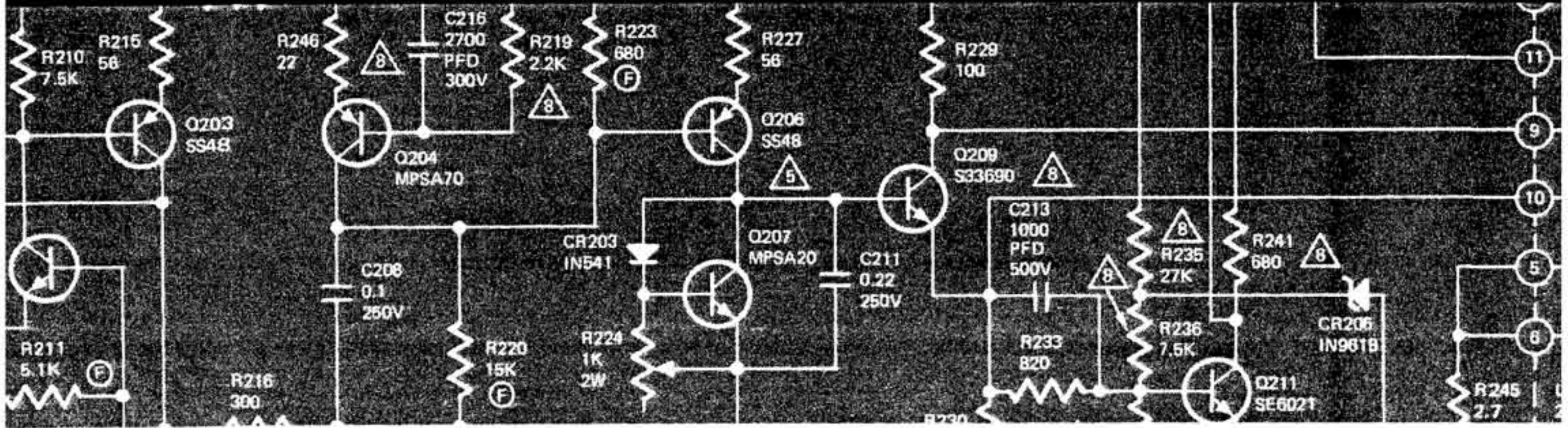


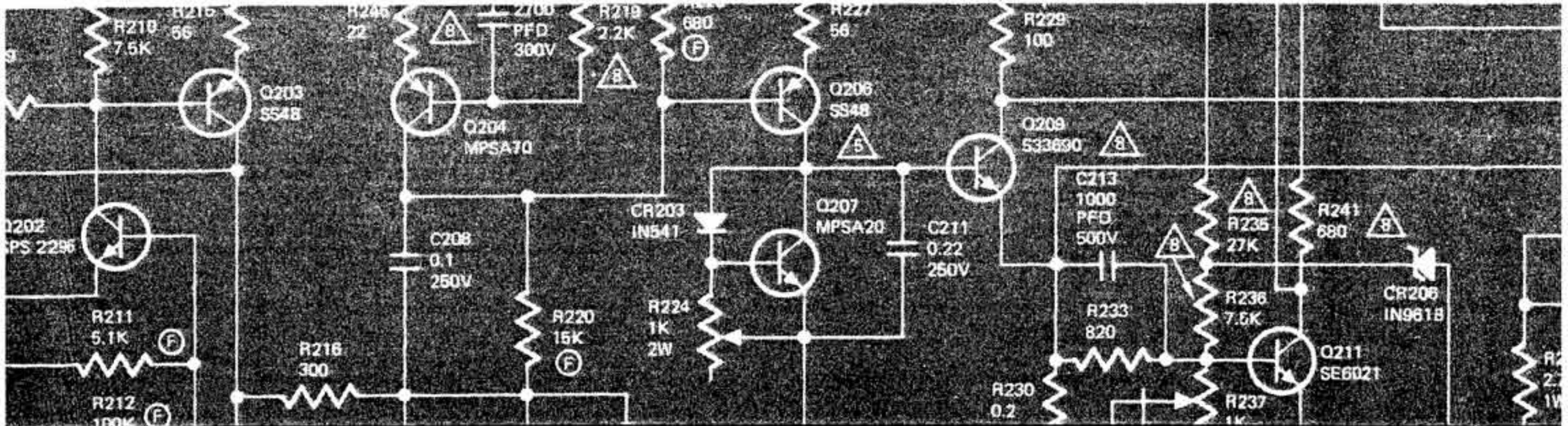
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SERVICE MANUAL **MODEL 3300**



Stereophonic Control Console

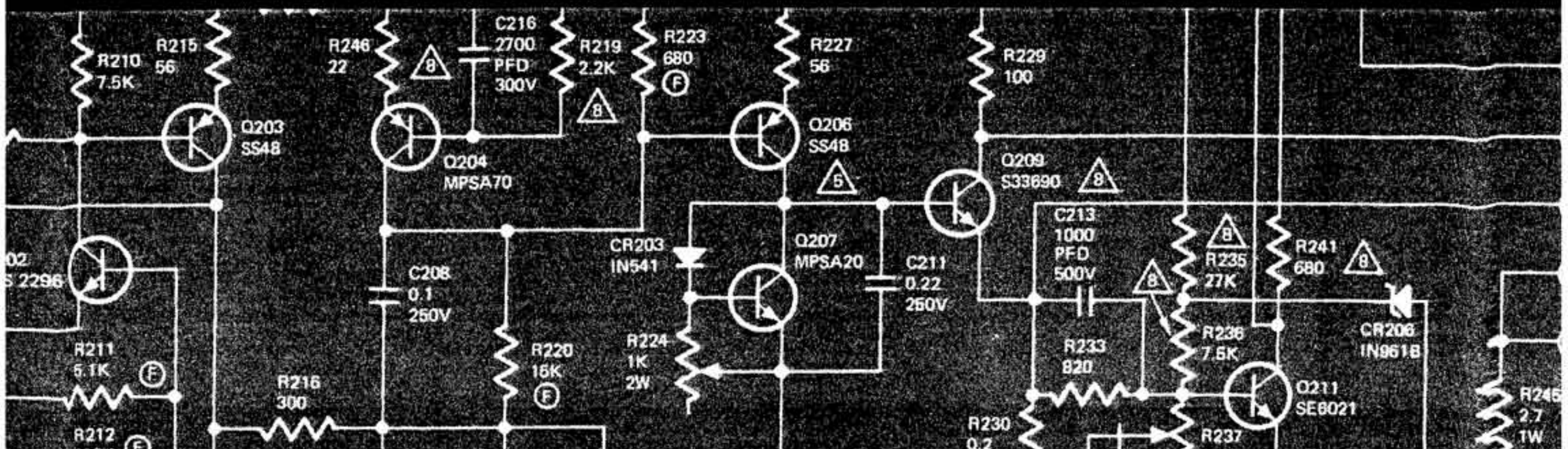


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CIRCUIT DESCRIPTION

GENERAL

This section is included to assist the service technician in understanding the operation of the Model 3300 Stereo Control Console. It is intended to describe, on a technical level, the basic operating principles of the Model 3300. The description will be based on one channel only, unless otherwise indicated.

SYSTEM

The signal flow diagram is shown in Figure 1. The function of the Selector Switch is to select the appropriate source and route it to the Tape Monitor Switches. In the low level positions (Mic, Phono 1 or Phono 2) the Selector Switch routes the signal to the Phono Amp, and selects the proper equalization (RIAA or Mic). The output of the Phono Amp is then sent to the Tape Monitor Switches. In the high level positions (Tuner, Aux 1 or Aux 2) the signal is sent directly to the Tape Monitor Switches.

The Tape Monitor Switches route the Tape Inputs or the selected input to the Tape Outputs and Mode Switch. A detailed description of this circuit and its operation will be described later.

From the Tape Monitor Switches, the signal is applied to the Mode Switch where the left and right input signals are routed to the desired left and right channel preamplifier circuits.

The Gain Switch provides control of an "L" pad attenuator. The attenuator shunt resistance is determined by the Balance and Volume Controls. In the

INTRODUCTION

This service manual is intended for use by authorized warranty stations. The manual contains service information for the Marantz Model 3300 Stereo Control Console, manufactured by The Marantz Company, a subsidiary of Superscope Incorporated, Sun Valley, California.

Adjustments, maintenance and troubleshooting information listed herein should be attempted only by the technician knowledgeable in solid state amplifier operation and the use of test equipment. All instructions should be read carefully and understood fully before proceeding with any service.

Symptoms (and their probable cause) listed in the trouble analysis section are those which might occur in some units. As The Marantz Company becomes aware of other field problems, supplementary service bulletins will be issued to all stations. To improve this service, all problems (and their solutions) not covered in this service manual should be brought to the attention of the National Technical Service Manager at our Sun Valley location.

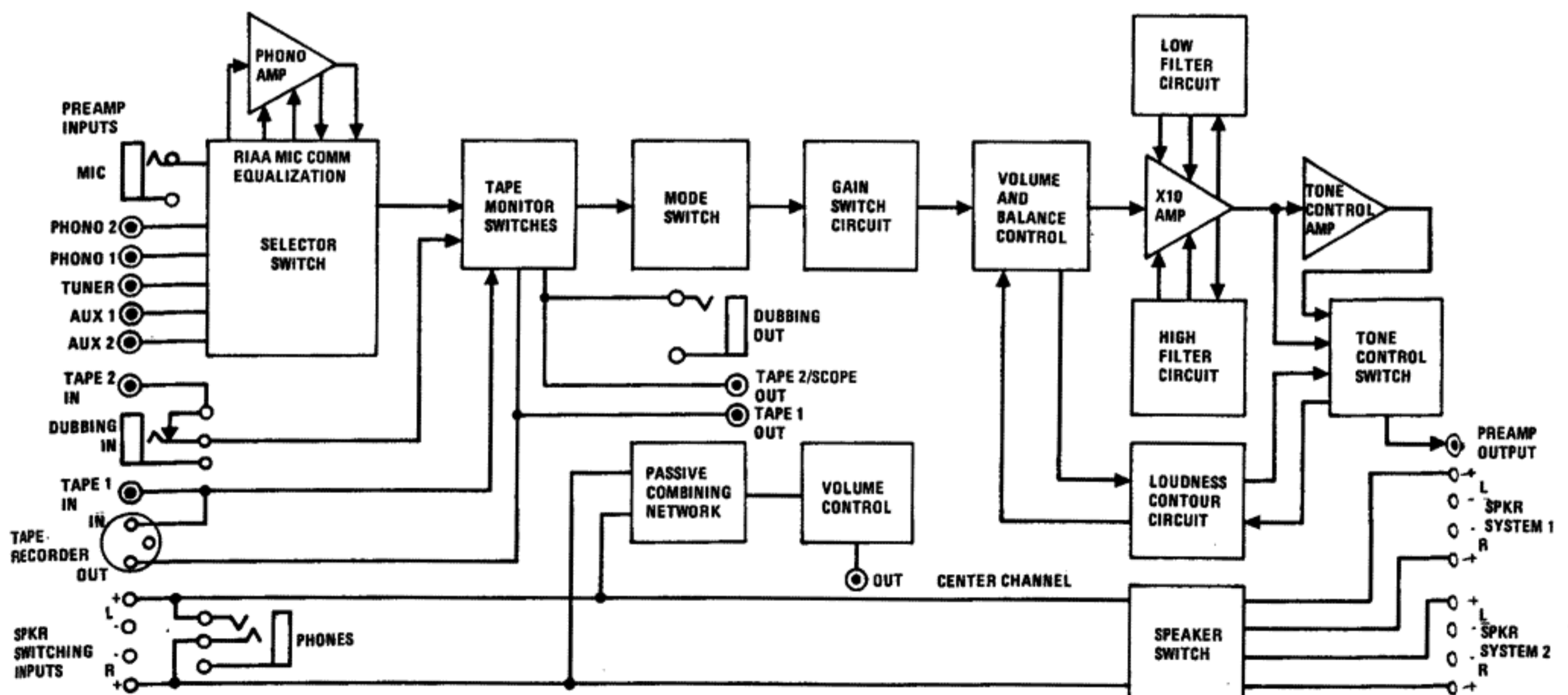


Figure 1 Signal Flow Diagram

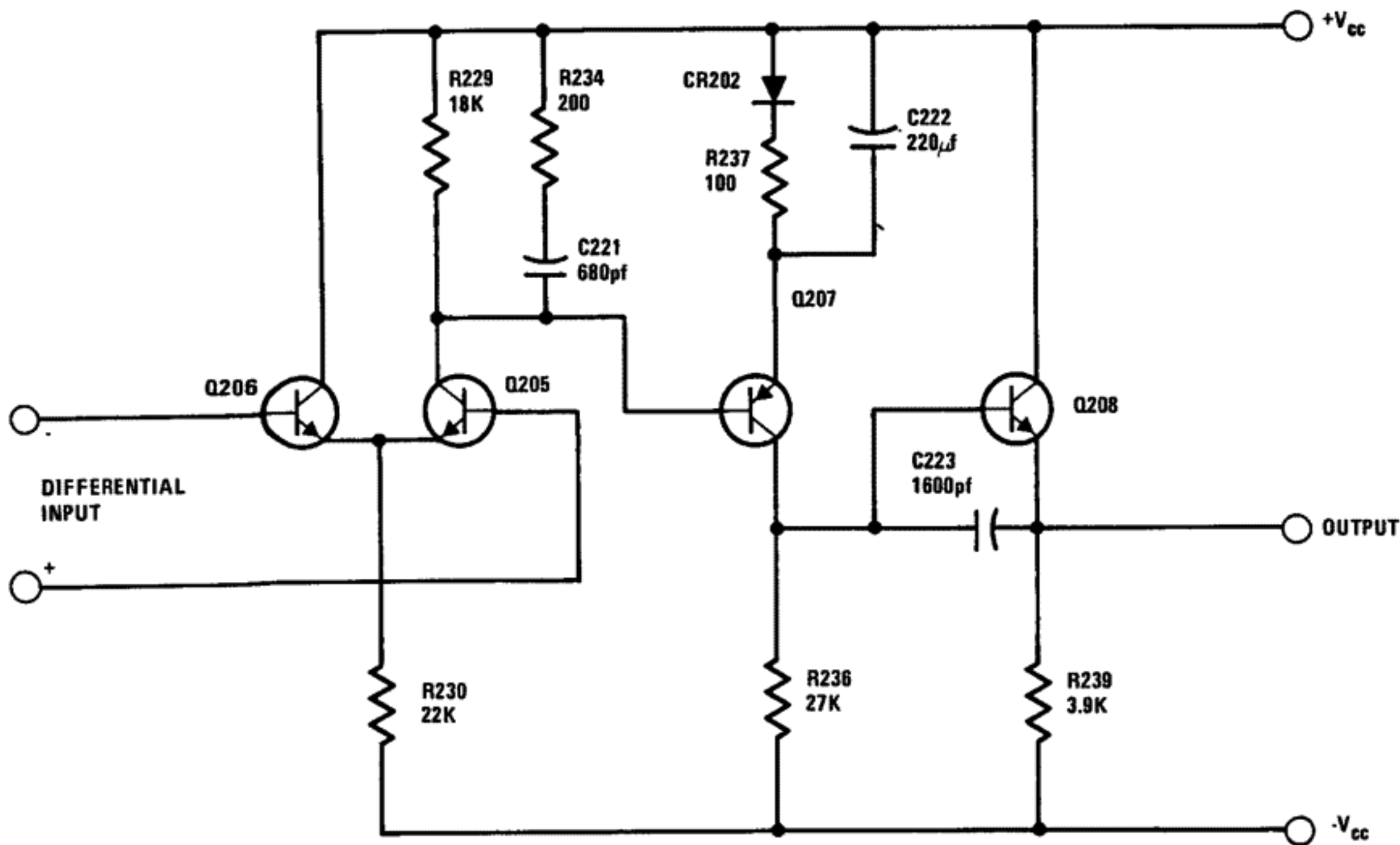


Figure 2 Phono Amp, Operational Amp Schematic

High Gain position, the series resistor is bypassed and there is no loss in signal level. In the Low Gain position the series resistor causes a 10dB loss in signal level.

The Balance Control is a special potentiometer that, in the mid-position, has 0dB loss on either channel. As the control is rotated towards either extreme, one channel is attenuated (up to 80dB) and the other channel is not affected.

The Volume Control is an audio taper potentiometer that allows 80dB of attenuation of both channels simultaneously. There is a tap at 35% rotation that is used for contouring the frequency response curve when the Tone Control Switch is in the Loudness position. The two resistor-capacitor networks in the loudness circuit make the Volume Control "frequency dependent" and attenuate the low and high frequencies less than the mid-frequencies. This, when the Volume Control is in low positions, gives an apparent "boost" to the low and high frequencies. The values are selected to approximate the Fletcher-Munson curve.

The Times Ten Amp is a 20dB gain, non-inverting, operational amplifier. The Hi and Low Filters are included in this circuit. Both Filters provide 6dB/octave roll off with a maximum of 20dB attenuation.

The Tone Amp is a unity gain, inverting, operational amplifier. The Bass and Treble Controls are within the feedback circuit and provide 10dB boost, or cut, at 100Hz (Bass) and 10KHz (Treble).

