

## KAA14021 70 Watt x 2 Class-D Audio Amplifier Kit



This amplifier kit uses Texas Instruments TPA3156D2 stereo audio amplifier IC for driving speakers up to 70 watts @ 4 ohm per channel in stereo mode and 100 watts @ 2 ohm in mono mode. It's efficient Class-D operation produces very little heat and with the oversized heat sink will only get slightly warm when cranking it up. Fault LED on board for indicating a Over-temp, DC detect or Open speaker / connections. The amplifier operates on 5 to 26 Volts DC, full power is only available at 24 Volts.

## **What's Included in the kit:**

- 1 - Quality PC Board with TPA3156D2 Power Amp IC Presoldered
- 2 - 1000ufd 35v Electrolytic Capacitors
- 1 - 10ufd 35v Electrolytic Capacitor
- 4 - 10ufd 10v Ceramic Capacitors (106)
- 1 - 1ufd 50v Ceramic Capacitors (105)
- 4 - 0.68ufd 50v Ceramic Capacitors (684)
- 4 - 0.22ufd 50v Ceramic Capacitors (224)
- 2 - 0.1ufd 50v Ceramic Capacitors (104)
- 2 - 100k ¼ Watt Resistor (brown, black, yellow)
- 1 - 75k ¼ Watt Resistor (violet, green, orange)
- 3 - 47k ¼ Watt Resistors (yellow, violet, orange)
- 1 - 39k ¼ Watt Resistor (orange, white, orange)
- 1 - 20k ¼ Watt Resistor (red, black, orange)
- 1 - 5.6k ¼ Watt Resistor (green, blue, red)
- 2 - 4.7k ¼ Watt Resistors (yellow, violet, red)
- 1 - 10k Variable Resistor
- 4 - 10uh Inductors
- 2 - LED's, 2 LED Spacers
- 3 - 2 Position Terminal Blocks
- 2 - Phono Jacks
- 1 - Heatsink, 2 Screws, 2 Spacers and Heatsink Compound
- 4 - PCB Standoffs

## **What you will need:**

1. Good quality soldering iron 25 – 40 watt
2. Solder tip cleaning sponge
3. Electronic grade rosin core or no clean solder
4. Diagonal wire cutter

## **Basic instructions:**

Insert parts from top side (component side) of PC board.

Parts should be fully inserted, most parts will touch PC board.

If parts are polarity sensitive, double check your installation.

On some parts you can bend the leads after inserting to help hold them in place.

While soldering apply a small amount of solder to the solder tip to help with heat transfer.

Touch the soldering tip to both the component lead and PC board.

To improve your solder connection apply solder to part/PC board instead of solder tip.

The solder should flow around the component lead and on the PC board.

Avoid adding too much solder or too much heat.

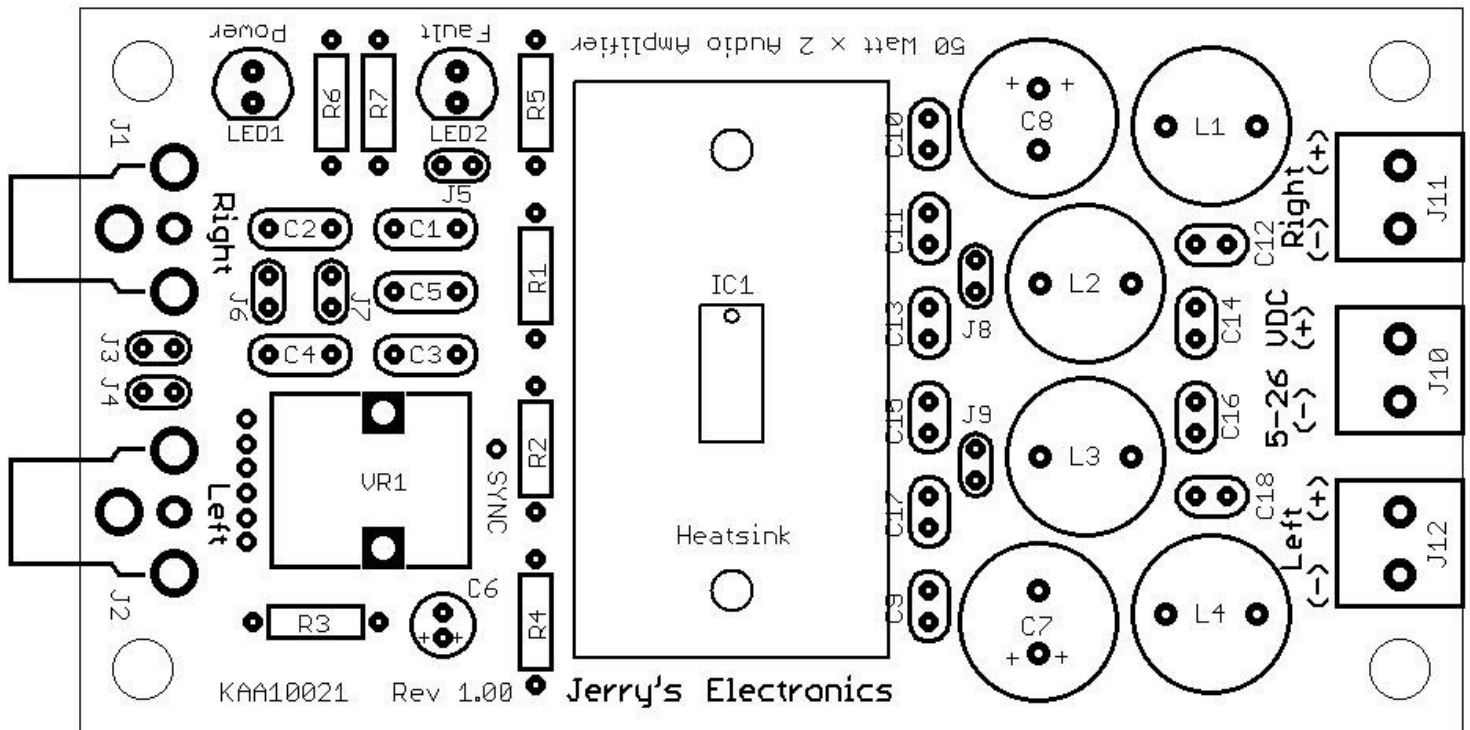
Your solder connection should be shiny and smooth, not balled or grainy looking.

