

# IS31AP4913 3D AND BASS ENHANCE STEREO HEADPHONE DRIVER EVALUATION BOARD GUIDE

## DESCRIPTION

The IS31AP4913 evaluation board is a fully assembled and tested PCB. The IS31AP4913 is a high quality stereo headphone driver with 3D and bass enhance designed to allow the removal of the output DC-blocking capacitors for reduced component count and cost. The features 3D and bass can be externally adjusted via a simple RC network.

## FEATURES

- Supply voltage range from 2.7V to 5.5V
- Low output noise (8 $\mu$ V)
- High SNR (102dB)
- -92dB PSRR
- No output DC-blocking capacitors
- Pulse Count Control serial interface
- Available in QFN-20(3mm  $\times$  3mm) package

## QUICK START

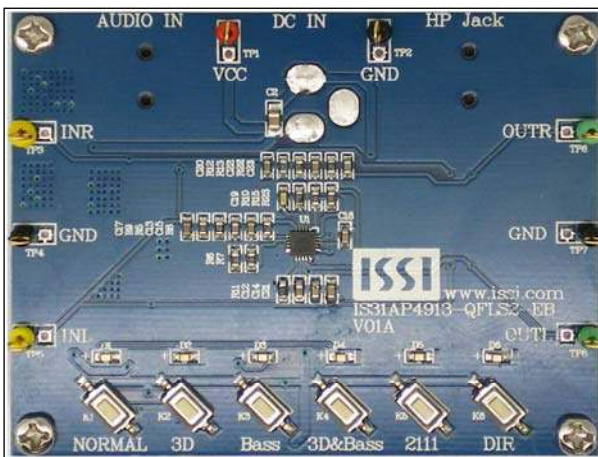


Figure 1: Photo of IS31AP4913 Evaluation Board

## RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply
- Audio source (i.e. MP3 player, Notebook PC, etc.)
- Headphone (32 $\Omega$ )

## ABSOLUTE MAXIMUM RATINGS

- $\leq$  5.5V power supply

**Caution: Do not exceed the conditions listed above; otherwise the board will be damaged.**

## PROCEDURE

Follow the steps listed below to verify IS31AP4913 evaluation board operation.

**Caution: Do not turn on the power supply until all connections are completed.**

- 1) Connect headphone (32 $\Omega$ ) to the connector (HP Jack).
- 2) Connect the ground terminal of the power supply to the GND and the positive terminal to the VCC. Or connect DC power to connector (DC IN).
- 3) Connect the audio sources to the INR terminal (right channel) and INL terminal (left channel); or connect audio sources to the connector (AUDIO IN).
- 4) Turn on the power supply, and pay attention to the supply current. If the current exceeds 200mA, please check for circuit fault.
- 5) Turn on the audio sources.

## ORDERING INFORMATION

Part No.	Temperature Range	Package
IS31AP4913-QFLS2-EB	-40°C to +85°C (Industrial)	QFN-20, Lead-free

Table 1: Ordering Information

For pricing, delivery, and ordering information, please contacts Lumissil's analog marketing team at [analog@Lumissil.com](mailto:analog@Lumissil.com) or (408) 969-6600.

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## PERFORMANCE DESCRIPTION

The IS31AP4913 evaluation board has six buttons to switch between the different modes. The operating mode is indicated by an LED illuminated above the appropriate buttons. The (1~4) modes are performed by IS31AP4913.

- 1) (Default mode) normal: basic operating mode
- 2) 3D mode: enable 3D enhance function.
- 3) Bass mode: enable bass enhance function.
- 4) 3D&Bass: enable 3D and bass enhance function.
- 5) 2111: use the output DC-blocking capacitors headphone amplifier (HWD2111) drive headphone
- 6) DIR: use the input audio source direct drive headphone.

**Note:** The IS31AP4913 headphone driver provides solely audio function capability on the evaluation board.

## SOFTWARE SUPPORT

Please refer to the integrated program.

