

IRON SOUNDS AMPLIFICATION



JA-TMB PCB 18 Watt Amplifier

Installation/Assembly Guide

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Warnings and Disclaimer

With this amplifier kit, you will be working with **HIGH VOLTAGE**. These voltages **CAN BE DEADLY** if you are not extremely careful. If you are not comfortable working with **HIGH VOLTAGE**, please do not attempt to do so. Contact an experienced amplifier technician to assist you in the final stages of the build where you will be applying power to the amplifier.

⚠ USE AT YOUR OWN RISK ⚠

Iron Sounds LLC, assumes no liability FOR PERSONAL INJURY OR PERSONAL PROPERTY CLAIMS RESULTING FROM THE USE OF THIS PRODUCT OR THE INFORMATION INCLUDED IN THIS MANUAL.

Before You Begin

When you first receive your kit, remove all of the parts from the shipping box and place them on a well-lit, clean surface. Check all of the parts against the parts list and verify that you have everything before you begin. Contact us at once if you are missing anything, or if something appears to be damaged.

Note: Some capacitor values included in the kit are slightly different from the values listed in the schematic and silk-screened on the PCB. These are considered “vintage” values (i.e. The modern equivalent of 50uf is 47uf). Since most capacitors have a 10-20% tolerance, “modern” substitutions are considered equivalent to the “vintage” specifications.

Soldering Tips

- Set the temperature of your soldering iron to about 700F.
- Use 60/40 rosin-core solder.
- Make a good *mechanical* connection first, and then make a good electrical connection.
- Tin all wires before soldering.
- Never “butter” partially melted solder to make a connection.
- Do not apply the tip of the soldering iron to the PCB any longer than it takes for the solder to flow.

Tools Needed

- Soldering Iron
- Solder Vacuum Bulb or Solder-Sucker.
- Needle-Nose Pliers
- Wire Strippers
- Wire Cutters
- Phillips and Flat-Head Screwdrivers for #4, #6 and #8 screws.
- Nut Driver/Socket Set

Amplifier Overview and Features

The Iron Sounds 18 watt JA-TMB is an EL-84 based, Two-Channel tube guitar amplifier designed to produce classic “British” clean and overdriven tones at stage volumes.

Below is a brief description of the amplifier:

Channel One – We consider this channel to be the “Pure” channel, as it only contains a volume and a tone control. This channel is capable of producing moderate gain, and is desirable for those who play blues to classic rock.

Channel Two – This channel contains two volume controls, each of which is used to ‘blend’ two separate gain stages together to produce a variety of tones. Neither is a “Master Volume”. Treble, Mid and Bass controls are also provided for further tone shaping. This channel is capable of producing High Gain and early 1980’s British Heavy Metal tones.

Gain Boost Footswitch – This feature works with Channel Two only. Engaging a simple on/off footswitch (not included) will increase your gain and volume giving an overall “Boost” to the sound of the amp. This is useful for solo’s when the user needs a bit more bite. It can also be left “always on” for further tone shaping.

Negative Feedback Switch – This feature works with both channels. Engaging this switch to the “on” position will tighten the sound of the amplifier by increasing the bass and high frequencies.

