

S E R V I C E N O T E

SUPERSEDES:

None

HP MODEL 8690B SWEEP OSCILLATOR

Serial Prefixes 1124A and Below

MODIFICATIONS TO IMPROVE RELIABILITY

This Service Note provides instructions for modifying the 8690B Sweep Oscillator with serial prefixes 1124A and below to improve reliability.

The modification that is recommended depends on the serial prefix of the 8690B as shown below:

8690B

Serial Prefix	Modification Number
1050A and below	I
1114A only	II
1124A only	III

The appropriate modification should be made to the 8690B Sweep Oscillator whenever it is serviced.

I. MODIFICATION I (Serial Prefixes 1050A and Below)

- A. Replace the germanium transistors on the A10 Sweep Generator Board and the A11 Amplitude Modulator Board.
- B. Add protective diodes for transistors that are susceptible to damage from excessive reverse bias voltage on the A3 Reciprocal Amplifier Board and the A11 Amplitude Modulator Board.
- C. Replace transistors in high voltage applications for ones with higher breakdown voltage rating on the A3 Reciprocal Amplifier Board and the A6 Power Supply Regulator Board.

- D. Add clamp diodes to the input of the A4 Helix Amplifier Board to prevent high voltage transients on the helix voltage.

PARTS REQUIRED FOR MODIFICATION I

Qty.	Description	HP Part Number
1	Terminal Solder Lug	0360-1190
9	Transistor PNP Silicon	1853-0020
3	Transistor NPN Silicon 2N3439	1854-0079
7	Diode Silicon 180 PIV 13 pf 100 mA	1901-0033
1	Diode Zener 48.7 V 2% 400 mw	1902-3400
2	RF 17.8 K OHM 1% 1/8 w	0698-3136

PROCEDURE FOR MODIFICATION I

1. Turn 8690B line switch to Off position. Remove AC power cord from rear of instrument.
2. Remove top and bottom cover from 8690B.
3. Remove A11 Amplitude Modulator Board assembly from 8690B.
4. Remove and discard Q2, 3, 4, 6, 7, 8, and 11 and replace with silicon transistor (HP Part Number 1853-0020).
5. Install a diode (HP Part No. 1901-0033) from the base to emitter of Q11. Connect the diode anode to the base and the cathode to the emitter. See Figure 1.

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6. Replace the A11 board assembly back in the 8690B.
7. Remove the A10 Sweep Generator Board assembly from the 8690B.
8. Remove and discard Q3 and Q4; and replace with silicon transistor (HP Part No. 1853-0020). Use the component identification photo in the Operating and Service Manual to locate R17 and R18. Remove R17 and R18 and replace each with a 17.8K ohm resistor (HP Part No. 0698-3136).
9. Replace the A10 board assembly back in the 8690B.
10. Remove the A3 Reciprocal Amplifier board assembly from the 8690B.
11. Install three protection diodes (HP Part No. 1901-0033) to Q3, Q4, and Q5. The diodes should be connected from the base to the emitter of the transistors with the anode connected to the base of the transistor and the cathode connected to the emitter. See Figure 2. Remove and discard Q6; and replace with Silicon Transistor (HP Part No. 1854-0079).
12. Replace the A3 board assembly back in the 8690B.
13. Locate J10 Marker Output BNC on the rear panel of the 8690B. Unsolder the white-red-orange wire from the center conductor. Remove the hexagon nut securing the BNC connector to rear panel. Remove the internal star lock washer from the connector. Install the solder lug (HP Part No. 0360-1190) so that it is facing J9. Replace the lock washer and hexagon nut. Install a diode (HP Part No. 1901-0033) from J9 center conductor to the solder lug. Connect the diode anode to the center conductor of J9 and the cathode to the solder lug. Install a diode (HP Part No. 1901-0033) from J10 center conductor to the solder lug. Connect the diode anode to the center conductor of J10 and the cathode to the solder lug. Reconnect the white-red-orange wire to the center conductor of J10.
14. Remove the A5 and A6 Power Supply Board assemblies from the 8690B, by removing the two screws that secure the A6 Board. Remove and discard A6Q1 and Q2. Replace with silicon transistors (HP Part No. 1854-0079). Replace the A5 and A6 Board Assemblies back in the 8690B. Secure the A6 board to the deck with the two screws.
15. Remove the A4 Helix Amplifier Board assembly from the 8690B.
16. Install a 78.8 Volt Zenier diode (HP Part No. 1902-3400) in series with a silicon diode (HP

