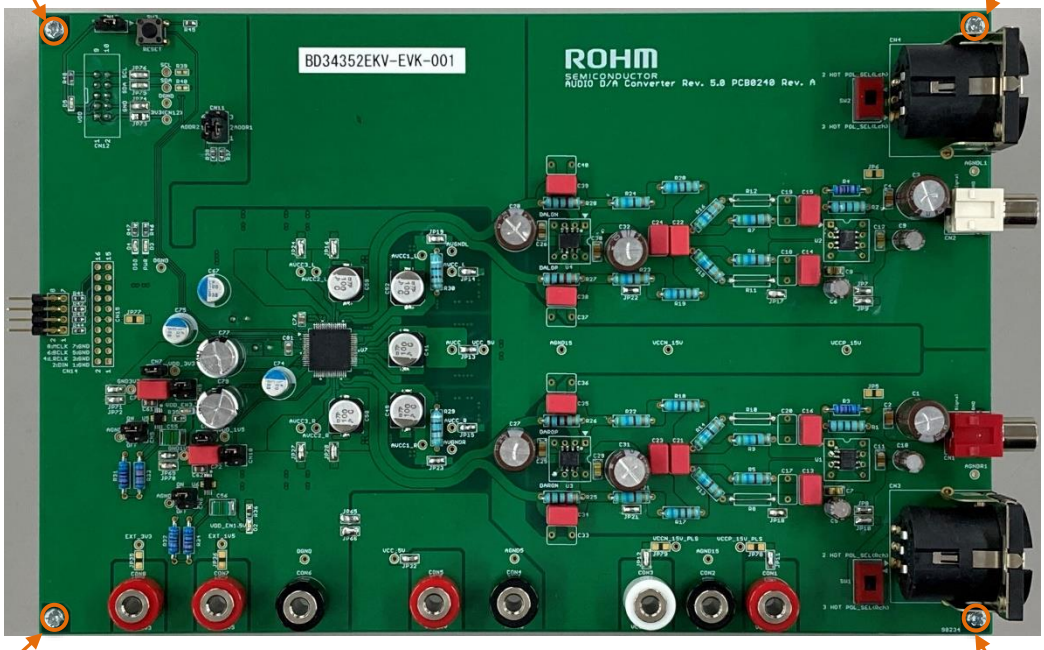
・**Spacer for evaluation board 4 pcs**

Attach the spacers to the 4 points on the evaluation board before use.



