

# ***DYNACO STEREO 120 C12 REPLACEMENT MANUAL***



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## Section 1: About This Manual

This manual covers the replacement of the stock C12, a 3300  $\mu\text{F}$  capacitor, with a total of 20,400  $\mu\text{F}$ . This gives any Dynaco Stereo 120 better bass. This manual covers 4 configurations of power supply and amplifier circuit boards:

Power Supply	Amplifier Modules	Upgrade Kit
Dynaco	Dynaco	C12DD
Updatemydynaco	Dynaco	C12UD
Dynaco	Updatemydynaco	C12DU
Updatemydynaco	Updatemydynaco	C12UU

Some sections of this manual are common to all of the configurations. Some sections are specific to your configuration. The headings and introductions clearly label each, making your upgrade easy to complete.

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

You can build this kit and improve 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. make basic voltmeter measurements
4. 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 a video about the assembly process

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

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

1. multi-meter capable of reading the 72 Volt (nominal) DC Power supply output
2. flat blade screwdriver for #6 screws, #2 Phillips screw driver
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. wooden toothpicks (or some other means of clearing component holes of solder)

### ***Project Overview***

The project replaces C12, and some other components that vary depending upon your configuration. The major steps are:

1. Checking the existing Dynaco Stereo 120 power supply.
2. Replacing C10 on PC-15, and/or modifying Updatemydynaco amplifier modules
3. Building and installing the new C12.
4. Testing the completed result and reassembling 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.

## **Section 2: Preliminaries**

### ***Does Your Stereo 120 Work?***

The C12XX kits are meant to be installed into a working Stereo 120. If your Stereo 120 is broken, then you should definitely repair it first. Doing otherwise invites bad outcomes unless you are very knowledgeable.

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

### ***Check the Power Supply Voltage***

First, you'll need to safely check the power supply output voltage.

1. Turn the Stereo 120 power switch off.
2. Keeping hands well clear of the inside of the Stereo 120, plug in the power cord.
3. Turn the Stereo 120 power switch on, and give the amp about 15 seconds to stabilize.
4. Refer to Figure 5. Measure the DC voltage present on the terminals of C12. The nominal voltage is 72 volts.
  - a) You may proceed with the rest of these directions if the actual voltage is between 68 and 76 volts.
  - b) If the voltage is more than 80 Volts, do not go on. Repair the regulator. There are some hints about this on the [Updatemydynaco](#) web site. If you're good at

building, but not strong on electronic troubleshooting, it might make more sense for you to purchase the PSUG kit.

- c) If the voltage is less than 68 volts, do not go on. Repair the regulator or determine if its output is being overloaded by the amplifier modules.

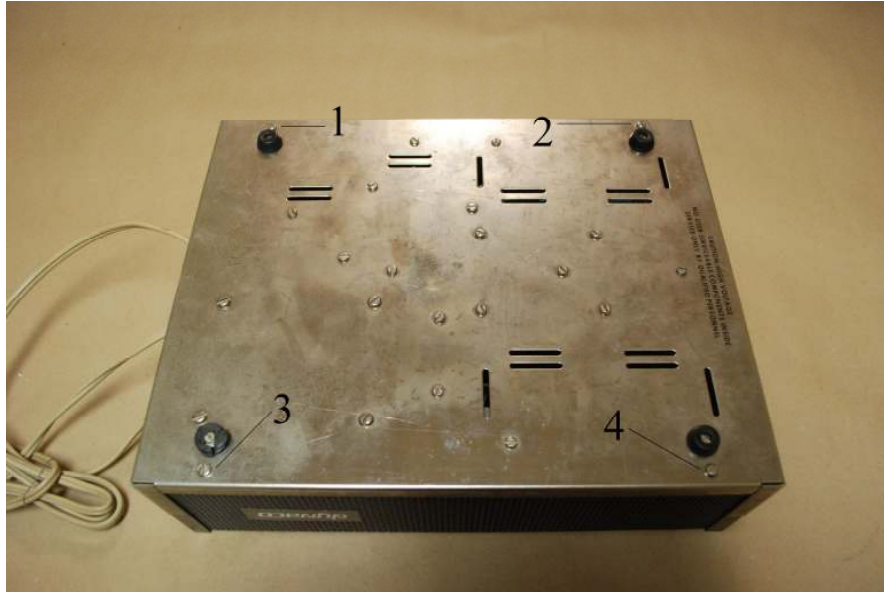


Figure 1-Location of the four screws that hold the cover to the base

If the voltage on C12 was within tolerance, then:

1. **Remove the power plug from the wall socket**
2. **Turn the Stereo 120 power switch off.**
3. **Allow one full minute for the capacitors to discharge.**