Part No. 1901-0033) from the grid of V5 (Pin 2) to ground. The anodes of the two diodes should be soldered together. The cathode of the Zener diode connects to the grid of V5 Pin 2 and the cathode of the silicon diode connects to ground. See Figure 3.

CAUTION

Insure that the anodes of the diodes do not contact pins 4 and 5 of V5.

After this modification has been completed the 8690B should be calibrated as outlined in the Adjustments section of your Operating and Service Manual.

Make the necessary changes to the schematics and parts list in your Operating and Service Manual to document these changes.

II. MODIFICATION II. (Serial Prefix 1114A Only)

- A. Replace the A14 Heater Supply Board Assembly.
- B. Change components on the A8 Helix Voltage Supply Board to improve Repeatability of the Time Delay Circuit.
- C. Replace transistors in high voltage applications for ones with higher breakdown voltage rating on the A3 Reciprocal Amplifier Board and the A6 Power Supply Regulator Board.
- D. Add diode in series with Helix clamp diode on the A4 Helix Amplifier Board to insure helix voltage is not turned on when a 8698A or 8699B is used.
- E. Change components on the A11 Amplitude Modulator Board to improve reliability of the Blanking circuit.

PARTS REQUIRED FOR MODIFICATION II

Qty.	Description	HP Part Number
1	A14 Heater supply Board Assembly (replaces 08690-60054)	08690-6022
1	CF 140 μ f 30 V	0180-2268
1	RF 502 K OHM 1% 1/2 w	0757-0868
1	RF 909 OHM 1% 1/8 w	0698-3136
2	RF 17.8 K OHM 1% 1/8 w	0698-3136
3	Transistor NPN Silicon 2N3439	1854-0079
1	Diode Silicon 180 piv 13 pF 100 100 mA	1901-0033

PROCEDURE FOR MODIFICATION II

1. Turn 8690B line switch to Off position. Remove AC power cord from rear of instrument.

2. Remove top and bottom cover from 8690B.
3. Remove the A14 Heater Supply Board if it is HP Part No. 08690-60034. Discard it and replace it with HP Part No. 08690-60022.
4. The A8 Helix Supply Board should be HP Part No. 08690-60053. Using the component identification photo (Figure 4) locate and remove C6, R13, and R16. Replace C6 with a 140 μ f capacitor HP Part No. 0180-2268. Replace R13 with a 562 K ohm resistor HP Part No. 0857-0868. Replace R16 with 909 ohm resistor HP Part NO. 0757-0422.
5. Remove the A3 Reciprocal Amplifier Board Assembly. Remove and discard Q6 and replace with HP Part No. 1854-0079.
6. Replace the A3 Board assembly back in the 8690B.
7. Remove the A5 and A6 Power Supply Board Assemblies from the 8690B by removing the two screws that secure the A6 Board Assembly to the deck. Unplug the A6 board from the A5 board. Remove and discard Q1 and Q2 from the A6 board. Replace A6Q1 and Q2 with HP Part No. 1854-0079.
8. Replace the A5 and A6 board assemblies in the 8690B. Replace the two screws that secure the A6 board to the deck.
9. Remove the A4 Helix Amplifier Board from the 8690B. Using the Component Identification Photo (see Figure 5) locate CR11. Unsolder the anode end of CR11. Solder the cathode of a silicon diode HP Part No. 1901-0033 in the spot where CR11 was removed. Solder the anode of CR11 to the anode of the added diode.
10. Replace the A4 Board in the 8690B.