The Tone Control Switch selects the output of

either the Times Ten Amp (Flat position) or the Tone Amp (In or Loudness position) and routes this signal to the Preamp Out jacks.

An external power amplifier output is to be connected to the Speaker Switching Inputs terminal strip. The signal is then sent to the Speaker Switch, the Stereophone jack (through limiting resistors), and the Center Channel network.

The Speaker Switch routes the signal to the Spkr System 1 and/or Spkr System 2 as selected.

The Center Channel network is a passive combining network which sums left and right channel signals for application to the Center Channel Output jack through the Center Channel Volume control.

PHONO AMP

The Phono Amp provides 40dB of gain at 1KHz for the Phono or Mic inputs. Equalization (RIAA or Mic) is controlled by S1 (Selector Switch). The signal input is applied to the non-inverting input of an op amp. Gain, and equalization, is controlled by the attenuator from the output to the inverting input (negative feedback).

The operational amplifier, shown in Figure 2, is a high gain differential input amplifier. The differential input pair (Q205 and Q206) operates with an open loop voltage gain of 38dB into a single ended load (Q207). R229 is for D.C. bias. R234 and C221 are frequency compensation to reduce the differential open loop gain 28dB from 20KHz to 2MHz.

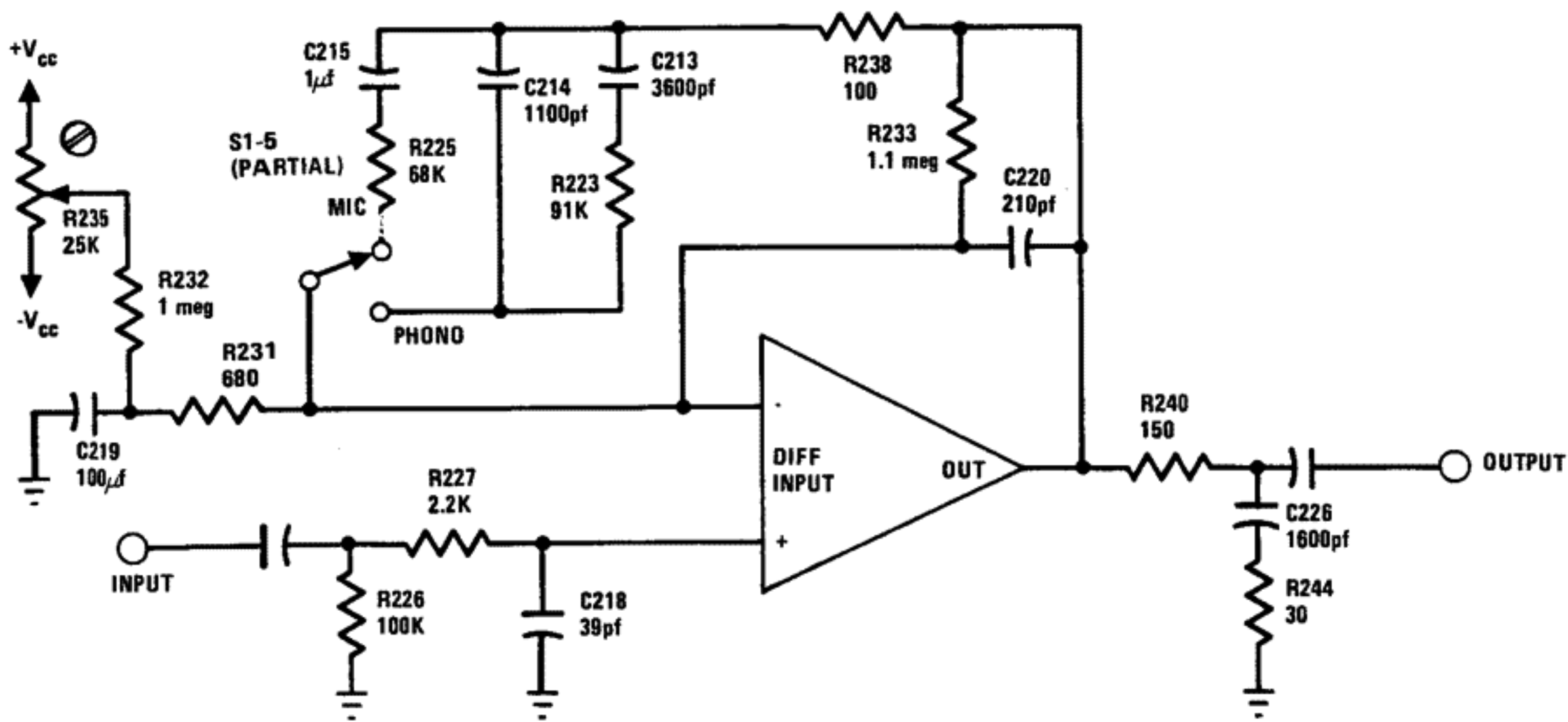


Figure 3 Phono Amp, Circuit Schematic

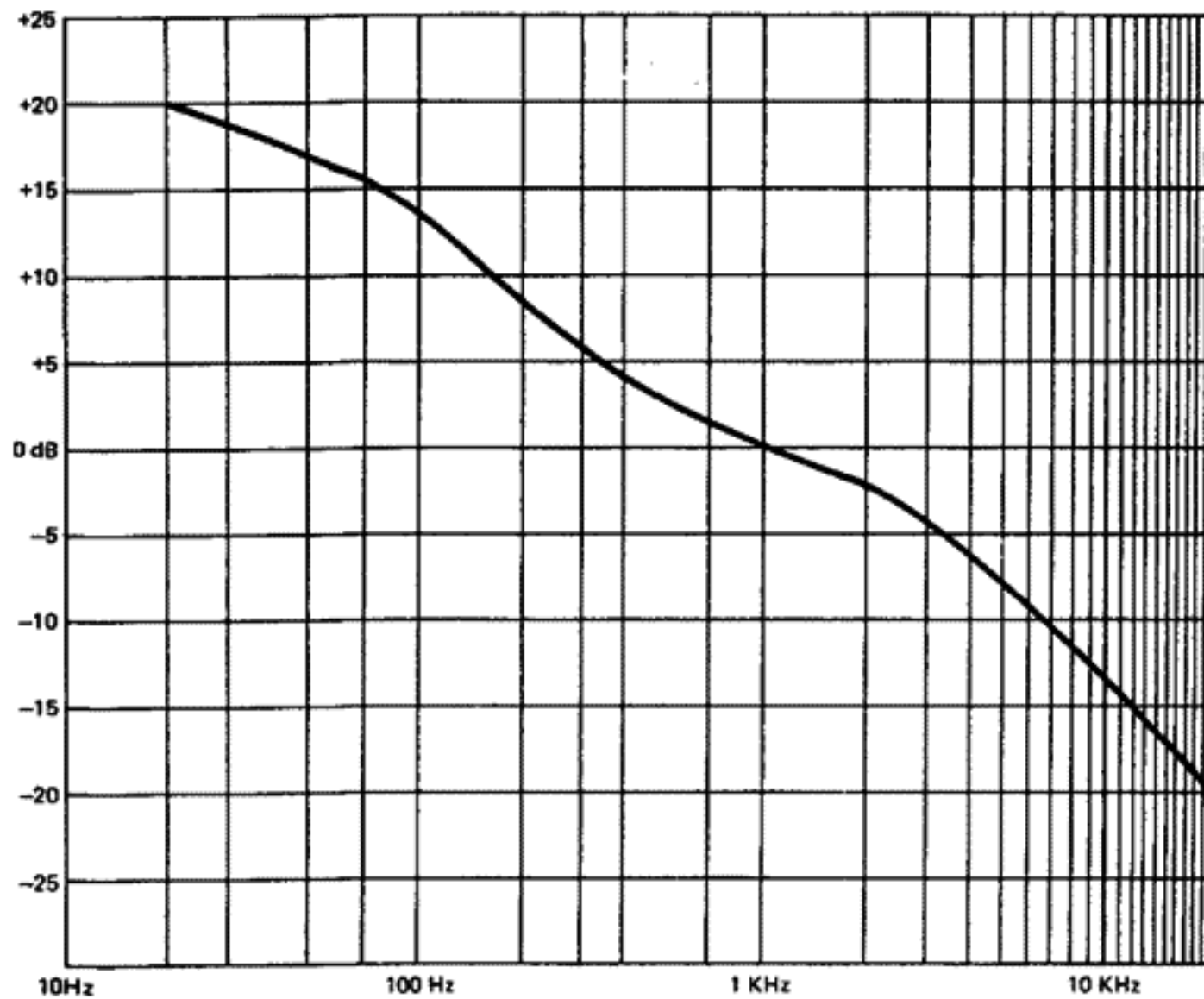


Figure 4 RIAA Equalization Curve

RIAA NAB DISK REPRODUCING STD.	
20 KHz	-20 dB
15 KHz	-17.17 dB
14 KHz	-16.64 dB
13 KHz	-15.95 dB
12 KHz	-15.28 dB
11 KHz	-14.55 dB
10 KHz	-13.75 dB
9 KHz	-12.88 dB
8 KHz	-11.91 dB
7 KHz	-10.85 dB
6 KHz	-9.62 dB
5 KHz	-8.23 dB
4 KHz	-6.64 dB
3 KHz	-4.76 dB
2 KHz	-2.61 dB
1000	0
700	+ 1.23 dB
400	+ 3.81 dB
300	+ 5.53 dB
200	+ 8.22 dB
100	+13.11 dB
70	+15.31 dB
50	+16.96 dB
30	+18.61 dB
20 Hz	+ 20 dB

The inverter stage, Q207, provides an open loop voltage gain of 48dB. CR202 and R237 control D.C. bias on Q207. C222 bypasses R237 and CR202, allowing for 48dB open loop gain at 20Hz. The output device, Q208, is a common collector, buffer stage to prevent load changes from affecting the gain of Q207. C223 is a frequency compensation network to reduce "Miller" effect.

The Phono Amp Circuit is shown in detail in Figure 3. The input signal is capacitive coupled to the positive (non-inverting) input of the op amp. R227 serves a dual purpose; first, it limits source impedance to allow for optimum noise with a wide range of source impedances; and secondly, with C218, it functions as an attenuator for high frequency noise picked up by the input cables. R226 is the input bias resistor.

D.C. feedback is controlled by R233, R231, R232 and R235. R235 is the offset adjustment (adjusted for +1.3v d.c. out, typically). The voltage at the wiper of R235 controls the output with inverted unity gain, through the ratio of R232 to R233.

Mic gain is controlled by R225, C215, C220, R231 and C219. C219, in the audio frequency range, is only to provide a ground path for R231. Likewise, C215 is a D.C. blocking capacitor. The ratio of R225 to R231 (100:1) determines Mic gain (40dB). C220 is a high frequency roll-off element, establishing a 3dB point at 10KHz and a 6dB/octave roll-off thereafter.

Phono gain is controlled by C214, C220, C213, R223, R233, R231 and C219. The network exhibits an impedance ratio of 100:1 at 1KHz giving a gain of 40dB. The frequency response curve of

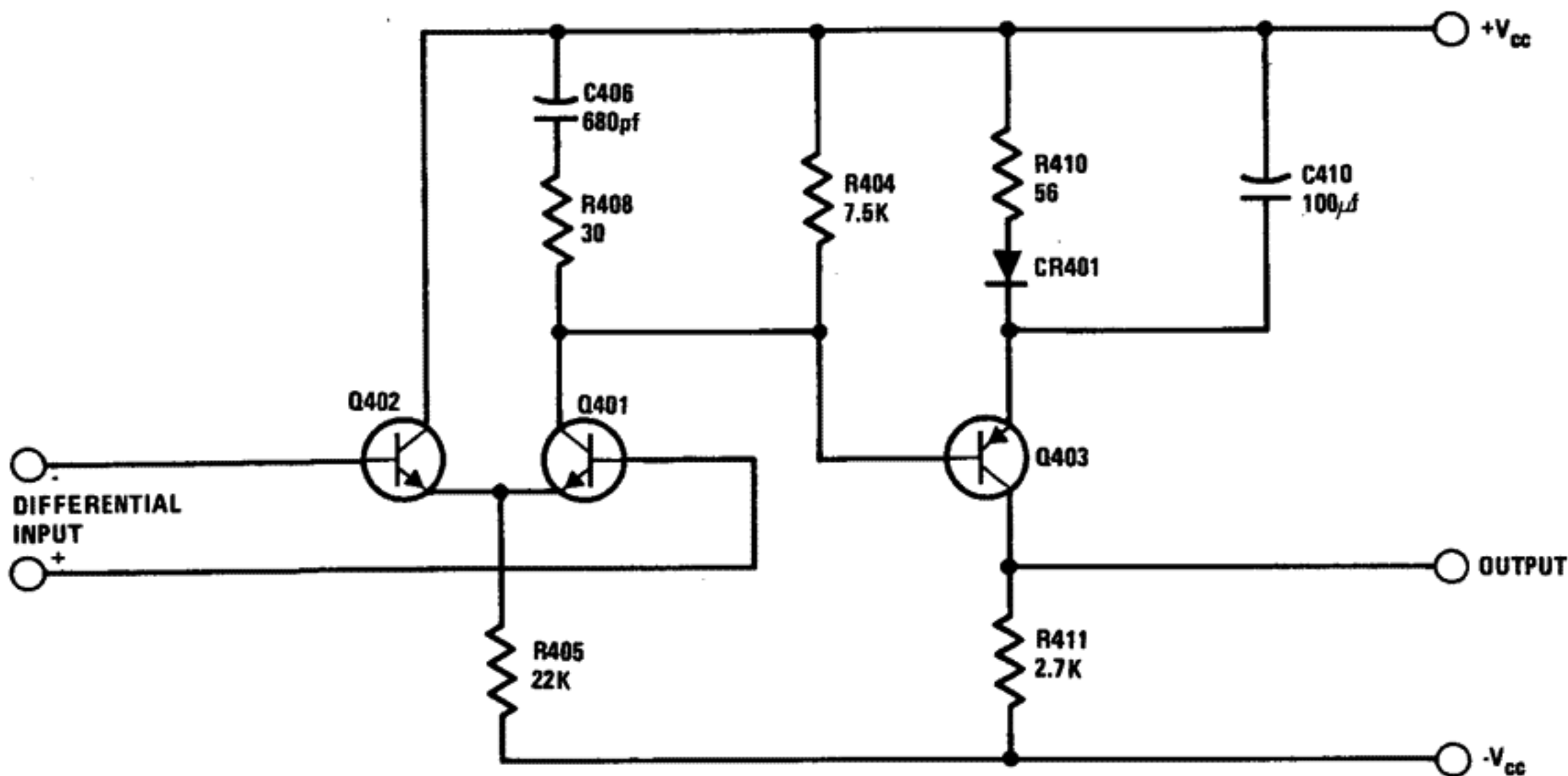


Figure 5 Times Ten Amp, Operational Amp Schematic

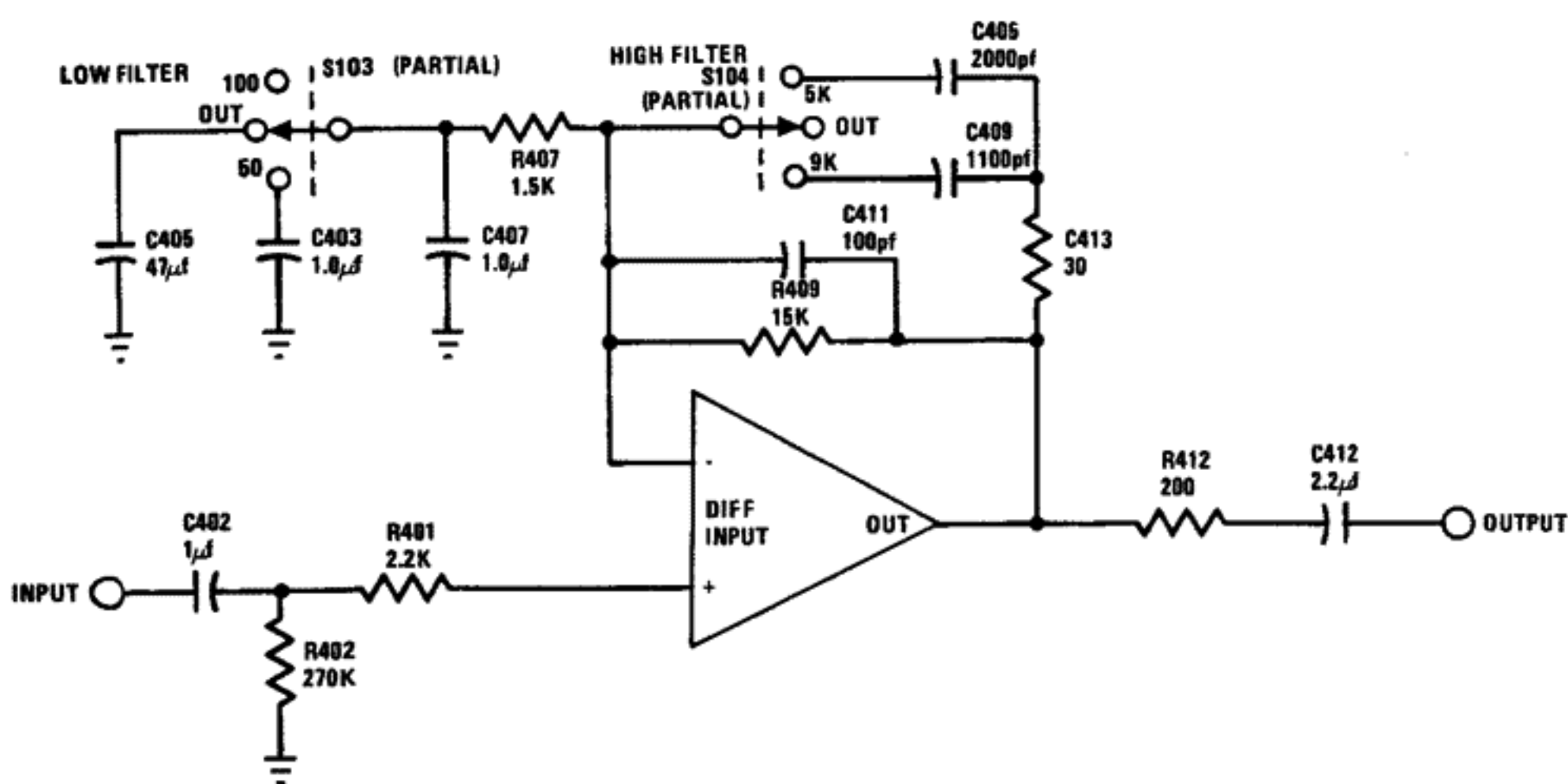


Figure 6 Times Ten Amp, Circuit Schematic

the feedback circuit is the reverse RIAA, therefore the closed-loop voltage gain will follow the RIAA phono playback response curve (see Figure 4). R238 serves to limit minimum impedance and increase stability.

