PAT-4 IMPROVEMENTS

Introduction

The PAT-4, Dynaco's original solid state preamp, had one of those classic Dynaco designs where every transistor did a lot. Some of the compromises were fine for the 1960's, but with time, people have come to expect more.

The modification described here disables the tone controls and reduces the preamp gain, reducing the noise and hum by a factor of 3.6x. That's a significant reduction, about 11 dB! With 2 1200 Ohm resistors and 30 minutes, you can complete this modification.

Is This Mod Right for You?

This is the right modification for you if:

- You typically keep the volume control pretty low, say below 10 o'clock.
- Don't mind the loss of the tone controls, or
- Have always hated the tone controls, or
- Your tone control pots are scratchy or intermittent
- You want to reduce your hum and noise by almost 11 dB.

This mod works great with a Stereo 120 revised by using the updatemydynaco amplifier modules. They are about 3 dB more sensitive than Dynaco's original amplifiers. However, please note that if your amp is insensitive, and you regularly keep the PAT-4 volume control at 1 O'clock or above, this mod wouldn't be a good idea.

A Bit About the Tone Controls and High Level Stage

The PAT-4 tone controls have long been subject to scorn from audiophiles. They probably aren't that much worse than any other tone controls. However, the combination of the high level gain stage and tone controls around the two transistor gain stage meant that the gain stage always had about 22 dB of gain. The volume control is in the front, and the result just isn't optimum for signal to noise ratio. However, it does get a lot done with just two transistors.

Finally, if your tone control pots have become intermittent beyond cleaning, the best answer may be to take them out of the circuit. The pots have very special tapers that just aren't available. They are described on the updatemydynaco web site. If you happen to find a source of pots with these tapers, I'd love to hear about it.

Modification Directions

Before working on the PAT-4:

- Disconnect it from your system.
- Disconnect the power plug from the AC outlet.
- Wait 1 minute for capacitors to discharge

Be SAFE...there are potentially lethal voltages in the PAT-4 if you leave it plugged in!

To gain access to the circuits:

- Remove the four sheet metal screws (two on each side) that hold the cover in place. Lift the cover straight up to remove it.

Here are step by step circuit modification directions. The same directions apply to both left channel and right channel circuit boards.

1. Clip the bass pot wires about ½" from where they connect to the PC board at eyelets 13, 14, and 15.
2. Slide the insulation off the ½" wires connected to eyelets 13, 14, and 15.
3. Connect the wires from eyelets 13, 14, and 15 together using the technique shown in Figure 1.
4. Desolder and remove the treble pot wires by heating eyelets 16, 17, and 18 on the PCB.
5. Clear eyelet 17 as best as you can. A soldering iron and a wooden toothpick will do a pretty reasonable job in a pinch.
6. Bend 1 lead of a ¼ Watt 1200 Ohm resistor at 90 degrees, about 3/8" from the body. Leave the other lead straight.
7. Insert the bent resistor lead into eyelet 17 from the solder side of the board and solder it. Clip off the extra lead on the component side of the board.
8. Connect the straight lead to the wires that connect eyelets 13, 14, and 15 together. Solder the four connections together (eyelet 13, 14, 15, and the straight resistor lead). Cut the extra resistor lead length.
9. Bundle the ends of the wires that connect to the bass pot. Tape the ends so they can't contact the circuit boards.
10. Bundle the ends of the wires that connect to the treble pot. Tape the ends so they can't contact the circuit boards.

Figure 1-modification connects eyelets 13, 14, and 15 together. The combined node connects to eyelet 17 via a 1200 Ohm resistor (only one channel shown here, both channels must be converted).

Replace the cover, replace and tighten the four sheet metal screws. Reinstall the preamp into your system.

RESULTS

You will find that you have to advance your control further for the same sound level. In my case, I went from keeping the volume around 9 o'clock to 12 o'clock. That still leaves half of the control rotation if I really want to crank the sound.

The measured him and noise dropped by the predicted factor of about 3.6X. That's a very worthwhile improvement.