Mount location 1

Mount location 4



Mount location 2

Mount location 3

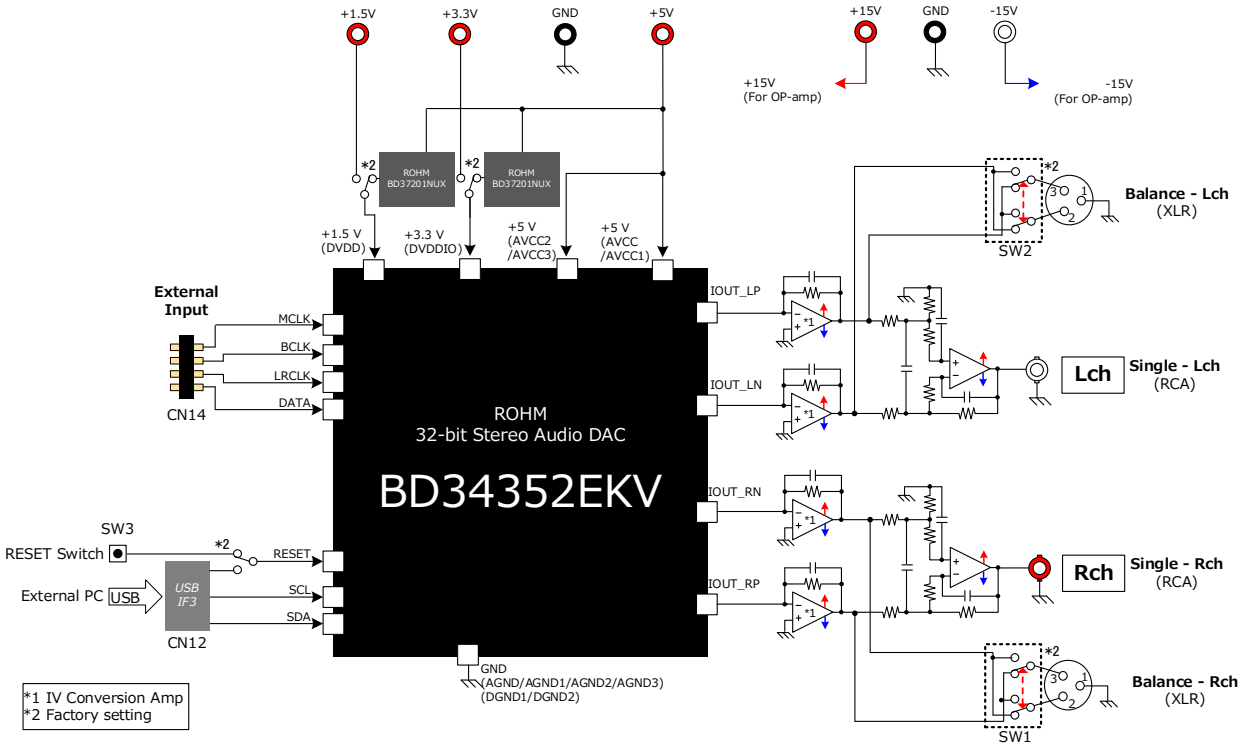
・**CD-ROM 1 disc**

Control software & Manuals

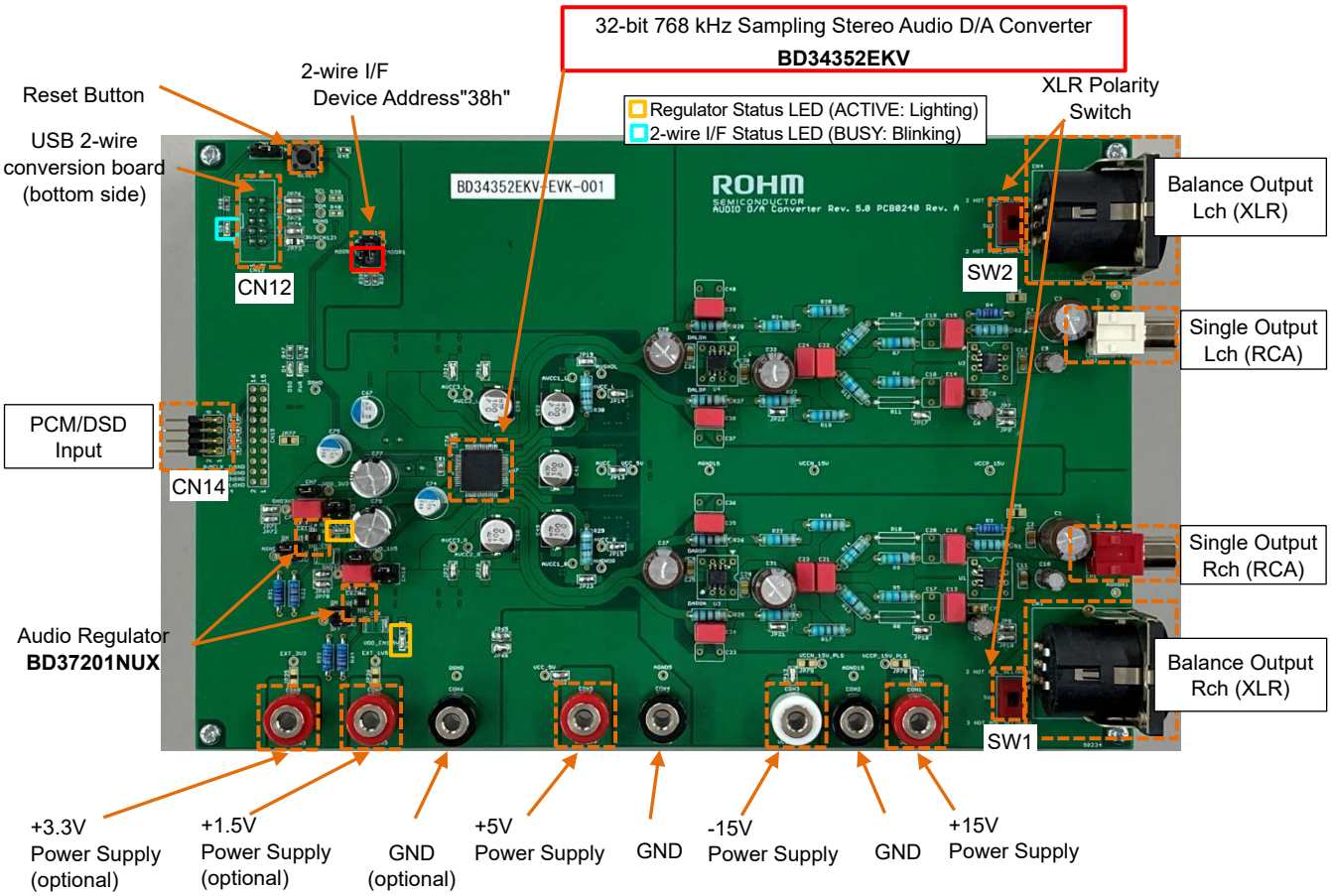
・**Quick Manual**

・**Precautions**

Evaluation Board Block Diagram

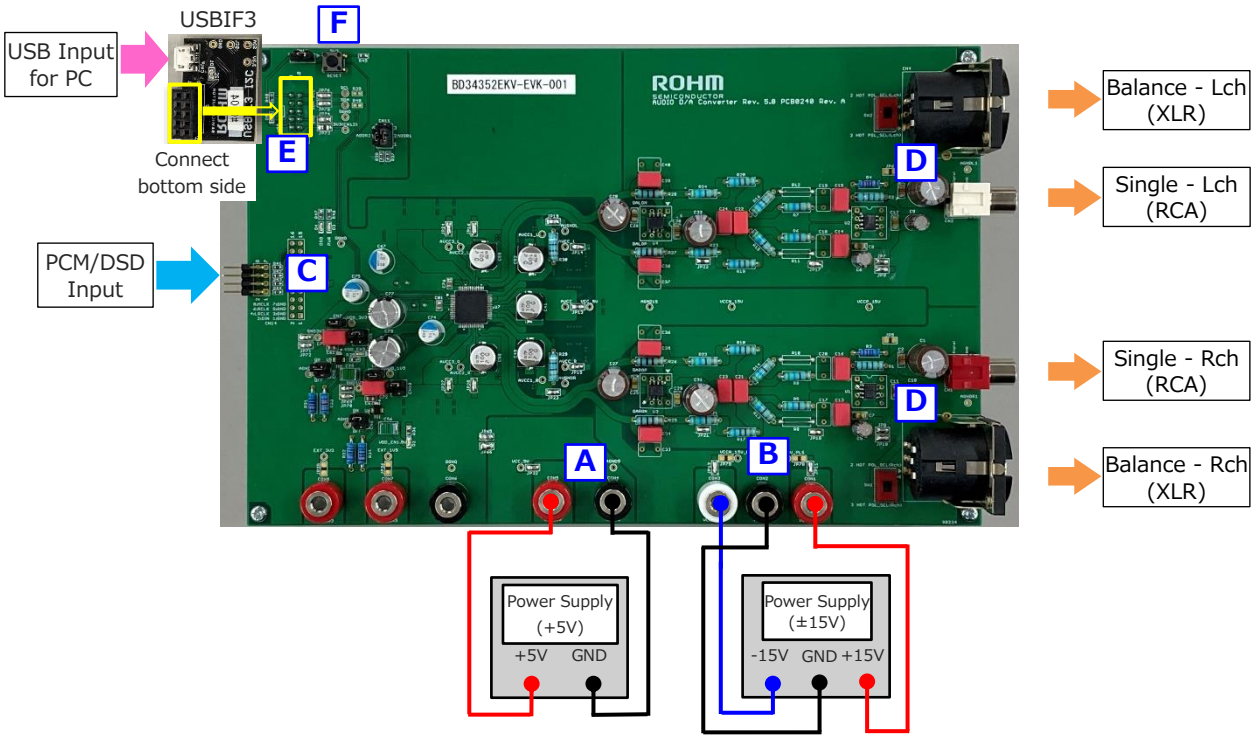


Evaluation Board



Hardware Setup (Proceed set-up procedure from "**A**" to "**F**" in sequence)

1) Connect "+5V Power Supply" to "**A**".
2) Connect "±15V Power Supply" to "**B**".
3) Input PCM/DSD signal to "**C**".
4) Connect "Single Output" or "Balance Output" to "**D**".
5) Connect USB 2-wire conversion board (USBIF3) to "**E**" on the bottom side.



around 5 mA (@After Start-up sequence 3) **around 30 mA** (@After Start-up sequence 3

Start-up/Shutdown Procedure

Start-up Procedure

1) Power Amplifier connecting Evaluation Board Output set to "Mute ON".
2) Set "+5V Power Supply" turn "ON".
3) Set "±15V Power Supply" turn "ON".
4) Connect USB 2-wire conversion board(**"E"**) and PC by using Micro-USB Type B cable.
5) Push Reset button "**F**".
6) Send command setting sample script at each mode by using Control software*1 on PC.
7) 2-wire I/F status indicator LED will blink during BUSY. Wait for LED to turn off.
8) Power Amplifier connecting Evaluation Board Output set to "Mute OFF".
9) Start playback.

*1 Refer to Control software & manual of Evaluation-board kit (BD34352EKV-EVK-001) for detail information.

Shutdown Procedure

1) Stop playback.
2) Power Amplifier connecting Evaluation Board Output set to "Mute ON".
3) Set "±15V Power supply" turn "OFF".
4) Set "+5V Power supply" turn "OFF".

