

CCS Update

Level: Use this change if the “Parts Level” on the Main Board is marked “A” or “B”.

Purpose: This change provides a subtle but noticeable improvement in the sound.

Scope: The kinds of MOSFETs used in the CCSs and the values of the carbon composition gate stopper resistors are changed. The Active Output must be removed from its enclosure and disassembled to make these changes.

Parts Needed

| Designator | Description | Quantity |
|--|---|---------------------|
| R28, R31, R32, R35, R36, R40, R41, R45, R46, R50, R51, R55 | Resistor, 1K, ¼W carbon composition Digi-Key part number: OD102JE-ND | 12 |
| Q2, Q4, Q6, Q8, Q10, Q12 | MOSFET, 08N100D2 Digi-Key part number: IXTP08N100D2-ND | 6 |
| Q1, Q3, Q5, Q7, Q9, Q11 | MOSFET, 01N100D | recycle existing |

Special Tools: The existing gate stopper resistors are removed from the board and any residual solder must be removed from the component mounting holes so that new resistors may be installed. These tools, while not absolutely necessary, make the job of removing residual solder easier.

- Solder removal braid, Digi-Key part number CW7-25-ND. Techni-tool part number 237SO074
- De-soldering tool, Techni-tool part number 330ED082

Instructions

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1. Unsolder all wires connecting the Active Output with other components and remove the Active Output from its chassis.

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2. Remove the two tubes and set them aside.

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3. Unsolder the six wires connecting the Output board and Amplifier board and remove the Output board.
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4. Unsolder the six wires connecting the Power board and Amplifier board and remove the Power board.

In the following step you will remove the twelve resistors that are mounted on end. You may find it convenient to heat both leads at the same time from the bottom of the board, making it easy to extract the resistor.

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5. Remove the resistors from the following locations:
R28, R31, R32, R35, R36, R40, R41, R45, R46, R50, R51, R55

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6. Remove any residual solder from the resistor holes.

In the following step the resistors will be mounted vertically on end. Form one lead back along the body of the resistor such that the two leads are parallel. Insert the resistor in its location and hold the body of the resistor about 0.1" off the board as you solder it.

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7. Insert a 1K (brown, black, red, gold) carbon composition resistor in the following 12 locations: R28, R31, R32, RR35, R36, R40, R41, R45, R46, R50, R51 and R55.

Solder and trim the leads.

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8. Being careful not to touch the component leads, remove all twelve MOSFETs and set them aside.

You will re-use the mounting hardware as well as some of the MOSFETs.

9. Install two MOSFETs as follows:

Plug a 01N100D MOSFET into location Q1.
Plug a 08N100D2 MOSFET into location Q2.

Align the MOSFETs such that their tabs are against the heatsink.

Insert an insulator between each MOSFET and the heatsink. Secure with a screw, lock washer and a nut, using two insulating bushings (one for each tab) on the screw, and tighten moderately.

10. In a like manner, install
a 01N100D MOSFET in location Q3, and
a 08N100D2 MOSFET in location Q4.

11. In a like manner, install
a 01N100D MOSFET in location Q5, and
a 08N100D2 MOSFET in location Q6.

12. In a like manner, install
a 01N100D MOSFET in location Q7, and
a 08N100D2 MOSFET in location Q8.

13. In a like manner, install
a 01N100D MOSFET in location Q9, and
a 08N100D2 MOSFET in location Q10.

14. In a like manner, install
a 01N100D MOSFET in location Q11, and
a 08N100D2 MOSFET in location Q12.

15. Using your VOM, measure continuity between the body of the heatsinks and the tabs on each of the twelve MOSFETs, Q1—Q12. There should be NO continuity. If continuity exists, check that the insulators and insulating bushings are installed correctly.

16. Replace the Output board in its location and solder the six wires connecting the Output board and Amplifier board.

17. Replace the Power board in its location and solder the six wires connecting the Power board and Amplifier board.

18. Replace the two tubes in their locations.

19. Install the Active Output in its chassis and solder all of the wires to other components.

20. Use Acetone to remove the “Parts Level” marking on the main board.

21. Use a fine-tip felt tip marker and mark the “Parts Level” to be “C”.

Adjust the Constant Current Sources

The adjustments that you are about to make interact. Therefore, the first time you may have to alternate adjustments to get them in range.

Power on the Active Output and allow it to warm up for about one minute.

1. Measure the voltage across the 20K Ω resistor, R27 and adjust potentiometer R34 for 200V across R27.

2. Measure the voltage across the 20K Ω resistor, R26 and adjust potentiometer R30 for 200V across R26.

3. Measure the voltage across each of the four CCS current sense resistors and adjust the associated potentiometers for 240mV across its resistor.

| Measure | Adjust | Voltage |
|---------|--------|---------|
| R39 | R38 | 0.240V |
| R44 | R43 | 0.240V |
| R49 | R48 | 0.240V |
| R54 | R53 | 0.240V |

4. Allow the unit to warm up for about 15 minutes and then check and re-adjust the above six adjustments.