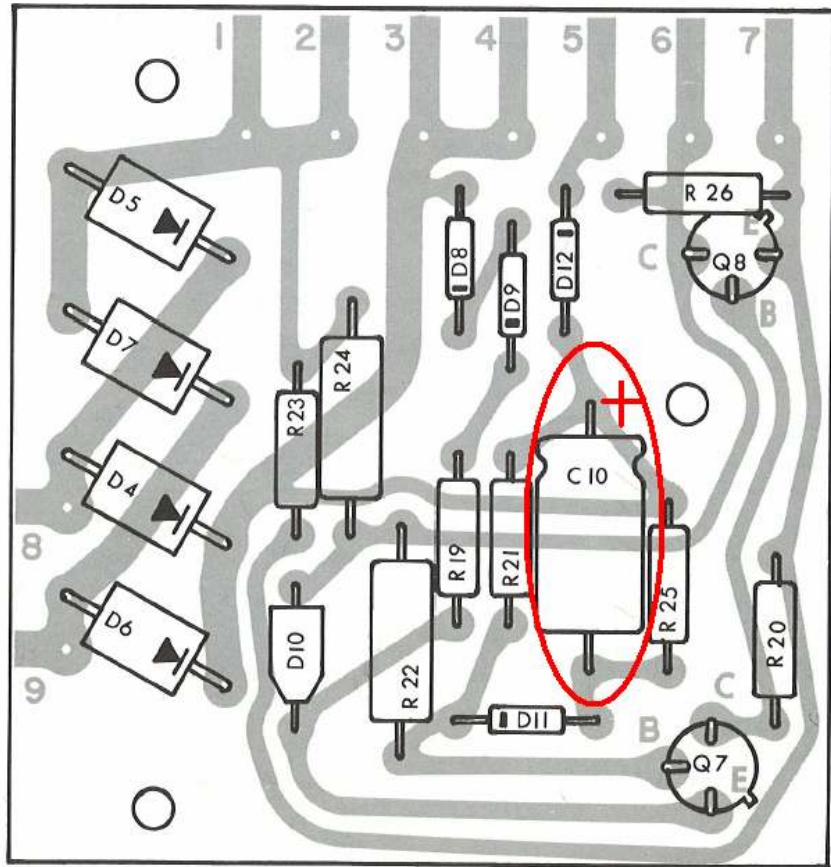
### **Removing the PC-15 module and Replacing C10**

- Perform this step if your Stereo 120 uses the original Dynaco PC-15 power supply regulator.
- Skip to “

Building the Dynamite Capacitor” if your Stereo 120 uses the Updatemydynaco PSUG kit.

***Important: If your Stereo 120 used the original Dynaco PC-15 regulator board, then C10 must be replaced. It is not optional. If you change C12 from 3300  $\mu$ F to 20,400  $\mu$ F and do not change C10, then your regulator will die, causing further damage to the amplifier!***

1. To remove the PC15 module, loosen the two 6-32 screws and nuts that hold the heat sink to the chassis. One of the screws may also hold a foot. There will probably be lock-washers under the nuts. Don't lose them, and don't allow them to go wandering loose inside the amplifier.
2. De-solder the red and black wires from C9, at the C9 end (see Figure 5).
3. At the C12 end, clip (or de-solder) the red wire that runs from PC-15 eyelet 4 to the positive terminal of C12.
4. With a little care, you should now have enough leeway to lift the power supply module free of the chassis.
5. Remove and save the three long screws, nuts, stand-offs and lock washers that secure the PC-15 circuit board to the heat sink. Be sure to keep track of the lock washers so they don't end up rattling around inside the amplifier.
6. Carefully lift the bottom end of the PC-15 away from the heat sink to gain access to the component side of the board.
7. C10, nominally 50  $\mu$ F, is the only large capacitor on the PC-15. De-solder and remove C10.
8. Clear the holes in which C10 was previously installed using your favorite method, be that solder wick, a sold-a-pult, or a solder sucker. My favorite method is the “toothpick trick”, as it's inexpensive.
  - a. Insert a toothpick from the component side, while simultaneously heating the pad on the solder side.
  - b. Push the toothpick through the hole to clear it.
9. Install the new C10, a 330  $\mu$ F capacitor. Make sure that the polarity is correct. The ridged (positive) end of the cap goes in the hole closer to the center of the board.
10. Solder both leads of C10, and then clip the extra lead length.
11. Re-install the 3 screws, standoffs, nuts and lock washers to once again fasten the PC-15 to the heat sink.
12. Do not re-install the regulator assembly to the chassis. That will be done later.