Mode Selection

16 Mode setting sample scripts are included in the control software of the evaluation board.

It is possible to select each mode by sending its corresponding sample script from control software.

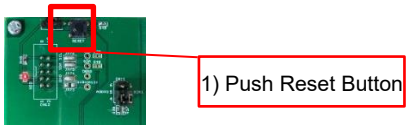
The control commands can be sent without using the sample script, or users can create and use their own command script.

Mode	Format	Filter Type	Input	MCLK	FIR Filter*4		Over Sampling Rate*6						Sampling Frequency fs [kHz]				
					FirAlgo [3:0]	FirCoef [2:0]	X8	X16	x32	x64	x128	x256	44.1 / 48	88.2 / 96	176.4 / 192	352.8 / 384	705.6 / 768
Mode 0*1	PCM (I^2S)	Sharp1	External PCM (I^2S)	512 x fs	1h	0h				O			O				
Mode 1				256 x fs	2h	1h				O				O			
Mode 2				128 x fs	4h	2h			O						O		
Mode 3				22.579 MHz (fs=705.6 k) 24.576 MHz (fs=768 k)	8h	0h	O										O
Mode 4		Not Available															
Mode 5*2		Sharp2	External PCM (I^2S)	512 x fs	1h	0h						O	O				
Mode 6*2				256 x fs	2h	1h					O			O			
Mode 7*2				128 x fs	4h	2h				O					O		
Mode 8*2*3		Slow		512 x fs	1h	3h						O	O				
Mode 9*2				256 x fs	2h	4h					O			O			
Mode A*2				128 x fs	4h	5h				O					O		
Mode B*2		–		22.579 MHz (fs=352.8 k, 705.6 k) 24.576 MHz (fs=384 k, 768 k)	8h	0h										O	
Mode C*2					8h	0h											O
Mode D*2	DSD	–	External DSD	–	0h	0h	DSD Filter*5 [1:0]		10	Input Signal: DSD64(2.8M), DSD128(5.6M)							
Mode E*2					0h	0h			01	Input Signal: DSD256(11.2M)							
Mode F*2					0h	0h			00	Input Signal: DSD512(22.4M)							

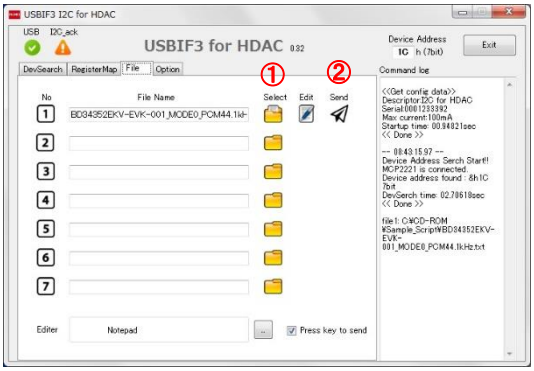
*1 Mode 0 are Electrical Characteristics in BD34352EKV Datasheet.
*2 Mode 5~F are Recommended Settings in BD34352EKV Datasheet.
*3 Although Recommended setting is HpcMode = 1, only Mode 8 uses HpcMode = 0.
*4 Refer to BD34352EKV Datasheet P27 [18. Address 30h, 31h (FIR Filter 1, FIR Filter 2)].
*5 Refer to BD34352EKV Datasheet P22 [11. Address 16h (DSD Filter)].
*6 Over Sampling Rate of FIR Filter is included.

Mode Setting

1) Push Reset Button.



2) Set sample Script for each mode by using control software[*1].



Script Setting Window of control software

①Click "Select" button and select sample script.

②Click "Send" button to load the sample script.

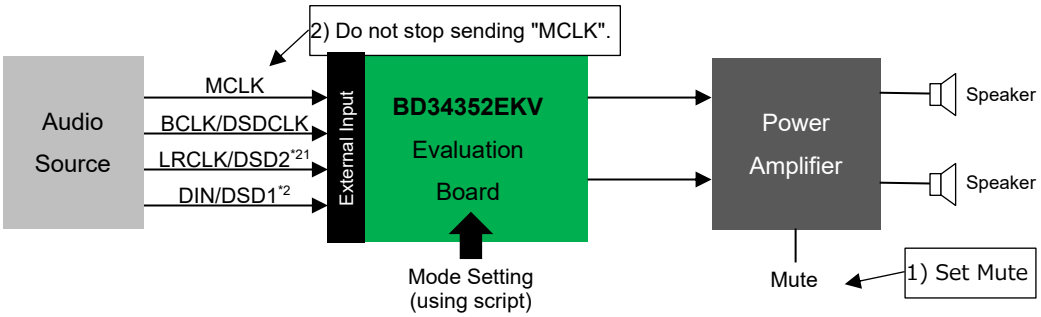
*1 For more detail, refer to Manual in CD-ROM.

Sample script list

Mode	File name
MODE0	BD34352EKV-EVK-001_MODE0_PCM44.1kHz.txt
MODE1	BD34352EKV-EVK-001_MODE1_PCM96kHz.txt
MODE2	BD34352EKV-EVK-001_MODE2_PCM192kHz.txt
MODE3	BD34352EKV-EVK-001_MODE3_PCM768kHz.txt
MODE5	BD34352EKV-EVK-001_MODE5_PCM44.1kHz.txt
MODE6	BD34352EKV-EVK-001_MODE6_PCM96kHz.txt
MODE7	BD34352EKV-EVK-001_MODE7_PCM192kHz.txt
MODE8	BD34352EKV-EVK-001_MODE8_PCM44.1kHz.txt
MODE9	BD34352EKV-EVK-001_MODE9_PCM96kHz.txt
MODEA	BD34352EKV-EVK-001_MODEA_PCM192kHz.txt
MODEB	BD34352EKV-EVK-001_MODEB_PCM384kHz.txt
MODEC	BD34352EKV-EVK-001_MODEC_PCM768kHz.txt
MODED	BD34352EKV-EVK-001_MODED_DSD2.8MHz.txt
MODEE	BD34352EKV-EVK-001_MODEE_DSD5.6MHz.txt
MODEF	BD34352EKV-EVK-001_MODEF_DSD11.2MHz.txt

Mode Change

1) Set to Mute the Power Amplifier connecting Evaluation Board Output to avoid pop-noise when changing Mode.
2) Do not stop input to "MCLK" when changing Mode, while selecting the "External PCM or DSD" input.

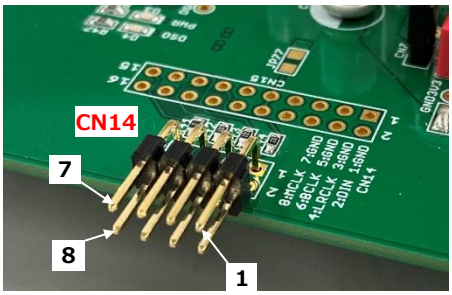


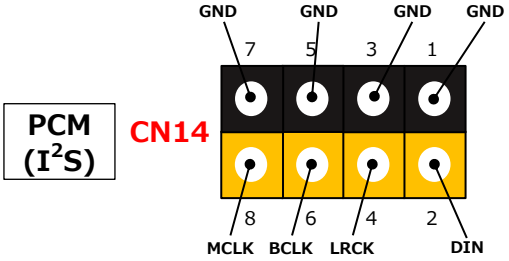
*2 DSD1 and DSD2 are swapped because Register 13h sets to 1h in sample scripts.

