crosstimbers audio

TDA7297 Amplifier

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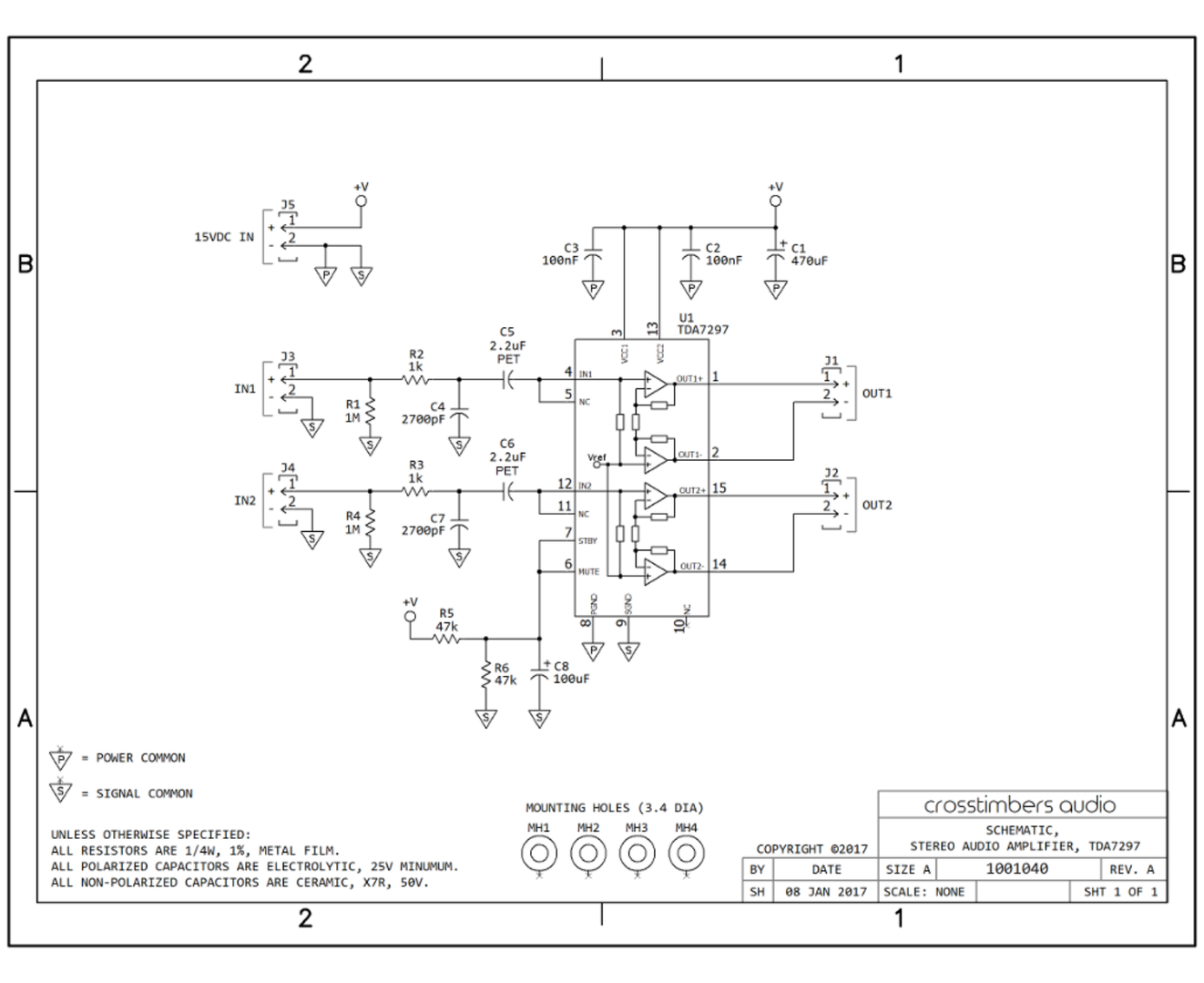
This is a small integrated amplifier project based on the TDA7297 from STMicroelectronics.