The output signal is capacitive coupled to the Output terminal. R240 prevents capacitive output loads from affecting op amp stability. C226 and R244 serve as a phase loading network to increase stability and reduce high frequency distortion.

TIMES TEN AMP

The Times Ten Amp provides 20dB voltage gain from 20Hz to 20KHz. The normal 3dB points are 3Hz and 100KHz. Like the Phono Amp, the Times Ten Amp is a non-inverting op amp using negative feedback for gain control.

The operational amplifier in Figure 5 is similar to the Phono op amp, however, the open-loop gain is not as high. The differential input devices, Q401

and Q402, have a D.C. voltage gain of 30dB and, because of the loading effect of C410, have a 1 KHz gain of 20dB. The frequency compensation network R408 and C406 reduce the differential open-loop voltage gain 20dB from 160KHz to 8MHz. The inverter stage, Q403, has an open-loop voltage gain from 32dB (at D.C.) to 48dB (at 1KHz), a gain, because of C410. This stage can be loaded with a 15K ohm impedance without affecting open-loop gain. An output load of 2.5K ohm will reduce open-loop voltage gain 6dB. However, this will not adversely affect operation of the amp. The overall open-loop voltage gain will increase from 62dB (at D.C.) to 68dB (at 1KHz) and remain at 68dB up to 160 KHz.

The Times Ten Amp and the Filter circuits are shown in Figure 6. The input signal is capacitively coupled to the non-inverting input. R401 serves to limit minimum source impedance to optimize noise at any Volume Control setting. R402 is the input bias resistor.

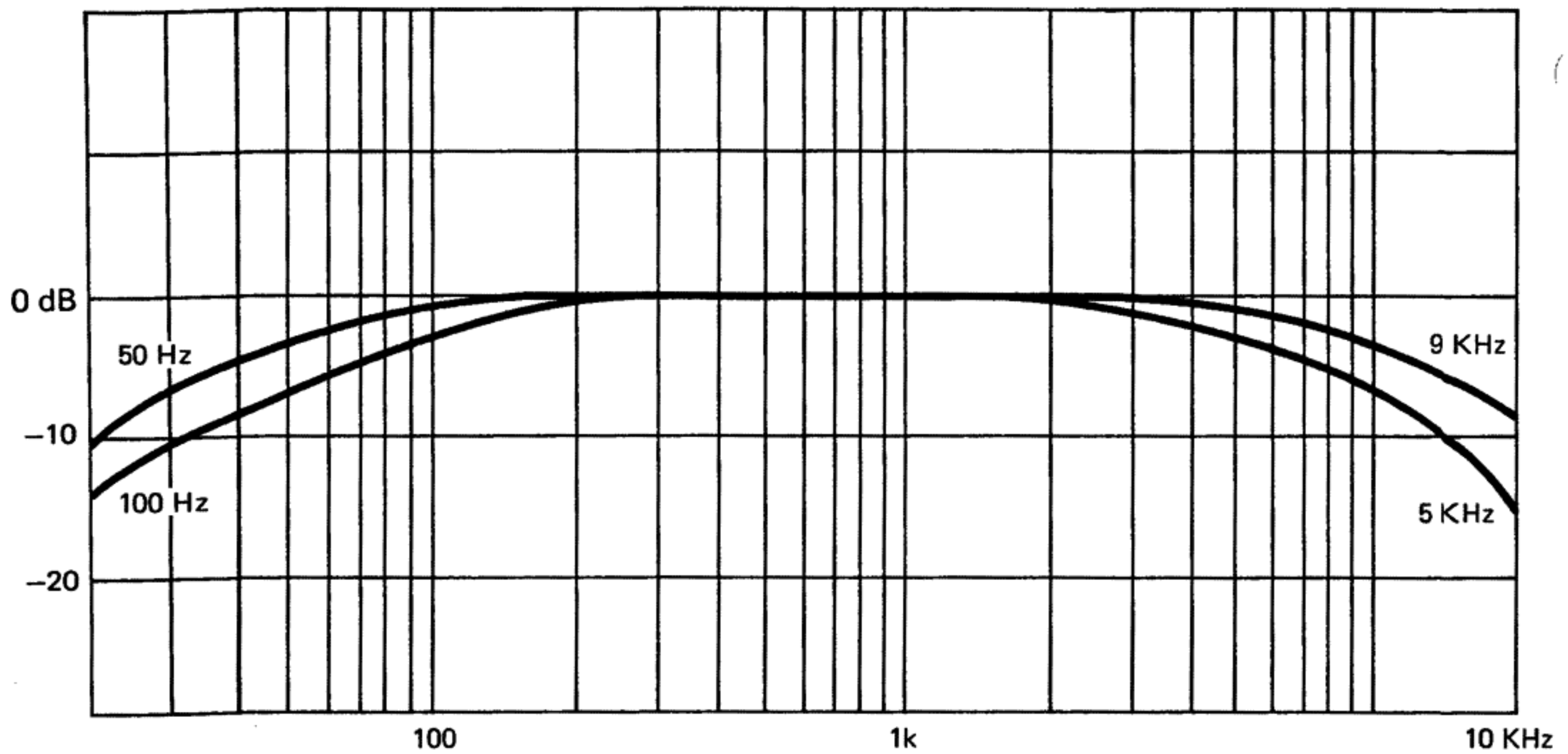


Figure 7 Filter Response Curve

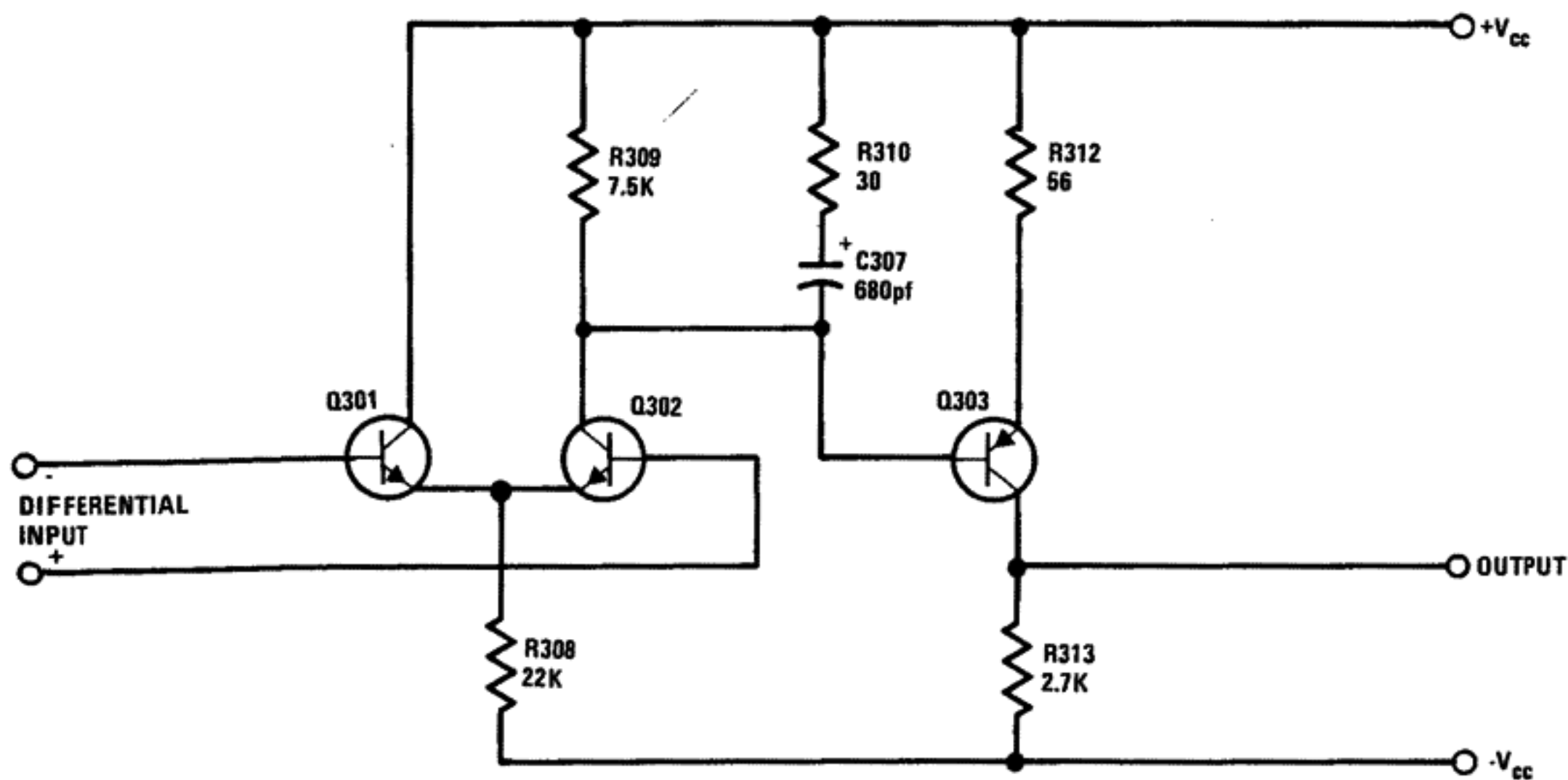


Figure 8 Tone Amp, Operational Amplifier Schematic

Gain is determined with negative feedback through R409 and the "shunt" elements. In the Audio spectrum, the gain is determined by the ratio of R409 to R407, which is 20dB (10:1). C411 is the high frequency roll-off capacitor with the 3dB point at 100KHz.

The Hi Filter Switch normally does not enter into the operation of the amplifier (out position). In the 5K or 9K position, capacitor C408 or C409, respectively, are placed in parallel with C411 and effectively reduce the high frequency 3dB point from 100KHz to 5KHz or 9KHz (as selected), see Figure 7. R413 is to limit feedback impedance and

increase stability when the 5K or 9K filter is switched in the circuit.

The Low Filter Switch normally connects C405 in the "shunt" circuit which allows the low frequency 3dB point to be 3Hz. In the 50 position, C403 and C407 are the "shunt" bypass capacitors, this raises the 3dB frequency to 50Hz. In the 100 position, only C407 is in the circuit, and this brings the 3dB point to 100Hz, see Figure 7.

The output signal is capacitively coupled to the output terminal through C412, R412 serves to limit the effect of capacitive loading on the op amp.

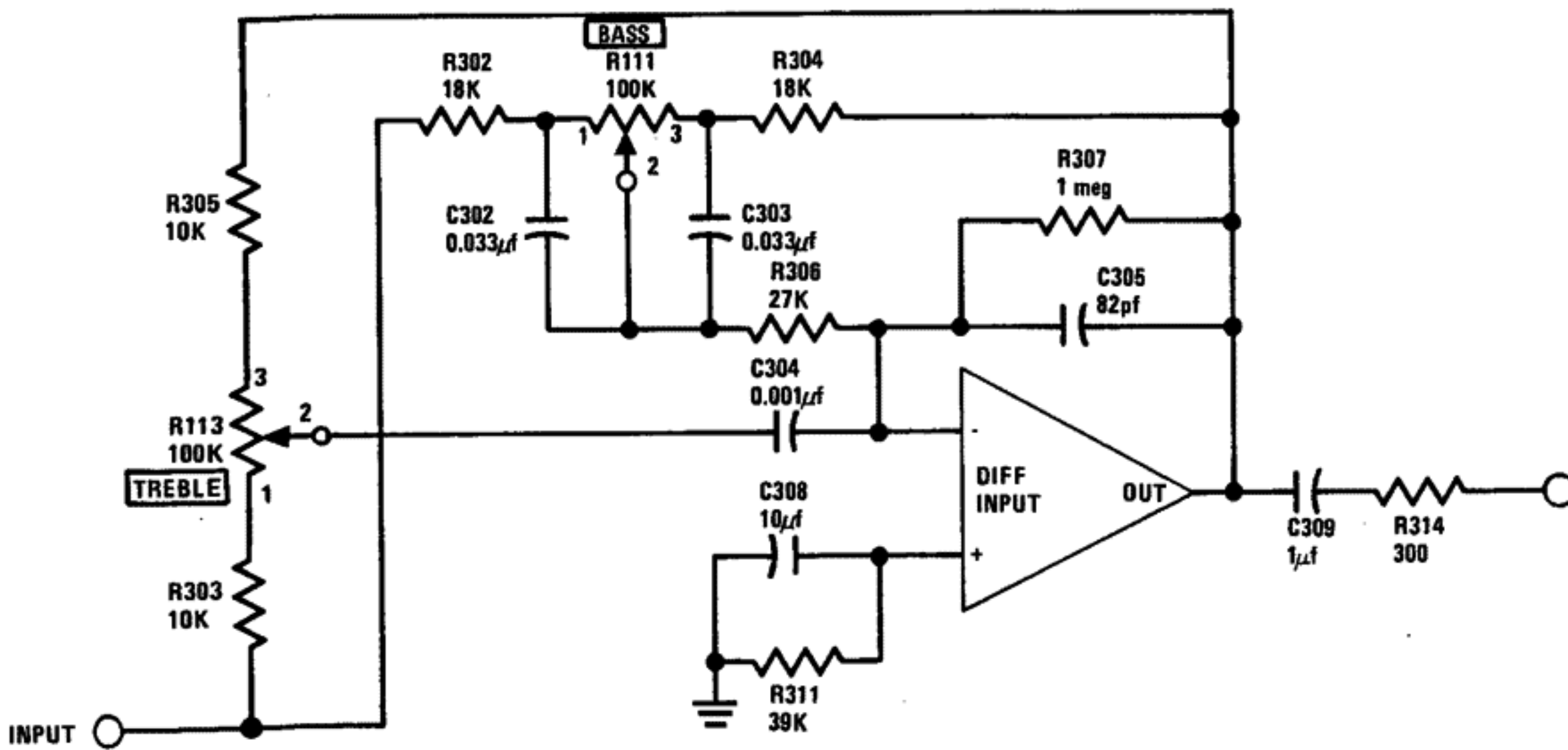


Figure 9 Tone Amp, Circuit Schematic

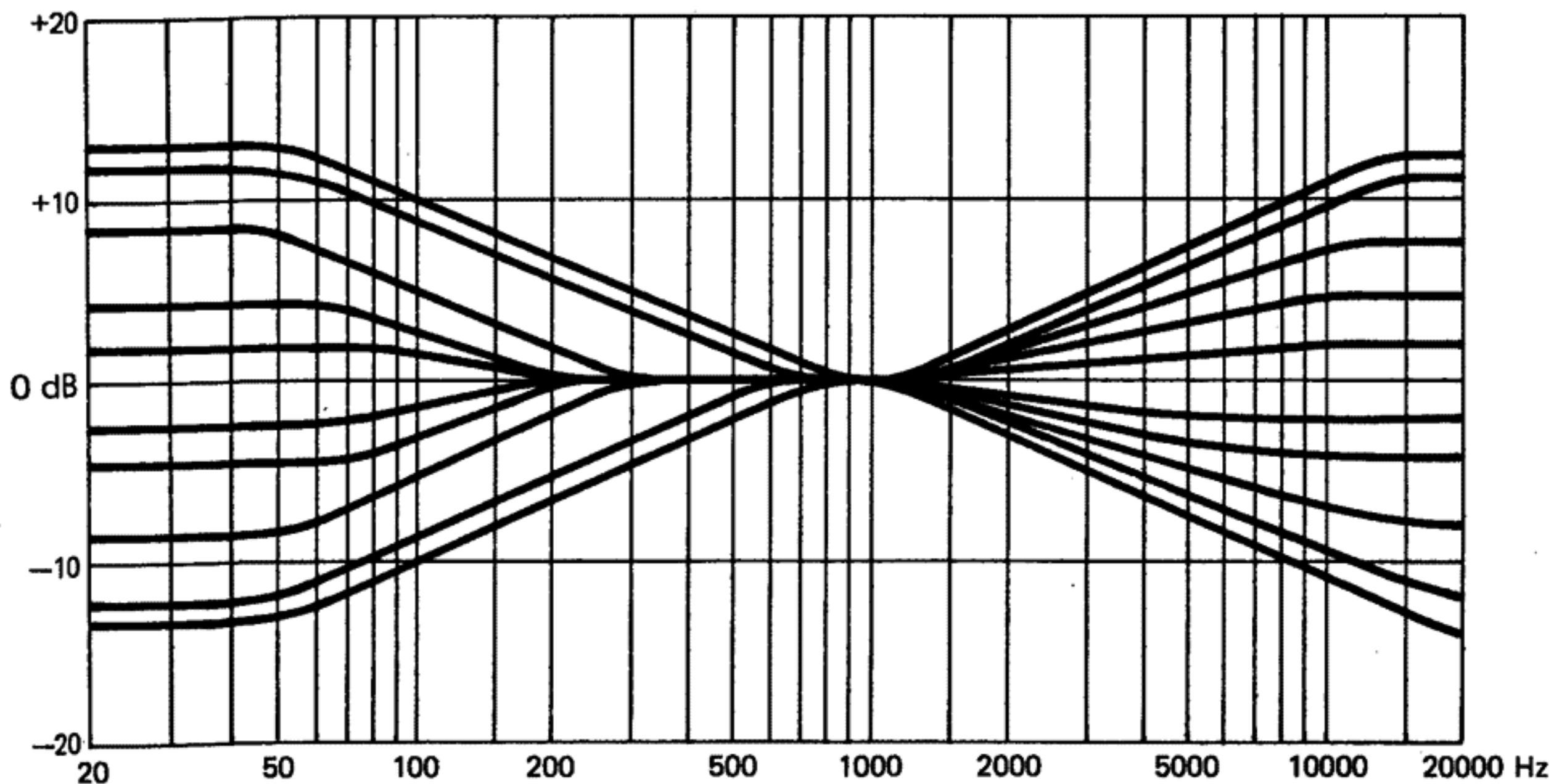


Figure 10 Tone Control Response Curves

TONE AMP

The Tone Amp is an inverting, unity gain, operational amplifier. The Bass and Treble Controls are included within the feedback loop. 10dB Boost or Cut is available in each control.