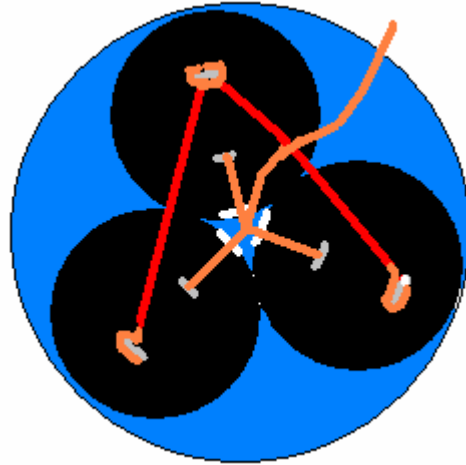


POWER SUPPLY CIRCUIT BOARD

Figure 2-Dynaco PC-15 Power supply board highlighting C10 location and polarity

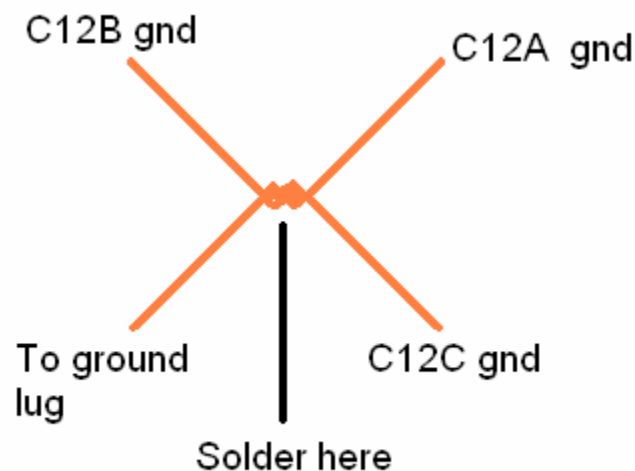
## Building the Dynamite Capacitor

1. You'll replace C12, a single 2.5" diameter capacitor with three 30 mm diameter capacitors, as shown in Figure 3.



**Figure 3-3 30 mm diameter capacitors take the space of one 2.5" diameter capacitor**

2. Orient the three capacitors with the *negative* leads in the center of the grouping.
3. Place a piece of masking tape around the outside of the three capacitors to hold them together. This will make it easier to install the ground and positive wire harnesses.
4. Construct the ground harness for the caps:
  - a. Remove 4" of insulation from the supplied 20 AWG wire.
  - b. Cut the resulting bare wire into two 2" long pieces.
  - c. Twist and shape the wires as shown in Figure 4.



**Figure 4-Ground Harness Configuration**

5. Solder the center section as indicated. Place the soldered portion of the jumper in the center of the dynamite capacitor configuration. Hook the ends of three of the



- four wires to the three negative terminals of the capacitors. Solder the wires to the negative terminals.
6. Form the remaining wire upward, away from the caps. You'll attach it to the amplifier ground connections in a later step.
  7. Prepare the Positive Wire Harness as follows (see Figure 3):
    - a. Cut two pieces of red 20 AWG wire, each to a length of 2 ½".
    - b. Remove ¼" of insulation from the ends of the wires (4 places).
    - c. Form the bare ends into hooks. Crimp the hooks around the positive terminals of the capacitor as shown in Figure 3. Solder the connections, making sure to leave room for additional wires added in later steps.

### **Removing the Old C12**

1. Either de-solder or cut the remaining red wires on the old C12 near its positive terminal.
2. De-solder or cut the black wire(s) from the old C12 negative terminal near that terminal.
3. Loosen the clamp-band-tightening screw on the C12 clamp. Wiggle and rotate the old C12, then lift it up and out of the amplifier. You may have to loosen the band-tightening screw a bit more, but try and leave the nut on the bolt to make reassembly easier.

