



EB-TA2024

2x15W Class-T Digital Audio Amplifier Evaluation Board using Digital Power Processing™ Technology

Technical Information

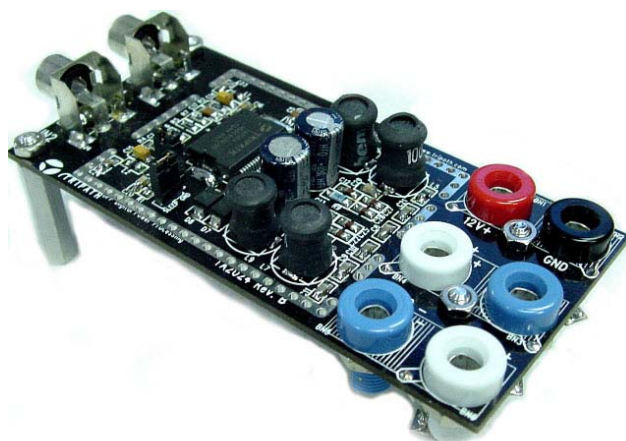
Revision B - April 2002

GENERAL DESCRIPTION

The EB-TA2024 evaluation board is based on the TA2024, digital audio power amplifier from Tripath Technology. The board is designed to provide a simple and straightforward environment for the evaluation of the Tripath TA2024. The board can be connected to a +12V supply using cables with standard banana connectors. Audio inputs are via standard RCA jacks. The TA2024 provides amplification for two channels of audio. Signal outputs are on four banana connectors to which any 4Ω or 8Ω passive speakers may be connected.

Features

- Class-T architecture
- Proprietary Digital Power Processing™ Technology
- Requires single +12V power source
- Output Power (per channel @ $V_S = 12V$):
 - 15W per channel (4Ω, 10% THD+N)
 - 10W per channel (4Ω 0.1%, THD+N)
- Easy engineering evaluation platform for Tripath Technology's TA2024 product
- "Audiophile performance" typically:
 - 0.04% THD+N (9Wrms, 4Ω)
 - 0.18% IHF-IM (1Wrms, 4Ω)
- Efficiency - >88% @ full power ($R_L = 8\Omega$)
- No heat sink required up to 15W per channel
- MUTE and SLEEP inputs
- Turn-on & turn-off pop suppression
- Intelligent short-circuit protection
- Intelligent over-temperature protection
- Connects to any passive 4/8Ω speakers
- Takes standard audio line output from any sound system
- Cost-effective 2-layer PCB design
- 36-pin Power SOP package



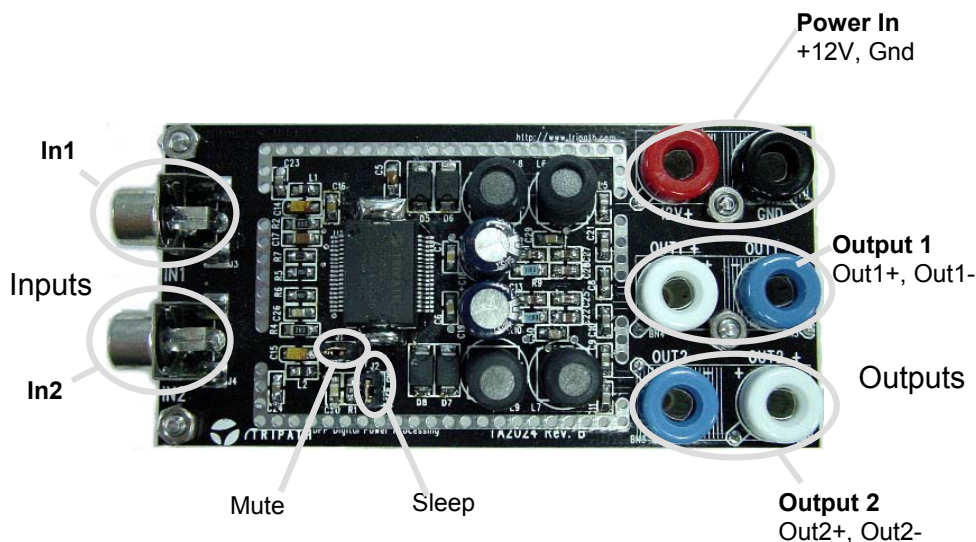
TA2024 Evaluation Board

Introduction

The EB-TA2024 was designed to provide the designer with a simple means of evaluating the performance and functionality of the TA2024 2x15W amplifier IC from Tripath Technology. The EB-TA2024 is very simple to operate and requires only the following to evaluate:

- Stereo signal source
- 12V power supply (*not to exceed 13.2V*)
- Two loads (*4-Ohm minimum*)

For more information on the TA2024, please refer to the TA2024 datasheet (www.tripath.com).