**Note:** Please refer to the datasheet to get more information about IS31AP4913.

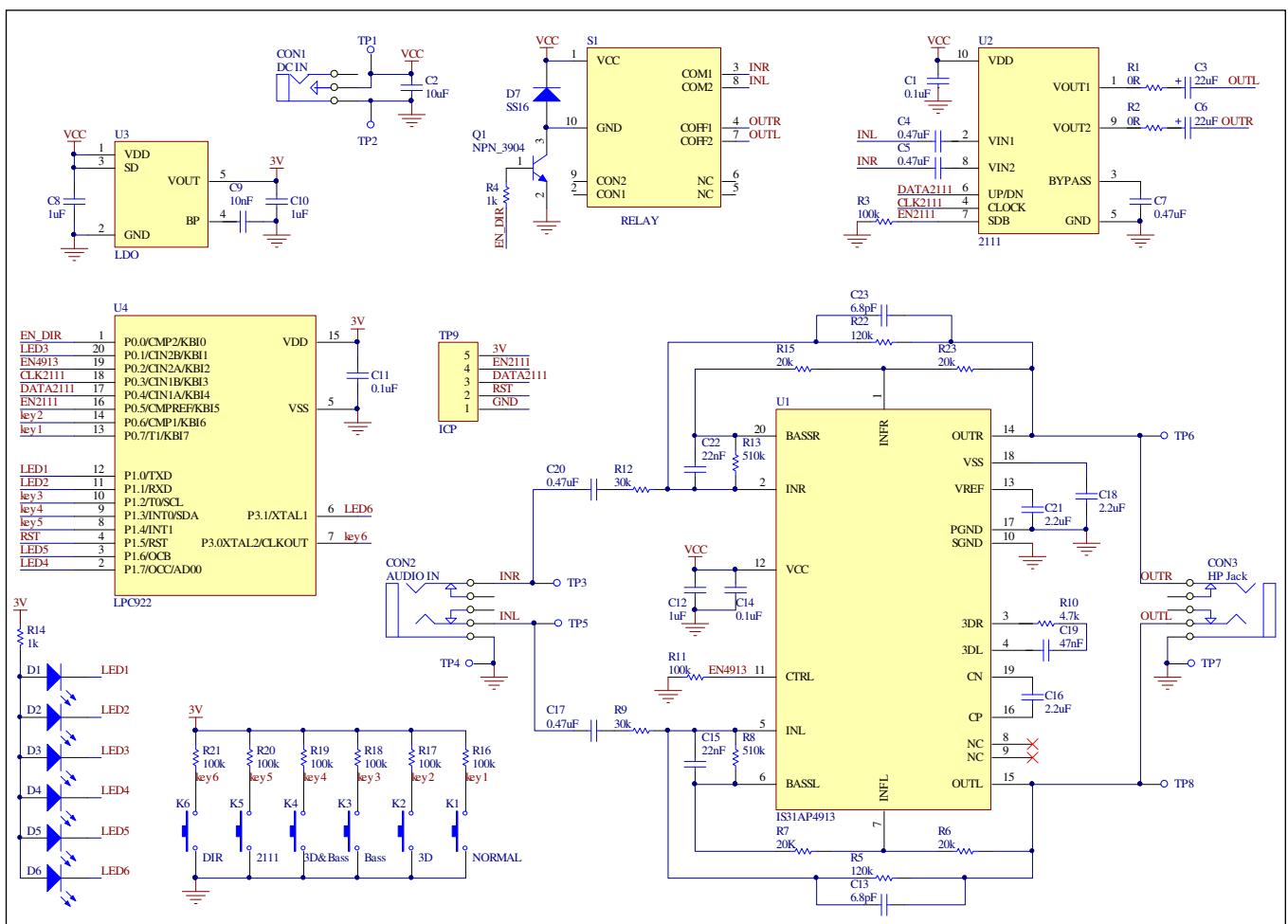


Figure 2: IS31AP4913 Application Schematic

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## BILL OF MATERIALS

Name	Symbol	Description	Qty	Supplier	Part No.
Audio Amplifier	U1	3D,Bass Stereo Headphone Driver	1	Lumissil	IS31AP4913
Audio Amplifier	U2	Headphone Amplifier	1	HWD	HWD2111
LDO	U3	LDO	1	PAM	PAM3101
MCU	U4	Microcontroller	1	NXP	LPC922
Relay	S1	Relay, 5V	1	Panasonic	TQ2-5V
Transistor	Q1	Transistor, NPN,3904	1	Avic	MMBT3904LT1
Diode	D1~D6	Diode, LED Blue, SMD	6	Everlight	19-217/BHC-ZL1M2RY/3T
Resistor	R1,R2	RES,0Ω,1/16W,±5%,SMD	2	Yageo	RL0603JR-0700RL
Resistor	R3,R11	RES,100k,1/16W,±5%,SMD	2	Yageo	RC0603JR-07100KL
Resistor	R4,R14	RES,1k,1/16W,±5%,SMD	2	Yageo	RC0603JR-071KL
Resistor	R5,R22	RES,120k,1/16W,±1%,SMD	2	Yageo	RC0603FR-07120KL
Resistor	R6,R7,R15,R23	RES,20k,1/16W,±1%,SMD	4	Yageo	RC0603FR-0720KL
Resistor	R8,R13	RES,510k,1/16W,±5%,SMD	2	Yageo	RC0603JR-0720KL