The op amp is a simplified form of the Times Ten operational amplifier (see Figure 8). The differential input pair, Q301 and Q302, have an open-loop voltage gain of 30dB. The frequency compensation network, R310 and C307, reduce the differential pair gain to unity at 300KHz.

The inverter, Q303, has an open-loop voltage gain of 33dB. Output loads reduce the gain of this stage. However, a 2.5K ohm load will only change the overall open-loop gain from 63dB to 57dB. This

6dB reduction in open-loop gain will not adversely affect operation of the Tone Amp.

The closed-loop D.C. gain of this inverting amplifier is determined by R307 only, (Figure 9) and is unity. The A.C. gain is determined by the transfer ratio of the attenuator network in the feedback circuit. Response curves are shown in Figure 10.

Input bias and ground reference is accomplished through R311 and C308. The output signal is capacitively coupled to the output terminal. R314 serves to reduce the effect of capacitive loads.

POWER SUPPLY

The Power Supply (Figure 11) is a bi-polar, full wave, zener controlled, regulated supply. The initial charging filter is of the resistive input type thereby eliminating capacitor charging spikes that are normally radiated by capacitive input filters.

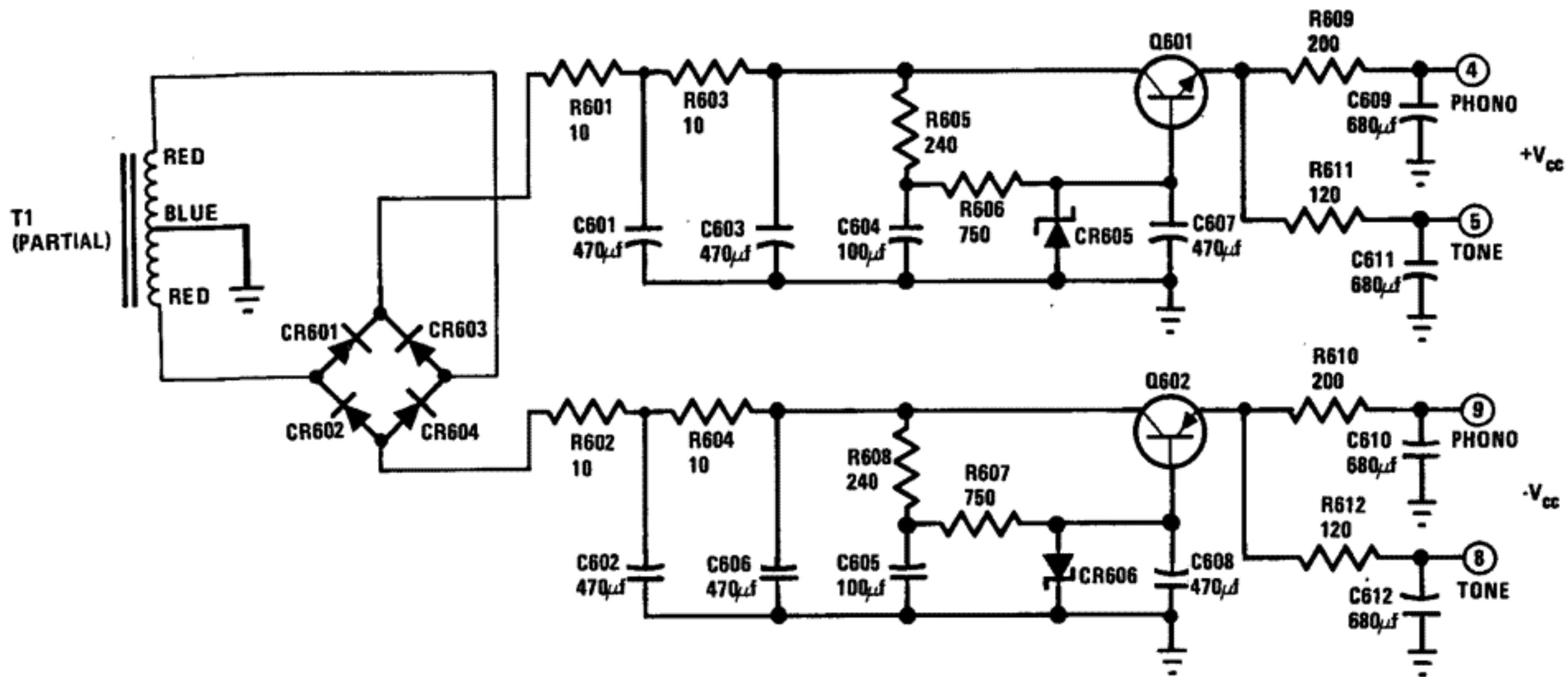


Figure 11 Power Supply Schematic

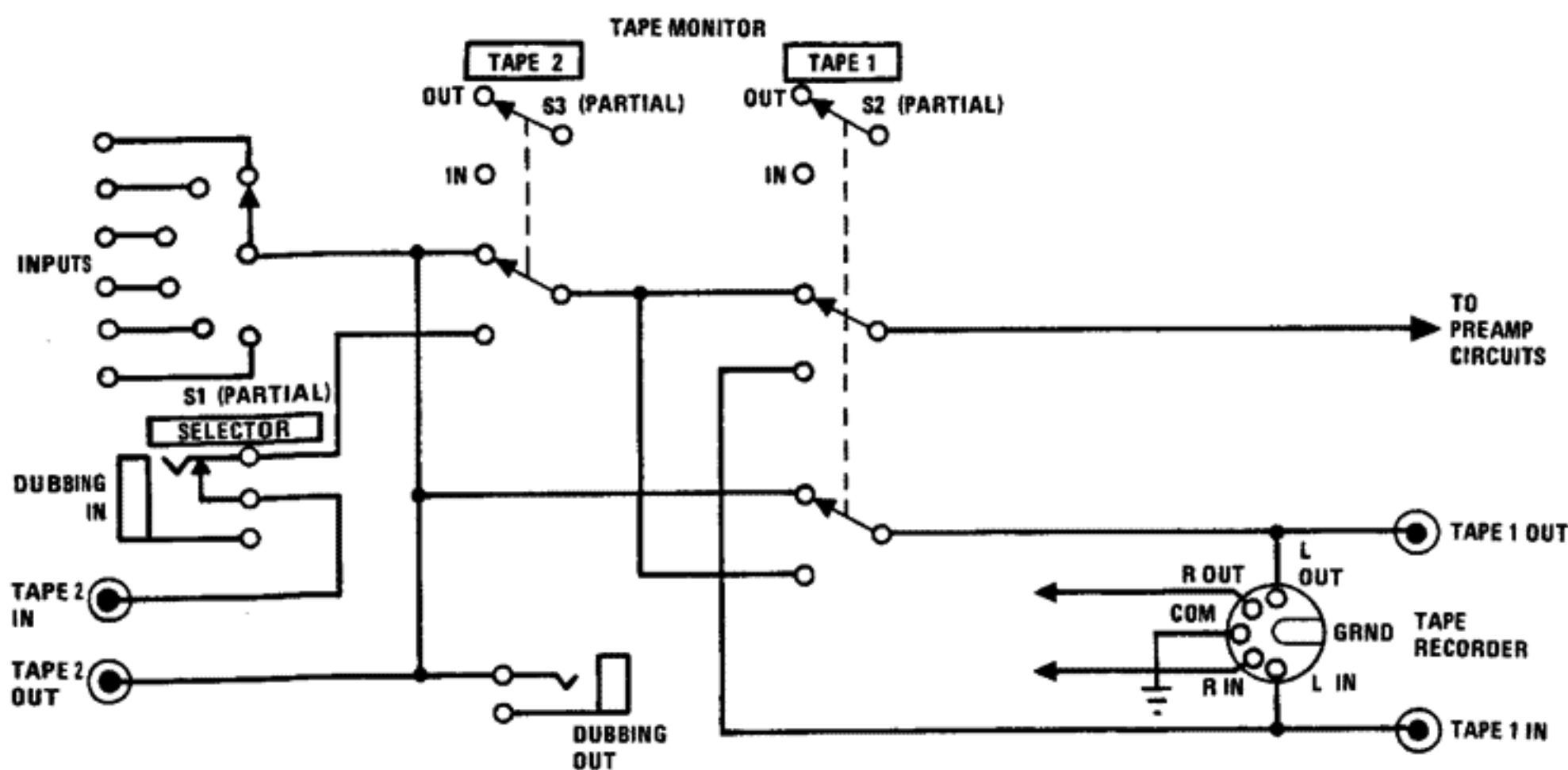


Figure 12 Tape Monitor Circuit Schematic

The "pass" transistor, Q601 (or Q602) is controlled by the zener diode, CR605 (or CR606) to prevent a.c. line variations from changing the output voltage. The base capacitor, C607 (or C608), further filters ripple on the emitter of the "pass" device by a factor proportional to the Beta of Q601 (or Q602).

The output voltage to the Phono Amp is isolated from the output voltage to the Tone Amp and Times Ten Amp to prevent power supply feedback.

TAPE MONITOR CIRCUIT

The Tape Monitor Circuit Schematic is shown in Figure 12. With both switches in the normal (out) position, the signals from the selector switch are routed to the preamp circuit, Tape 1 Out jacks, Tape 2 Out jacks, Dubbing Out jack and the Out terminal on the Tape Recorder connector.

With either Tape Monitor switch depressed (In), the selector switch signal remains at each of the four Tape Output jacks. However, the signal being

played through the preamp is from the appropriate Tape Input (Tape 1 In or the Input terminal of the Tape Recorder connector if Tape 1 Monitor is depressed; or Tape 2 In or Dubbing In if Tape 2 Monitor is depressed).

When both Tape 1 and Tape 2 Monitor switches are depressed, the signal from the Selector switch is routed to Tape 2 Out and Dubbing Out. The Tape 2 In (or Dubbing In) signal is sent to Tape 1 Out and Tape Recorder Output terminal. The signal from Tape 1 In (or Tape Recorder Input terminals) is routed to the preamp circuits.

PERFORMANCE VERIFICATION

A. Test Equipment

Refer to Table 1 (page 41) for recommended test equipment.

B. Preliminary Procedure

1. Set controls on A.C. Control Box as follows:

Line Switch Off
 Phase Switch Normal
 Wattmeter Switch In
 Variac Control . Minimum (Full CCW)

2. Set Model 3300 controls to the "Normal" condition (any variation of this set-up in this section will be so noted):

Selector Aux 2
 Mode Stereo
 Volume Maximum (Full CCW)
 Balance Mid
 Bass Control 0dB
 Tape 1 Monitor Out
 Tape 2 Monitor Out
 Treble Control 0dB
 Hi Filter Out
 Low Filter Out
 Tone Control Flat
 Speaker Off
 Gain (Rear Panel). High
 Center Channel
 Volume Minimum (Full CCW)

3. Install shorting plugs in Aux 2 Input jacks.

C. Power Consumption Verification

1. Plug Model 3300 AC Plug into AC Control Box outlet.
2. Set LINE Switch (AC Control Box) to VARIABLE.
3. Observing Wattmeter, slowly rotate Variac Control CW to 120VAC. If Wattmeter indicates greater than 20W at any time, (or fails to indicate at all), shut off AC power and refer to the Trouble Analysis section.

D. Functional Test

Perform functional test on unit to establish the operation of all inputs, outputs and controls. Return Model 3300 controls to the "Normal" positions upon completion of the functional test.

E. High Level Gain Test

1. Check the gain at 1KHz of Aux 2 Input, should be 20.8dB (± 0.2 dB).
2. Set Gain switch to low, gain should be reduced 10dB (± 1.0 dB). Return switch to high when test is completed.
3. Using 1KHz as a reference (0dB), check gain at 20Hz and 20KHz, should be 0dB (± 0.25 dB).
4. Lower oscillator frequency to obtain a 3dB drop in level, frequency should be 3Hz ± 2 Hz.
5. Increase frequency of oscillator for 3dB

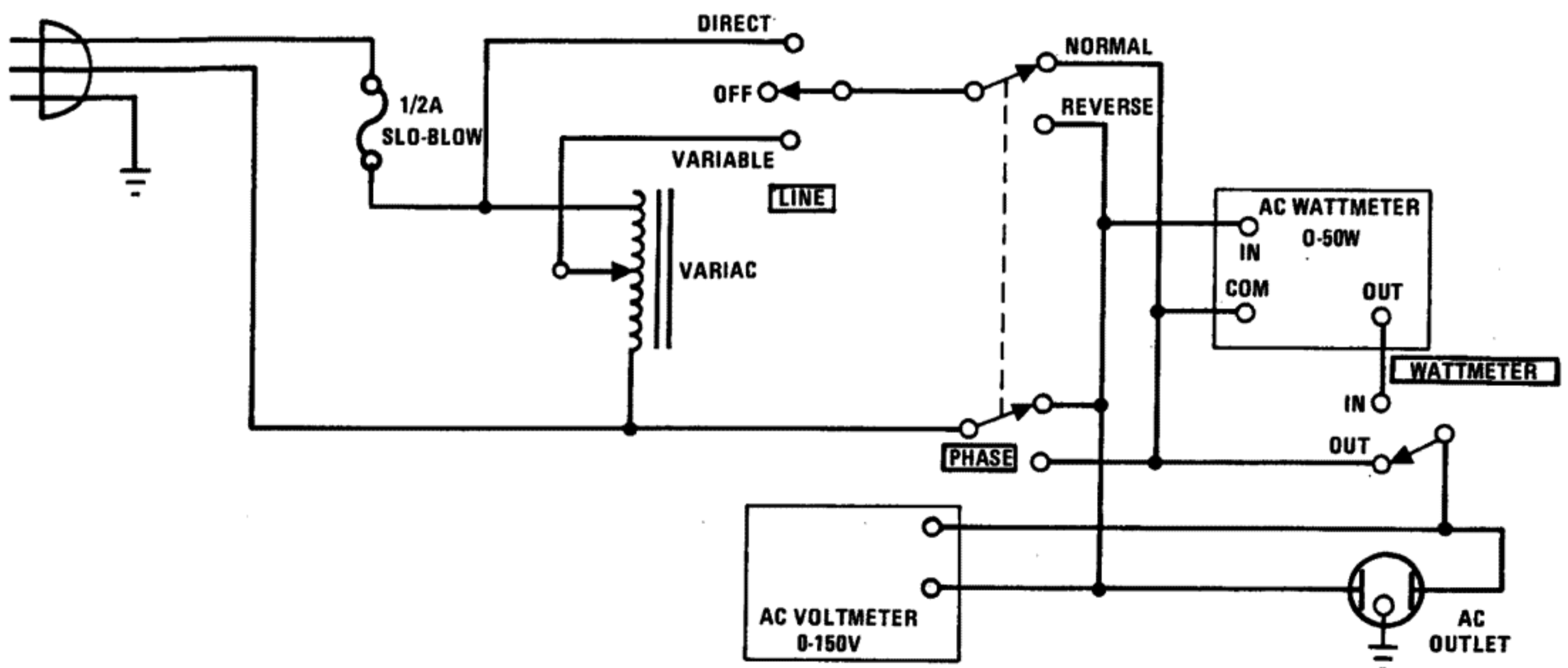


Figure 13 A.C. Control Box Diagram

drop, frequency should be 100KHz \pm 10KHz.