EB-TA2024 Board

Connection and Operation

Figure 1 shows the connections required for proper operation of the EB-TA2024.

Input Connection

Audio input to the board is provided via two RCA female connectors.

Connector Name	Channel
IN1	Channel 1 Input
IN2	Channel 2 Input

Power Connection

The TA2024 requires a +12V power supply (13.2V max) to operate.

Power to the board is provided via the red and black female banana connectors. The positive 12V from the power supply connects to the red banana connector labeled 12V+. The ground connection of power supply attaches to the black banana connector labeled GND.

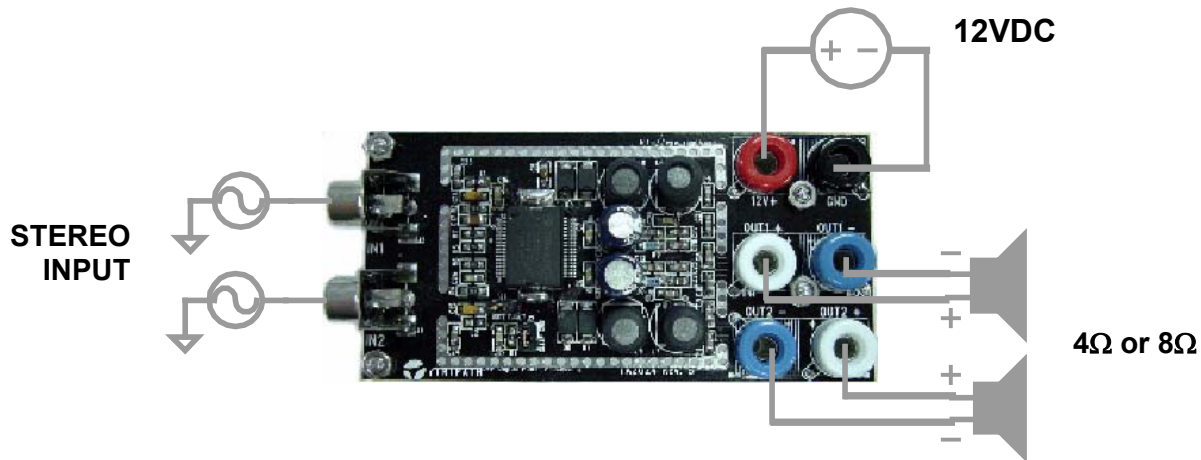


Figure 1: EB-TA2024 Connections

Connector Label	Description	Color
12V+	Positive of the 12V Power supply	Red
GND	Negative (GND) of 12V Power Supply	Black

Warning: Do not exceed Maximum Operating Supply Voltage of 13.2V

Output Connection

There are four female banana connectors on the evaluation board for speaker output. The TA2024 has differential outputs (bridged) so it requires two wires per channel to connect to each speaker.

Connector Label	Description	Color
Out1+	Positive output of Channel 1	White
Out1-	Negative output of Channel 1	Blue
Out2+	Positive output of Channel 2	White
Out2-	Negative output of Channel 2	Blue

Jumper Settings

There are two jumpers on the EB-TA2024 board, which should both be connected (shorted) for normal operation. Jumper, J1 connects the FAULT output to the MUTE pin, allowing the part to Mute itself when a Fault condition (over-current, etc.) is detected. Jumper, J2 connects the SLEEP pin to GND, effectively disabling SLEEP for normal operation. If J2 is removed, the part will go into SLEEP mode.

Jumper	Purpose
J1	Connects FAULT to MUTE
J2	Connects SLEEP to GND

Gain Settings

The TA2024 amplifier gain can be adjusted by modifying external resistor values. R2 and R5 are used to set the gain for Channel 1, while R4 and R6 set the gain for Channel 2.