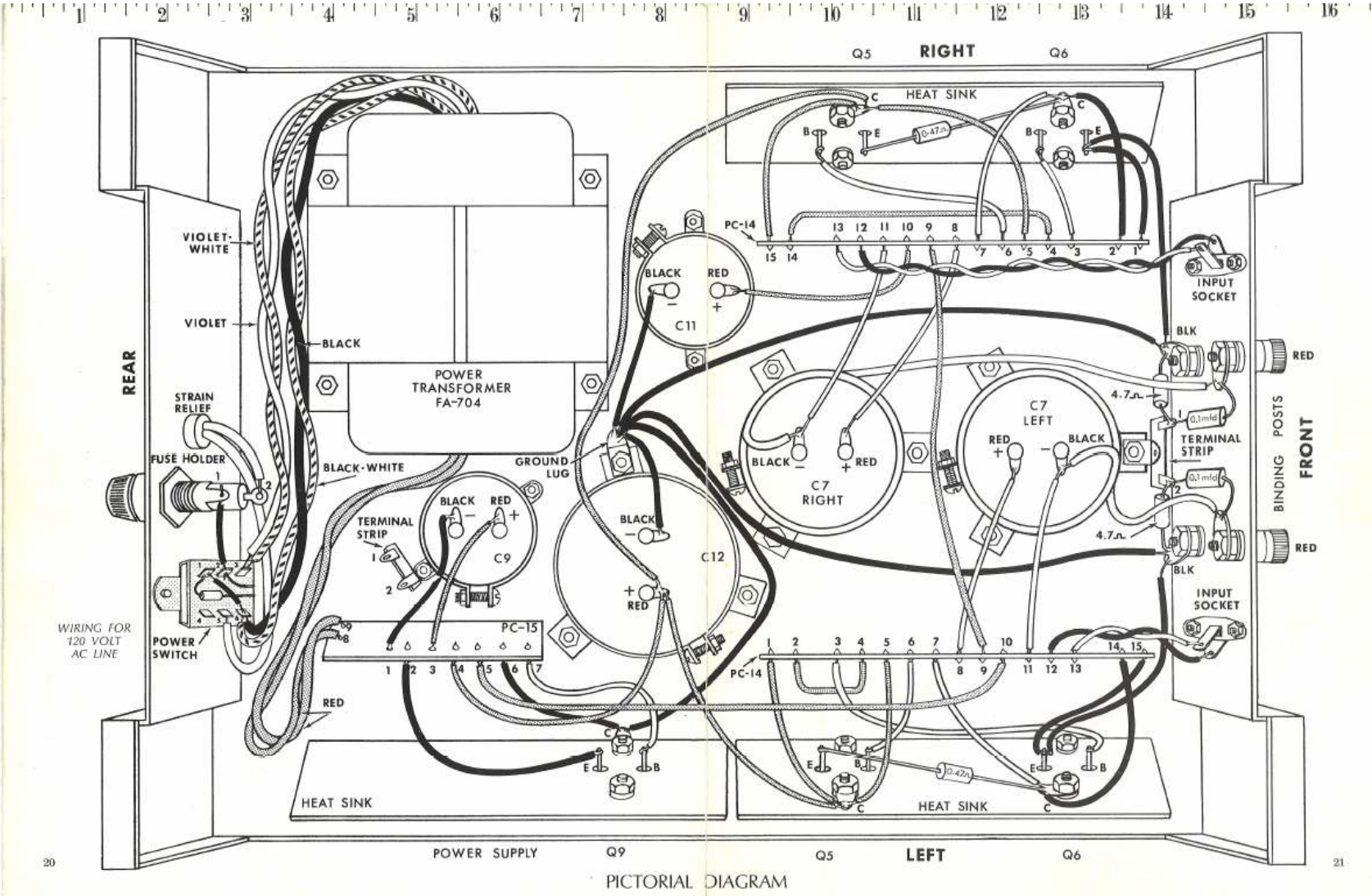


Figure 5-Stock amplifier layout (before C12 replacement)