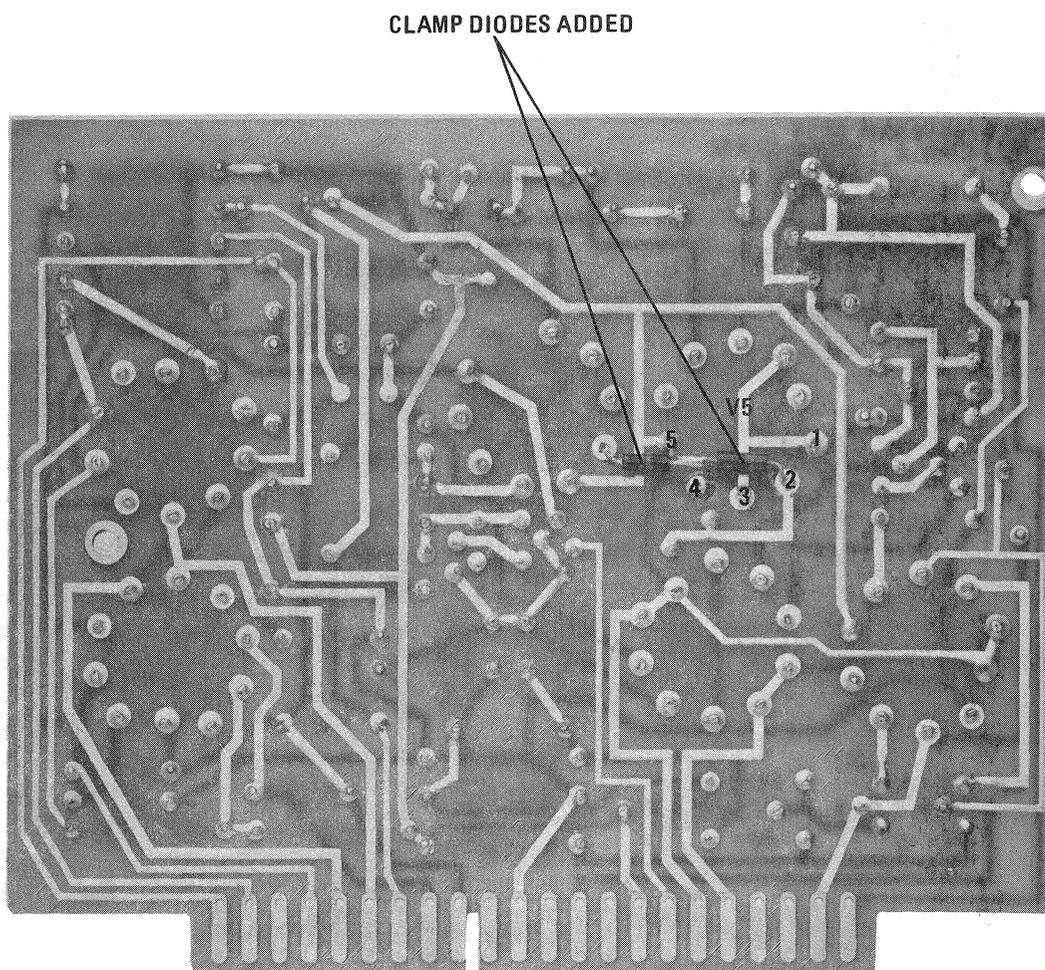


Figure 3. Modified A4 Helix Amplifier Board Assembly

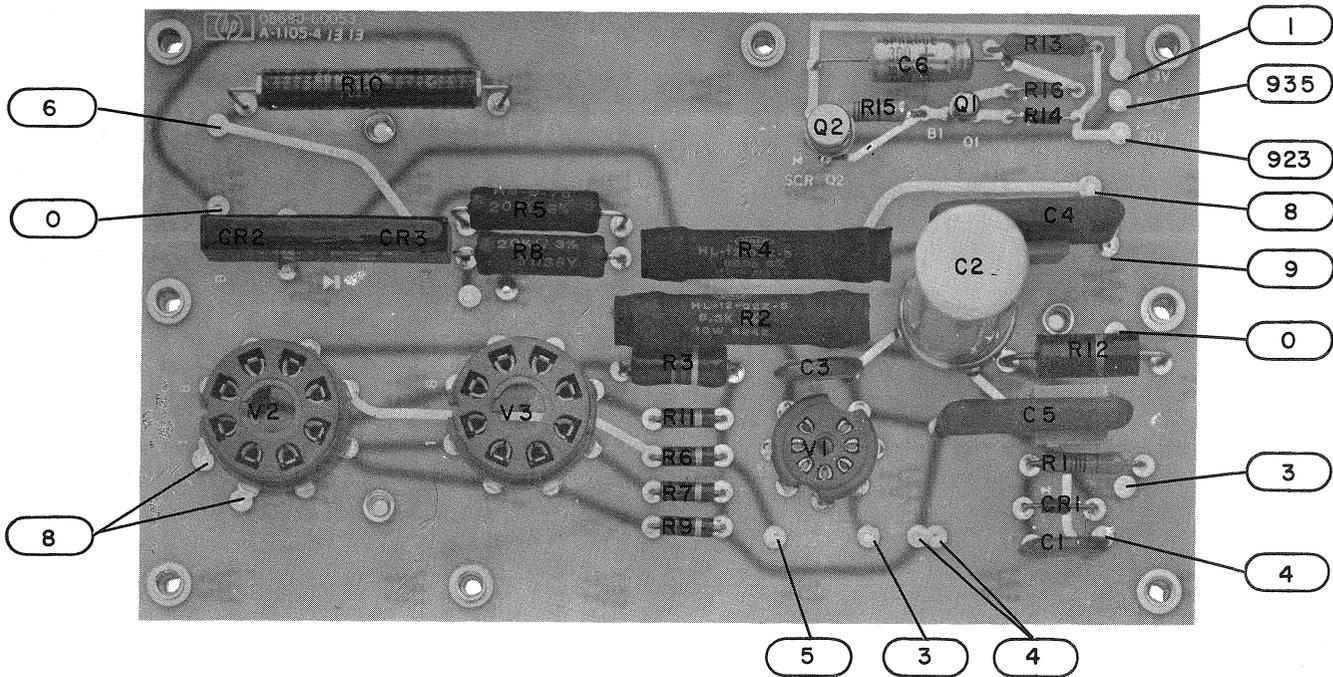


Figure 4. Component Identification, A8 Assembly

11. Remove the A10 Sweep Generator Board assembly from the 8690B.
12. Use the component identification guide in the Operating Service Manual to locate R17 and R18. Remove and discard R17 and R18 replace them with 17.8 K ohm resistor HP Part No. 0698-3136.
13. Replace the A10 board assembly in the 8690B.

After this modification has been completed the 8690B should be calibrated as outlined in the Adjustments section of your Operating Service Manual.

Make the necessary changes to the schematics and parts list in your Operating and Service Manual to document these changes.

III. MODIFICATION III (Serial Prefix 1124A Only)

- A. Replace transistors in high voltage applications for ones with higher breakdown voltage rating on the A3 Reciprocal Amplifier Board and the A6 Power Supply Regulator Board.
- B. Add diode in series with helix clamp diode on the A4 Helix Amplifier Board to

insure helix voltage is not turned on when a 8698A or 8699B is used.

- C. Change components on the A11 Amplitude Modulator Board to improve reliability of the blanking circuit.