The equation for the gain setting is:

$$A_V = 12 \cdot \left(\frac{R_f}{R_i} \right)$$

Where,

$$\text{For channel 1: } A_{V_ch1} = 12 \cdot \left(\frac{R5}{R2} \right) \quad \text{For channel 2: } A_{V_ch2} = 12 \cdot \left(\frac{R6}{R4} \right)$$

For a more detailed description, please refer to the TA2024 data sheet.

Performing Measurements on the EB-TA2024

The TA2024 operates by generating a high frequency switching signal based on the audio input. This signal is sent through a low-pass filter that recovers an amplified version of the audio input. The frequency of the switching pattern is spread spectrum in nature and typically varies between 100kHz and 1MHz, which is well above the 20Hz – 20kHz audio band. The pattern itself does not alter or distort the audio input signal, but it does introduce some inaudible components.

The measurements of certain performance parameters, particularly noise related specifications such as THD+N, are significantly affected by the design of the low-pass filter used on the output as well as the bandwidth setting of the measurement instrument used. Unless the filter has a very sharp roll-off just beyond the audio band or the bandwidth of the measurement instrument is limited, some of the inaudible noise components introduced by the TA2024 amplifier switching pattern will degrade the measurement.

One feature of the TA2024 is that it does not require large multi-pole filters to achieve excellent performance in listening tests, usually a more critical factor than performance measurements. Though using a multi-pole filter may remove high-frequency noise and improve THD+N type measurements (when they are made with wide-bandwidth measuring equipment), these same filters degrade frequency response. The EB-TA2024 Evaluation Board has a simple two-pole output filter with excellent performance in listening tests.

(See Application Note 4 for more information on bench testing with Tripath Class-T amplifiers)

EMI and Shielding

The TA2024 evaluation board has perforated holes around the amplifier and associated circuitry so that an EMI shield can be soldered directly to the board. Due to the spread-spectrum nature of the Class-T amplifier (the energy is spread across a wider spectrum, instead of being concentrated at a single frequency), we have found that specific EMI shielding is typically not necessary for most applications where the amplifier board is mounted inside a chassis. However, a shield perimeter is still provided for use in more sensitive applications.

(See Application Note 11 for more information on EMI)

Contact Information

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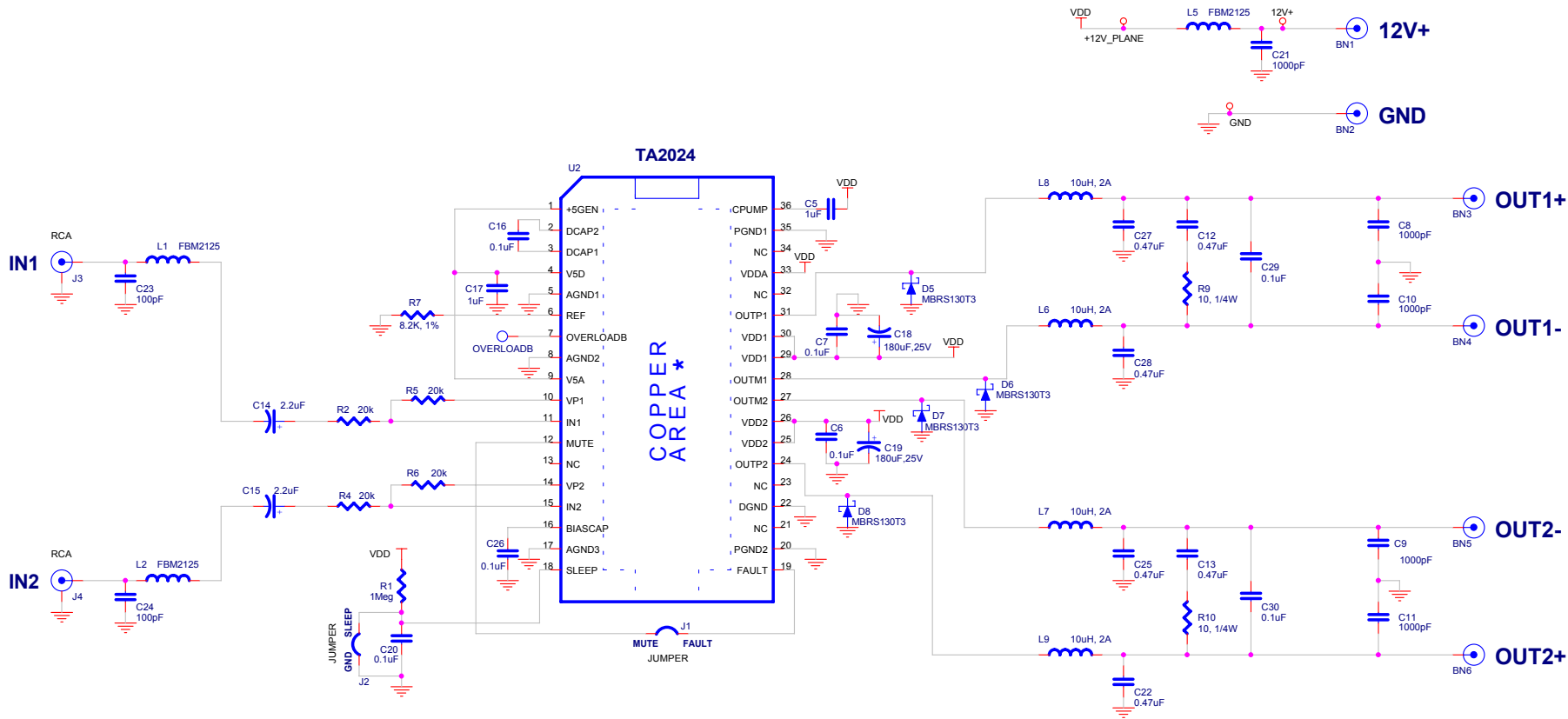
For more Sales Information, please visit us @ www.tripath.com/cont_s.htm