If your solder connection is grainy looking try adding some flux and reheat the joint.

Cold solder connections are the most common beginner mistakes.

Cold solder joints happen when the part lead and/or the PC board are not heated well.

After soldering trim the component leads close to the solder joint.



**To ease assembly install parts in the following order:**

1. R3,4 – 47k ¼ Watt Resistor (yellow, violet, orange)
2. R5,6 – 4.7k ¼ Watt Resistor (yellow, violet, red)
3. R7 – 100k ¼ Watt Resistor (brown, black, yellow)
4. C1,2,3,4 – 10ufd 10v Ceramic Capacitor (106)
5. C9,10 – 0.1ufd 50v Ceramic Capacitor (104)
6. C5 - 1ufd 50v Ceramic Capacitor (105)
7. C11,13,15,17 – 0.22ufd 50v Ceramic Capacitor (224)
8. C12,14,16,18 – 0.68ufd 50v Ceramic Capacitor (684)
9. C6 – 10ufd 35v Electrolytic Capacitor (observe polarity)
10. LED1,2 – LED and spacer, insert LED leads through spacer then through PC board (observe LED polarity) the spacer is used to help prevent melting the LED when soldering.
11. J1,2 – Phono Jack - \*see assembly tips
12. J10,11,12 – Terminal Block (observe orientation)
13. L1,2 ,3,4 – 10uh Inductor
14. C7,8 – 1000ufd 35v Electrolytic Capacitor (observe proper polarity)
15. VR1 – 10k Variable Resistor
16. PCB Standoffs

### **For Stereo Operation:**

Install jumpers in J3 and J4 positions – you can use cut offs from resistors.

### **For Bridged Operation:**

Install jumpers in J6 ,J7, J8 and J9.

Connect the right speaker jack (+) and (-) together for the positive speaker terminal (+)

Connect the left speaker jack (+) and (-) together for the negative speaker terminal (-)

J1 right side phono jack becomes the input.

Optional jumper in J3 position. J4 unused in bridged operation.

### **Gain Selection:**

Resistor R1 and R2 determine the gain of the amplifier as follows:

<u>R1</u>	<u>R2</u>	<u>Gain</u>	
open	5.6k	20db	All resistors for selecting gains are included in the kit
100k	20k	26db	
100k	39k	32db	
75k	47k	36db	

### **Auto Reset:**

I recommend leaving jumper J5 (auto-reset) open, but if your having problems locating the cause of the amplifier shutting off, it helps in troubleshooting to add a jumper in J5 position.

