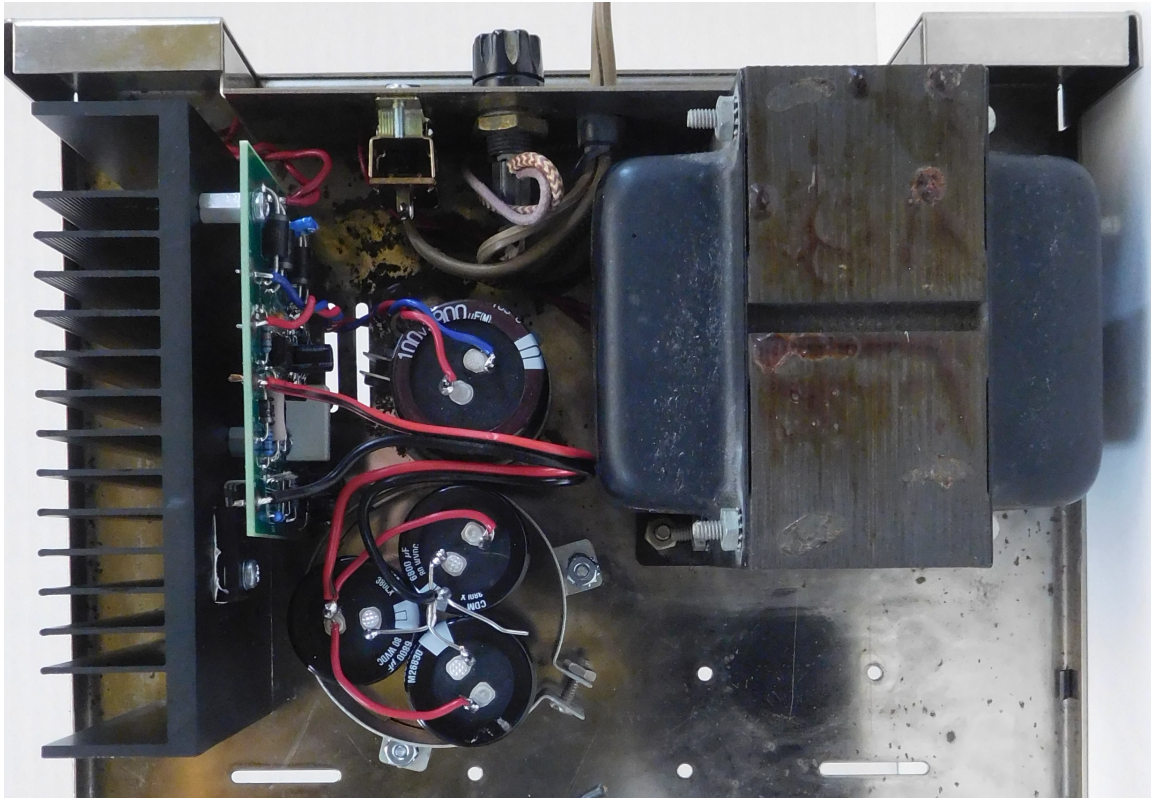


# ***DYNACO STEREO 120***

## ***Installing the Really Big Heatsink for the Power Supply***



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## **Section 1: About this Manual**

This manual gives you the information you need to replace the original power supply heatsink in a Dynaco Stereo 120 Solid State Power Amplifier with the Really Big Heat Sink. This kit allows your Stereo 120 to deliver more power, particularly at low frequencies, while running cooler.

### ***Who Should Attempt this Project?***

You can rebuild your Dynaco Stereo 120 if you can:

1. solder (using normal rosin core solder and a soldering iron).
2. use simple hand tools like screwdrivers, wire cutters, and pliers.
3. read and follow directions.