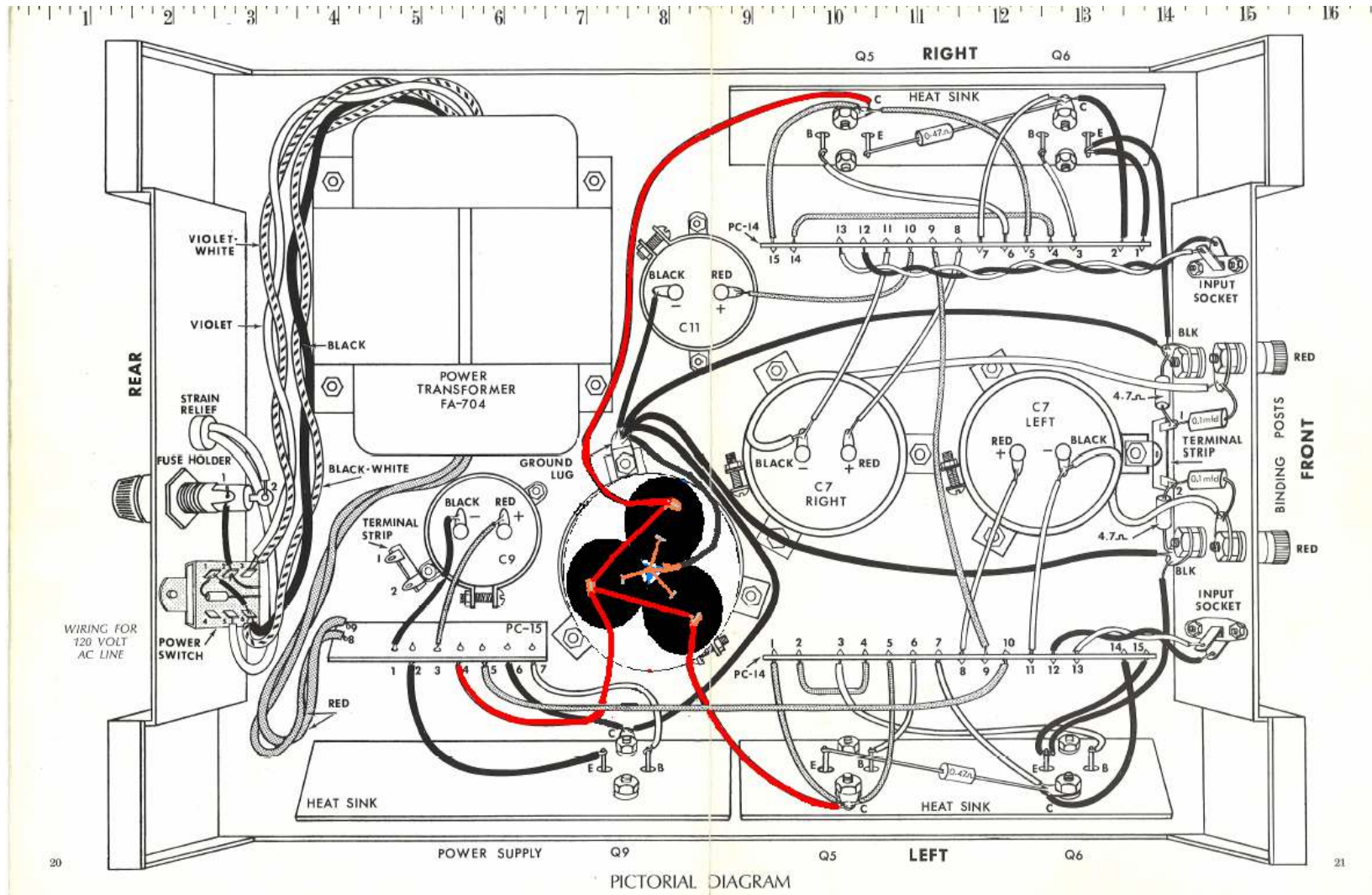


Figure 6-Stock Amplifier with Dynamite Capacitor Configuration Installed

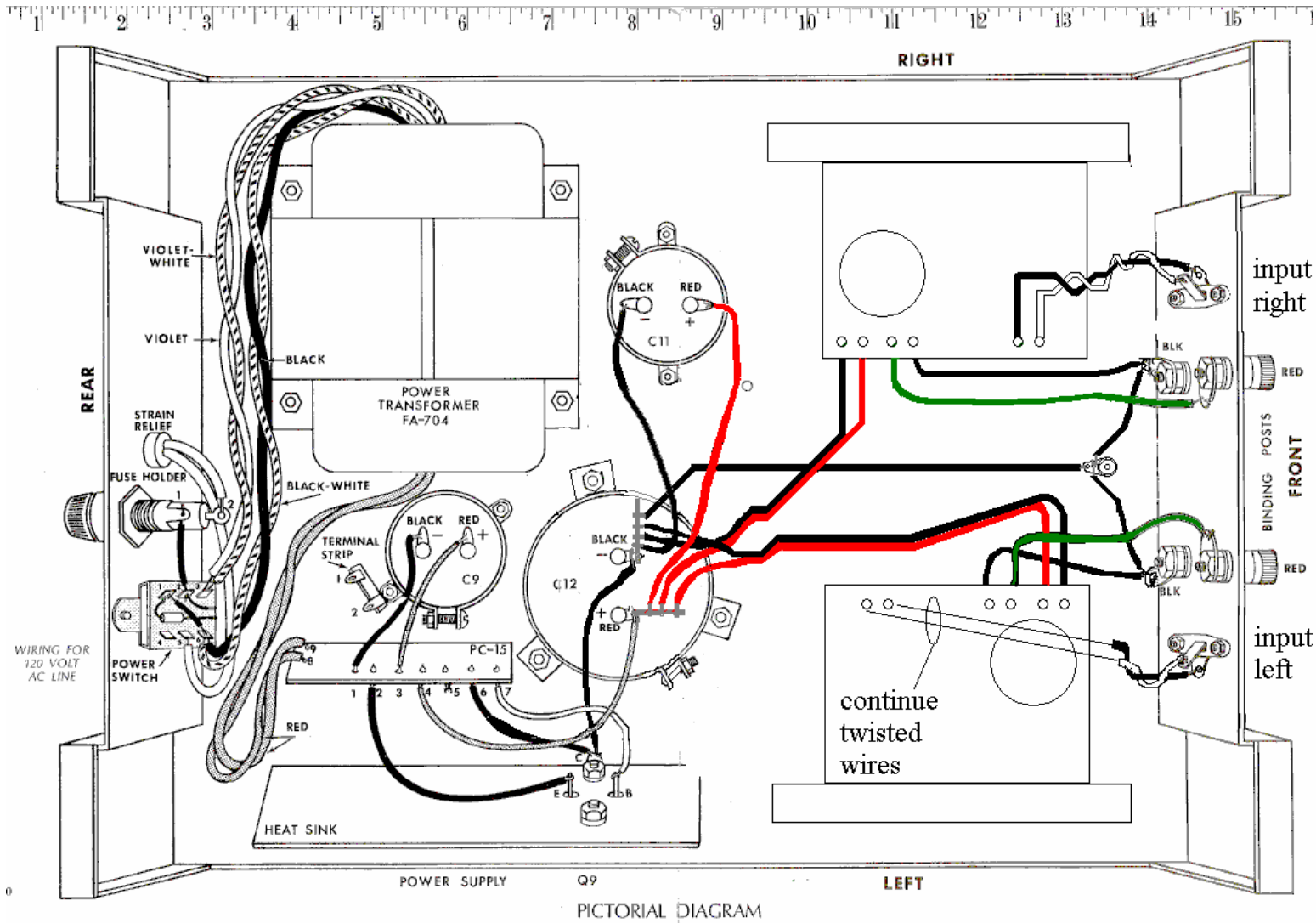


Figure 7-Dynaco PC-15 Power Supply and Updated dynaco amplifier modules, before changing C12