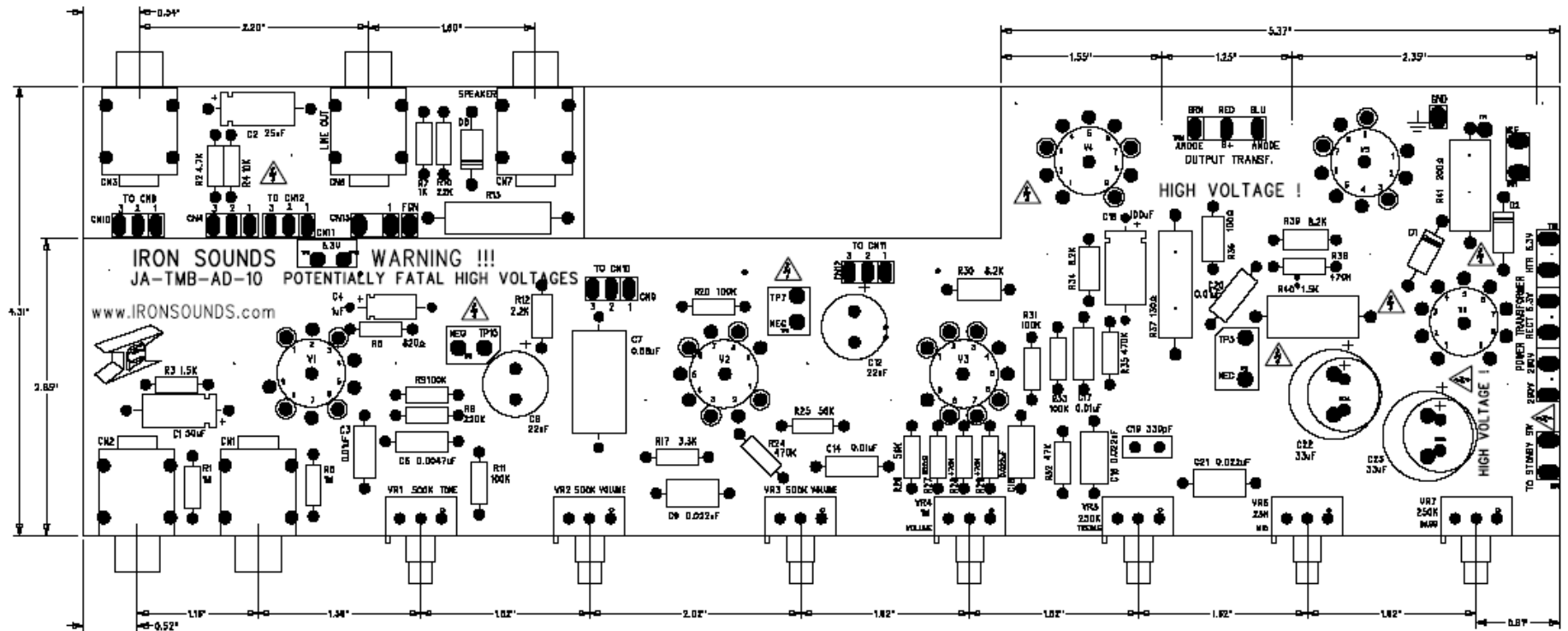
Line Out – This feature allows you to connect the output of the amplifier into another amp, or into a mixing console. However, the speaker cannot be disconnected when using this feature, although you may use a “load box” or an “attenuator” to silence it. Since the overdriven tone of the EL-84’s is part of the Line Out signal, you can use it send to another amplifier to increase your overall volume. Another way to use this feature is to send the line out signal to the input of a delay pedal or delay unit, and then sending its output to another amp. This is what is known as a Wet/Dry setup, where you have an amplifier with no effects and another amplifier with effects. This technique was used by Jimmy Page of Led Zeppelin and countless other acts during the 1960’s and 70’s.

Impedance Selector – This feature allows you to select the impedance of the speaker cabinet that you are using. You may use the 4ohm, 8ohm and 16ohm setting to mate the amplifier to a variety of different cabinets.

Solid State/Tube Rectifier Option – The Iron Sounds JA-TMB allows you to use either its built-in solid state rectifier or an EZ-81 tube rectifier. Although the choice is yours, you cannot switch between the two once the amplifier has been built. We recommend that you use the included solid-state rectifier, as it has been designed to replicate the “sag” effect of the EZ-81, and it sounds great! Note: When using the Iron Sounds Transformer Set, you can only use a Solid State rectifier.

Circuit Protection – The JA –TMB is equipped with a 2 amp, slow-blow glass fuse to protect the amplifier if any accidents should occur. Additionally, we have protected the PCB against sudden damage in case the amplifier is powered on without a speaker. However, if this condition occurs, immediately turn the amplifier off or plug a speaker into the speaker jack.

PCB Assembly Layout



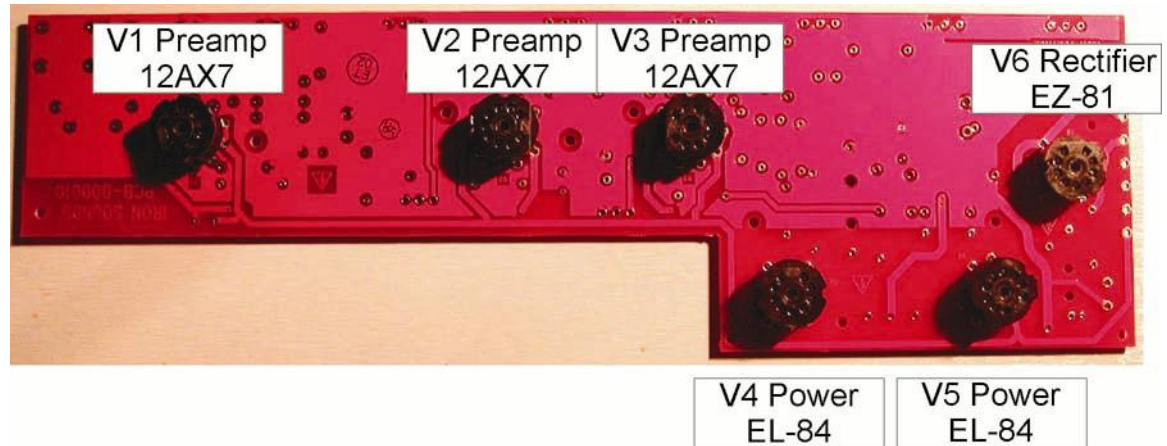
PCB Assembly Instructions

1. Before starting the assembly, check all of the parts against the parts list and verify that all components are present.