It helps if you:

1. know a bit about electronics, or
2. have a friend who knows a bit about electronics
3. can get to YouTube to watch videos about the assembly process (not yet available)

### ***Tools You'll Need***

You'll need the following tools to update your Stereo 120:

1. flat blade screwdriver for #6 screws
2. Phillips screwdriver (#2)
3. pliers or nut drivers suitable for #6 hardware (5/16" nut driver or hex wrench)
4. needle nose pliers (helpful, but not strictly necessary)
5. pencil type soldering iron of 25 to 50 Watts (no huge honking soldering guns or blowtorches)
6. wire cutters and strippers
7. multi-meter (strongly recommended to cross-check resistor values against color codes)
8. magnifying glass, to verify identification codes on small components

### ***Project Overview***

The project consists of the following steps:

- Remove the stock heat sink and PSUG power supply combination from the amp
- Change 3 components on the PSUG to
  - increase the DC power that the power supply delivers from 3 amps to 3.5 amps
  - increase the transient power that the power supply delivers
- Mount the upgraded PSUG to the Really Big Heat Sink
- Add one 9/64" hole to the chassis.
- Install the combination of PSUG and Really Big Heat Sink into the amplifier

## ***Important Safety Notes***

By purchasing this kit, you have agreed to hold Akitika, LLC harmless for any injuries you may receive in its assembly and/or use. To prevent injuries:

- Wear safety glasses when soldering to prevent eye injuries.
- Always unplug the power before working on the amplifier.
- Large capacitors hold lots of energy for a long time. Before you put your hands into the amplifier:
  - Pull the AC plug!
  - Wait 1 full minute for the capacitors to discharge!
- Remove jewelry and rings from your hands and wrists, or anything that might dangle into the amplifier.
- If working in the amplifier, keep one hand in your pocket, especially if you're near the power supply or power supply wires. This can prevent serious shocks.
- Build with a buddy nearby. If you've ignored all the previous advice, they can dial 911 or get you to the hospital.

## ***About Components***

We reserve the right to make design/or component changes at any time without prior notification.

## ***Recommended Solder***

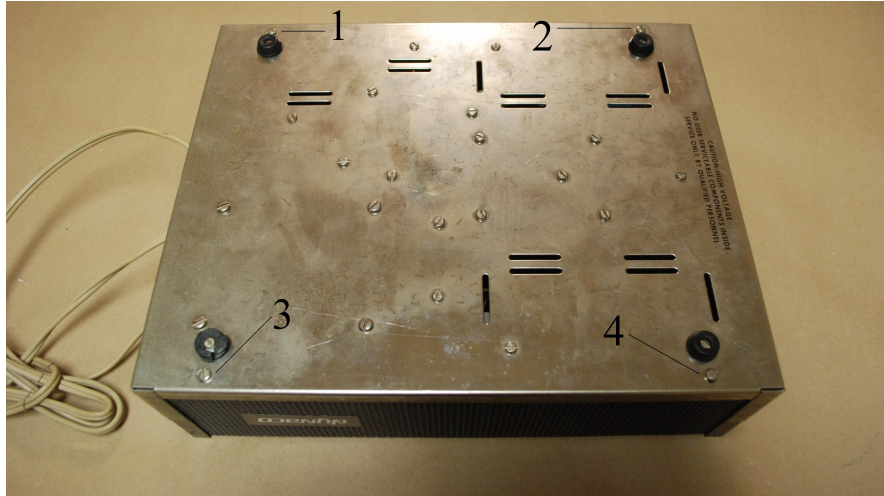
The kit must be assembled with 63/37 Rosin Core solder. The recommended diameter is 0.031 inches. Among many such sources of solder, I have used

- Kester 24-6337-8800 50 Activated Rosin Core Wire Solder Roll, 245 No-Clean, 63/37 Alloy, 0.031" Diameter. This is a 1 pound roll of solder. No-clean means that it leaves the minimum possible residue on the PCB.
- MG Chemicals 60/40 Rosin Core Leaded Solder, 0.032" Diameter, 0.6 oz Pocket Pack