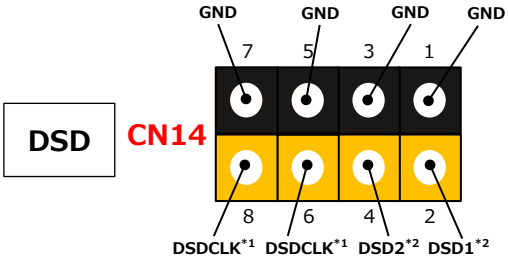
Input Terminal

PCM(I^2S) / DSD Input

Input signal to each pin.





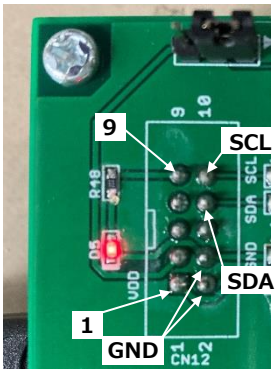


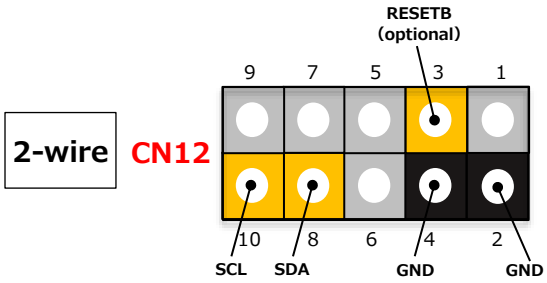
*1 "DSDCLK" should be the input to both 6pin and 8pin of CN14.

*2 DSD1 and DSD2 are swapped because Register 13h sets to 1h in sample script.

2-wire Input

Connect SCL and SDA on the bottom side of the board.





Output Terminal

UNBAL(RCA) - (Default)

The sound quality is tuned using this pin for this EVK.

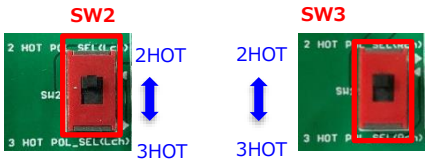
BAL(THRU-XLR)*1 - (Direct Output from IV Conversion Amp *2)

The Polarity of XLR(Hot/Cold) ca be switched by SW2, SW3.

*1 This terminal is direct output from IV Conversion Amp.
*2 Refer to P2, Evaluation Board Block Diagram.

XLR Output Polarity	Switch Position	
	SW2(Lch)	SW3(Rch)
2-HOT, 3-COLD	"2HOT"*3	"2HOT"
2-COLD, 3-HOT	"3HOT"*3	"3HOT"

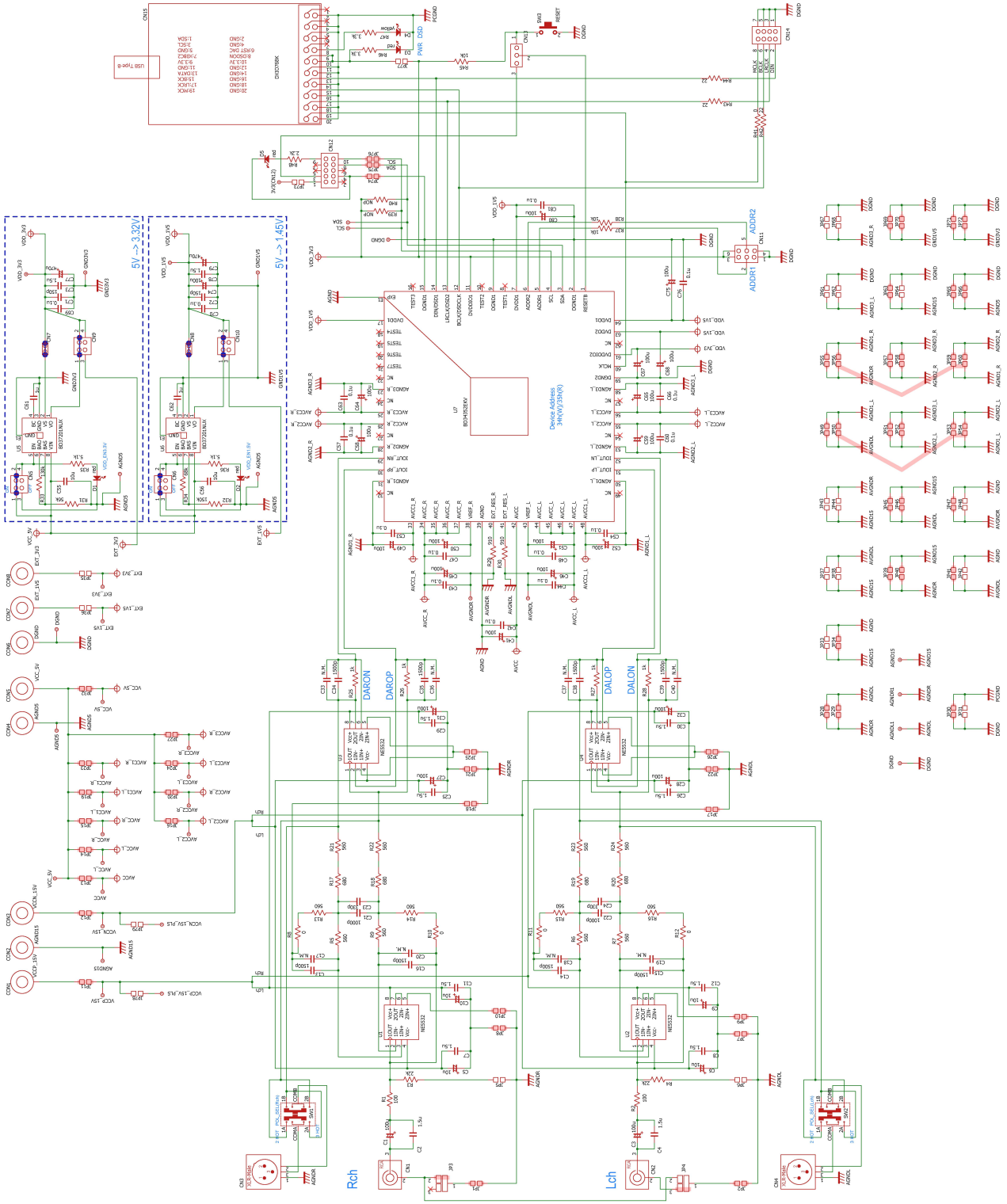
*3 Polarity inverted by register 14h in sample script.