For more Technical Information, please visit us @ www.tripath.com/data.htm

TA2024 Eval Board Revision: B

Bill Of Materials

Quantity	Reference		Part	Size
2	C23,C24	Capacitor	100pF	805
5	C8,C9,C10,C11,C21	Capacitor	1000pF	805
7	C6,C7,C16,C20,C26,C29, C30	Capacitor	0.1uF	805
6	C12,C13,C22,C25,C27,C28	Capacitor	0.47uF	805
1	C5	Capacitor	1uF	3216
1	C17	Capacitor	1uF	1206
2	C15,C14	Capacitor	2.2uF	3216
2	C18,C19	Capacitor	180uF, 25V 105°C Panasonic HFQ or equiv.	150\300
2	R10,R9	Resistor	10, 1/8W	1206
1	R7	Resistor	8.2K, 1%	805
2	R6,R5	Resistor	20k	805
2	R4,R2	Resistor	20k	1206
1	R1	Resistor	1Meg	805
3	L1,L2,L5	Ferrite Bead	Ferrite Bead FBM2125	805
4	L6,L7,L8,L9	Inductor	Power Inductor 10uH, 2A Toko 8RDY or equiv.	200\400
1	U2	Class-T Amplifier IC	TA2024	
4	D5,D6,D7,D8	Diode	MBRS130T3	
6	BN1, BN2, BN3, BN4, BN5, BN6	Connector	PCB Mount BANANA Jack	
1	J1	Connector	0.1" Header 2-pin	
1	J2	Connector	0.1" Header 2-pin	
2	J3, J4	Connector	PCB Mount RCA Jack	
4		Standoffs		



NOTES:

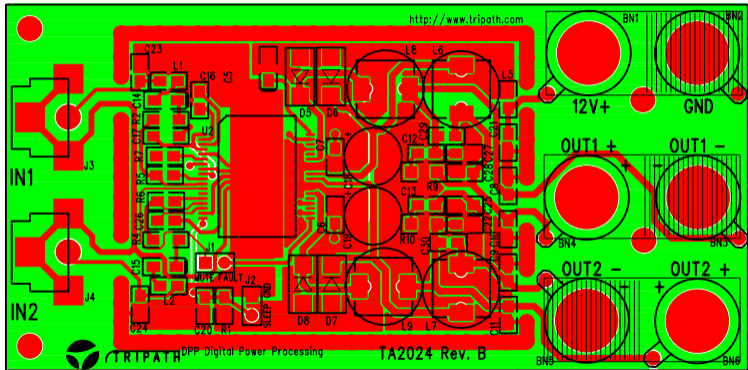
- TA2024 inputs have a DC bias of 2.5V. If input preamp circuitry is NOT biased at 0V, C14 and C15 may need to be reversed.
- The MUTE function can be optionally tied to the FAULT pin to allow for an automatic reset in the event of an over current FAULT.