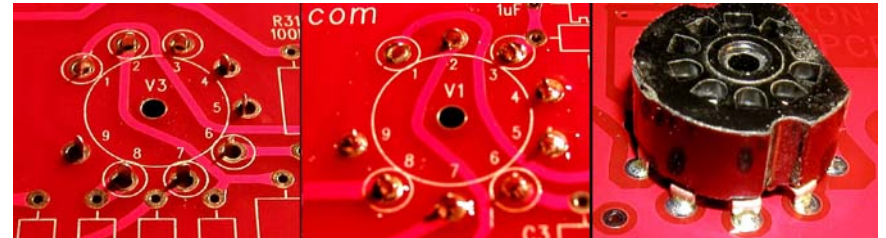
Tube Sockets

2. You will have (6) tubes sockets. If you use the included solid-state rectifier, it is not necessary to solder in the tube rectifier socket (V6). However, it is recommended that you do so to protect the user against accidental contact with high voltage.

Note: If a rectifier tube is accidentally plugged into the socket while the solid state rectifier is in place, no damage will occur to the tube or the PCB.



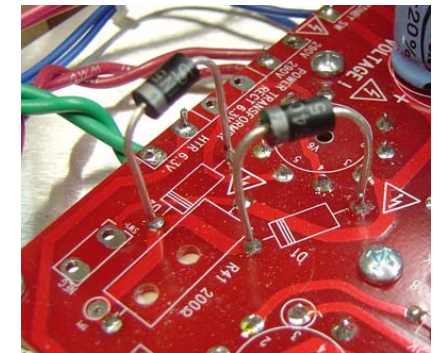
3. Insert the tube sockets into the PCB as shown. You may need to slightly straighten the pins to get them in.
4. Verify that all of the pins are fully inserted and that the socket is flush against the PCB.
5. Solder the socket and inspect your work. All holes must be filled with solder.



Solid State / Tube Rectifier Option

6. The JA TMB PCB includes a solid state rectifier (recommended), along with the option to use a tube rectifier. You cannot use both once installation is complete. If you wish to install the solid state rectifier, solder in diodes D1 and D2 as shown. Be sure to observe the polarity marker. If you **do not** wish to use the solid state rectifier, DO NOT INSTALL THE FOLLOWING COMPONENTS:

- R41: 200ohm 5W Resistor
- D1: Diode 1N5408
- D2 Diode 1N5408



Note: When using the Iron Sounds Transformer Set, you can only use a Solid State rectifier.

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Resistors

7. Locate all of the 1/2 Watt and 2 Watt resistors and bend the pins of the resistors as shown. Using the values printed on the PCB as your guide, insert the resistor leads into the PCB. Do not force them in.



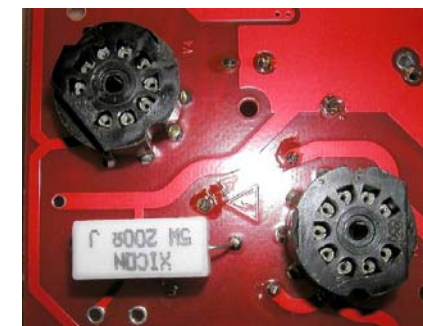
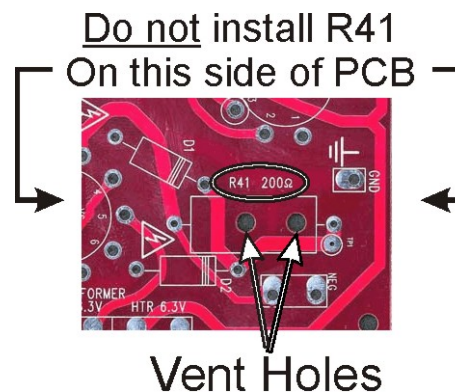
8. Once all of the resistor leads are in the PCB, solder all them to the PCB.
9. Inspect your work and verify that all holes are filled with solder.
10. When finished, snip the ends of the leads off.



11. Locate and install the large 5 Watt resistors.

For Solid State Rectifier only (When using the Iron Sounds Transformer Set):

Install the R41 power resistor ON THE OPPOSITE SIDE of the PCB that the diodes are on. Use the two vent holes for the resistor as a visual marker, and then confirm the resistor leads are in the correct location by flipping the PCB over to the component side. With the resistor underneath the board, the heat it generates will dissipate upwards into the aluminum chassis, keeping it and the surrounding components cool.



Correct Side of PCB for Placement of R41.