6. Place Tone Control in the IN position, set level (0dB) at 1KHz, check level at 20Hz and 20KHz; should be 0dB (\pm 0.5dB).
7. Place Tone Control in the LOUDNESS position, set VOLUME CONTROL for 40dB attenuation, set level for 0dB at 1KHz, check level at 100Hz and 10KHz, should be +6dB (\pm 1.5dB).
8. Return all controls to "Normal."

F. Phono Gain Test

1. Put 1KHz into Phono 1 Input, set SELECTOR to PHONO 1. Set output level of -10dB on the AC Voltmeter.
2. Check output level at the following frequencies (\pm 0.5dB):

20Hz	+10dB
100Hz	+3.1dB
400Hz	-6.2dB
2KHz	-12.6dB
10KHz	-23.8dB
20KHz	-30.0dB

G. Mic Gain Test

1. Put 1KHz into Mic Input, set SELECTOR to MIC; set output to 0dB.
2. Output level at 20Hz, 200Hz and 2KHz should be 0dB (\pm 0.5dB).
3. Output level at 20KHz should be -6dB (\pm 1.0dB).

H. High Filters Test

1. Return all controls to "Normal", set oscillator to Aux 2 In, 1KHz, output level to 0dB.
2. Place 5K Filter In with oscillator switched to 5KHz, output should drop 3dB (\pm 0.5dB).
3. Place 9K Filter In, with 9KHz input, output level should drop 3dB (\pm 0.5dB). Return switch to Out.

I. Low Filters Test

1. Place 100 Filter In, a 100Hz input signal should drop level 3dB (\pm 0.5dB).
2. Place 50 Filter In, at 50Hz, level should drop 3dB (\pm 0.5dB).

J. Tone Control Test

1. Return all controls to "Normal."
2. Set TONE CONTROL to IN. Set level

at 1KHz to 0dB.

3. Change input frequency to 100Hz.
4. Move BASS Control to +10dB, output level should increase 10dB (\pm 2.0dB).
5. Move BASS Control -10dB, output level should decrease 10dB (\pm 2dB).
6. Change input frequency to 10KHz.
7. Move TREBLE Control to +10dB, output level should increase 10dB (\pm 2.0dB).
8. Move TREBLE Control to -10dB, output level should decrease 10dB (\pm 2dB).
9. Return all controls to "Normal", and frequency to 1KHz.

K. Volume Control Tracking

1. Reduce VOLUME in 5dB steps up to 40dB attenuation, checking that the Left and Right Channels are within 2dB of each other.
2. Continue reducing VOLUME in 5dB steps (40dB to 60dB attenuation) checking that Left and Right Channels are within 4dB of each other.

L. Total Harmonic Distortion

1. With maximum VOLUME check THD of AUX 2 at 3vrms output, at 20Hz, 2KHz and 20KHz. THD should be less than 0.05%.
2. Change input to PHONO 1 and SELECTOR switch to PHONO 1. Adjust VOLUME control for 20dB attenuation; check THD at 20Hz (3.0vrms out), 2KHz (3.0vrms out) and 20KHz (3.0vrms out), should be less than 0.05%.

M. Noise

1. Insert 600 ohms shorting plug into PHONO 1 and AUX 2 input jacks.
2. With MAX VOLUME, PHONO 1; noise output should be less than 1mV rms (Through 20-20K Filter).
3. Set SELECTOR switch to AUX 2, rotate VOLUME Control for maximum noise; through a 20-20K filter, noise should be less than 75 μ V.

TROUBLE ANALYSIS

This section is included to assist in locating troubles that may be encountered with the Model 3300. The information given is to help in situations where problems may be difficult to isolate. Any field problems that arise will be covered through service bulletins (supplementary to this manual) that will be issued to all service stations. It is assumed that normal troubleshooting techniques (i.e., point-to-point signal tracing, oscilloscope analysis, etc.) will be used to isolate problems.

NOTE: Performance verification is necessary following any repair.

This section is divided into six parts. The first part will assist in isolating problems in the unit as a system, referring to circuit boards, wires, etc. The remaining five parts will prove helpful in locating problems in the individual circuit boards.

System Trouble Analysis

The following is a partial list of possible problems and causes that may be found in a defective Model 3300. It is not the intent of this section to indicate all potential problems and their remedies since the service technician will be quite capable of recognizing most. It is the intent to aid the service technician in isolating problems from the entire system, to a sub-system. Other sections are provided for troubleshooting the sub-systems.

All references in this part will be made to Figures 14 and 15.

SYMPTOM	PROBABLE CAUSE
1. No Primary Power Consumption.	a. Open A.C. Input circuit; Line cord, fuse, power switch, transformer, etc. b. Power Supply Board defective.
2. Excessive Primary Power Consumption.	a. Short in A.C. Input circuit; transformer power switch, etc. b. Short in A.C. secondary circuit; pilot lamp circuit, power supply board.
3. No Signal Output both channels.	a. No. D.C. supply voltage to amplifiers, +Vcc, -Vcc or neither, caused by broken supply lines, defective power supply lines or defective power transformer.
4. No Signal Output in any condition.	a. Short in Input circuit. b. Open Input circuit; selector, tape monitor, mode, volume or balance. c. Defective times ten board. d. Output circuit open. e. Short in output circuit.
5. No Signal Output in low level inputs.	a. Short in Input circuit to phono board. b. Open Input circuit. c. Defective phono board. d. Phono board output circuit open. e. Short in phono board output circuit. f. Phono board oscillating (VHF) because of open (or shorted) feedback circuit through selector switch.
6. No Signal Output with Tone Control Switch In or Loudness.	a. Defective tone board. b. Open tone board output circuit.
7. No Signal Output with Gain Switch Low.	a. Open resistor, R101 (R104) (refer to Interconnect Board Trouble Analysis).
8. Low Gain, Gain Switch not functioning.	a. Open cable to Gain switch. b. Defective Gain switch.
9. Low Gain, Gain Switch functioning.	a. Defective times ten board.

- | | |
|---|---|
| 10. Low Gain in low level inputs. | a. Defective phono board. |
| 11. Low Gain with Tone In or Loudness. | a. Defective tone board. |
| 12. High Distortion in any condition. | a. Times ten board defective. |
| | b. Excessive output loading. |
| | c. Short in Low Filter switch circuit. |
| 13. High Distortion in low level inputs. | a. Defective phono board. |
| | b. Hum pickup in the input circuit. |
| 14. High Distortion with Tone In or Loudness. | a. Defective tone board. |
| 15. Excessive Noise in low level inputs. | a. Defective phono board. |
| | b. Open feedback circuit, selector switch. |
| | c. Input circuit open. |
| | d. Input cable shield not grounded. |
| 16. Excessive Noise in high level inputs. | a. Defective times ten board. |
| | b. Input circuit cable shield not grounded. |
| | c. Excessive power supply ripple. |
| 17. Excessive Noise with Tone In or Loudness. | a. Defective tone board. |
| 18. Oscillation in low level inputs. | a. Open input circuit. |
| | b. Feedback circuit open, selector switch. |
| | c. Grounds improper or broken. |
| | d. Defective phono board. |
| 19. Oscillation in high level inputs. | a. Defective times ten board. |
| | b. Shorts in Hi or Low filter circuits. |

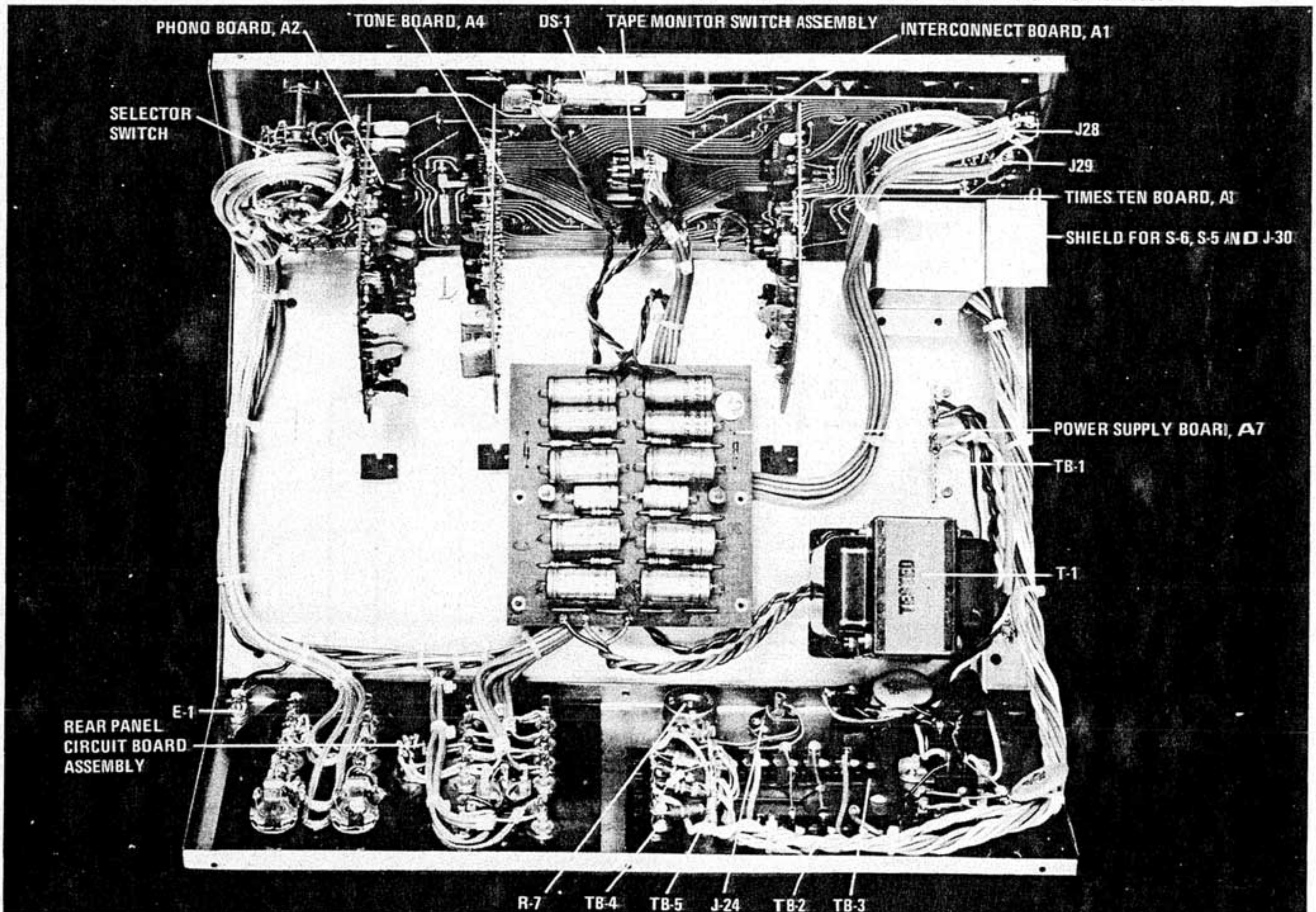


Figure 14 Model 3300 Inside View

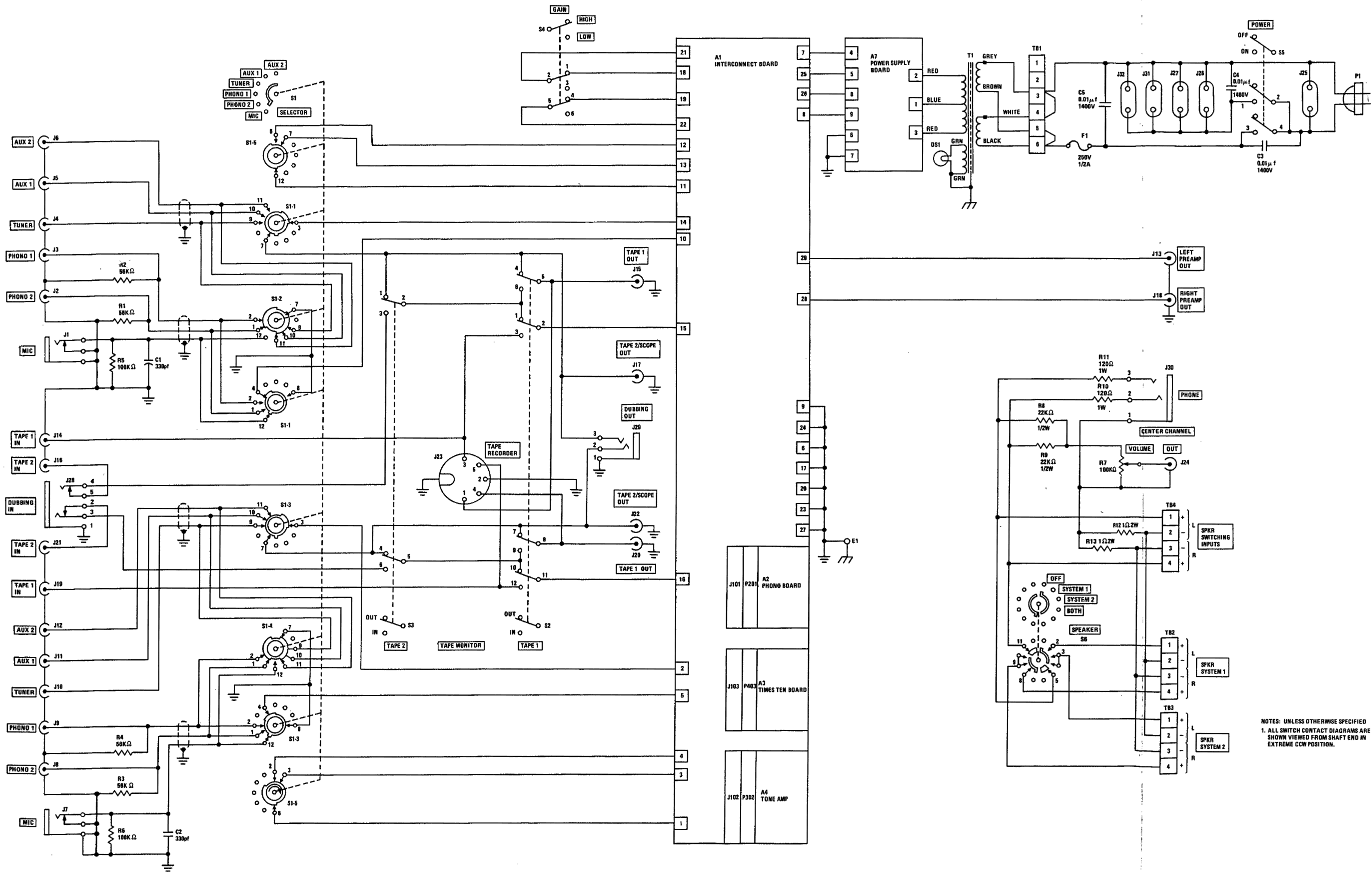


Figure 15 System Schematic

Phono Board Trouble Analysis

This part is intended to aid the service technician in troubleshooting the Phono Board. The circuit may be serviced with the Tone Board and Times Ten Board removed. Use the Tape 2/Scope Out jacks as the output. All references are made to Left Channel with Right Channel references in parenthesis. For service identification, refer to Figures 16, 17 and 18.