Polarity Switch for XLR Output

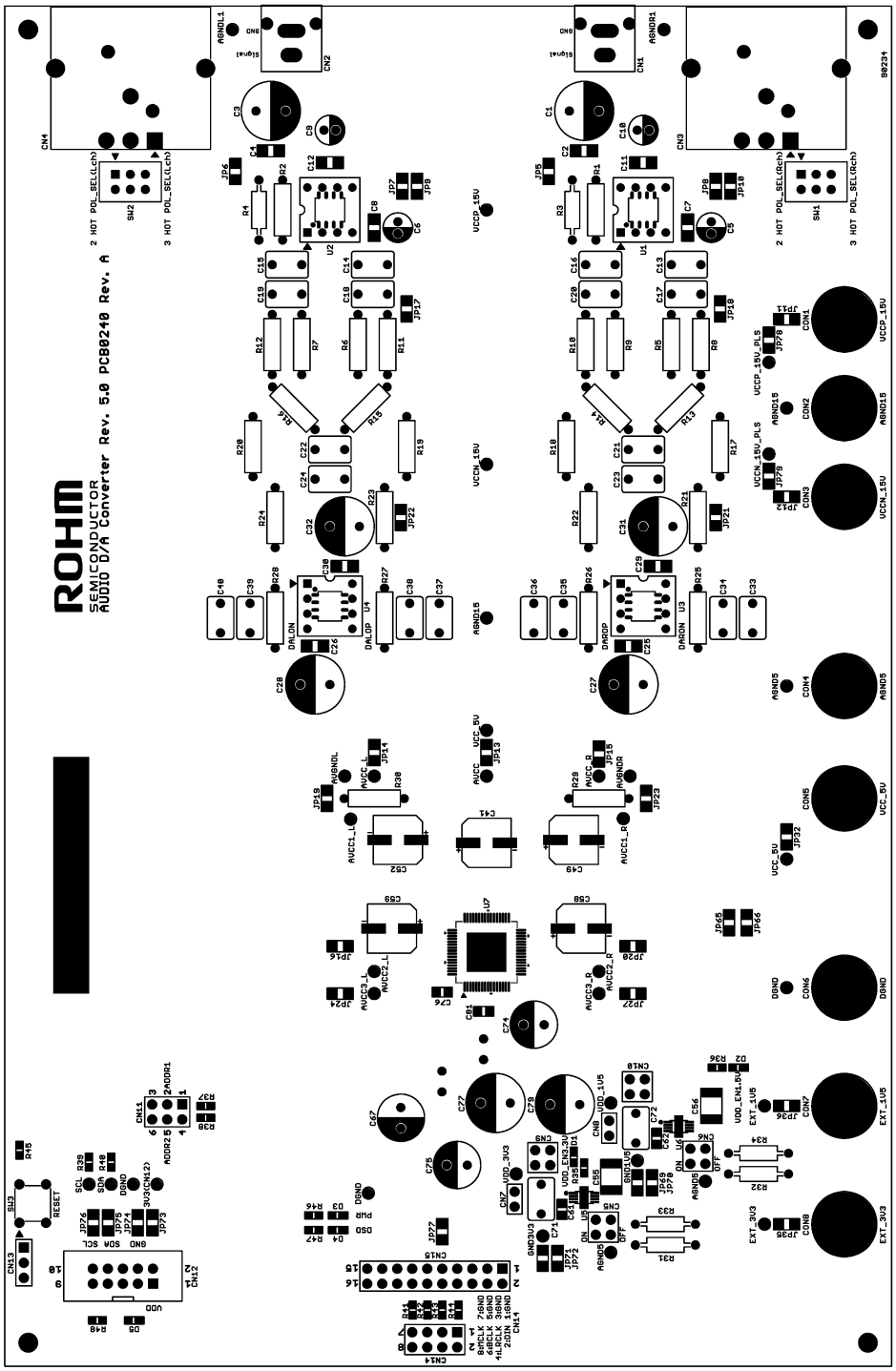
Evaluation Board Schematic

Click inside Circuit Diagram area to open high resolution Circuit Diagram.