## **Section 2: Removing the PSUG Power Supply and stock Heatsink**

### ***Opening the Amplifier***

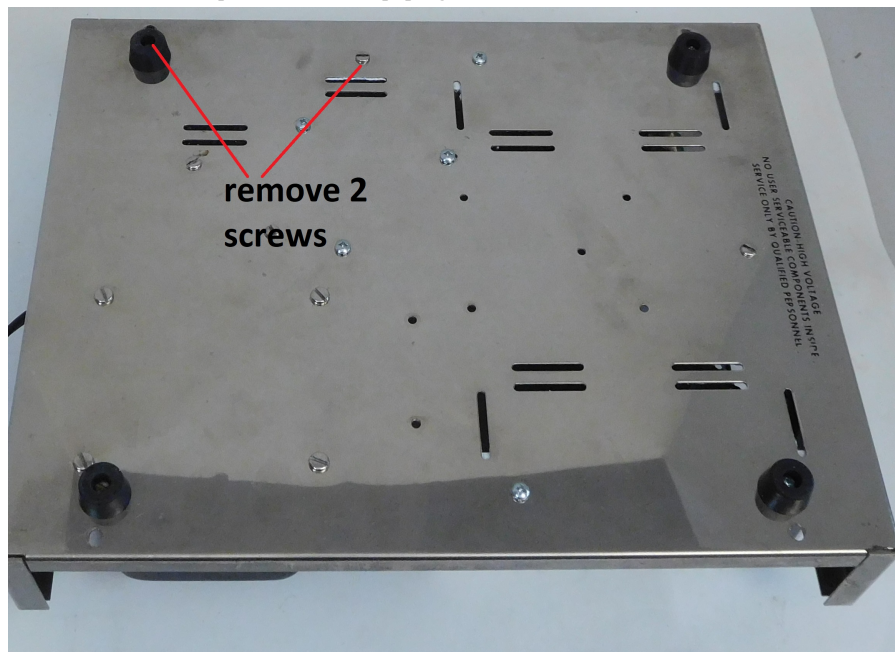
1. *Make sure the amplifier is unplugged. If it was recently powered allow the amp to sit for one full minute before proceeding.*
2. Remove the four screws along the outside edge of the bottom that hold the cover in place (see Figure 1).



**Figure 1-Location of the four screws that hold the cover to the base**

3. Holding both the top and bottom of the amplifier, flip it over.
4. Lift the perforated metal top off the amplifier.

### ***Remove the PSUG power supply and heatsink***



**Figure 2-Remove the two screws that hold the heatsink to the chassis**

Remove the two screws that hold the PSUG/Heat-sink combination to the floor of the chassis.

1. One of the screws holds both a mounting foot and the heatsink in place.
2. The other screw only holds the heatsink to the chassis.

### ***Separate the PSUG and the Heatsink***

1. Remove the nut and bolt that hold the power MOSFET to the stock heatsink.
2. Remove the three keps nuts that fasten the PSUG PCB to the three male-female 6-32 stand-offs.



3. Unscrew the three male-female standoffs from the stock heatsink.
  - a. Keep the three male-female standoffs. They will be re-used shortly.
  - b. The three keps nuts will no longer be used.
4. Transfer the three male-female standoffs to the Really Big Heat Sink, installing them as shown in Figure 3. Note that the 4 holes highlighted in red are *not used*.