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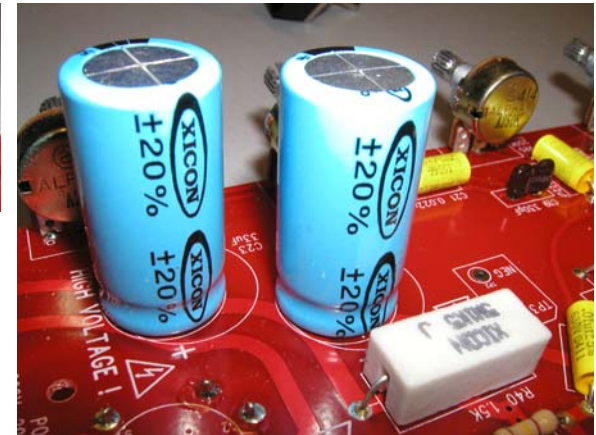
Capacitors

12. Install of the radial capacitors in the same manner as the resistors. Be sure to observe the correct polarity of the electrolytic capacitors. **Failure to do so could result in explosion!**
13. For an easier installation, install the large 22uf and 33uf “can” capacitors *after* installing the 1/4” jacks and potentiometers.

Note: Some capacitors may be provided in a different form than the printed symbol on the PCB.



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1/4” Jacks

14. Insert the jacks into the PCB as shown. Verify that all of the pins are fully inserted, and that the jack is flush against the PCB.
15. Solder one pin on the jack and confirm that it is flush against the PCB. If not, reheat the pin while pushing the jack in. Solder the remaining pins.



Note: It is important that the jacks are soldered properly as they must also fit into the chassis mounting holes.

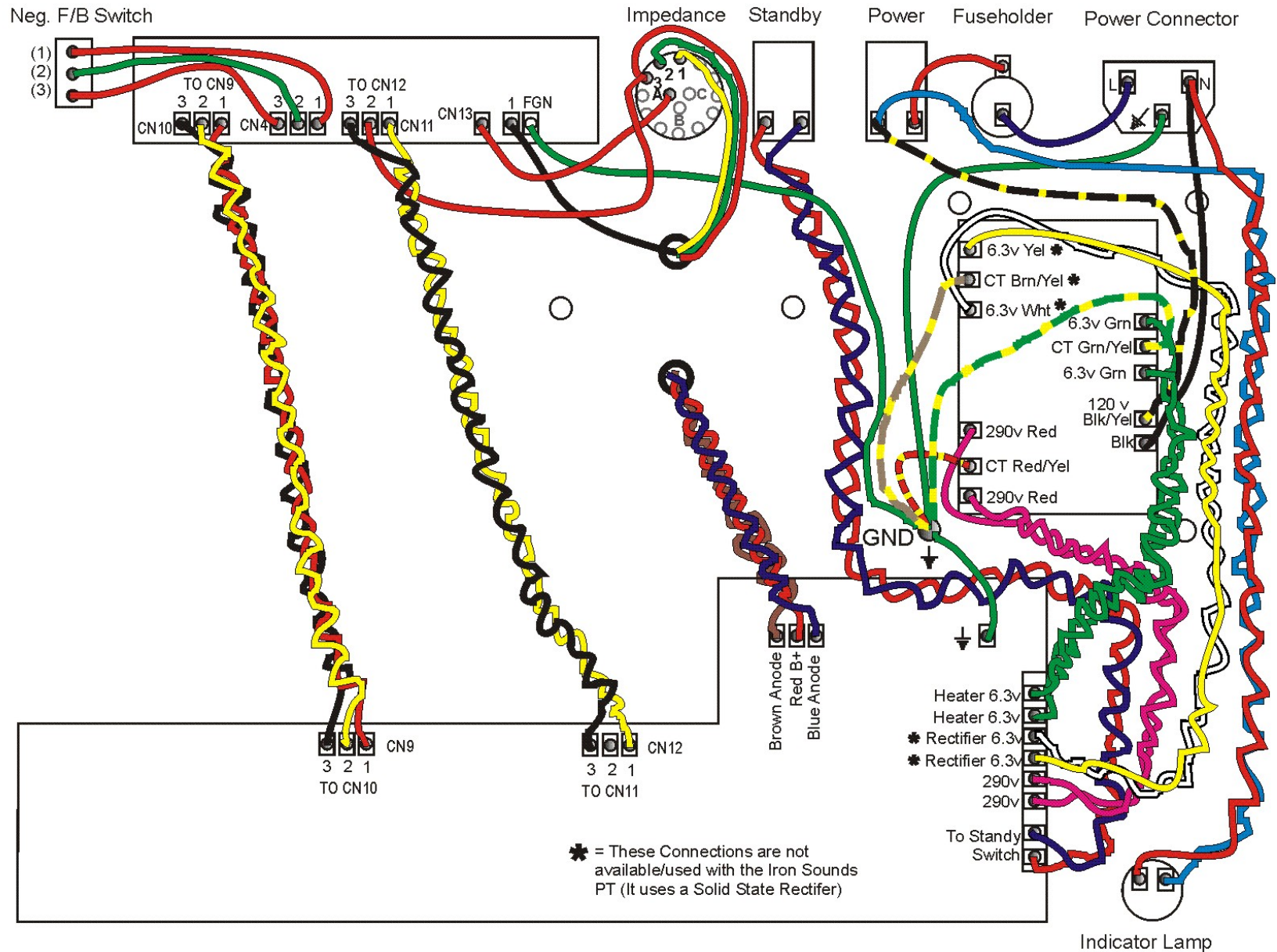
Potentiometers

1. When installing potentiometers (pots), work with one at a time and double-check its value before installation.
2. Confirm that each pot's locator pin has been removed. To remove the locator pin, simply bend them with pliers to break them off. See photo at right.
3. Solder one pin on the pot and confirm that it is flush against the PCB. If not, reheat the pin while pushing the pot in. Solder the remaining pins.



