



Dynaco PAS 2, 3 & 3X Phono Board RIAA EQ Modification

Introduction

The original Dynaco PAS 2, 3 and 3X preamplifiers include a low level amplifier board (PC-6) that provides the necessary amplification and equalization required to support low level sources such as microphones, analog tape heads and the much more common, magnetic phono cartridge (moving magnet and high output moving coil). Three (of the eight) inputs available on the rear panel of the preamp are assigned to these devices and routed through the low level amplifier - equalization is deployed actively. The selector switch simultaneously selects the input and inserts the component(s) into the feedback circuit to provide the correct equalization to match the requirement of the input selected.

The equalization necessary for modern moving magnet and moving coil cartridges is defined by the RIAA (Recording Industry Association of America) standard. It has been the standard for the playback of vinyl records since 1954. The frequency dependent response defines three transition points at 75 μ s, 318 μ s and 3180 μ s, corresponding to frequencies 2122 Hz, 500 Hz and 50 Hz.

Unfortunately, the moving magnet phono response of the Dynaco PAS preamplifier as designed departs significantly from the standard by as much as 5db at the lowest frequencies (see Figure 1A). The purpose of this document is to describe the modifications to the original Dynaco phono amplifier (PC-6) circuit that will provide a response within 0.25dB of the standard (see Figure 1B).

This steps defined will require basic soldering skills and tools outlined in the following documents (available from our web page www.curcioaudio.com) :

- a. Soldering Tutorial (CAE Tech Note # 2)
- b. Recommended Tools & Test Instruments (CAE Tech Note # 3)

Please take the time to familiarize yourself with all of these documents in particular Tech Note # 2.

Note 1: Once this modification is completed, all three low level inputs (Tape Head, Special and Phono) will be equalized as defined by the standard RIAA phono equalization – the original Tape Head and Special equalizations are replaced with phono RIAA. The benefit is that you may use up to 3 turntables.

Note 2: It is important to note that the condition of your printed circuit board may have deteriorated sufficiently so that the de-solder operation may result in foil delamination or breakage. It is therefore very important that you be very careful when removing components to not disturb the fragile condition of the foil. Should the foil delaminate (quite possible) be very careful to maintain its original position and more importantly install the replacement component so as not to stress the foil. This may include bringing the lead of the new component into the board hole and running the lead along the foil until it reaches a nearby component lead along the trace.

Procedure

Both phono preamplifier channels (left and right) are included within Dynaco PC-6 circuit board. The modification will involve the removal and replacement of four resistors and four capacitors located on the Dynaco PC-6 phono board. You will also be cutting four leads leading to the equalization components on the selector switch.

Refer to figure 2 and proceed with the following steps.

1. Disconnect your PAS preamplifier from the AC mains and allow the internal voltages possibly stored in the electrolytic capacitor to discharge over a 20 minute period.
2. Remove the four screws holding the top cover and remove the top cover.
3. Next remove the bottom plate exposing the foil side of both printed circuit cards (PC-5 & PC-6).
4. Locate one of the 0.1uF capacitors labeled "C0" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a short piece of wire – (use 22ga or smaller as thicker leads will stress the PC board foil)
5. Locate the remaining 0.1uF capacitor labeled "C0" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a short piece of wire – (use 22ga or smaller as thicker leads will stress the PC board foil)
6. Locate one of the 100K resistors labeled "R1" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 95.3K ohm (1/2 watt) resistor.
7. Locate the remaining 100K resistors labeled "R1" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 95.3K ohm (1/2 watt) resistor.
8. Locate one of the 4M7 resistors labeled "R2" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 2.0M ohm (1/2 watt) resistor.
9. Locate the remaining 4M7 resistors labeled "R2" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 2.0M ohm (1/2 watt) resistor
10. Locate one of the 68pF capacitors labeled "C1" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 820pF polystyrene capacitor.
11. Locate the remaining 68pF capacitor labeled "C1" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. Replace with a 820pF polystyrene capacitor.
12. Locate one of the 2750pF capacitors labeled "C2" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. You will be replacing this capacitor with two capacitors – a 2200pF polypropylene (0.0022uF) in its original position topside and a 470pF silver mica capacitor mounted on its leads on the bottom side of the board.
13. Locate the remaining 2750pF capacitors labeled "C2" and its associated leads on the foil side of the printed circuit board (PC-6). Desolder and remove. You will be replacing this capacitor with two capacitors – a 2200pF polypropylene (0.0022uF) in its original position topside and a 470pF silver mica capacitor mounted on its leads on the bottom side of the board.
14. Locate the lead from the selector switch leading to terminal # 2 of printed circuit board PC-6. Cut this lead near the plane of the PC board. Cut the other end (at the selector switch and discard).
15. Locate the lead from the selector switch leading to terminal # 3 of printed circuit board PC-6. Cut this lead near the plane of the PC board. Cut the other end (at the selector switch and discard).