Resistor	R9,R12	RES,30k,1/16W,±1%,SMD	2	Yageo	RC0603FR-0730KL
Resistor	R10	RES,4.7k,1/16W,±5%,SMD	1	Yageo	RC0603JR-074K7L
Resistor	R16~R21	RES,10k,1/16W,±5%,SMD	6	Yageo	RC0603JR-0710KL
Capacitor	C1,C11,C14	CAP,0.1μF,50V,±10%,SMD	3	Yageo	CC0603KKX7R9BB106
Capacitor	C2	CAP,10μF,16V,±20%,SMD	1	Yageo	CC0805KKX7R6BB106
Capacitor	C3,C6	CAP,22μF,25V,±20%,SMD	2	Yageo	
Capacitor	C4,C5,C7	CAP,0.47μF,50V,±10%,SMD	3	Yageo	CC0603KKX7R9BB474
Capacitor	C8,C10,C12	CAP,1μF,50V,±10%,SMD	3	Yageo	CC0603KKX7R9BB105
Capacitor	C9	CAP,10nF,50V,±10%,SMD	1	Yageo	CC0603KKX7R9BB103
Capacitor	C13,C23	CAP,6.8pF,50V,±10%,SMD	2	Yageo	CC0603KKX7R9BB6P8
Capacitor	C15,C22	CAP,22nF,50V,±10%,SMD	2	Yageo	CC0603KKX7R9BB103
Capacitor	C16,C18,C21	CAP,2.2μF,16V,±10%,SMD	3	Yageo	CC0603KKX7R7BB225
Capacitor	C17,C20	CAP,0.47μF,50V,±10%,SMD	2	Yageo	CC0603KKX7R9BB474
Capacitor	C19	CAP,47nF,50V,±10%,SMD	1	Yageo	CC0603KKX7R9BB473
Connector	DC IN	2.5mm DC connector	1		
Connector	AUDIO IN	3.5mm mini connector	1		
Connector	HP Jack	3.5mm mini connector	1		

Bill of Materials, refer to Figure 2 above.