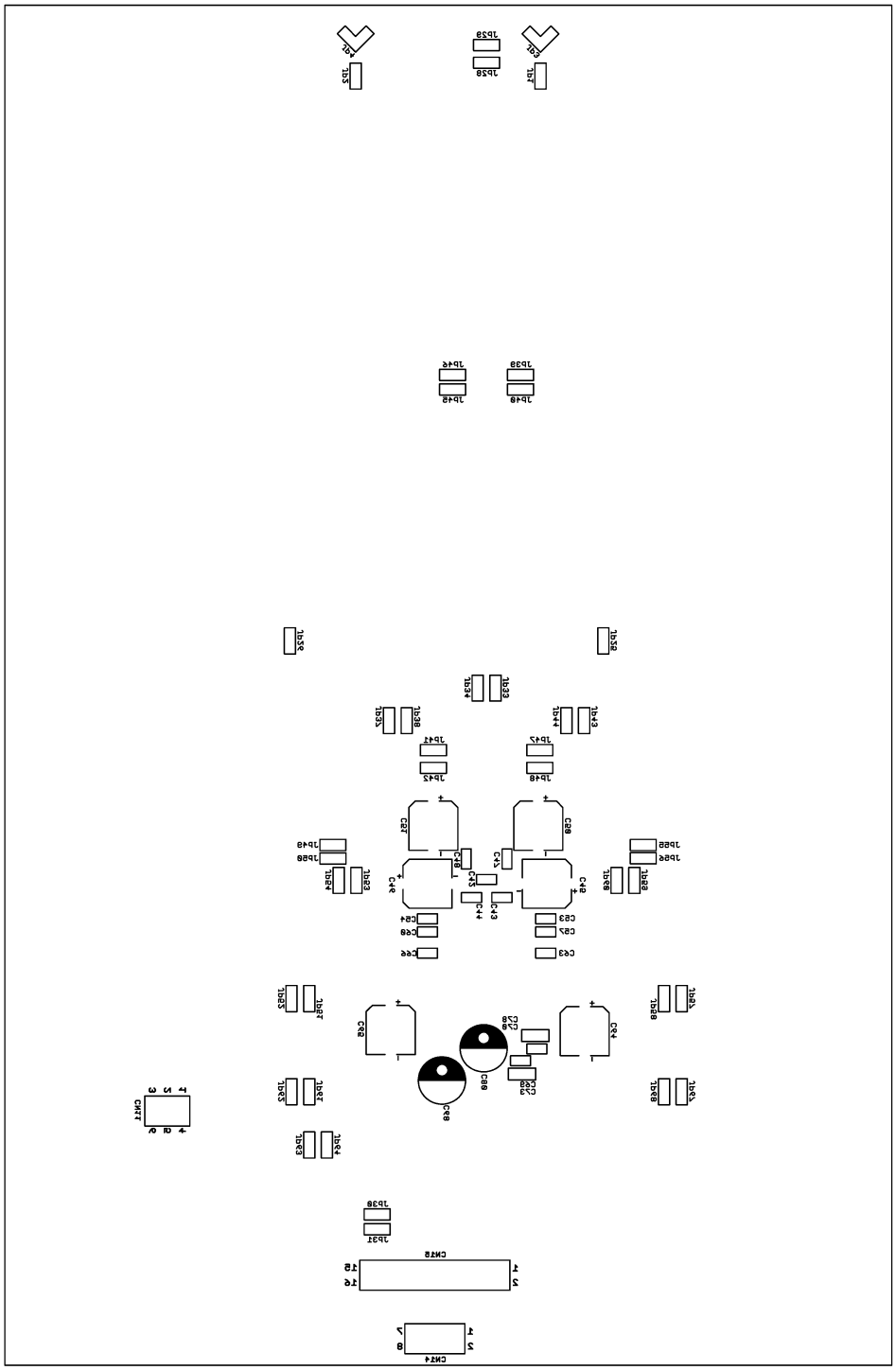


PCB Patterns

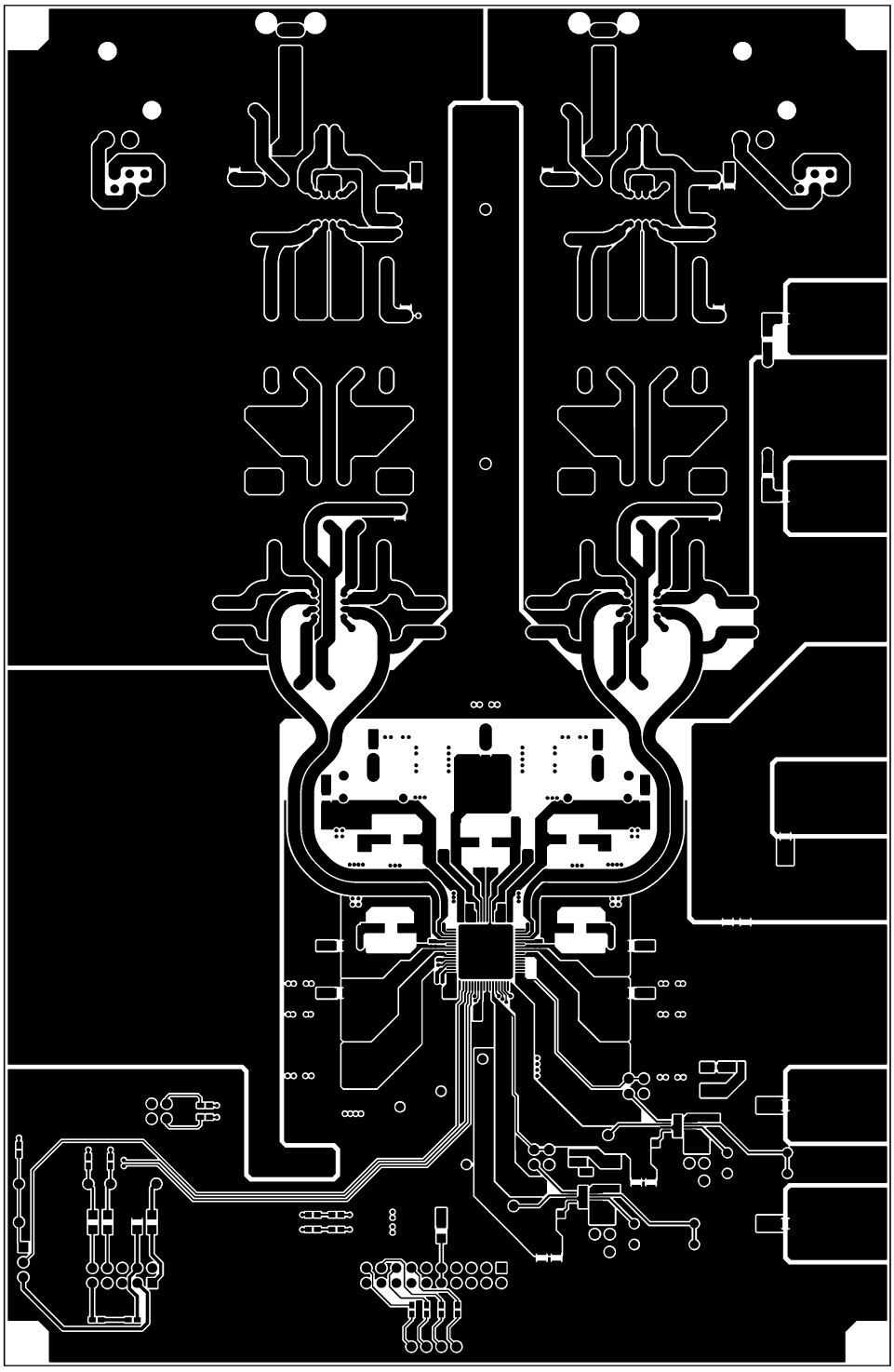
Top Silkscreen Overlay



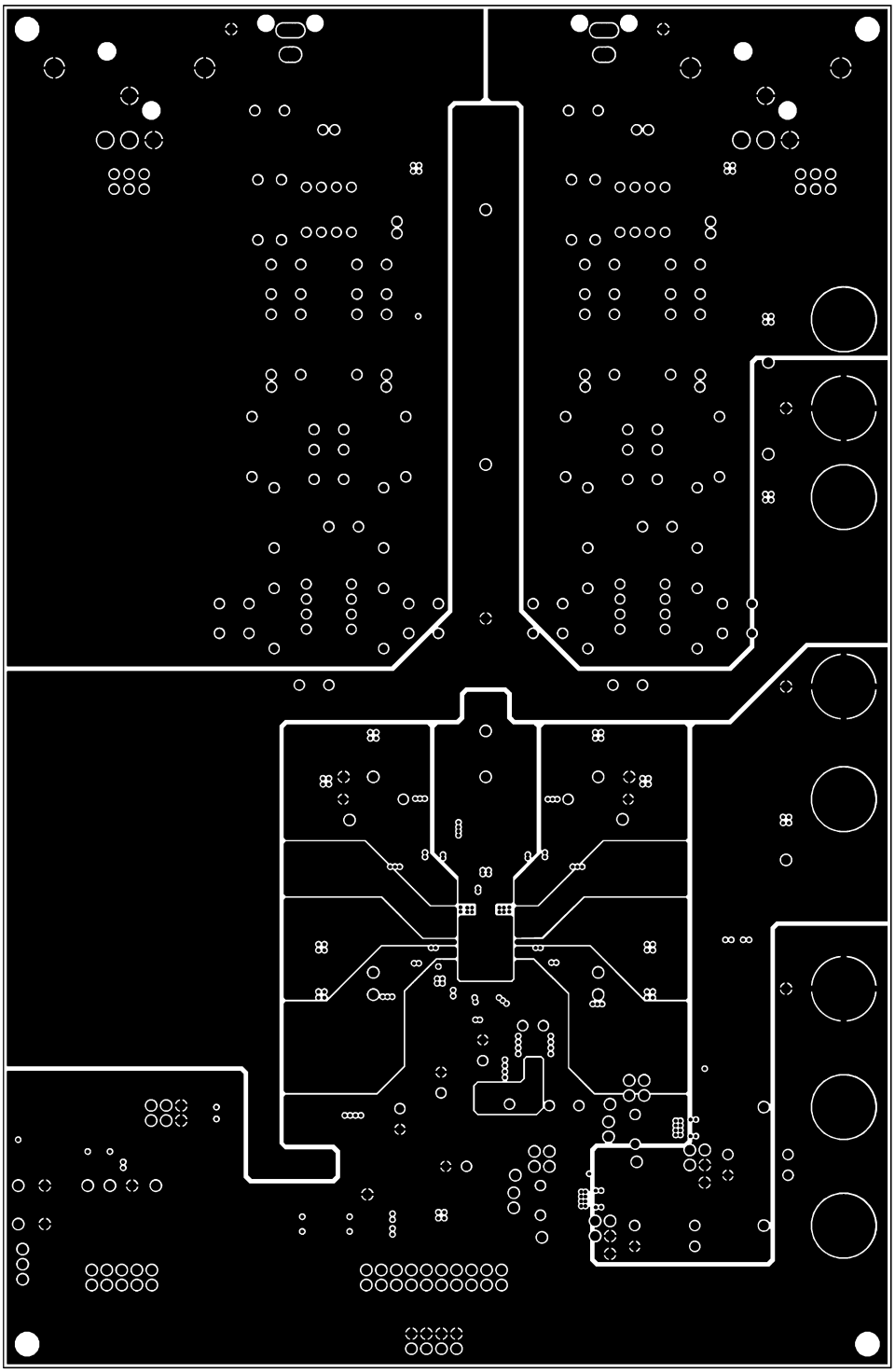
Bottom Silkscreen Overlay



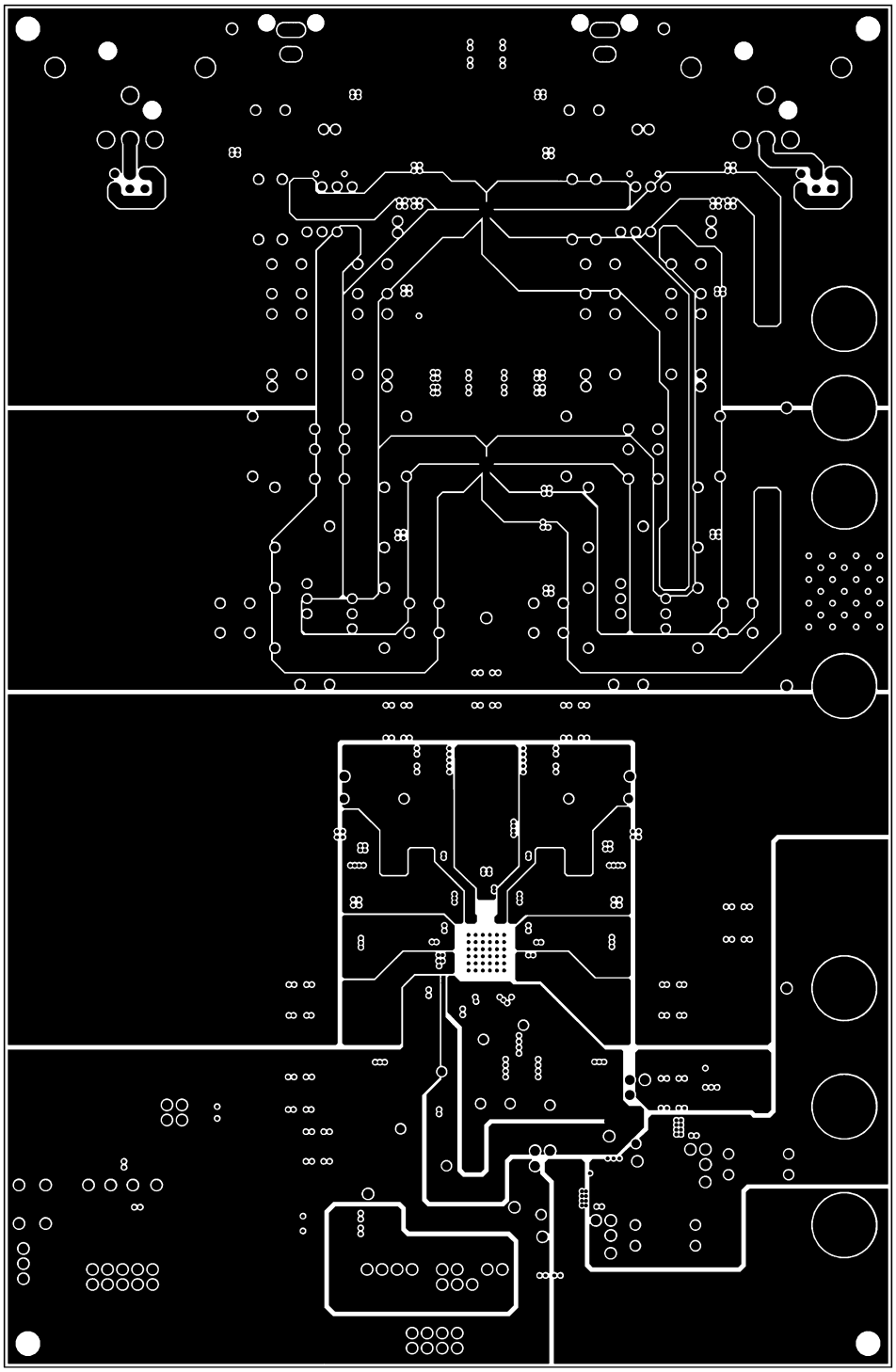
TOP Layer



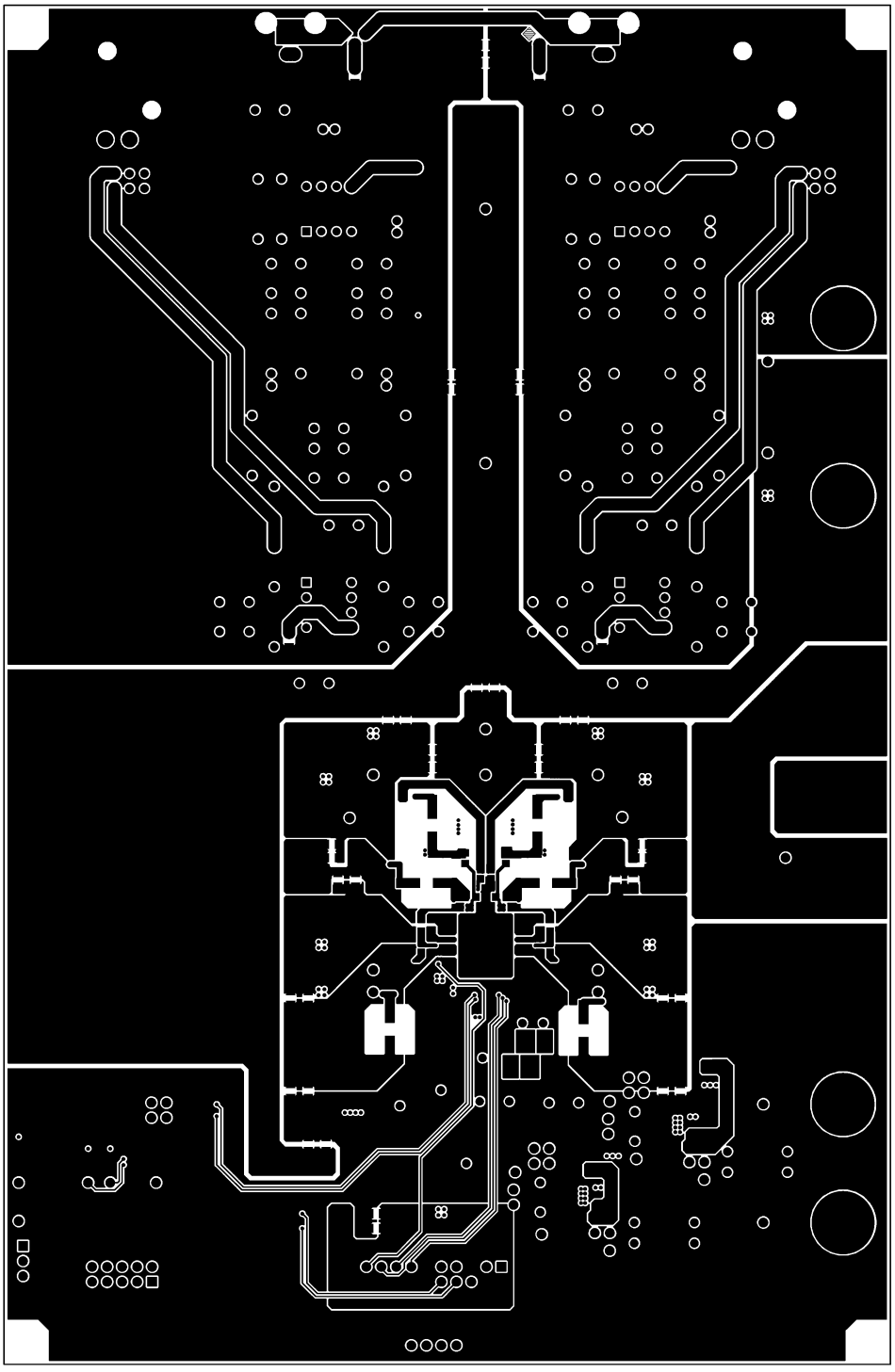
M1 Layer



M2 Layer



Bottom Layer



Bill of Materials

Type	Quantity	Value	Component No.	Manufacturer	Product No.
Capacitor	6	100 µF	C1,C3,C27,C28,C31,C32	ELNA	RFS-16V101MH3#5
	12	1.5 µF	C2,C4,C7,C8,C11,C12,C25,C26,C29, C30,C73,C78	Rubycon	16MU155MA23216
	4	10 µF	C5,C6,C9,C10	ELNA	RFS-35V100ME3#5
	8	1500 pF	C13,C14,C15,C16,C34,C35,C38,C39	WIMA	FKP2D011501D00
	2	1000 pF	C21,C22	WIMA	FKP2D011001D00
	2	330 pF	C23,C24	WIMA	FKP2D003301D00
	2	150 pF	C71,C72	WIMA	FKP2D001501D00
	11	100 µF	C41,C45,C46,C49,C50,C51,C52,C58, C59,C64,C65	NIPPON CHEMI-CON	EMAR160ADA101MH63G