- ★ 3 sq. in. of 1oz. copper directly under TA2024 on solder side of PC board with a 5 x 16 array of 14mil vias.
Package of TA2024 must be soldered to this area.

<http://www.tripath.com>

Tripath Technology, Inc.		
Title TA2024 Evaluation Board		
Size B	Document Number	Rev B
Date:	Monday, January 21, 2002	Sheet 1 of 1

3860Mils

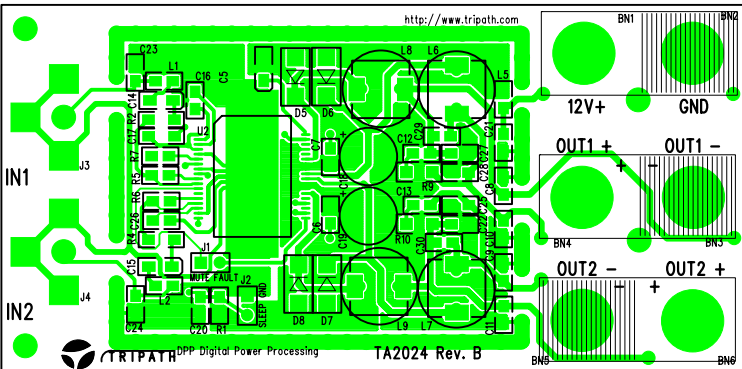


1900Mils

VIEWED FROM COMPONENT SIDE
TOP SILKSCREEN

3860Mils

<http://www.tripath.com>



1900Mils

TRIPATH

DPP Digital Power Processing

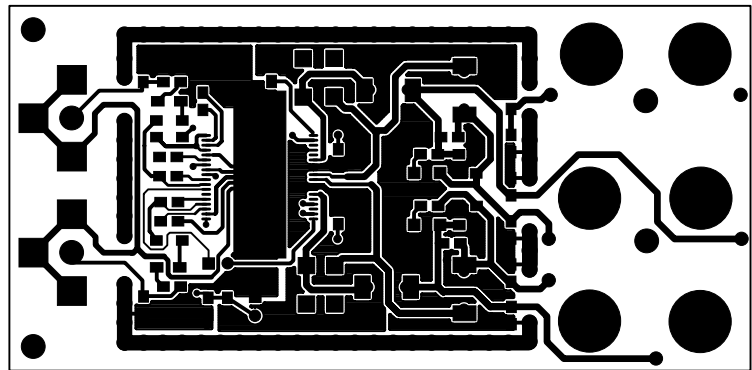
TA2024 Rev. B

VIED FROM COMPONENT SIDE
TOP SILKSCREEN

3860Mils

1900Mils

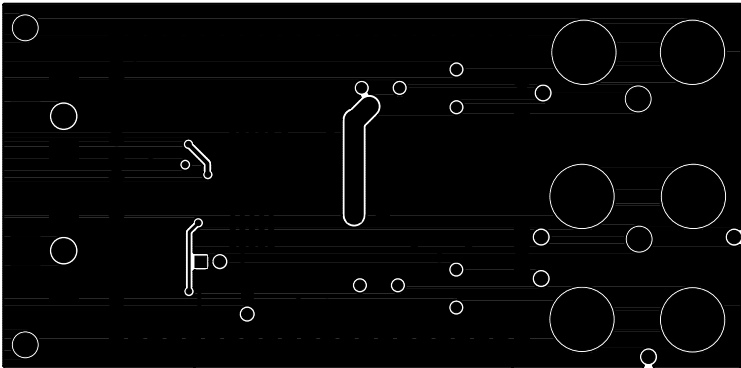
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3860Mils

1900Mils

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BOTTOM ETCH



Tripath Technology EB_TA2024 REV B.pcb
Drill Drawing