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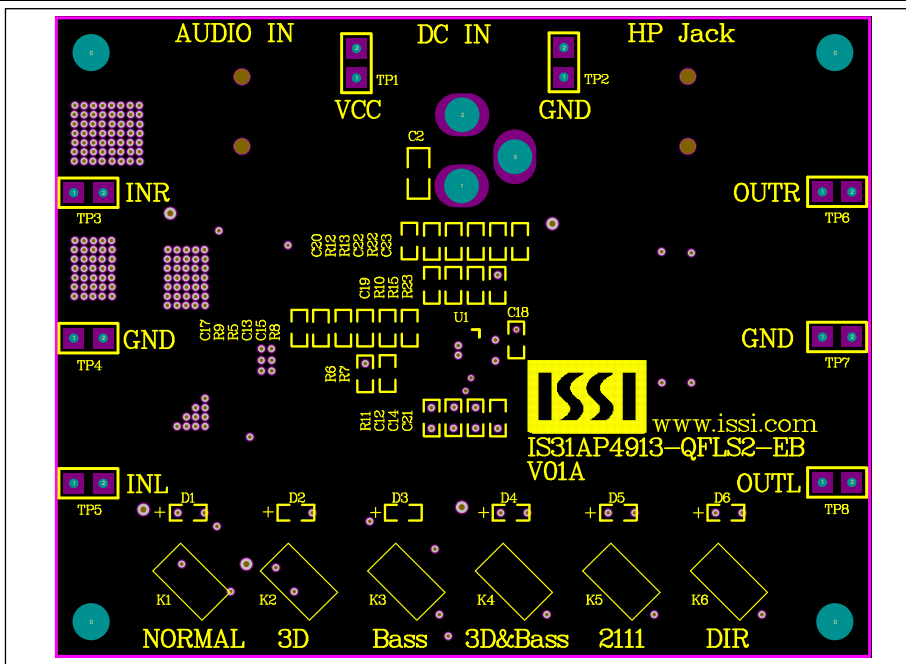