SYMPTOMS

PROBABLE CAUSE

- | | |
|--------------------------------------|---|
| 1. No Output. | a. Input circuit open or shorted to ground.
b. Output circuit open or shorted to ground.
c. R235 (R214) severely out of adjustment or defective.
d. R233 (R212) open.
e. R231 (R210) open.
f. R237 (R215) open.
g. CR202 (CR201) open.
h. C219 (C209) open or shorted.
i. C220 (C208) shorted.
j. Defective transistor.
k. Possible oscillation creating "Latch-up". If this is suspected, check frequency compensation components. |
| 2. Oscillation, Phono and Mic. | a. Open feedback circuit (Selector Switch).
b. Defective resistor: R234 (R211), R226 (R206) or R238 (R217).
c. Defective capacitor: C221 (C207), C223 (C216), C219 (C209), C204 or C206. |
| 3. Oscillation, Mic only. | a. Open input circuit.
b. Open feedback circuit R225 (R203) or C215 (C203). |
| 4. Oscillation, Phono only. | a. Open feedback circuit, R223, (R201), C213 (C201), or C214 (C202).
b. Shorted feedback circuit, C214 (C202). |
| 5. Low Gain, Phono or Mic. | a. R231 (R210) high resistance. |
| 6. High Gain, Phono or Mic. | a. R231 (R210) low resistance. |
| 7. Phono Gain Low, low frequency. | a. Low impedance in feedback path: C213 (C201), R223 (R201), R224 (R204), R242 (R221), R233 (R212).
b. C219 (C209) defective, low capacitance.
c. Open-loop gain of the operational amplifier too low: Low Beta Transistor -Q205 (Q201), Q206 (Q202), or Q207 (Q203) -C222 (C210) open. |
| 8. Phono Gain Low, mid frequencies | a. R223 (R201), low resistance.
b. C213 (C201), high capacitance or shorted.
c. C214 (C202), high capacitance. |
| 9. Phono Gain Low, high frequencies. | a. C214 (C202), high capacitance. |

10. Phono Gain High, low frequencies.
 - a. High impedance in feedback path: C213 (C201), R223 (R201), R224 (R204), R242 (R221), R233 (R212), R225 (R203), or C215 (C203).
11. Phono Gain High, mid frequencies.
 - a. R223 (R201), high resistance.
 - b. C213 (C201), low capacitance or open.
 - c. C214 (C202), low capacitance or open.
12. Phono Gain High, high frequencies.
 - a. C214 (C202), low capacitance or open.
 - b. C219 (C209), open.
13. Mic Gain Low.
 - a. R225 (R203), low resistance.
 - b. C215 (C203), shorted.
 - c. C220 (C208), high capacitance.
14. Mic Gain High.
 - a. R225 (R203), high resistance.
 - b. C215 (C203), low capacitance or open.
 - c. C220 (C208), low capacitance or open.
15. High Phono Distortion, low frequencies.
 - a. R235 (R214) improperly adjusted.
 - b. Low open-loop gain (See symptom 7).
 - c. High "low frequency" gain (See Symptom 10).
 - d. Leaking capacitor in feedback path: C213 (C201), C214 (C202), C215 (C203) or C219 (C209).
 - e. Precision resistor in feedback path with non-linear resistance: R223 (R201), R224 (R204), R231 (R210), R233 (R212) or R242 (R221).
16. High Phono Distortion, all frequencies.
 - a. Leaking capacitor — C213 (C201), C214 (C202), C215 (C203) or C219 (C209).
 - b. Non-linear resistor — R223 (R201), R224 (R204), R231 (R210), R233 (R212) or R242 (R221).
17. High Mic Distortion, all frequencies.
 - a. Leaking capacitor — C215 (C203), C219 (C209), or C220 (C208).
 - b. Non-linear resistor — R225 (R203) or R231 (R210).
18. High Mic Distortion, high frequencies only.
 - a. Low open-loop gain caused by excessive frequency compensation — R234 (R211) low; C221 (C207) high; C223 (C216) high; C226 (C225) high; R244 (R243) low; or R240 (R219) low.
19. Excessive Noise, Phono and Mic.
 - a. Noisy transistor — Q205 (Q201), Q206 (Q202), Q207 (Q203), or Q208 (Q204).
 - b. Noisy resistor — R233 (R212), R226 (R206) or R231 (R210).
20. Excessive Noise, Phono only.
 - a. Noisy resistor — R223 (R201), R242 (R221) or R224 (R204).
 - b. Leaking capacitor — C213 (C201), C214 (C202), or C220 (C208).
21. Excessive Noise, Mic only.
 - a. Noisy resistor — R225 (R203).
 - b. Leaking capacitor — C215 (C203) or C220 (C208).

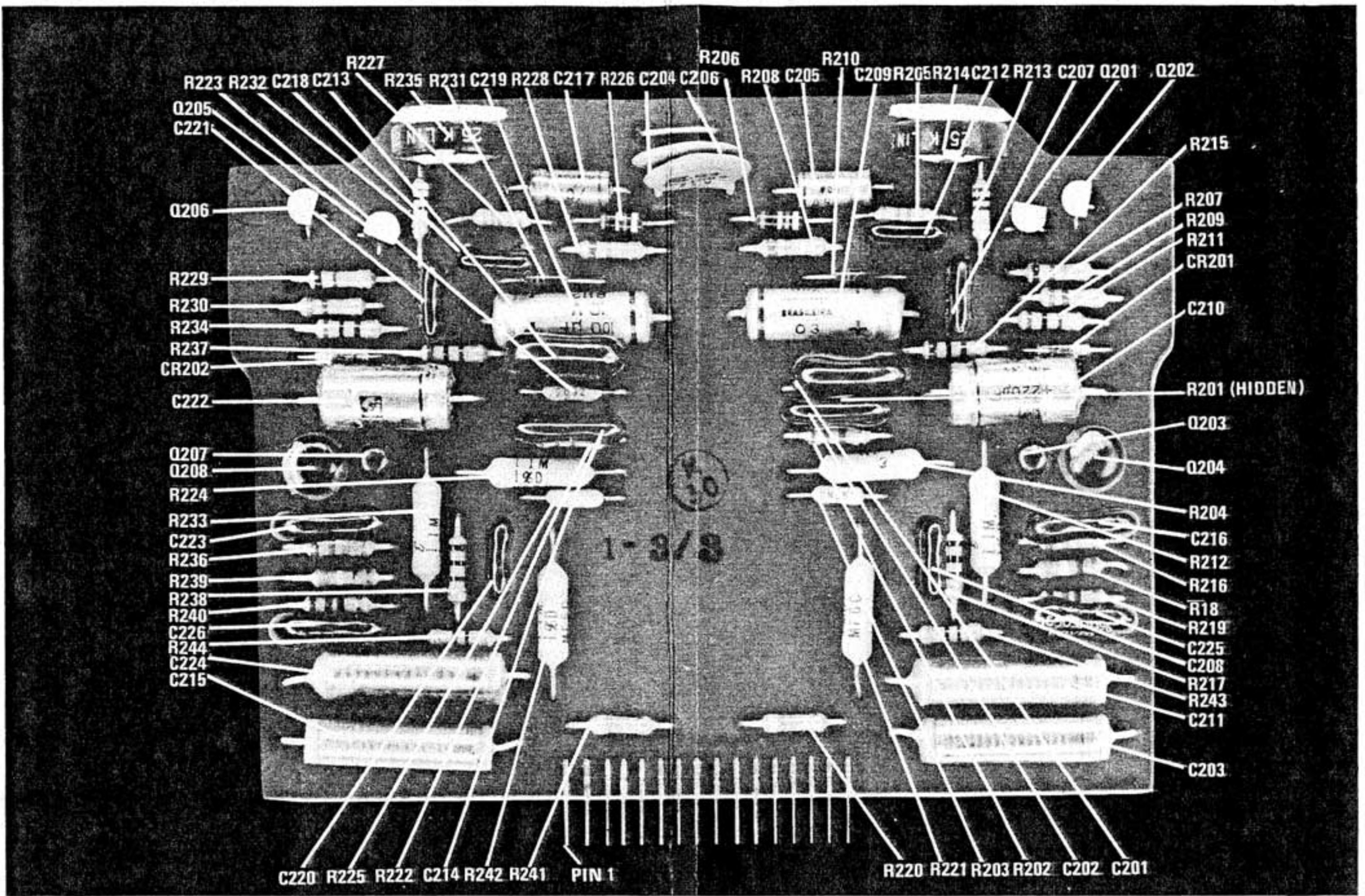


Figure 17 Phono Board, Component Side

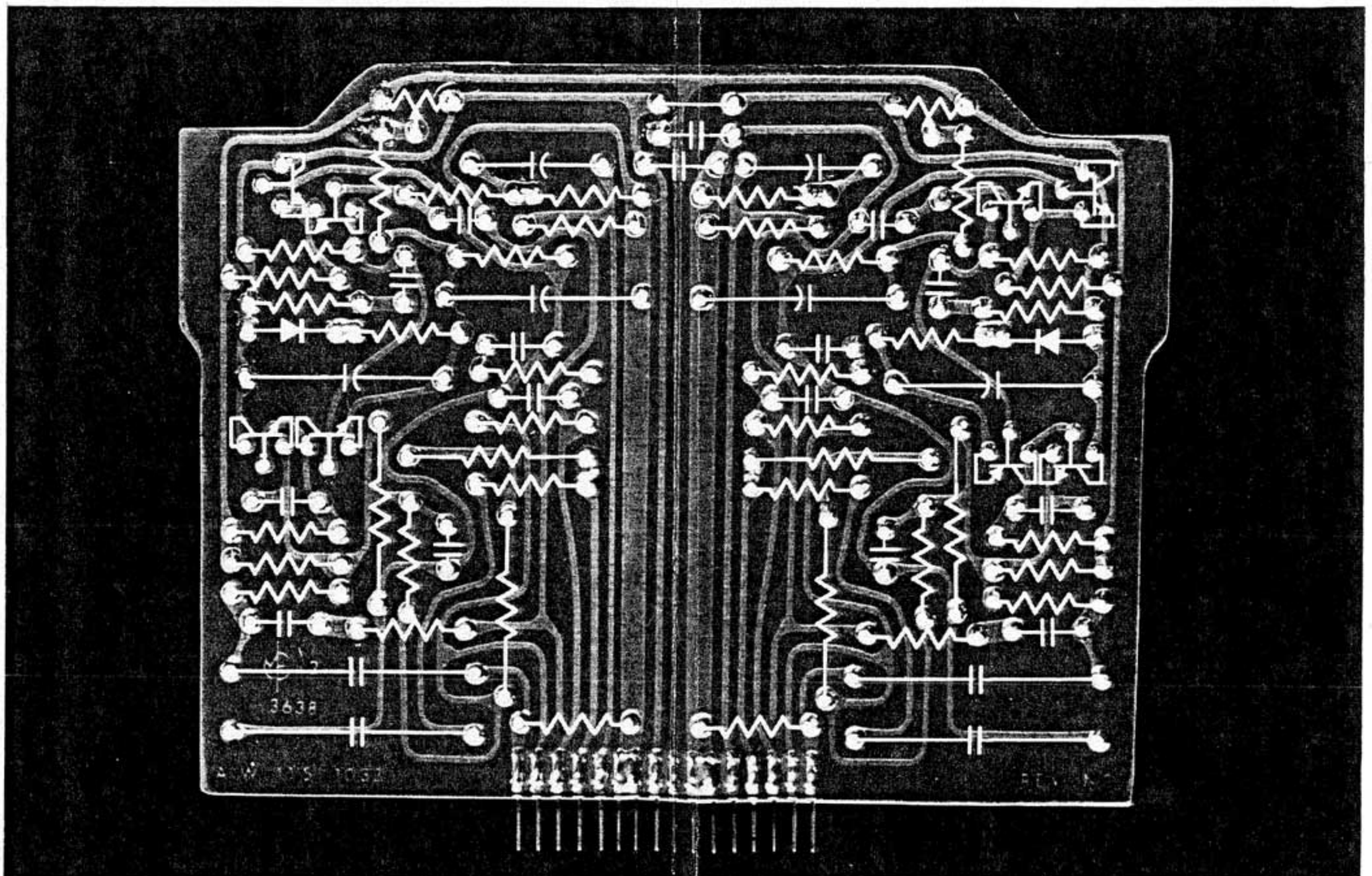


Figure 18 Phono Board, Circuit Side

Times Ten Board Trouble Analysis

The following is a guide to troubleshoot and repair the Times Ten Board. References are made to Left Channel with the Right Channel references in parenthesis. For service identification, refer to Figures 19, 20 and 21

SYMPTOM	PROBABLE CAUSE
1. No Output.	<ul style="list-style-type: none">a. Input circuit open or shorted to ground.b. Output circuit open or shorted to ground.c. R405 (R418) open.d. R410 (R426) or CR401 (CR402) open.e. R402 (R416) open.f. R409 (R422) open.g. C407 (C417) or C405 (C415) shorted.h. Defective transistor.i. Possible "Latch-up" caused by oscillation-check frequency compensation components.
2. Oscillation at all times.	<ul style="list-style-type: none">a. C401 or C404 open.b. Frequency compensation components defective — R408 (R421) or C406 (C418).c. R409 (R422) defective.d. C411 (C420) shorted.e. R407 (R420) low resistance.
3. Oscillation with Hi Filter.	<ul style="list-style-type: none">a. R413 (R423) shorted.b. C408 (C419) or C409 (C416), shorted.
4. Low Gain.	<ul style="list-style-type: none">a. R409 (R422) low resistance.b. R407 (R420) high resistance or open.
5. High Gain.	<ul style="list-style-type: none">a. R409 (R422) high resistance.b. R407 (R420) low resistance.
6. High Frequency Response is low.	<ul style="list-style-type: none">a. C411 (C420) high capacitance.b. Short in High Filter circuit.
7. Low Frequency Response is low.	<ul style="list-style-type: none">a. C405 (C415) low capacitance or open.b. Low Filter bypass circuit open.
8. High Distortion, all frequencies.	<ul style="list-style-type: none">a. Leaking capacitor — C407 (C417), C405 (C415) or C411 (C420).b. Non-linear precision resistor — R409 (R422) or R407 (R420).c. R404 (R417) open.d. R411 (R425) open.e. Check for possible tendency to oscillate.
9. High Distortion, high frequencies.	<ul style="list-style-type: none">a. C406 (C418) defective.b. R408 (R421) defective.c. C401 or C404 open.d. R412 (R424) defective.

10. Excessive Noise.

- a. Noisy transistor.
- b. Noisy resistor — R402 (R416), R409 (R422), or R407 (R420).
- c. R405 (R408) defective.
- d. R401 (R414) low resistance.
- e. C410 (C421), R410 (R426), or CR401 (CR402) shorted.
- f. Check for possible tendency to oscillate.