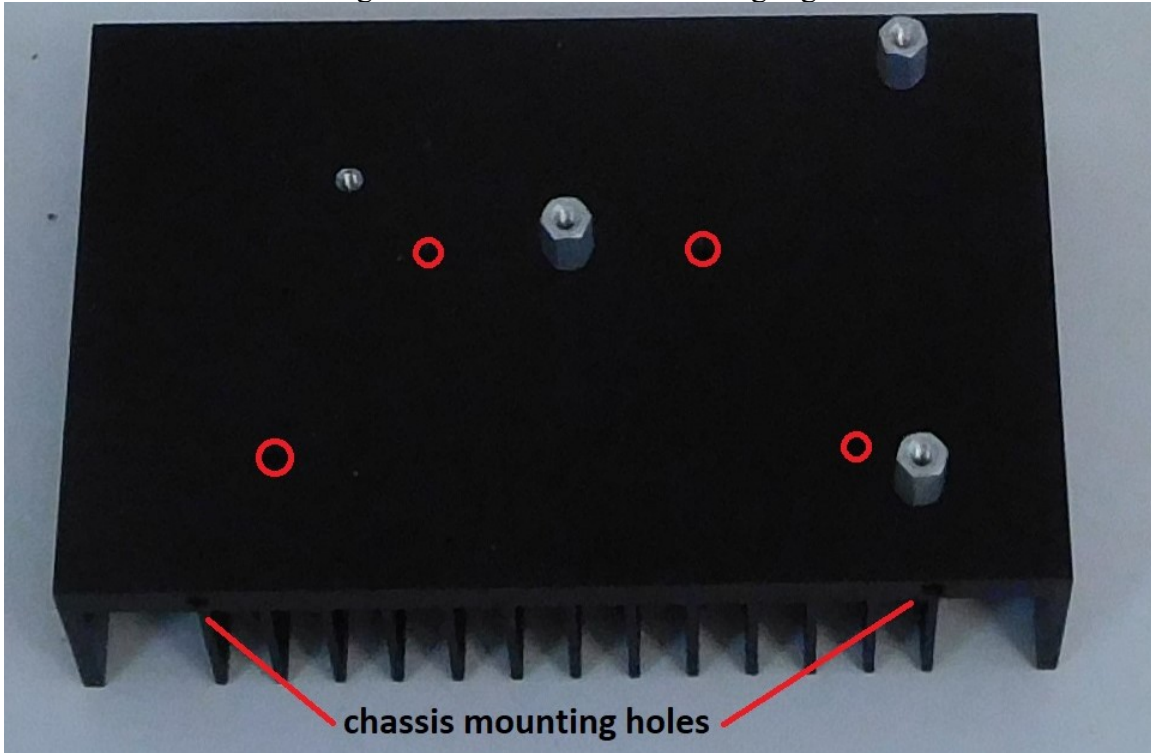


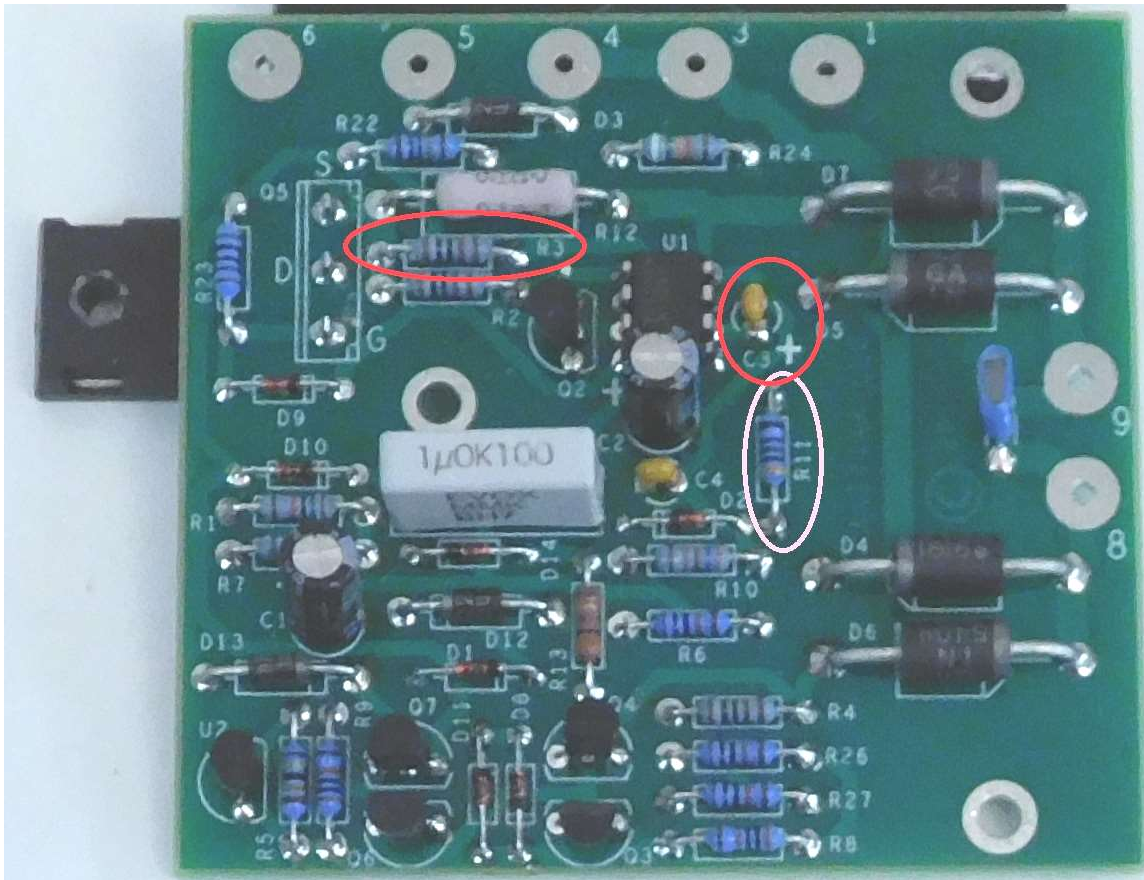
Figure 3-Install the male-female standoffs