Note: It is important that the pots are soldered properly as they must also fit into the chassis mounting holes.

Chassis Wiring Layout



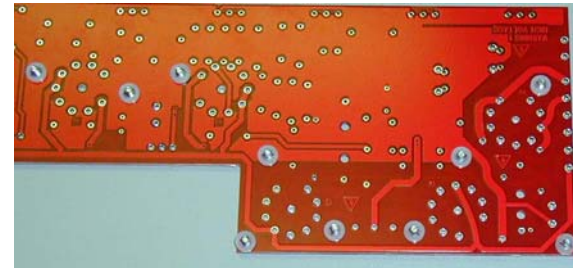
Installation of Chassis Components

1. Attach the (3) Preamp Tube Shields to the chassis, using the 4/32 screws and washers provided.



! IMPORTANT!

1. If you have the 10" deep chassis, insert the mounting screws into the board. Leave enough thread exposed on the other side, and push/thread a retaining washer onto each screw thread. Verify that all retaining washers are in place before proceeding to next step. **NOTE:** The retaining washers are not needed on the smaller 8.4" deep chassis.



2. Align the assembled main PCB to the potentiometer/input jack holes on the front of the chassis and place the PCB on the threaded chassis standoffs.
3. Secure the PCB to the chassis standoffs using the screws provided. Be sure all retaining washers are in place.



4. Secure the output PCB to the chassis using the 1/4" jacks on the board.

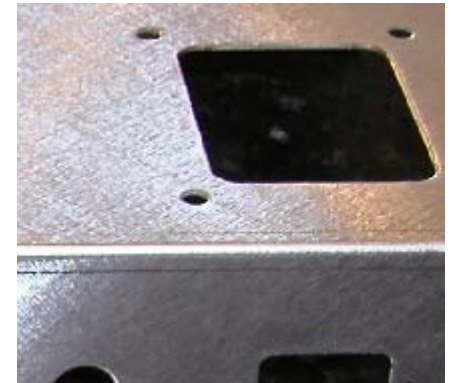
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5. Insert the Power Transformer (PT) into the PT mounting hole in the chassis.

Note: Be careful not to damage or cut the insulation on the wires when inserting the PT into the chassis. When inserting the power transformer, TILT one side in first, and then gently tilt the other side in.

6. Secure the PT to the chassis using the (4) washers and (4) nuts provided.

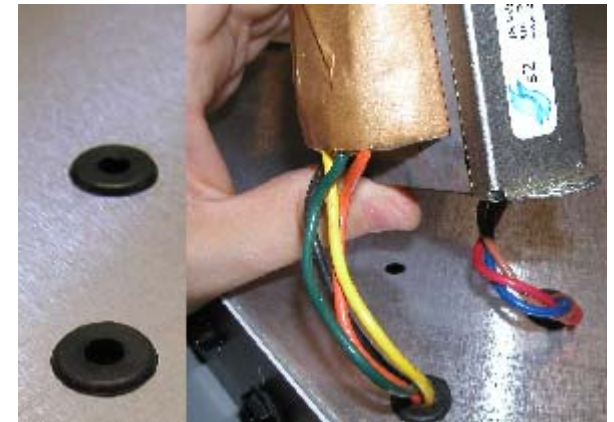


7. Install the (2) rubber grommets into the Output Transformer wiring holes on the chassis.

8. Install the Output Transformer (OT) into the OT mounting holes in the chassis.

9. There are two sets of wires on the OT. Carefully push the yellow, black, green and orange wire cluster through the OT wiring hole closest to the rear of the chassis. Push the remaining wires through the other OT mounting hole.

10. Secure the OT to the chassis using the (2) screws, (2) washers and (2) nuts provided.



11. Place the front panel over the protruding components on the front of the chassis. Insert the indicator lamp into its mounting hole. Secure the lamp, potentiometers and input jacks and using their included washer/nut assemblies. As you fasten the components, be sure to level the bottom of the front panel with the bottom of the chassis.



12. Place the following components into their mounting holes on the rear of the chassis
 - a. Negative Feedback Switch (5/16 socket)
 - b. Output PCB
 - c. Impedance selector (Verify the switch has only three positions.)
 - d. Standby and power switches (14mm sockets)
 - e. Fuse Holder
 - f. AC Power Connector



13. Place the rear panel over the protruding components and secure the items using their included washer/nut assemblies. As you fasten the components, be sure to level the bottom of the rear panel with the bottom of the chassis.

Impedance Switch Connections

1. Verify that the impedance switch has only three positions. If not, re-position the tang washer until the switch is restricted to three positions.