### **Installing the Heatsink:**

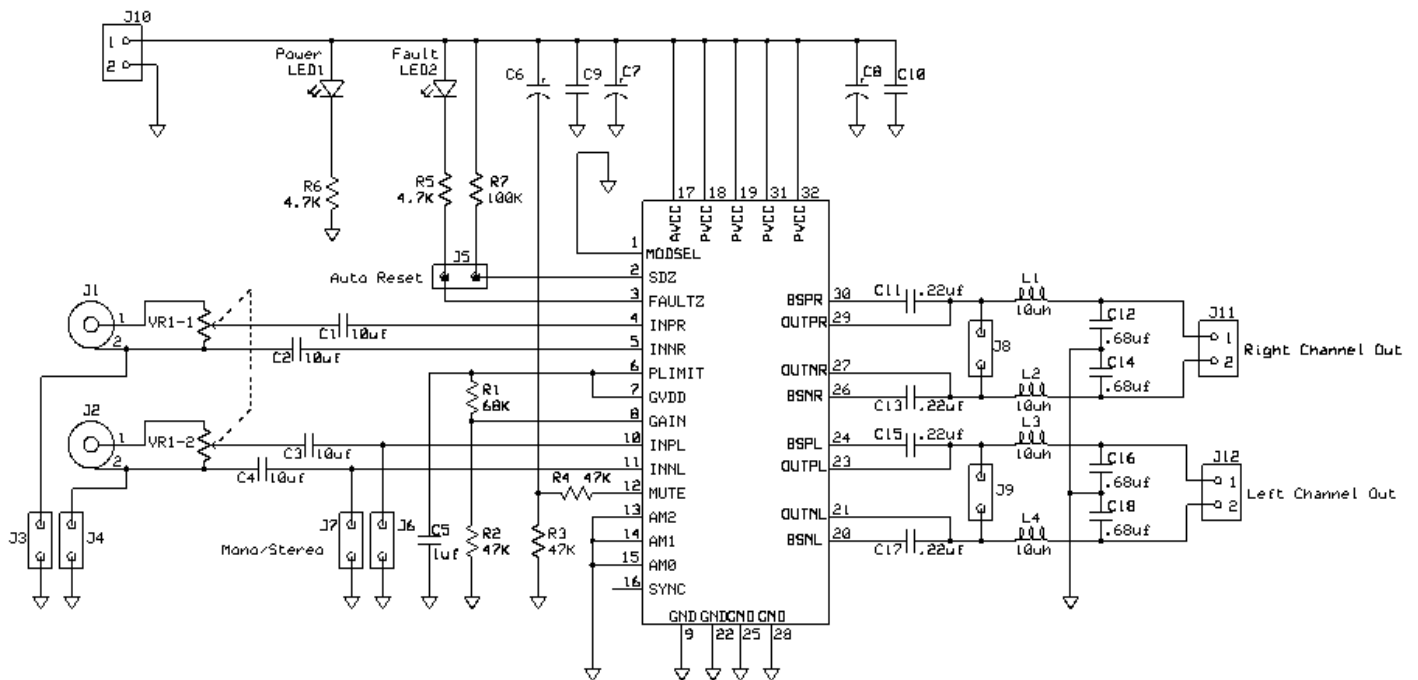
Apply the heatsink compound to the top of IC1 or to the heatsink (don't worry if you use too much), insert a 4-40 screw through the bottom of the PC board, install a washer on the screw before attaching heatsink. The washer needs to be between the PC board and the heatsink to prevent warping of the board and excessive pressure on IC1. Install both screws and washers then tighten snugly.

*Hint: you can use a little heatsink compound on the washer and stick it to the heatsink or PCBoard to help hold it in place while trying to insert screws.*

## Assembly Tips:

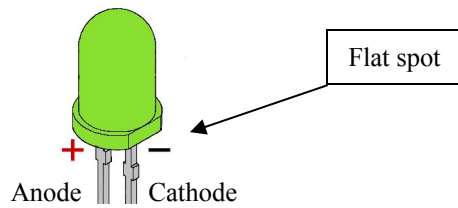
- For perfect solder joints clean solder tip with sponge before each solder connection – not after.
- When soldering the Phone Jacks – there is no need to fill entire hole with solder, just solder the part of the jack where it contacts the edge of hole.
- The “To ease assembly install parts in the following order” is to allow you to first install the part then flip the board over onto your work surface, this allows the weight of the board to help hold parts close to the board for ease of soldering.
- Not everyone has a ESD Protected Area, here are some basic tips to follow:
  - a: Do not assemble kit on a carpeted work surface.
  - b: Do not assemble kit in low humidity environment (<40% RH = increased risk).
  - c: Avoid working/walking in carpeted areas.

## Schematic:

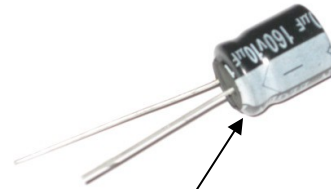


## Part Identification:

LED's  
Flat or notched side indicates  
Cathode or negative lead



Aluminum Electrolytic Capacitors



The (-) sign on this  
white stripe indicates  
the negative lead, the  
stripe can be any  
color.