

# Replacing the stock Dynaco driver board with a VTA CCS driver board

## Removal of the stock Dynaco ST-70 board

“(S)” means to solder that connection at that time.

- 1 - Remove all tubes from amplifier
- 2 - Turn amp over and remove bottom cover
- 3 - Unsolder all wires from the old PCB and mark them with the corresponding number or function with a small piece of tape
- 4 - The wires to pins 3 & 18, 6 & 21, 11 & 14, and pin 19 will no longer be used, so these wires can be completely disconnected on the other ends. Because much of this wiring is probably old, it is recommended that all wires to the driver board be replaced. 20 gauge solid core wire is the recommended wire to use. If stranded wire is used it is recommended that the end that attaches to the driver board be pre-tinned before the wire end is inserted into each eyelet hole on the driver board.
- 5 - The old bias components (2 - 50uF caps and 2 - 10K 2w resistors) on the 7 lug terminal strip can be removed. Also all the connections to the 2 original bias pots can be removed. The bias pots themselves may be left where they are or removed as they will not be used any more. The selenium rectifier can be removed. If triode/pentode switches are to be installed, the two bias potentiometers and the selenium rectifier must be removed.
- 6 - The 6.8K and 22K resistors on the quad cap must be removed. The 2<sup>nd</sup> and 3<sup>rd</sup> sections of the quad cap (where the 6800 ohm resistor was) should now be connected together with a jumper wire. At this time just solder the one end of the jumper wire that connects to the 2<sup>nd</sup> section of the quad cap. (the section that faces the REAR of the amp) The choke will remain connected between the 1st and 2nd section of the quad cap.
- 7 - Connect the 2200 (2.2K) ohm 3 watt resistor between sections 3 and 4 of the quad cap. Solder the connection to section 3 which has the other end of the jumper wire attached also. Remove the wire that goes from section 4 of the quad cap to eyelet 19 on the old PCB – It is not long enough. Connect one end of a 6 inch wire to section 4 and solder it in place. The other end of the 6 inch wire will be connected to the board later.
- 8 - The front panel components will need to be (temporarily) removed so the old PCB can be easily taken out and the new PCB installed. If you are going to keep the front octal (power take off) sockets the wiring to them can remain, just remove the screws and move them out of the way. The stereo/mono switch and input jacks must also be removed. Remove all wiring and resistors from these two components
- 9 – Remove the 4 attachment nuts and remove the old PCB

## Installation of the VTA driver board

1. Obtain the hardware set for the VTA driver board and locate the four 4-40 by 1/2 INCH long stainless steel screws. Place the four screws in from the TOP of the chassis. Place a 4-40 NON KEP nut on the other end from the inside of the chassis and screw it down to the bottom of the inside of the chassis but DO NOT TIGHTEN

**THE SCREW.** Make a “test fit” of the driver board. If it won’t fit on the screw ends then move the screws around slightly until the board fits properly. Tighten the 4-40 nut firmly into position. Now place ANOTHER 4-40 NON KEP nut on top of the first nut and tighten this nut on top of the first nut. The purpose of the TWO NUTS is to space the VTA board down slightly into the chassis so the 4 outboard 270K resistors do not touch the chassis. Make a final test fit and then remove the board.