### Replace 3 components to increase the power delivered

You'll now replace 3 components on the PSUG to increase the maximum power that it can deliver. We can do this because the Really Big Heat Sink is so much better at getting rid of heat. You'll remove the old components and install the new ones.

Be sure that the negative end of the new C3 installs away from the plus sign indicated on the silk screen as it is now a polarized capacitor.

Component Designation	Original Value	Description	New Value	Description
R3	1K	Brown, black, black, brown, brown	3K48	Orange, Yellow, Gray, Brown, Brown
R11	3K01	Orange, black, brown, brown, brown	3K48	Orange, Yellow, Gray, Brown, Brown
C3	0.1 $\mu$ F	Non-polar ceramic	10 $\mu$ F/100 V or 10 $\mu$ F/50 V	Aluminum electrolytic cap, polarized



**Figure 4-Showing locations of C3, R3, and R11**

If your PSUG was shipped before the end of 2018, it won't have the gray 1µOK100 capacitor, but the locations of the changed components are still the same.

### **Add a mounting hole to the bottom of the chassis**

To complete the new mounting arrangement, you'll need to add a 9/64" hole to the chassis bottom. A 9/64" hole is the standard size to pass a 6-32 screw. Follow carefully the layout shown in Figure 5. After laying out the hole and checking its location, I like to use an awl to make a depression in the metal right at the center of the hole location.

It's probably a good idea to form a catch basin of duct tape on the inside of the chassis. This will catch the metal shavings before they can cause random havoc and short circuits inside your amp.

### **Mount the power supply to the Really Big Heat Sink**

1. Smear a thin film of thermal compound onto the mounting surface of the power MOSFET. If the old thermal compound seems dry or crusty, you might want to remove it first using isopropyl alcohol and paper towels. ***Be careful, isopropyl alcohol and paper towels are quite flammable.***
2. Insert the following screws loosely until you see that everything fits, then tighten the screws:



- a. Use the 6-32x3/8" screw from the previous mounting arrangement to fasten the power MOSFET to the heatsink.
- b. Use the supplied 6-32x1/4" sem screws (with built-in lockwashers) to fasten the PSUG to the really big heat sink.