	15	0.1 µF	C42,C43,C44,C47,C48,C53,C54,C57, C60,C63,C66,C69,C70,C76,C81	TDK	C2012X7R1H104K085AA
	2	10 µF	C55,C56	Rubycon	16MU106MC44532
	2	1 µF	C61,C62	MURATA	GRM21BB31E105KA98L
	5	100 µF	C67,C68,C74,C75,C80	Nichicon	PLF1C101MDL4TD
	2	470 µF	C77,C79	Toshin Kogyo	1CUTSJ471M0
Connector	1	COAX_JACK	CN1	SMK	LPR6520-0802
	1	COAX_JACK	CN2	SMK	LPR6520-0803
	2	XLR-M	CN3,CN4	Switchcraft	PQG3MRA112
	5	Red	CON1,CON5,CON7,CON8	Sato Parts	TJ-563-R
	1	White	CON3	Sato Parts	TJ-563-W
	3	Black	CON2,CON4,CON6	Sato Parts	TJ-563-B
LED	4	Red	D1,D2,D3,D5	ROHM	SML-E12V8WT86P
	1	Yellow	D4	ROHM	SML-E12Y8WT86
Registor	2	100 Ω	R1,R2	Am Transformer	AMRT 1/2W 100Ω
	12	560 Ω	R5,R6,R7,R9,R13,R14,R15,R16,R21, R22,R23,R24	Am Transformer	AMRT 1/2W 560Ω
	4	680 Ω	R17,R18,R19,R20	Am Transformer	AMRT 1/2W 680Ω
	4	1 kΩ	R25,R26,R27,R28	Am Transformer	AMRT 1/2W 1kΩ