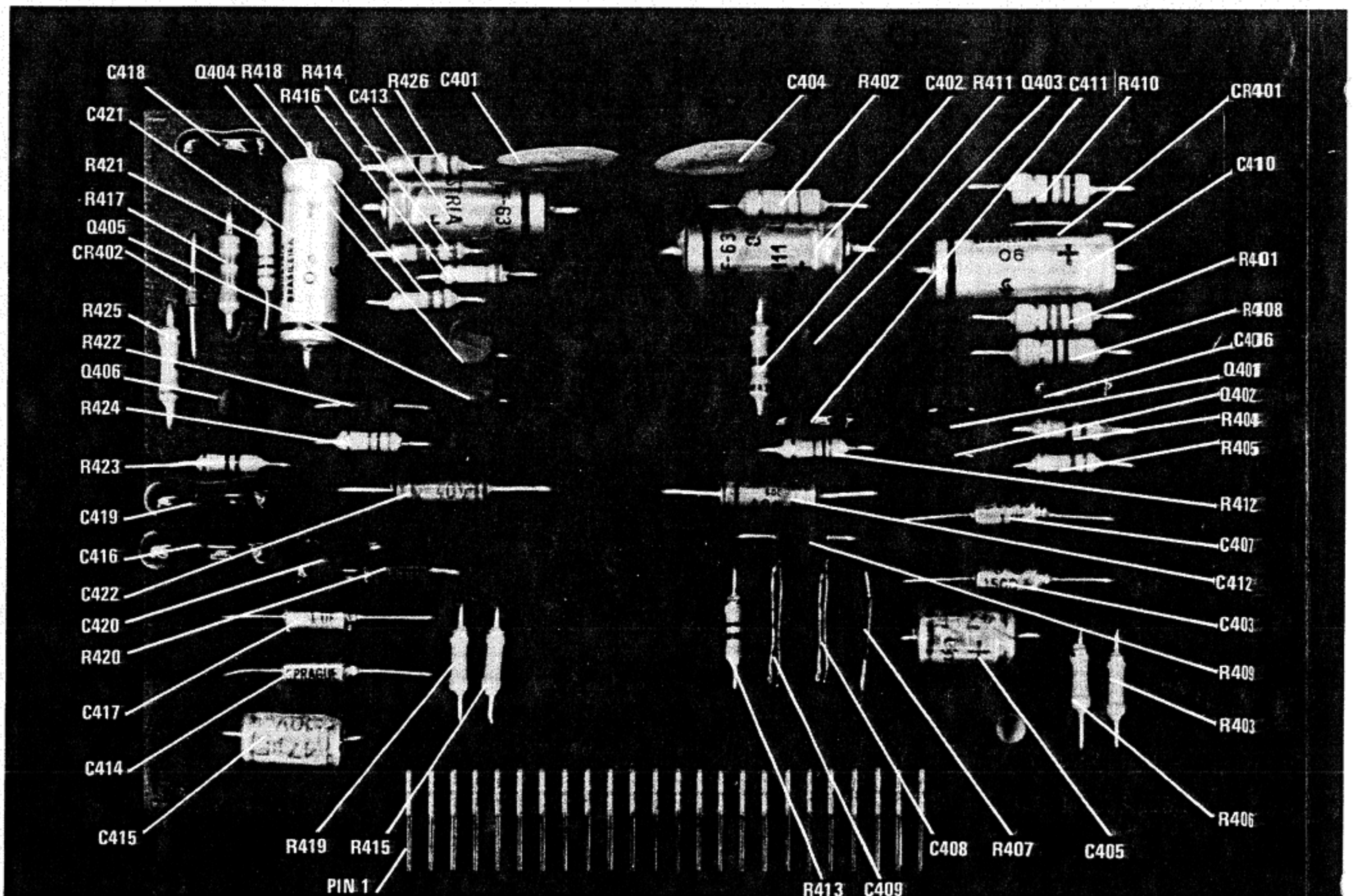


Figure 19 Times Ten Board, Component Side

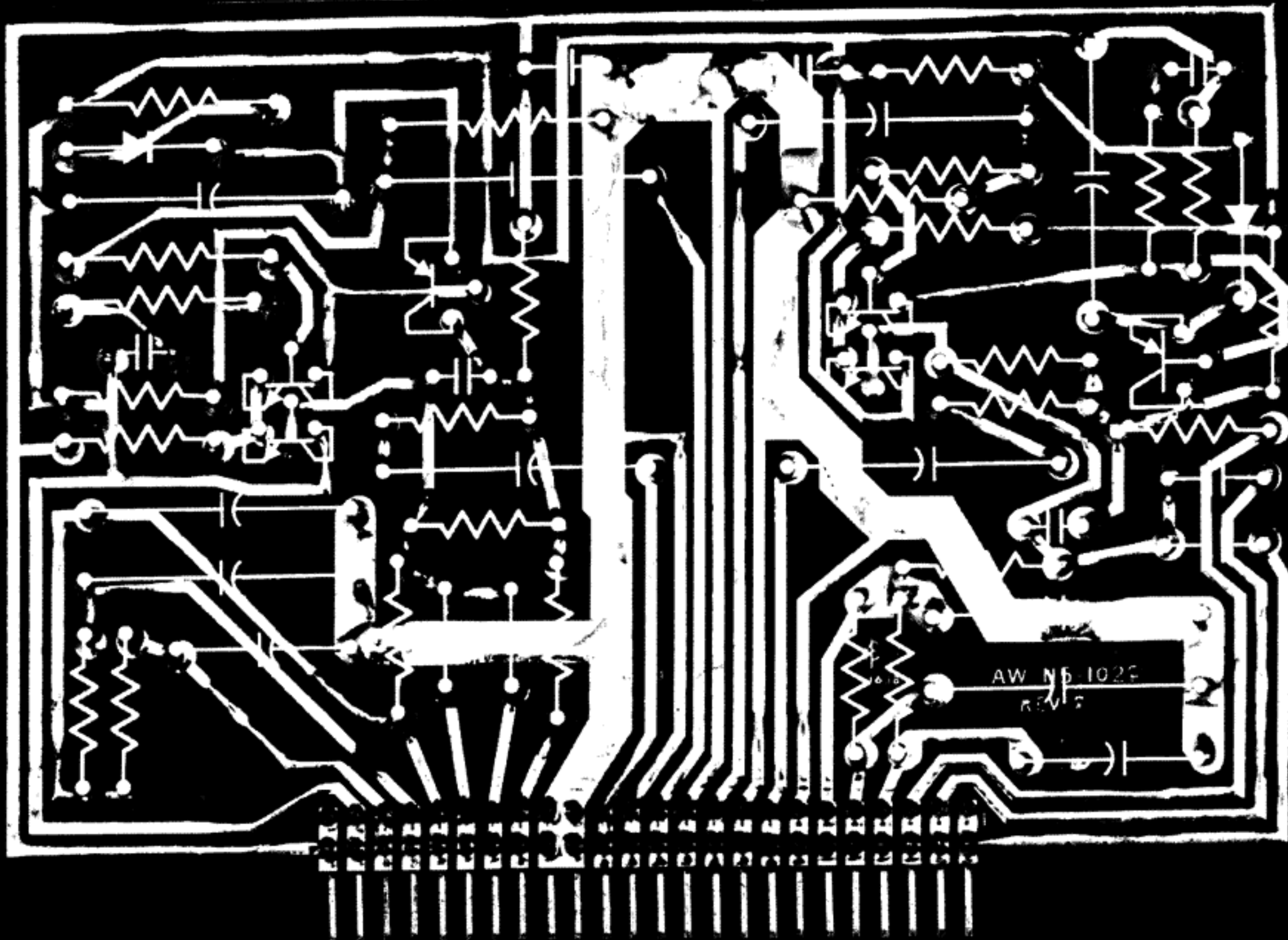


Figure 20 Times Ten Board, Circuit Side

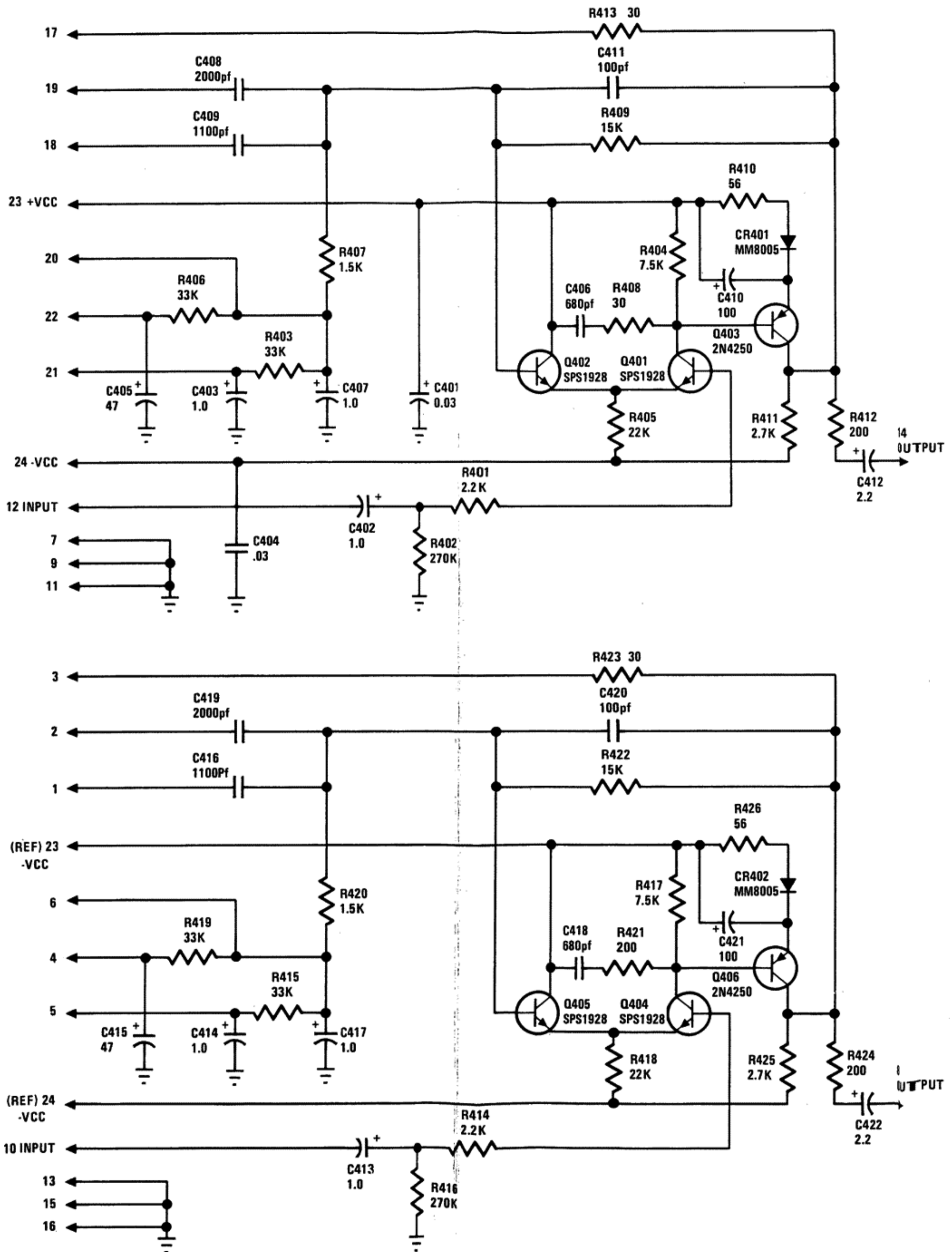


Figure 21 Times Ten Board, Complete Schematic

Tone Board Trouble Analysis

This part is intended to assist the service technician in troubleshooting and repairing the Tone Board. For convenience of servicing the Phono Board may be removed. All references are made to Left Channel with Right Channel references in parenthesis. For service identification refer to Figures 22, 23 and 24.

SYMPTOM

PROBABLE CAUSE

- | | |
|--|---|
| 1. No Output. | a. Input circuit open or shorted to ground.
b. Output circuit open or shorted to ground.
c. C305 (C315) shorted.
d. R308 (R323) open.
e. R312 (R328) open.
f. Defective transistor.
g. Possible "Latch-up" caused by oscillation. |
| 2. Oscillation. | a. C310 or C306 open.
b. R310 (R326) defective.
c. C307 (C316) defective. |
| 3. Bass Boost with controls at 0dB. | a. C302 (C312) shorted.
b. R111 (R112) 1-2, shorted.
c. R111 (R112) 2-3, open.
d. R304 (R320) open. |
| 4. Bass Cut with controls at 0dB. | a. C303 (C313) shorted.
b. R111 (R112) 2-3 shorted.
c. R111 (R112) 1-2 open.
d. R302 (R318) open. |
| 5. Bass Control inoperative. | a. R306 (R321) open.
b. R111 (R112) terminal 2 open. |
| 6. Bass Control affects all frequencies. | a. C302 (C312) open.
b. C303 (C313) open. |
| 7. Treble Boost with Controls at 0dB. | a. C303 (C313) open.
b. C302 (C312) shorted.
c. R113 (R114) 2-3, open.
d. R113 (R114), 1-2, shorted. |

8. Treble Cut with Controls at 0dB.
 - a. C302 (C312) open.
 - b. R113 (R114) 1-2, open.
 - c. R113 (R114) 2-3, shorted.

9. Treble Control inoperative.
 - a. C304 (C314) open.
 - b. R113 (R114) terminal 2 open.

10. Treble Control affects all frequencies.
 - a. R306 (R321) open.
 - b. C304 (C314) shorted.

11. Excessive Distortion.
 - a. R310 (R326) or C307 (C316) defective.
 - b. R309 (R324) open.
 - c. R313 (R327) open.
 - d. C305 (C315) or R307 (R322) defective.
 - e. Defective transistor.
 - f. C308 (C317) leaking.
 - g. R311 (R325) open.

12. Excessive Noise.
 - a. Faulty transistor.
 - b. C308 (C317) open or leaking.
 - c. C305 (C315) open or leaking.
 - d. R307 (R322) open or noisy.
 - e. R309 (R324) open.
 - f. R310 (R326) or C307 (C316) defective.
 - g. R312 (R328) open.
 - h. R311 (R325) defective.