The TDA7297 is a dual bridge amplifier that is powered by a single polarity power supply. It appears to be a big brother of sorts to the TDA7266 which I used in another project (Low Power Stereo Amplifier). In fact, both chips have the same pin out and can use the same PC board layout. The TDA7297 can dissipate more heat than the TDA7266 so a new PCB layout was created for this project that doesn't rely on a board mounted heat sink.

The schematic for the amplifier PCB is based on the data sheet application diagram. Since I was doing a new layout for this amp, input filtering was added that was missing on the TDA7266 version.



Notice that the schematic above has two distinct return paths, Signal Common (S) and Power Common (P). As can be seen in the PCB layout renderings below, these paths are kept separate on the PC board and connected together at one point at the negative terminal of the power input jack, J5.

Two separate copper pours are used for each of the return paths. Some audio amplifier PC board designs use a "star ground" consisting of several separate paths snaking to a common point. I don't have any data to show which method is better for an audio amplifier. I've settled on using copper pours and have not had any issues. It does seem to me that the fewer "antenna loops" snaking around a PC board, the better.

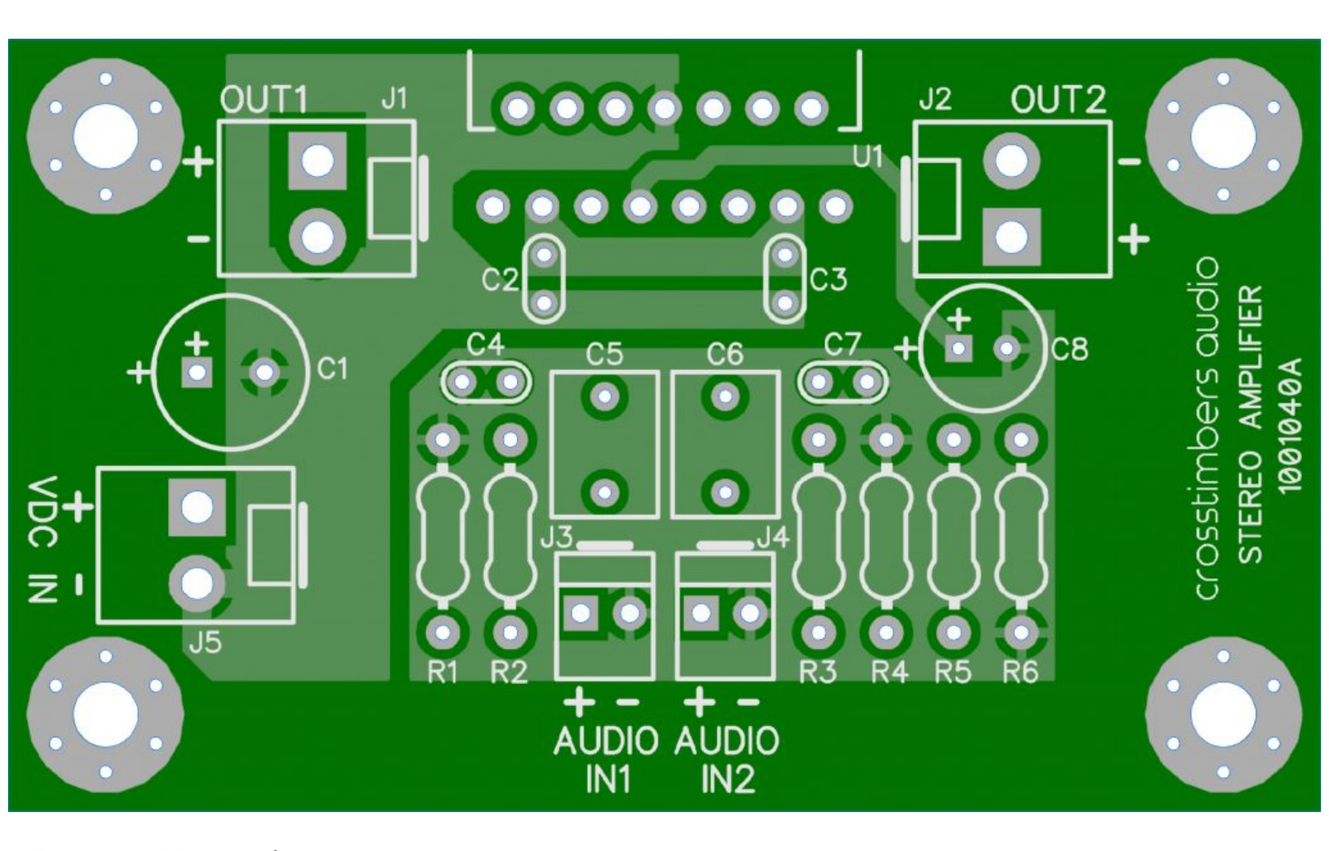
R1 and R4, the 1M resistors, are placed between the input lines and Signal Common and provide a return reference for the inputs when there is no source connected to the amplifier.