16. Locate the lead from the selector switch leading to terminal # 8 of printed circuit board PC-6. Cut this lead near the plane of the PC board. Cut the other end (at the selector switch and discard).
17. Locate the lead from the selector switch leading to terminal # 9 of printed circuit board PC-6. Cut this lead near the plane of the PC board. Cut the other end (at the selector switch and discard).

You have now completed the modification. Replace the bottom plate and top cover and secure with the four screws.

Figure 2 – RIAA Equalization Modification - PC6 Changes

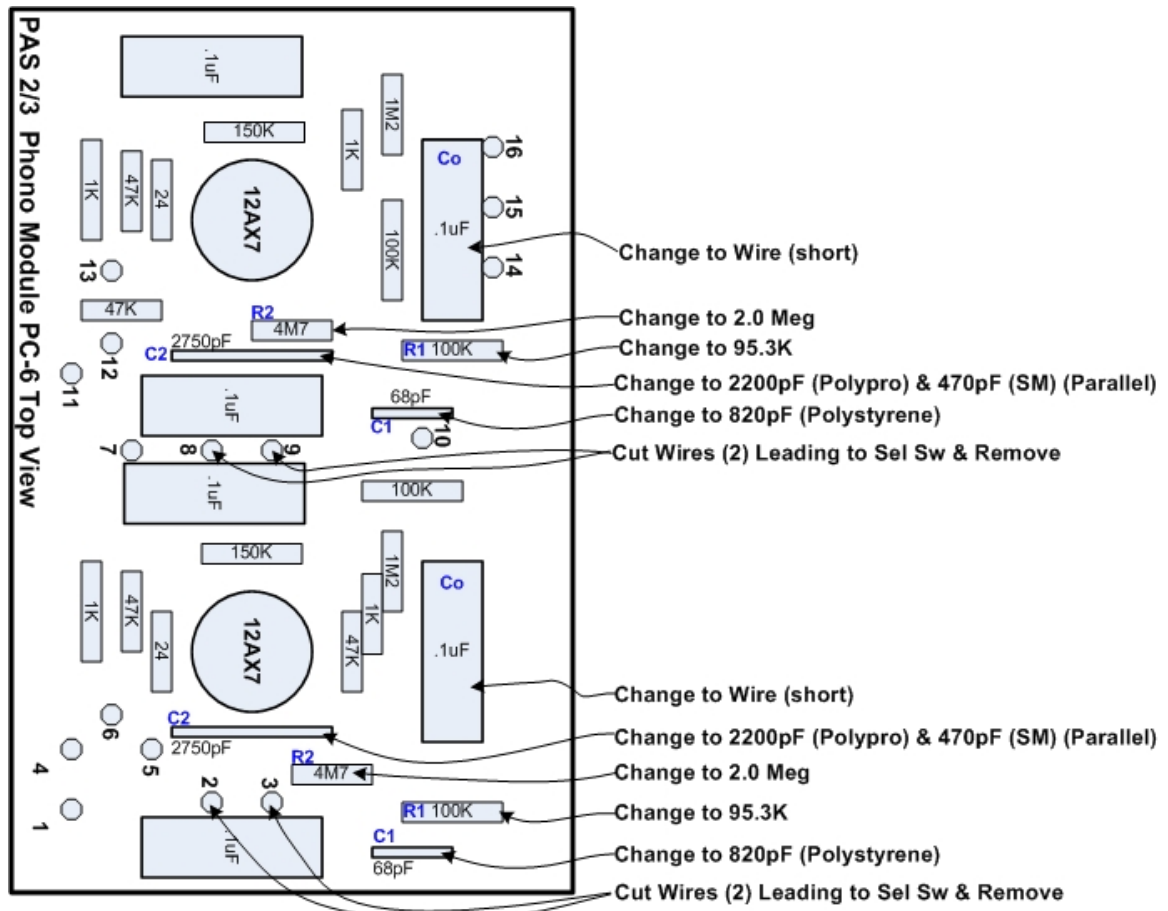


Figure 1A – Original Dynaco Circuit RIAA Error vs. Frequency

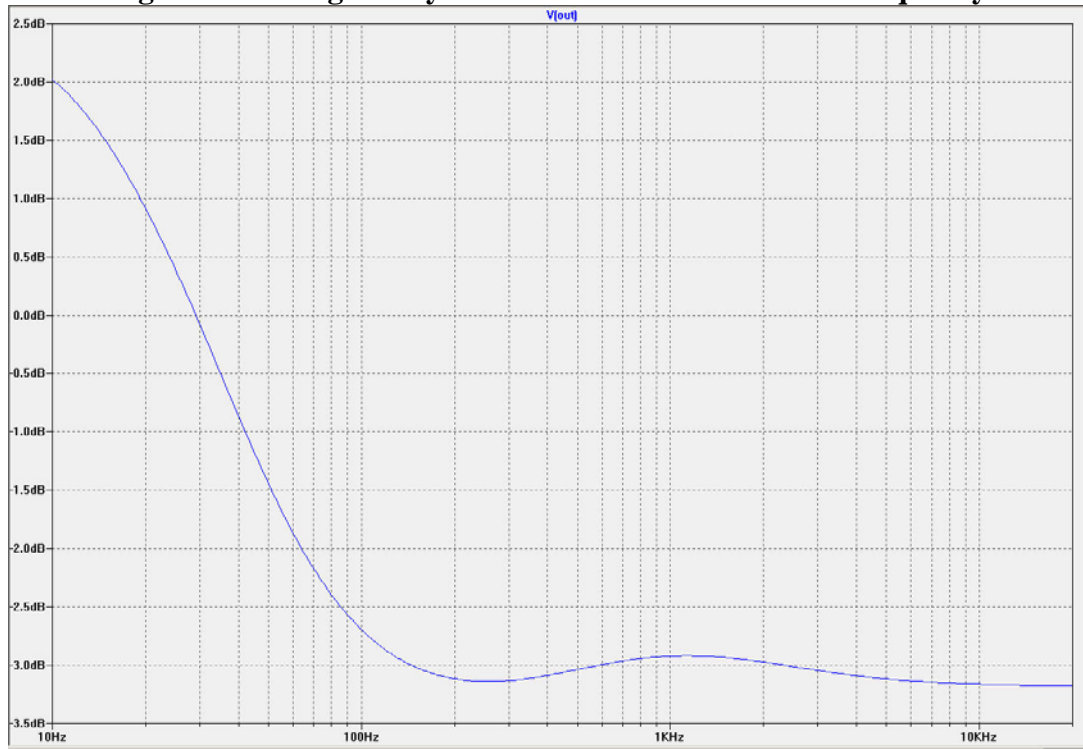


Figure 1B – Modified Dynaco Circuit RIAA Error vs. Frequency