	4	0 Ω	R8,R10,R11,R12	–	Steal Wire
	2	910 Ω	R29,R30	Am Transformer	AMRT 1/2W 910Ω
	2	22 kΩ	R3,R4	KOA	MF1/4CC2202F
	1	56 kΩ	R31	Yageo	MFR-25F(B)RF52-56K
	1	150 kΩ	R32	Yageo	MFR-25FBF52-150K
	1	130 kΩ	R33	Yageo	MFR-25FBF52-130K
	1	68 kΩ	R34	KOA	MF1/4CC 6802F
	2	5.1 kΩ	R35,R36	KOA	RK73B1JTTD512J
	3	10 kΩ	R37,R38,R45	KOA	RK73B1JTTD103J
	1	0 Ω	R41	KOA	RK73Z1JTTD
	3	22 Ω	R42,R43,R44	KOA	RK73B1JTTD220J
	2	3.3 kΩ	R46,R47	KOA	RK73B1JTTD332J
	1	2.2 kΩ	R48	KOA	RK73B1JTTD222J
Switch	2	DPDT Switch	SW1,SW2	NKK Switches	SS-22SDP2
	1	Tactile Switch	SW3	Alps Alpine	SKHHAJA010
IC	4	Op-amp	U1,U2,U3,U4	Texas Instruments	NE5532ADR
	2	Audio Regulator	U5,U6	ROHM	BD37201NUX
	1	DAC	U7	ROHM	BD34352EKV

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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ROHM SEMICONDUCTOR

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