PARTS REQUIRED FOR MODIFICATION III

Qty.	Description	HP Part Number
2	RF 17.8 K ohm 1% 1/8 w	0698-3136
3	Transistors NPN Silicon 2N3439	1854-0079
1	Diode Silicon 180 piv 13 pf 100 mA	1901-0033

PROCEDURE FOR MODIFICATION III

1. Remove the A3 Reciprocal Amplifier Board Assembly. Remove and discard Q6 and replace with HP Part No. 1854-0079.
2. Replace the A3 board assembly back in the 8690B.
3. Remove the A5 and A6 Power Supply Board Assemblies from the 8690B by removing the two screws that secure the A6 Board Assembly to the deck. Unplug the A6 board from the A5 board. Remove and discard Q1 and Q2 from the A6 board. Replace A6Q1 and Q2 with HP Part no. 1854-0079.

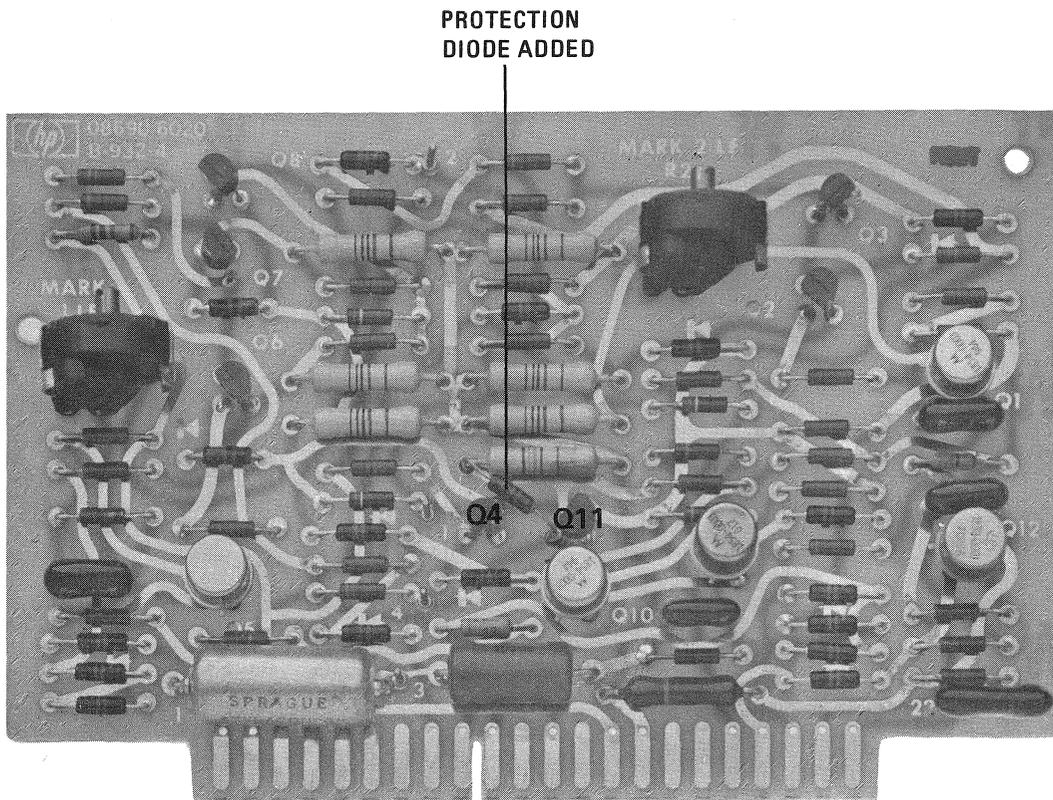


Figure 1. Modified A11 Amplitude Modulator Board Assembly

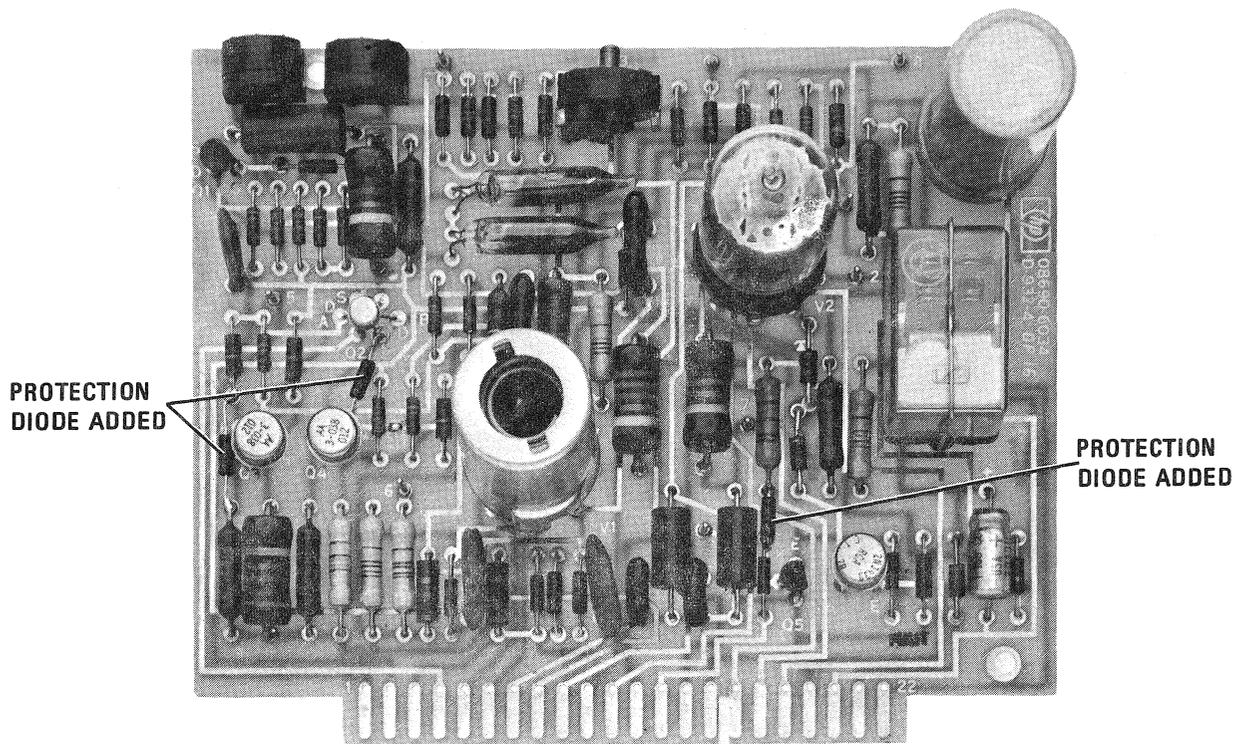


Figure 2. Modified A3 Reciprocal Amplifier Board Assembly

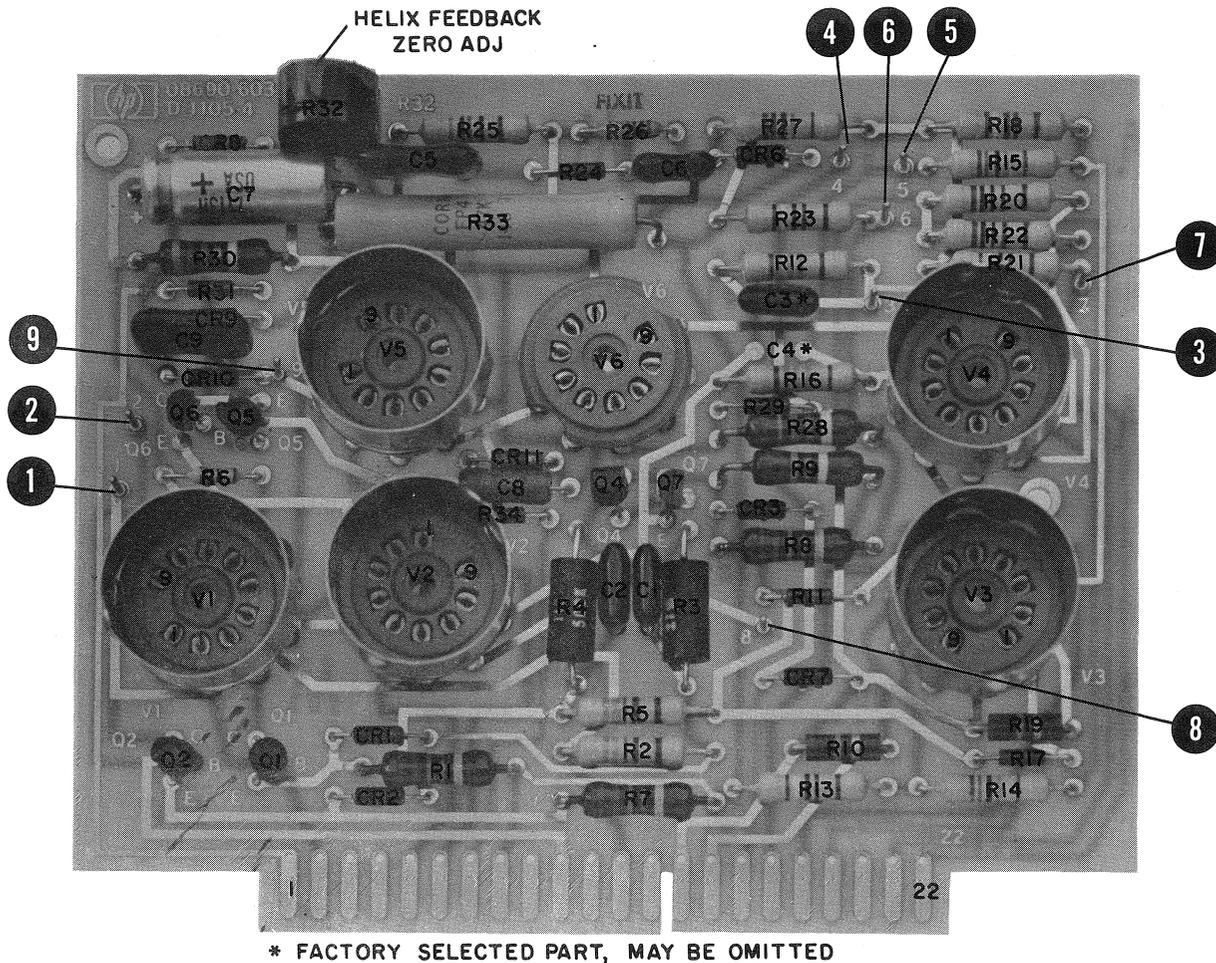


Figure 5. Component Identification, A4 Assembly

4. Replace the A5 and A6 board assemblies in the 8690B. Replace the two screws that secure the A6 board to the deck.
5. Remove the A4 Helix Amplifier Board from the 8690B. Using the Component Identification Guide (see Figure 5) locate CR11. Unsolder the anode end of CR11. Solder the cathode of a silicon diode HP Part No. 1901-0033 in the spot where CR11 was removed. Solder the anode of CR11 to the anode of the added diode.
6. Replace the A4 Board in the 8690B.
7. Remove the A10 Sweep Generator Board assembly from the 8690B.

8. Use the component identification guide in the Operating and Service Manual to locate R17 and R18. Remove and discard R17 and R18. Replace them with 17.8 K ohm resistors HP Part No. 0698-3136.
9. Replace the A10 board assembly in the 8690B.

After these modifications have been completed the 8690B should be calibrated as outlined in the Adjustments section of your Operating and Service Manual.

Make the necessary changes to the schematics and parts list in your Operating and Service Manual to document these changes.