R2/C4 and R3/C7 provide a low pass (sometimes referred to as a HF filter) filter at each input with a 3dB cutoff at approximately 59kHz.

C5 and C6 are the 2.2uF coupling/DC blocking capacitors. Along with the 30k input impedance of the TDA7297 they provide a high pass filter at each input with a 3dB cutoff at approximately 2Hz.

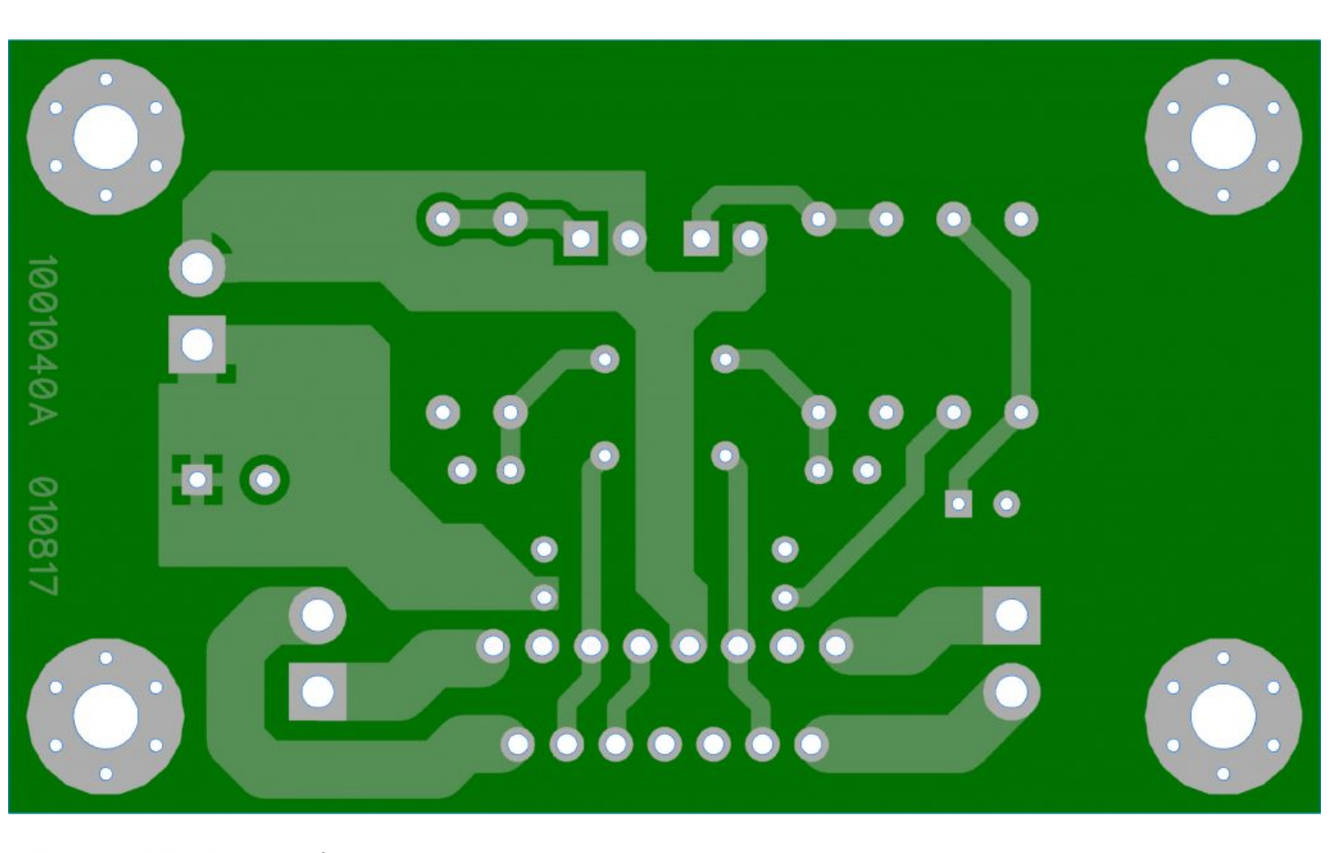
R5, R6, and C8 comprise the mute/standby delay circuit used to eliminate thumps when the amplifier powers on. The circuit is from page 5 of the TDA7297 data sheet. With 15VDC power, the 10uF capacitor shown in the data sheet allowed a slight, audible tun on noise in the speakers. I had a 100uF electrolytic with the same footprint so I used that instead. The 100uF capacitor increases the time constant of the RC circuit and completely mutes the amplifier during power up.