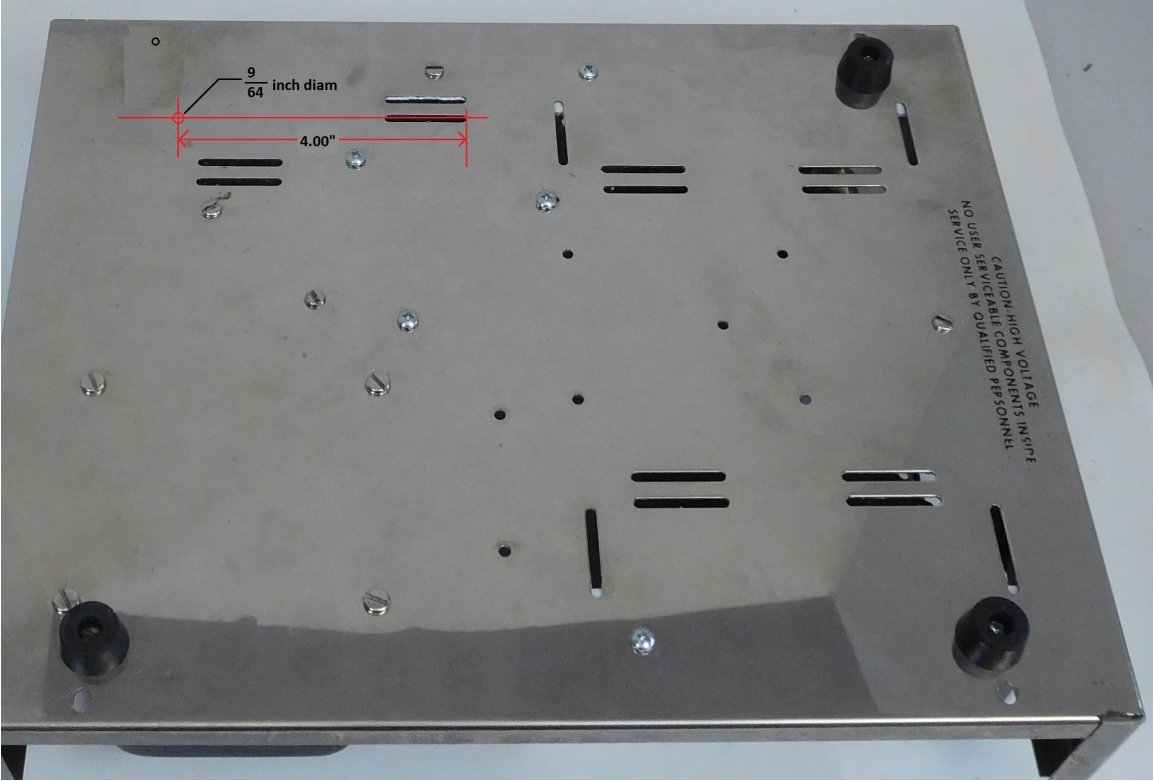


Figure 5-layout for added mounting hole

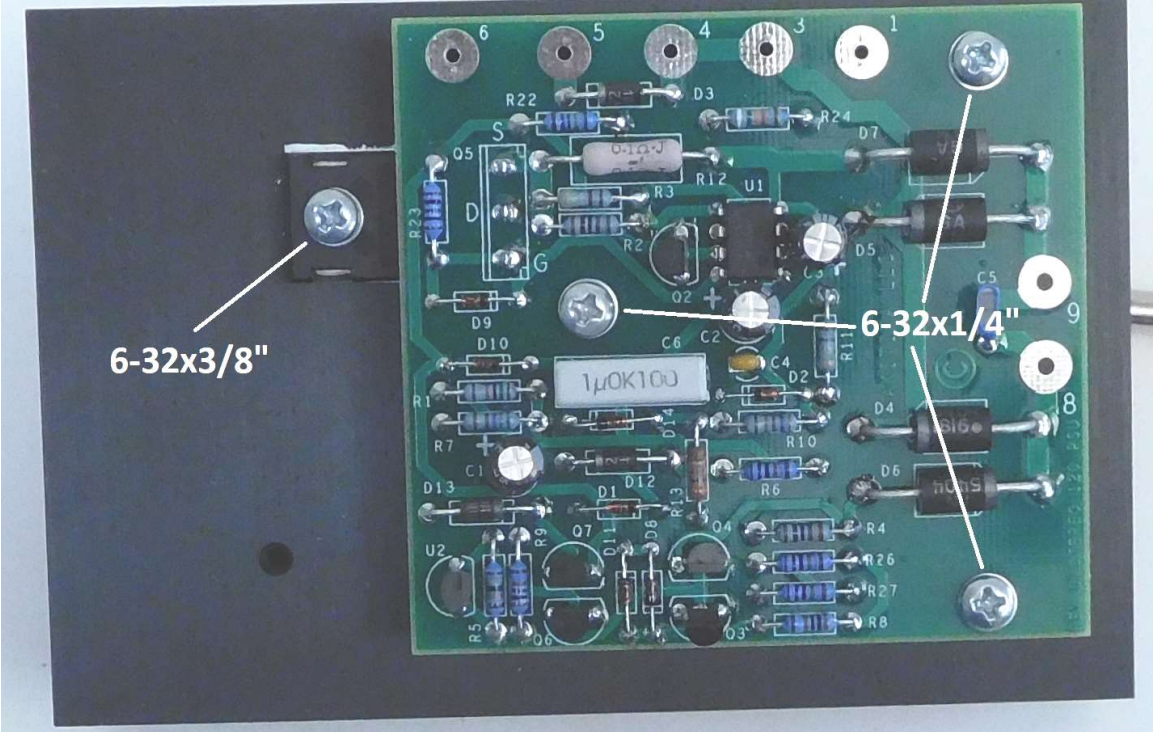


Figure 6-screw sizes to mount PSUG, remember to tighten the screws



## Mount the PSUG/Really Big Heat Sink Assembly to the Chassis

Mount the PSUG/Really Big Heat Sink assembly to the chassis using two 6-32x3/8" screws. One of the screws goes into the newly drilled hole. The other screw goes into the slot. The screw doesn't really quite fit into the slot, but you can screw it into the slot with your screw-driver. You could also use a rat-tail file to open up the slot just a bit.



Figure 7-use 6-32x3/8" screws to mount the heatsink

Note that for the ultimate heat transfer, you could apply thermal compound to the bottom of the heatsink.

## Inspect for clearance

Inspect your work, making sure that none of the components on the PCB has leads that are touching any metal surfaces outside the PCB. Refer to the cover illustration for the orientation of big capacitor clamps if you should find that there is interference.

Make sure that there are no miscellaneous bits of hardware or wire floating around the amplifier.

## Testing the Result

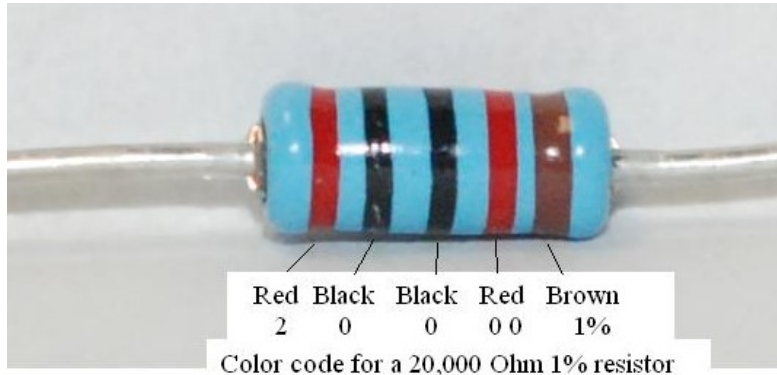
If you power up the amp, you should see 72 Volts of DC across C12 after the slow start time has expired. **Please be careful to stay clear of the high voltages inside the amplifier.**