2. Solder the yellow wire from the OT (4ohm tap) to terminal 1 on the impedance switch
3. Solder the green wire from the OT (8ohm tap) to terminal 2 on the impedance switch
4. Solder the orange wire from the OT (16 ohm tap) to terminal 3 on the impedance switch
Note: The wire from CN11 Connection #2 on the small board also attaches to terminal #3.

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Fuse, Lamp, Standby and Power Switch Connections

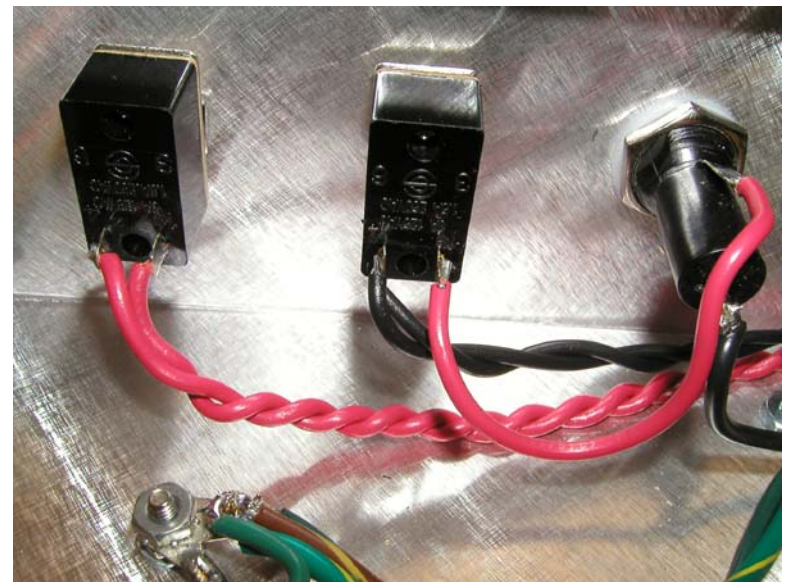
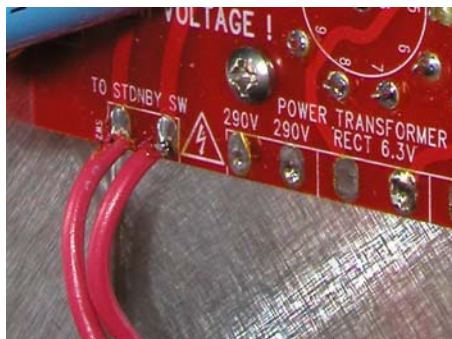
1. Trim and solder a wire from the terminal marked "L" on the Power Connector to the rear terminal on the Fuse Holder.
2. Trim and solder a wire to the center terminal of the power socket (Ground), and leave enough length so that it will reach the OT Ground screw. Solder the end of this wire to a solder ring terminal. See Page 16 for more info on Ground Connections.
3. Trim and solder the Black 120v wire from the PT to the terminal marked "N" on the Power Connector.
4. Trim and solder another wire from this terminal to a terminal on the indicator lamp.



Note: Insulate the terminals of the indicator lamp with electric tape to prevent electrical shorts.



5. Trim and solder a wire from the unused terminal on the indicator lamp to a terminal on the power switch.
6. Trim and solder the Black Wire with the Yellow Stripe from the PT to the same terminal on the power switch that the lamp is connected to.
7. Trim and solder a wire to the unused terminal on the power switch to the unused terminal on the Fuse Holder.
8. Twist and solder two wires to each standby switch terminal. Trim to the proper lengths to reach the PCB connections marked "TO STDBY SW".



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Main PCB Connections

1

Solder the two wires from the Standby switch to the solder pads on the PCB marked: "TO STDBY SW"

2

Trim, twist & solder the two Red 290v wires from the PT to the solder pads on the PCB marked: "290V 290V".

3


IF USING A TUBE RECTIFIER (NOT AVAIL. WITH IRON SOUNDS TRANSFORMER SET):
Twist & solder the yellow and white 6.3v wires from the PT to the pads on the PCB marked "RECT 6.3V".
If using the Solid State rectifier, tape and tie back these wires near the PT.

4

Twist & solder the two green 6.3v heater wires from the PT to the pads on the PCB marked: "HTR 6.3V".

5

Trim, twist and solder the Blue, Brown and Red wires from the Output transformer to the solder pads on the Main PCB marked "Output Transf."



Output PCB Connections

1. Make the following connections:

Solder Pad CN10

Solder three wires to connections 1, 2 and 3. Trim and twist the wires together and connect them to connections 1, 2 and 3 on the main PCB solder pad marked CN9.

Solder Pad CN4

Solder three wires to connections 1, 2 and 3. Trim and twist the wires together and connect them to connections 1, 2 and 3 on the Negative Feedback Switch. Refer to the Chassis layout for the switch diagram.