2. Solder FOUR 1 3/4 inch wires onto the board into the four input eyelets in the center front of the board. The two UNMARKED holes nearest the edge of the board are GROUND connectors. (they are marked "GND" on the TOP of the board.) The other two connectors are marked “R-IN” and “L-IN” ON THE TOP OF THE BOARD but are not marked on the bottom of the board. (S) After soldering all four wires to the board bend the 4 wires slightly towards the center of the board to facilitate the installation of the board.
3. Slide the VTA board onto the 4 screws until it bottoms out on the doubled up nuts. The four input wires you just soldered should be FACING THE FRONT of the amp. Tighten down the board this time WITH four 4-40 KEP nuts.
4. Connect back the two power take off sockets in the front of the chassis. Bend the tube socket pins in against the back of the tube socket slightly. Reinstall the LEFT power takeoff socket with 4-40 hardware. Reinstall the RIGHT power take off socket with 4-40 hardware. Both are a tight fit but will go in to their respective holes.
5. Reinstall the slide switch that fits into the stereo/mono slot with 4-40 hardware. This switch will NOT BE USED and NOT CONNECTED to the ST-70 circuitry in any way but it fills the rectangular slot to give the front face of the amp a better appearance.
6. Reconnect the input jacks to the chassis with 4-40 hardware
7. Cut and REMOVE the jumper wire that runs between the two output tubes on both channels. This wire runs from pins 1,8 on one tube to pins 1,8 on the other tube. Remove the 15.6 ohm resistor that runs from pins 1,8 to ground on each channel.
8. Attach one end of a 10 ohm 2 watt bias resistor to pin #8 of V3 (S). Bend back the grounding tab on the base of V3 next to pin #8 and connect the other end of the 10 ohm 2 watt resistor to this grounding tab (S).
9. Run a wire from pin 4 of the LEFT power takeoff socket (S) to pin 8 of V2. Attach one end of a 10 ohm 2 watt bias resistor to pin #8 of V2 (S). Bend back the grounding tab on the base of V2 next to pin #8 and connect the other end of the 10 ohm 2 watt resistor to this grounding tab (S).
10. Attach one end of a 10 ohm 2 watt bias resistor to pin #8 of V6 (S). Bend back the grounding tab on the base of V6 next to pin #8 and connect the other end of the 10 ohm 2 watt resistor to this grounding tab (S).
11. Run a wire from pin 4 of the RIGHT power takeoff socket (S) to pin 8 of V7 (S). Bend back the grounding tab on the base of V7 next to pin #8 and connect the other end of the 10 ohm 1 watt resistor to this grounding tab (S).
12. Measure the resistance from pin 8 to the chassis (ground) and pin 4 to the chassis on EACH of the TWO power takeoff sockets – You should get about 10 ohms in all four cases. If you don’t go back and check your wiring.

## Connections to the VTA driver board

You will be making SEVENTEEN connections during the wiring to the VTA driver board

1. Connect the two input ground wires from the UNMARKED eyelets (these are two of the four wires that you soldered in place in step 2 above) CLOSEST TO THE EDGE OF THE BOARD in the center to the two grounding tabs on the input jacks. (S) Connect wire coming from the "L-IN" eyelet on the VTA board to the center tab of the LEFT input jack. (S) Connect wire coming from the "R-IN" eyelet on the VTA board to the center tab of the RIGHT input jack. (S)
2. Connect the two twisted pair of wires coming from the LEFT power take off socket to the two open "FIL" eyelets below the left tube socket on the bottom of the driver board. These two "FIL" eyelets are set at a about a 45 degree angle to each other. Shorten the wires to the proper length if needed (S)
3. Connect the two twisted pair of wires coming from the RIGHT power take off socket to the two open "FIL" eyelets below the right tube socket on the bottom of the driver board. These two "FIL" eyelets are set at a about a 45 degree angle to each other. Shorten the wires to proper length if needed (S)
4. Connect the wire from the LEFT OUTPUT TRANSFORMER 16 ohm terminal that went to eyelet 12 to on the stock board to the eyelet marked "NFB" on the LEFT side of the driver board. (S) Connect the wire from the RIGHT OUTPUT TRANSFORMER 16 ohm terminal that went to eyelet 13 to on the stock board to the eyelet marked "NFB" on the RIGHT side of the driver board. (S)
5. Connect a 2 ½ inch wire from pin #6 of V3 that went to eyelet 2 on the stock board to the "PIN 6" eyelet near the left edge of the driver board about 5/8 inch from the FRONT of the board. Do not press the wire in too deeply as it may short against the chassis below. (S) Connect a 3 ½ inch wire from pin #6 of V2 that went to eyelet 1 on the stock board to the "PIN 6" eyelet near the left edge of the driver board about 5/8 inch from the BACK of the board. Do not press the wire in too deeply as it may short against the chassis below. (S)
6. Connect a 2 ½ inch wire from pin #6 of V6 that went to eyelet 23 on the stock board to the "PIN 6" eyelet near the right edge of the driver board about 5/8 inch from the FRONT of the board. Do not press the wire in too deeply as it may short against the chassis below. (S) Connect a 3 ½ inch wire from pin #6 of V7 that went to eyelet 22 on the stock board to the "PIN 6" eyelet near the right edge of the driver board about 5/8 inch from the BACK of the board. Do not press the wire in too deeply as it may short against the chassis below. (S)
7. Lengthen the RED-BLACK wire from the power transformer that went to the positive terminal of the selenium rectifier to an appropriate length and connect it to the eyelet on the board marked "-BIAS" near the back edge of the board. Do not press the wire in too deeply as it may short against the chassis below. (S)
8. Connect the ground wire coming from the main grounding lug that went to eyelet 9 on the stock board to the UNMARKED ground eyelet at the CENTER REAR EDGE of the driver board. (S)
9. Connect the loose end of the 6 inch wire coming from the quad cap section 4 to the eyelet marked "B+" near the center of the driver board. (S) . Do not press the wire in too deeply as it may short against the chassis below.