Figure 3: Board Component Placement Guide - Top Layer

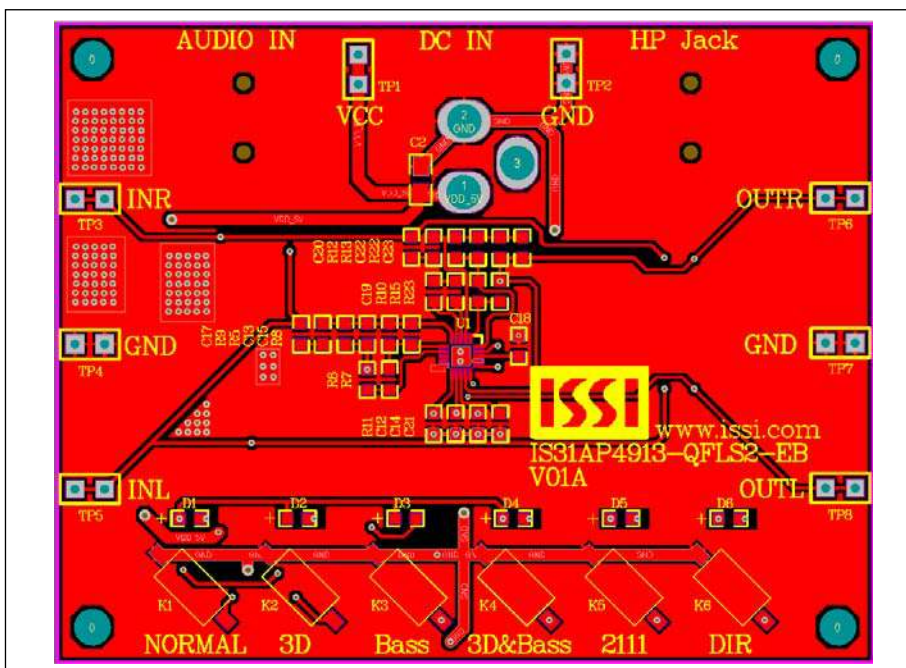


Figure 4: Board PCB Layout - Top Layer

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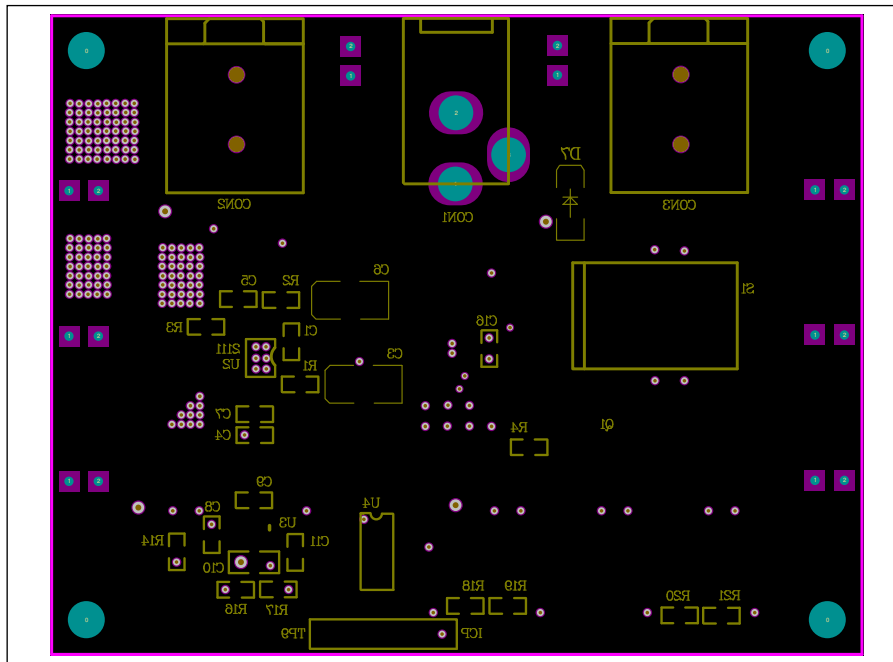


Figure 5: Board Component Placement Guide - Bottom Layer

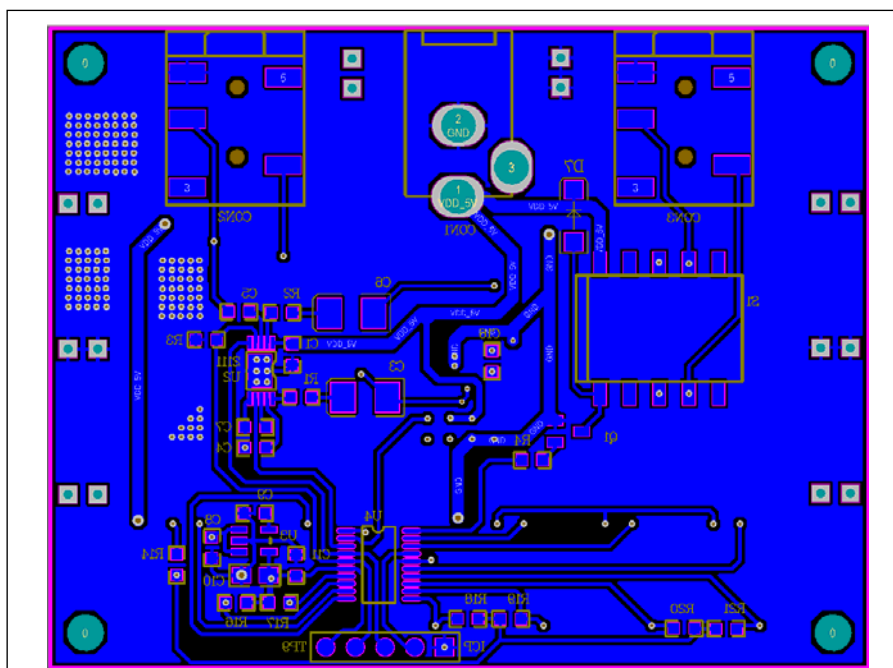


Figure 6: Board PCB Layout - Bottom Layer

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