Solder Pad CN11

- Solder two wires to connections 1 and 3. Trim and twist the wires together and connect them to connections 1 and 3 on the main PCB solder pad marked CN12.
- Trim and solder a wire from connection 2 of CN12 to terminal 3 on the impedance switch. Note: The orange wire from the OT is also connected to this terminal.

Solder Pad CN13

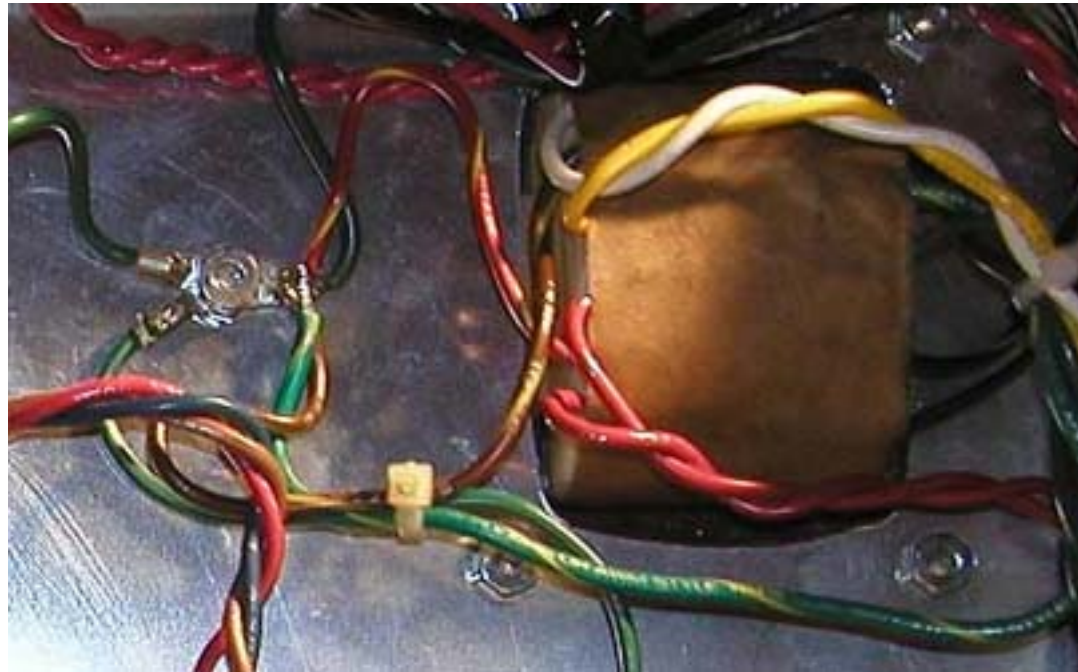
- Trim and solder a wire from CN13 to terminal A on the impedance switch.
- Trim and solder the black wire from the OT to the solder pad marked "1" on CN13.
- See *Ground Connections* for the FGN solder connection.



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Ground Connections

1. Twist and trim the following wires on the PT to the proper lengths to reach the PT mounting bolt hole marked 'GND':
 - (a) The Red wire with yellow stripes (between the two red 290v wires)
 - (b) The Green wire with the yellow stripes (between the two green 6.3v wires)
 - (c) The Brown wire with the yellow stripes (between the yellow and white 6.3v wires)
(For Tube Rectifiers Only - NOT AVAIL with the Iron Sounds Transformer Set)



2. Solder the end of each wire to a solder ring terminal.

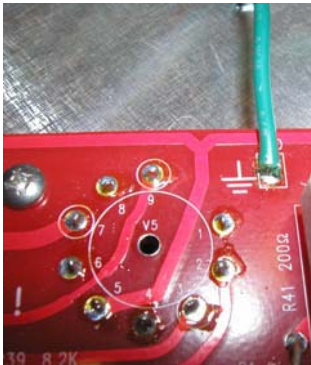
3. Trim and solder a wire from the 'FGN' solder pad on the speaker output PCB to reach the PT mounting bolt hole marked 'GND':

4. Solder the end of the wire to a solder ring terminal.



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- Trim and solder a wire from the 'GND' solder pad on the main PCB to reach the PT mounting bolt hole marked 'GND'.