The data sheet shows only one 100nF decoupling capacitor shared between the two Vcc input pins (pins 3 and 13). Another 100nF was added to provide decoupling right at each Vcc pin. The locations of C2 and C3 are shown in the PCB layout renderings below.



TDA7297 PCB Top View

The PCB renderings show how the Power Common and Signal Common copper pours are configured as mentioned above.

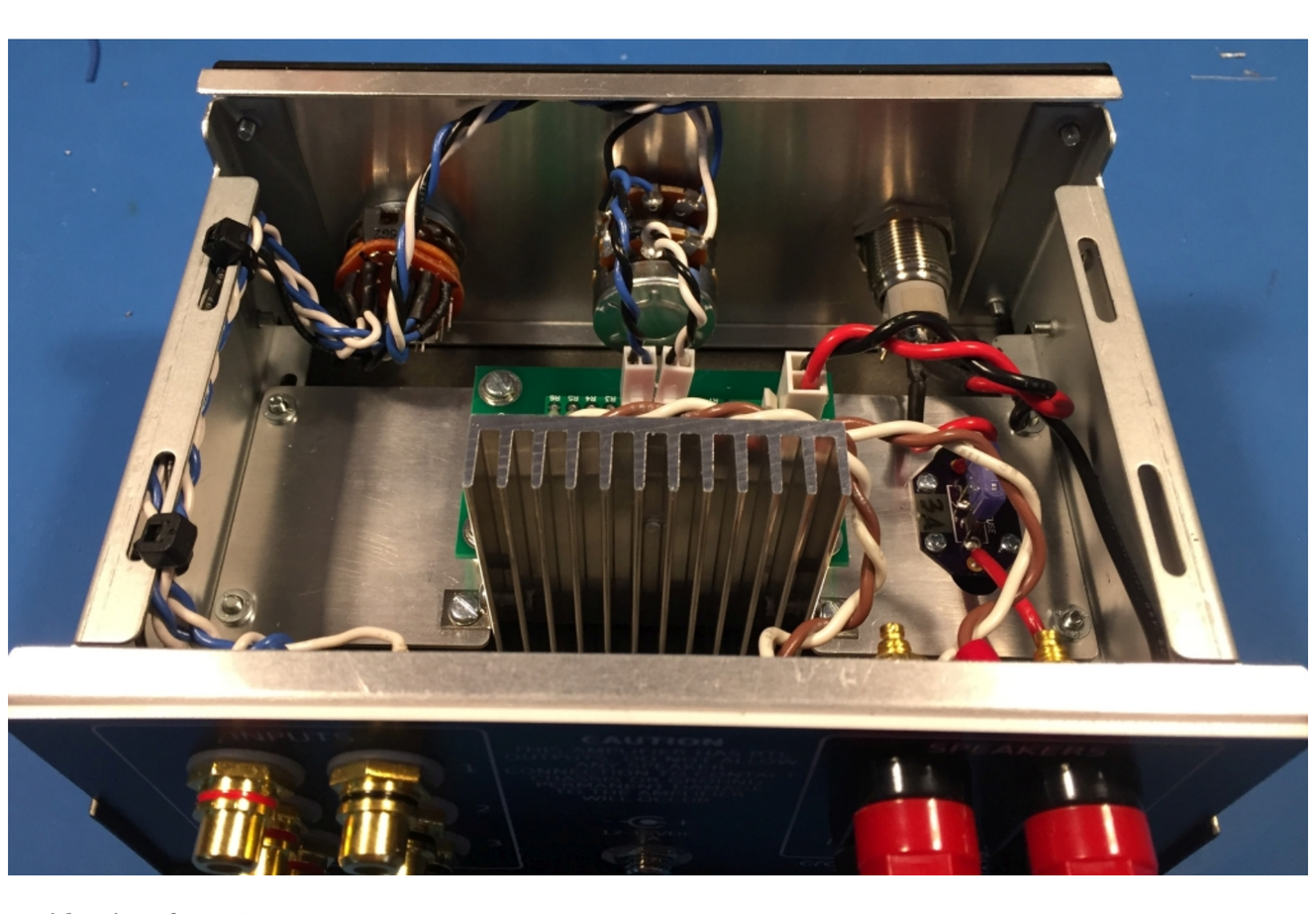


TDA7297 PCB Bottom View

Below are photos of the amplifier right after it had gone through final assembly on the work bench. It is housed in a model EM-01 cabinet from circuitspecialists.com. The EM-01 is a small cabinet, but this is a small amplifier, and I think the components fit in there comfortably.

Inside Top View from Front

The heat sink is made from 2.079 inch wide extrusion from heatsinkusa.com. I had them cut it 60mm long and then added a total of three M3 tapped holes. One for mounting the TDA7297 chip and two on either side to mount it to the support shelf using a couple of L-brackets. The heat sink extends below the support shelf a few millimeters. The support shelf was made by a local machine shop.



Inside View from Rear

The source selector switch and volume control are from Mouser. The power switch is a Ulincos U16F2SW latching push button with a white LED indicator ring wired to illuminate when the amplifier is powered on. A 22k resistor was added at the LED power terminal to soften the intensity of the LED.

The rear panel connectors are what I had in inventory.

Rear View

Front View

The front and rear panels/labels are 1.5mm thick acrylic that were laser cut and engraved at pololu.com. The artwork was created in Inkscape.

As of this writing the SA2 is powered by a Mean Well GSM60A15-P1J switching power supply which supplies 15VDC at 4A.

I named this amplifier the SA2 because it is the second amplifier I've built after I started naming them. It's currently earning its pay in my living room.

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Scott
January 31, 2018 at 4:25 am

Hi Steve,

Do you sell PC boards??

Thanks,
Scott

Reply

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January 31, 2018 at 12:35 pm

Hi Scott,
At this time I don't have any boards to sell.
Steve

Reply

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PREVIOUS
LM3886 Stereo Amplifier

NEXT
AM/FM Stereo Receiver Using the Si4831 and TDA7266