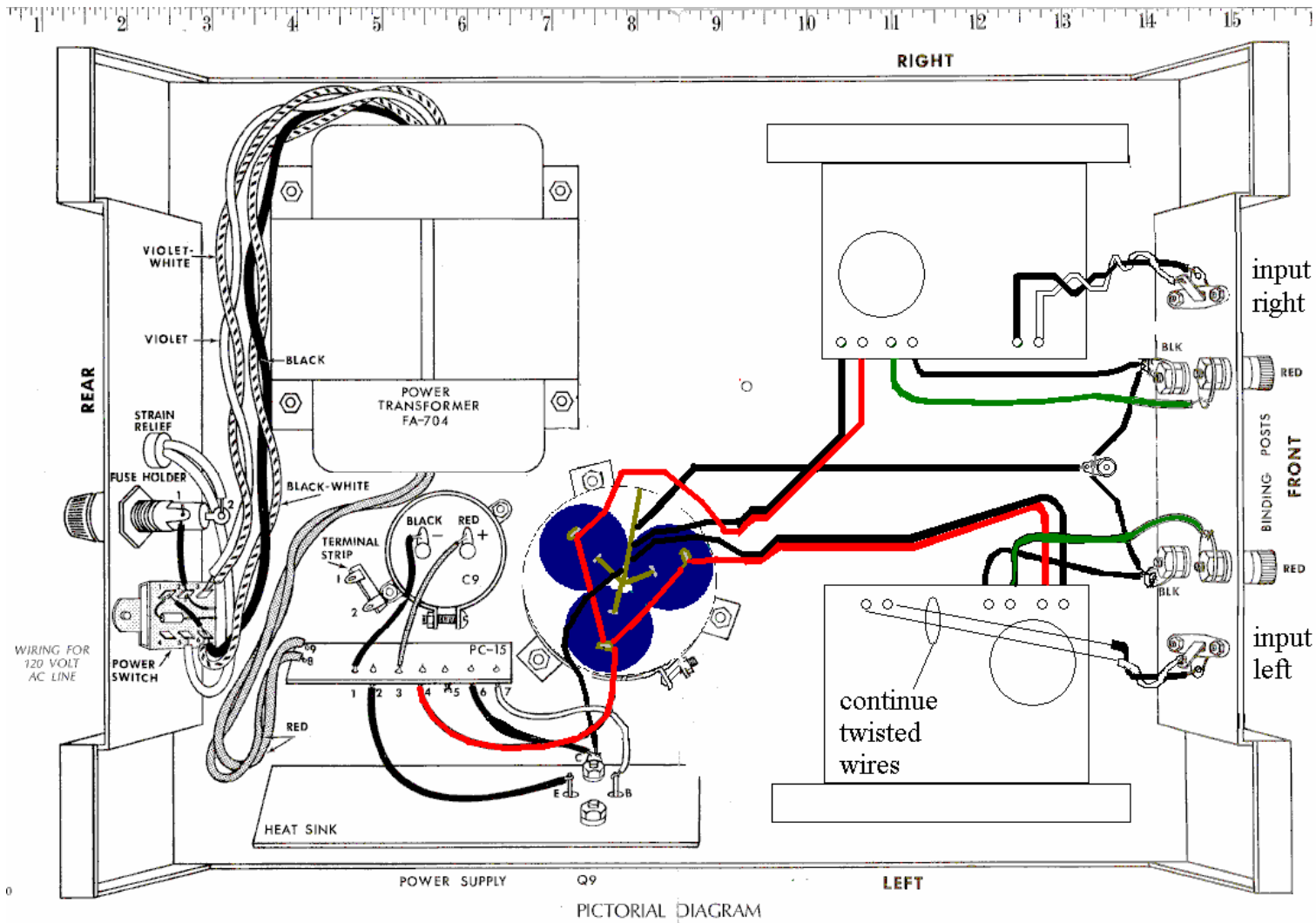


Figure 8-PC-15 Power supply, Updatemydynaco amp modules, after C12 replacement

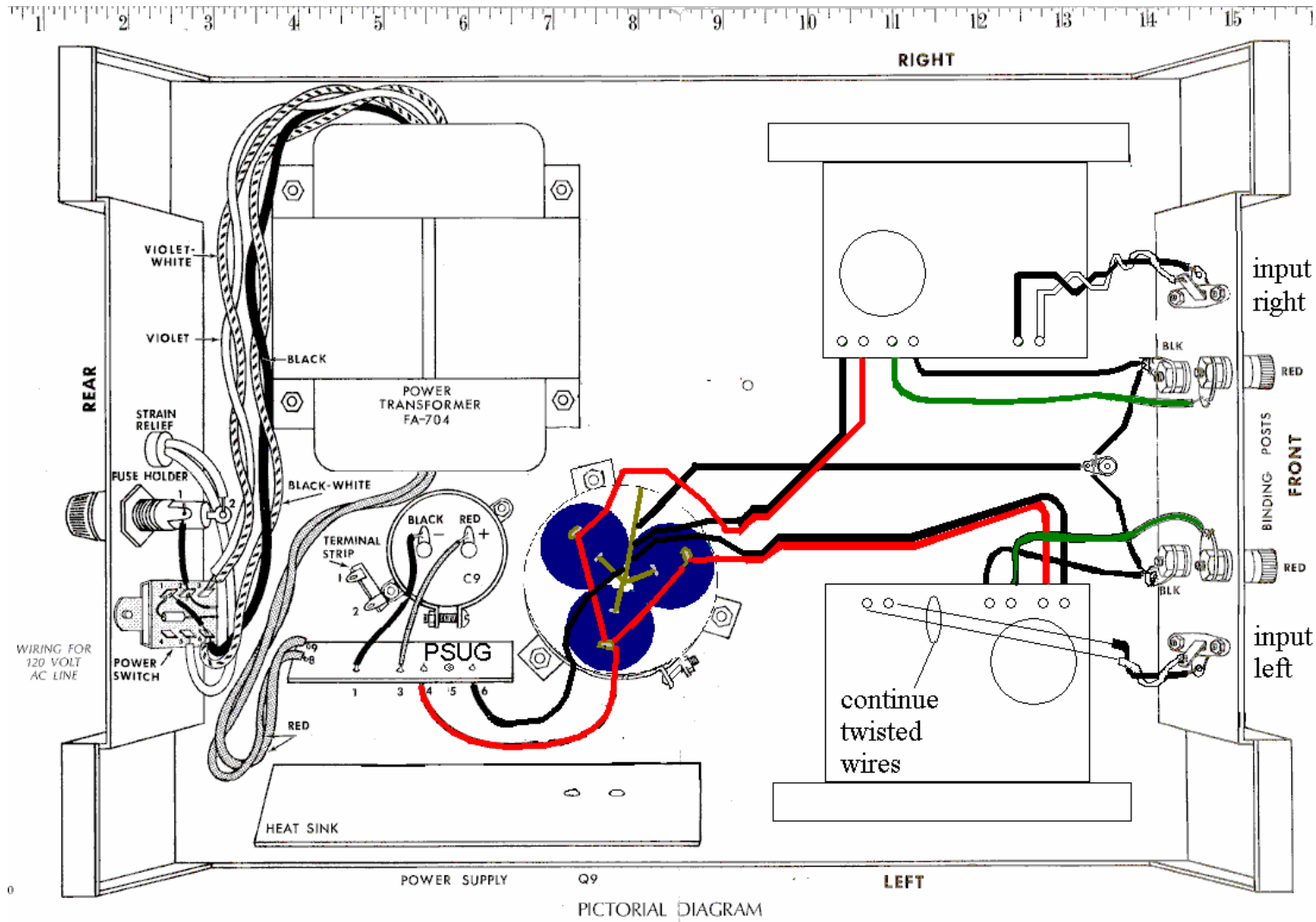


Figure 9-PSUG Power Supply and Updatemydynaco amplifier modules, after C12 replacement

## ***Installing the New C12 Dynamite Capacitor Configuration***

Now it's time to install the new capacitor arrangement and reconnect the wires. Review Figure 5 through Figure 9 to determine which is closest to your replacement conditions. Use those Figures to guide the re-wiring of the C12 replacement capacitor.

1. Fit the new dynamite capacitor configuration into the clamp. Rotate the cap so that the amplifier red wires will reach the Positive Wire Harness.
2. When you're sure that the disconnected red wires will reach a capacitor terminal, snug up the capacitor clamp band. Do not over-tighten it.
3. Remove the masking tape that held the capacitor configuration together.
4. Reconnect (crimp and solder) the disconnected red wires to the positive wire harness using the appropriate figure as your guide.
5. Reconnect (crimp and solder) the disconnected black wires to the ground harness, using the appropriate figure as your guide.
6. Inspect your work carefully. Make sure that there is no possible way for wires connected to the positive and negative terminals of the new C12 configuration to come into contact.

If your Stereo 120 uses the Updatemydynaco PSUG power supply regulator, then skip to "Check and Test Your Work".

## ***Reinstall the Regulator Assembly***

This section only applies to Stereo 120's that use the original PC-15 power supply regulator board.

1. Re-use the previously installed 6-32 hardware (nut, bolt, and lockwasher) to connect the regulator assembly to the chassis.
2. Remember that one of the mounting screws typically holds a mounting foot.

## ***Check and Test Your Work***

You're about to check and test your work. Please ***recall that there are potentially lethal voltages in the amplifier. Please continue to work safely.***

1. Make sure that the AC cord is still disconnected from power.
2. Verify that the positive terminals of the new C12 capacitor configuration are connected together.
3. Verify that the wires connected to the positive and negative terminals of C12 cannot, under any foreseeable circumstance, come into contact!
4. Place the rocker power switch in the Stereo 120 in the ON position.
5. Plug the amplifier power cord into a power outlet.
6. There may be the usual "bong" as the amp powers up, but there should be nothing else notable.
7. After 30 seconds or so, check the DC voltage on the new C12, it should be the same voltage you observed before replacing C12.