Turn off the amp and pull the plug before going on. Wait 2 full minutes before continuing.

## Reassemble the amplifier

Return the mounting foot to its original hole. Note that the mounting foot is now separate from the RBHS mounting. The mounting nut fits between the fins of the heatsink if you put your added hole in the correct place. Replace the cover and install the 4 screws that hold the cover in place.

## Resistor Color Code



**Figure 8-demonstrating the resistor color code**

Here's an extreme close-up of a  $\frac{1}{4}$  W metal film 20K (20,000) Ohm resistor, designated by the standard resistor color code.

The colors map to numbers:

Color	Number
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

The color band positions have the following meaning (5-band, 1 % resistors):

Position	Meaning
1	Left-most Digit (e.g. most significant)
2	Next digit to the right
3	Next digit to the right.
4	Number of zeros that follow the three digits, unless: <ul style="list-style-type: none"> <li>• Band 4 is gold =&gt; multiply by 0.1</li> <li>• Band 4 is silver=&gt; multiply by 0.01</li> </ul>
5	Tolerance: <ul style="list-style-type: none"> <li>• Violet (purple) =0.1%</li> <li>• Brown =1%</li> <li>• Red =2%</li> <li>• Gold=5%</li> <li>• Silver=10%</li> <li>• No band=20%</li> </ul>