## Initial startup

1. Make sure that the 3 amp SLO-BLO fuse is in the fuse holder.
2. Place the three 12AU7 (or 12BH7/5963/5814/6189) tubes in the sockets on the top of the driver board. **DO NOT PLUG IN THE RECTIFIER TUBE OR THE EL34 OUTPUT TUBES** at this time. Plug in the amp to an AC outlet and turn on the amp. Wait about 20-30 seconds to see if the three 12AU7 tubes light up. If they do and they stay on for a minute then proceed to step 2. If the 12AU7 tubes don't light up or if the fuse blows check the wiring below and measure the AC voltage where both sets of twisted wires connect to the driver board. Check to see that you get about 6.3 volts AC across the two wires. If not, check the wiring back to the power transformer for an error.
3. Get your multimeter and set the range for 0 to 2 volts DC. **CONNECT THE SPEAKERS.** Place the GZ34 rectifier tube and just the LEFT EL34 output tubes in their socket. Turn on the amp. Allow the amp to warm up for a minute and check to see that the EL34 and GZ34 tubes light up properly. Measure the bias on the LEFT output tubes by placing the BLACK NEGATIVE probe anywhere on the chassis and the RIGHT POSITIVE probe in the hole marked "Biaset 1.56 v". With a small screwdriver adjust the FRONT LEFT bias adjuster on the driver board closest to the front left tube. Turn the adjuster **CLOCKWISE TO INCREASE BIAS** and **COUNTERCLOCKWISE TO DECREASE BIAS**. Set the bias for .400 volts. (NOT 1.56 volts as marked on the chassis!) Now place the positive probe in pin 4 (which is on the opposite side of the power take off socket) and use the BACK LEFT bias adjuster to measure bias on the LEFT REAR output tube. Set it the same as the front tube. Turn off the amp.
4. Plug in the two RIGHT channel EL34 tubes, turn on the amp and repeat the bias procedure as outlined above on the RIGHT channel tubes. Now go back to the left channel tubes and notice that the bias is now a little LOW. **ADJUSTING BIAS ON ONE TUBE HAS A SLIGHT AFFECT ON THE OTHERS.** Go back and forth between all output tubes until all tubes have the proper bias.
5. If at any time a fuse blows **IMMEDIATELY** check carefully the power transformer wiring for an error. Check all wiring against the pictorial. If a fuse blows **AFTER A FEW SECONDS** and/or the rectifier tube shows arcing after a few seconds check carefully all of the **QUAD CAP CONNECTIONS** against the pictorial.
6. If the amp plays with **HUM** disconnect all associated equipment and short the input terminals. Plug in an RCA input cable and connect a wire across the **POSITIVE** and **NEGATIVE** terminals. If the hum goes away, the problem is with your associated equipment. If the amp still hums, check **ALL GROUND CONNECTIONS** inside the amp.
7. **ALWAYS BE CAREFUL WORKING ON THE AMP** with the power on. This amp has 400 + volts in certain areas.