## ***Install the Quiet Turn-off Kit***

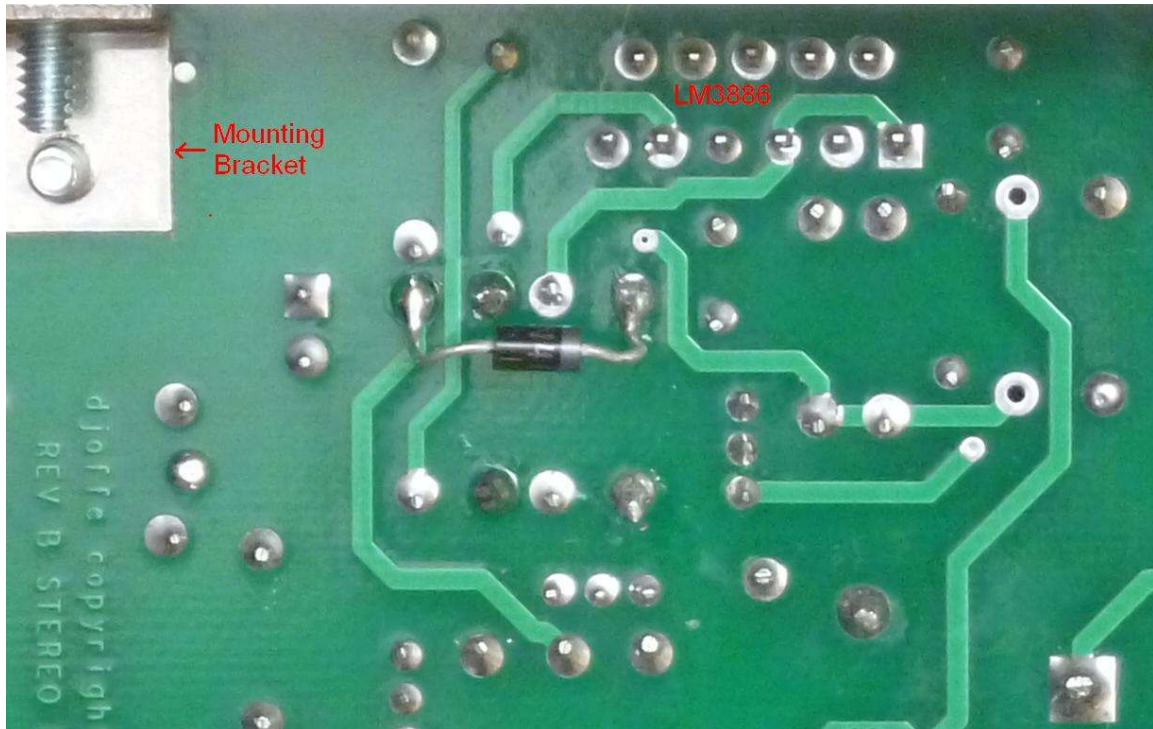
This section only applies to Stereo 120's that use Updatemydynaco amplifier modules. If your Stereo 120 uses the original Dynaco modules, then skip to "Reassemble the Amplifier".

The quiet turn-off kit is optional. If you don't install it, the combination of the big C12 and the Updatemydynaco amplifier modules will produce a low level tone burst sometime during the turn-off transient. Some people find this tone endearing, while others find it annoying. If you're amongst the group that would find it annoying, then complete the mods to the Updatemydynaco amplifier boards described in this section.

*Safety First – remember to unplug the amplifier and let the capacitors discharge before working on the amplifier. These new caps will hold charge for a long time. It's safe to work on the amp after the new C12 voltage is less than about 12 volts.*

For each amplifier board, do the following:

1. Change R7 from 100K to 9K09.
2. Change R8 from 100K to 11K0
3. Add a 1N4004 diode as shown below on the back side of the PCB. *Watch the orientation of the diode. The cathode (banded end) goes closer to the center of the board.*



Note that at the completion of this change, the LEDs will light quite brightly.

The added diode has its cathode at the junction of R7 and R8, and its anode on VMID (where the positive side of C1 meets the bottom of R3).



## ***Reassemble the Amplifier***

Remove the power cord and wait one full minute before proceeding. Reinstall the amplifier cover using the four screws that hold it in place.

## ***Results***

Once you've placed the amplifier back in service, you may notice the following:

1. It takes a little longer for the power supply to reach full voltage (a few seconds).
2. Upon turning power off, the amplifier will continue to produce sound longer than it previously would.
3. More extreme low bass power will be available.
4. If you've installed the quiet turn-off kit into updatemydynaco amplifier modules, the LEDs on board will be much brighter.

## ***References***

Be sure to visit [www.updatemydynaco.com](http://www.updatemydynaco.com) to see if the latest information, or to download the latest version of this manual.

There's a Youtube video showing parts of the process described in this manual:

[http://www.youtube.com/watch?v=xUsT-tAzI\\_k](http://www.youtube.com/watch?v=xUsT-tAzI_k)