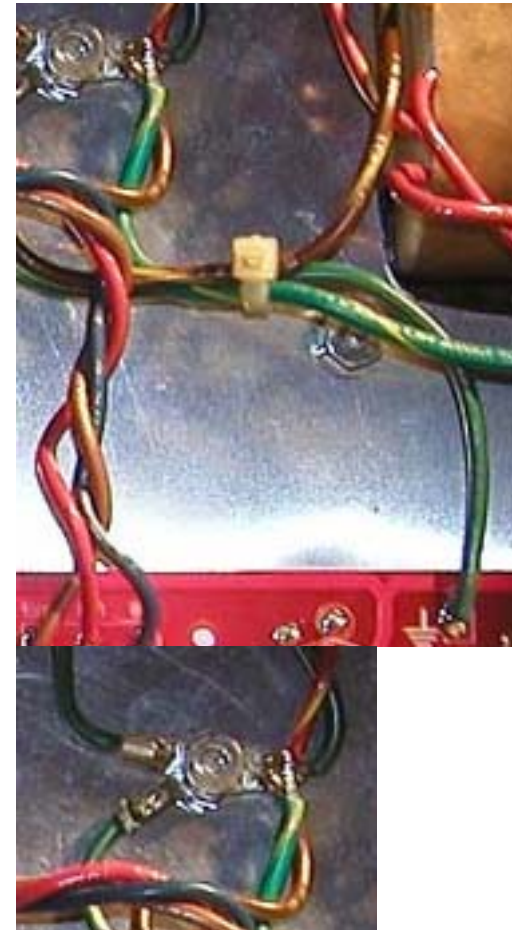
- Solder the end of the wire to a solder ring terminal.
- Secure all (6) of the solder ring terminals to the PT mounting bolt hole marked 'GND', using the washer and nut provided.

Note: If using a Solid State Rectifier, there will only be (5) ground wires.

⚠ IMPORTANT – You must verify that all ground connections are soldered well and secured to the chassis before proceeding.

- When finished, use wire ties to organize wires and prevent them from moving freely inside of the chassis.
- Be sure to keep the high voltage wires far away from the low voltage tube heater wires.

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Testing the Amplifier Voltages

In this section, use maximum caution. Do not under any circumstances touch any parts inside of the amplifier with your hands. It is advisable that you place one hand in your pants pocket at this time, as it may prevent an electric shock from traveling from one hand to the other and across your vital organs if you should come into contact with high voltage.

Also, we suggest that you wear Safety Goggles in case you have wired an electrolytic capacitor in backwards (they will explode).

1. Make sure that NO TUBES are installed in the amp.
2. Insert 2A slow blow Fuse (provided) into the fuse holder.
3. Verify that the Power and Standby switches are in the OFF position.
4. Insert the power cord into the AC Power Connector and plug the cord into the wall.

Note: Be ready to pull the power cord if you see, smell or detect anything unusual (i.e. smoke)

5. Turn the Power Switch ON. The indicator lamp will illuminate.
6. Using a multi-meter, test the Power Transformer Voltage.



7. Connect your meter's negative lead to the chassis and test the following pads on the PCB:
 - a) "HTR" voltage should read about 3.2V AC on each leg. The two legs together should read close to 7V AC. With no load, it will be higher, but it should not exceed this level.
 - b) "RECT" voltage should read about 3.2V AC on each leg. The two legs together should read close to 7V AC. With no load, it will be higher, but it should not exceed this level. **NOTE:** There will be no reading here if using a Solid State Rectifier.

8. Test main amplifier voltage level.

⚠ This is extremely HIGH voltage, use caution!!! (Make sure one hand is in your pocket!).
Each "290v" pad on the PCB should read close to 290v AC

9. Turn the Standby Switch ON.
10. Test the voltage between NEG and TP3 on the PCB, It should read just under 400V DC (this voltage is without a load, it will be lower once the tubes are in place).

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11. Test the voltage at TP11 and TP12 on the PCB. It should be 6.3V AC (with no load, it might be close to 7V)
12. Turn the Power and Standby Switches off.
13. Disconnect the Power Cord.

⚠ Warning: High Voltage is still present on the PCB from the charged capacitors. Use caution.

If all the voltage passed the test go to the next step. If not, you will have to troubleshoot. Again, check all of the connections and inspect the assembly. Email: ironsounds@verizon.net if you cannot solve the problem.

Powering the Amplifier for the First Time

1. Turn all of the potentiometer shafts on the front panel counter-clockwise to “zero”.
2. Position the knobs so they point to zero and push them into place.
3. Position the impedance knob so that the tip points to the 4 ohm selection when the switch is in its left-most position.
4. Secure the impedance knob to the shaft using its set screw.



5. Using the rear panel tube position chart, gently push all of the tubes into their tube sockets. Observe the orientation of the tube pins, as not all tube sockets are positioned the same on the PCB.

Note: Using the Electro-Harmonix 12ax7 in the first tube position (V1) is recommended.

6. Attach a speaker to the speaker out jack and select the proper impedance.
7. Turn the Power Switch ON. The indicator lamp will illuminate.

Note: Be ready to pull the power cord if you see, smell or detect anything unusual (i.e. smoke)

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8. All of the tubes should exhibit a soft glow.
9. After 30 seconds, turn the Standby Switch ON.
10. Plug a guitar into either channel's input jack and verify that the amplifier is working.

Note: If any 'ringing' sounds occur, inspect the preamp tubes by tapping on them with your finger. If you hear a "thud" (especially on V1), then switch or try other preamp tubes in that tube position.

11. If everything sounds good, install the preamp tube shields.

Note: You may smell a slight odor for an hour or two as the ink lettering on the tubes "bake in".

12. Enjoy the Classic Tone of the Iron Sounds JA-TMB.