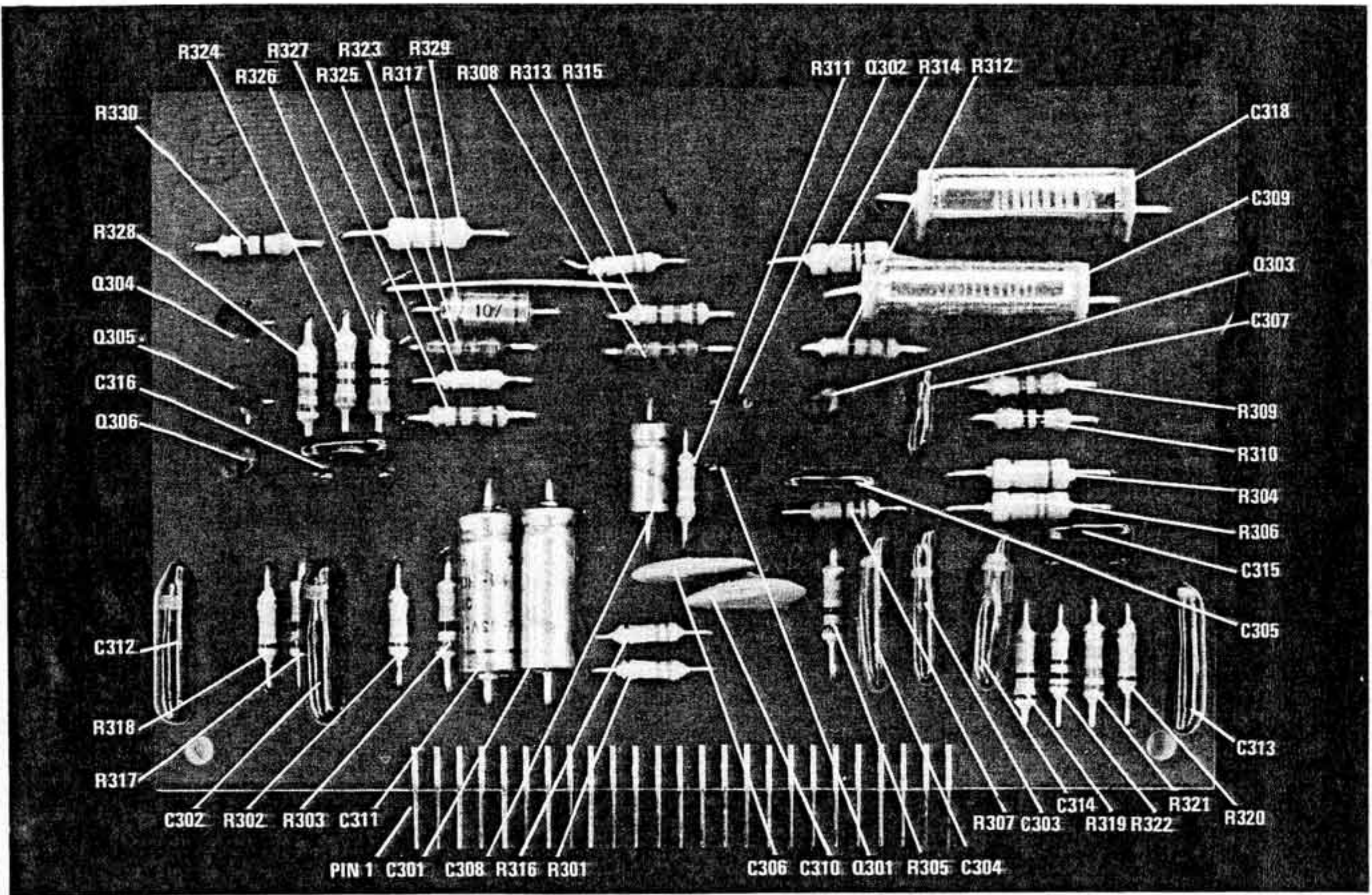


Figure 22 Tone Board, Component Side

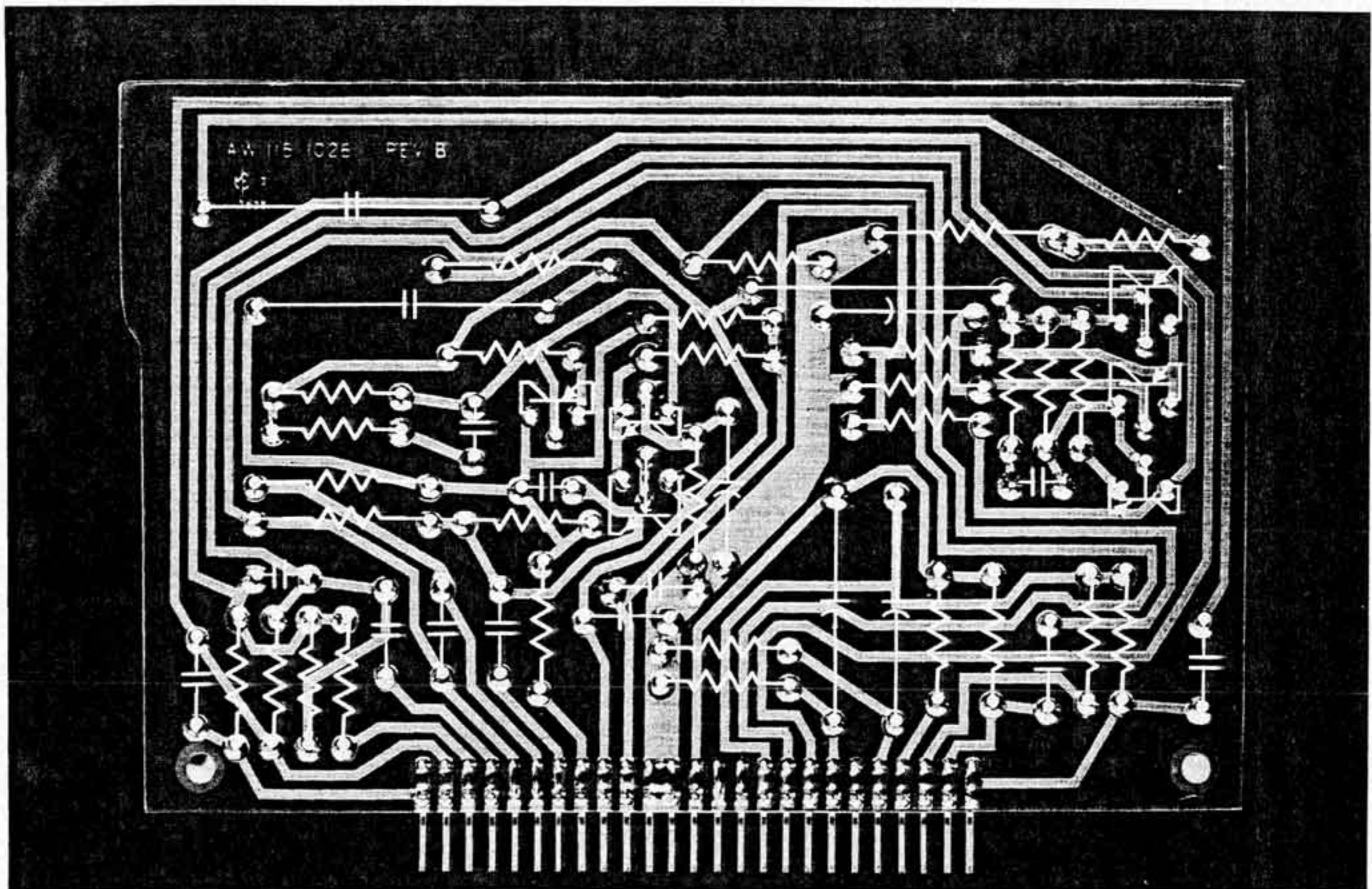


Figure 23 Tone Board, Circuit Side

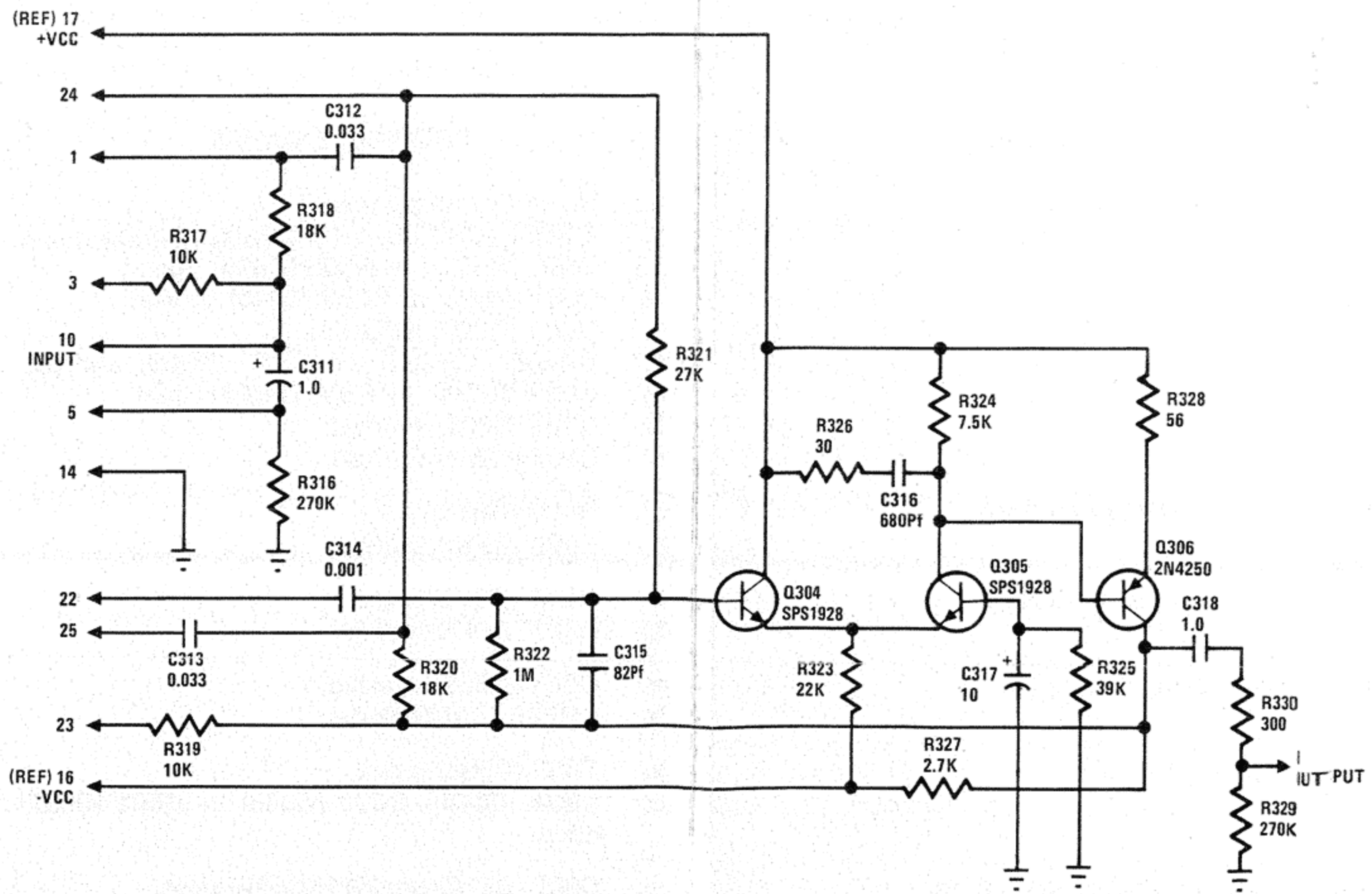
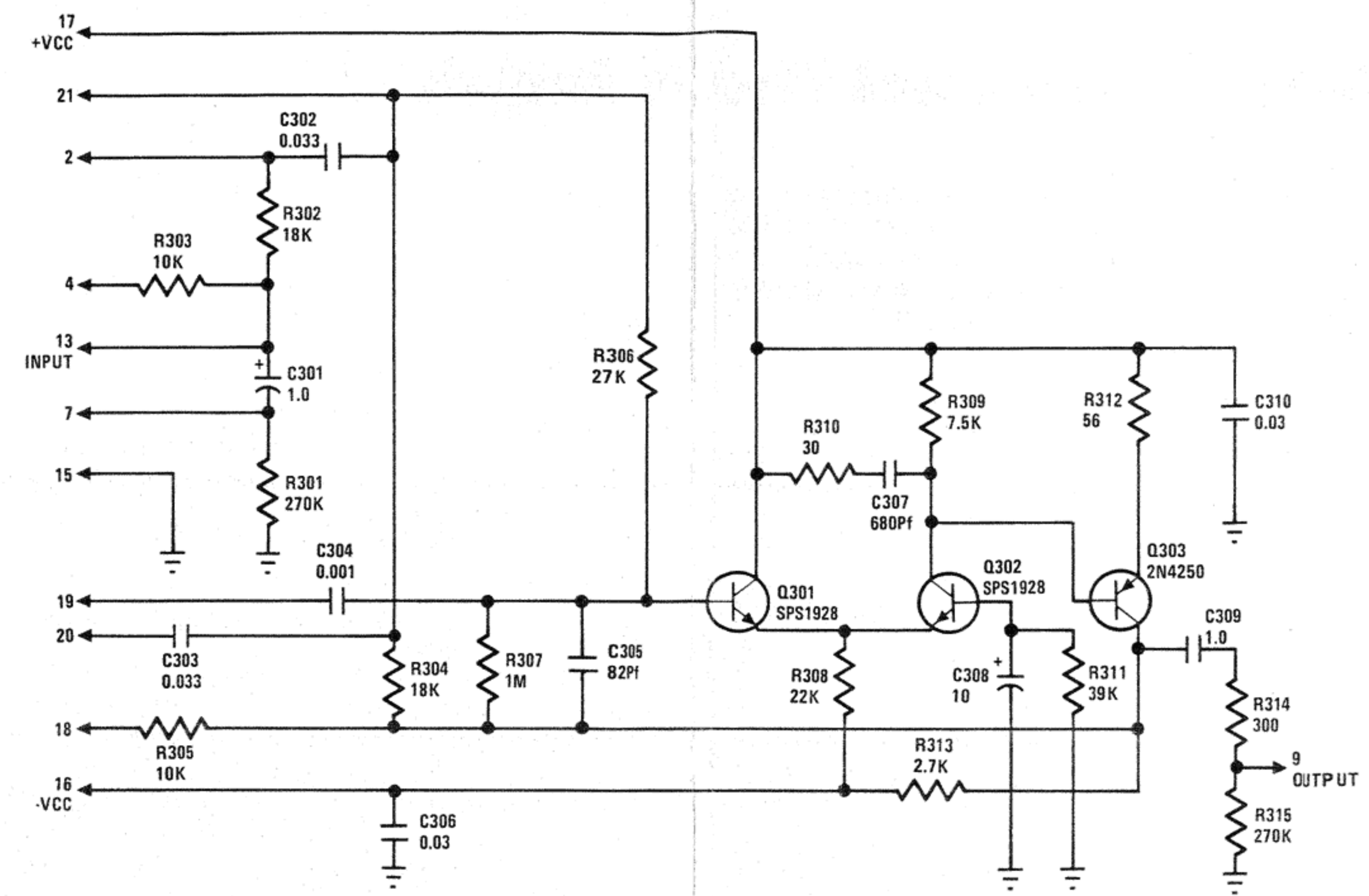


Figure 24 Tone Board, Complete Schematic

Power Supply Board Trouble Analysis

The following is a guide to troubleshooting and repairing the Power Supply Board. References will be made to the positive section with the negative section references in parenthesis. For service identification, refer to Figures 25, 26 and 27.

SYMPTOM	PROBABLE CAUSE
1. No Output Voltage.	a. No. A.C. Input voltage. b. CR601 (CR602) AND CR603 (CR604) open. c. R601 (R602), or R603 (C606) open. d. C601 (C602) or C603 (C606) shorted. e. Q601 (Q602) defective. f. CR605 (CR606) or C607 (C608) shorted. g. R605 (R608), or R606 (R607) open. h. C604 (C605) shorted. i. C607 (C608) shorted.
2. No Phono Output Voltage.	a. R609 (R610) open. b. C609 (C610) shorted.
3. No Tone Output Voltage	a. R611 (R612) open. b. C611 (C612) shorted.
4. High Output Voltage.	a. Q601 (Q602) shorted. b. CR605 (CR606) open.
5. Excessive Ripple	a. C607 (C608) open. b. C604 (C605), C603 (C606) or C601 (C602) open.
6. Inadequate Output separation.	a. C609 (C610) or C611 (C612) open.

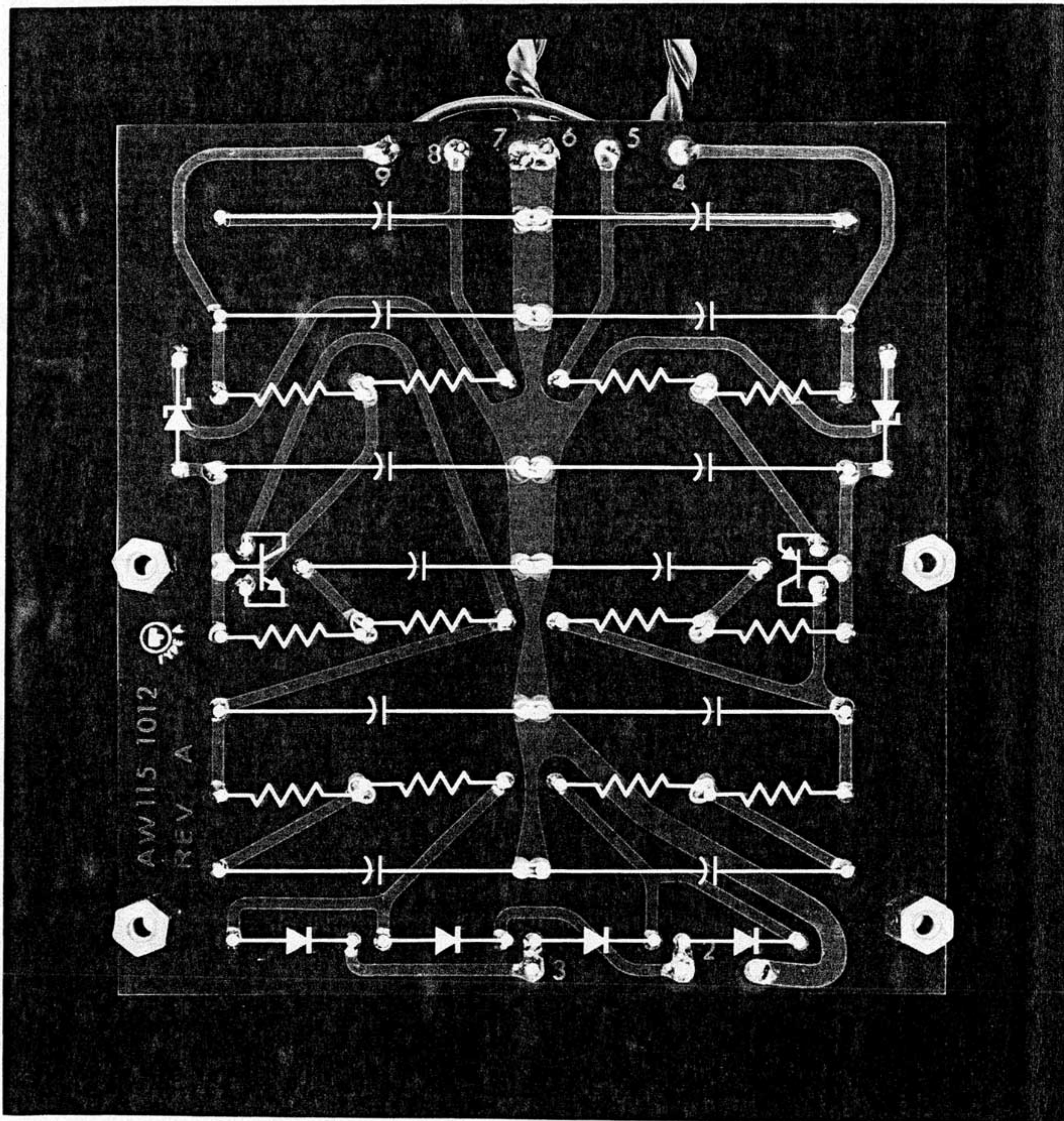


Figure 26 Power Supply Board, Circuit Side

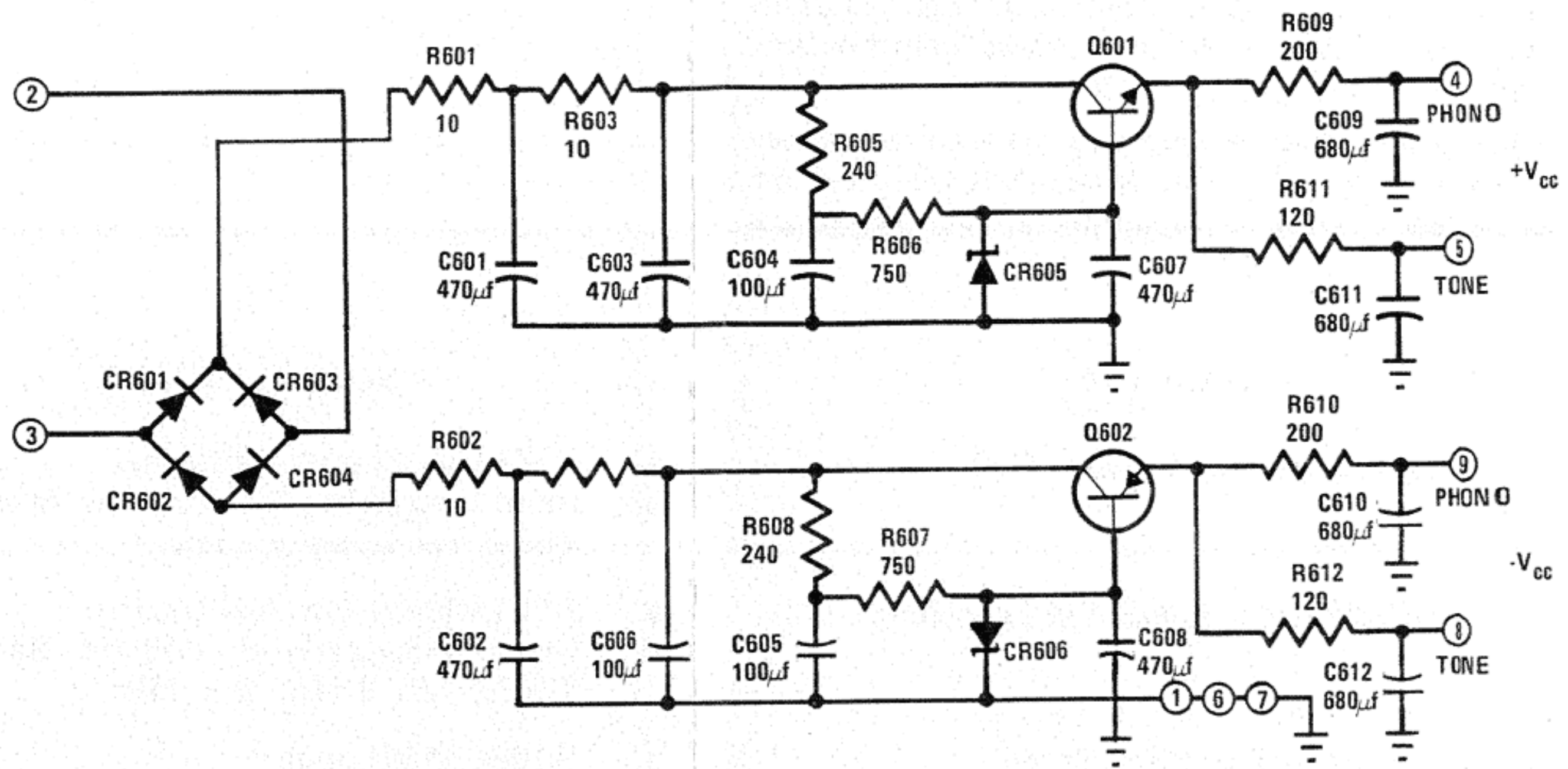


Figure 27 Power Supply Board, Complete Schematic

Interconnect Board Trouble Analysis

This part is intended to assist the service technician in servicing the Interconnect Board. All references are made to the Left Channel with Right Channel references in parenthesis. For service identification, refer to Figures 28, 29 and 30.

Minor component replacement (resistor or capacitor) does not require the removal of the Interconnect Board. Refer to Repair Section for procedure.

SYMPTOM	PROBABLE CAUSE
1. Excess Attenuation in Low Gain.	a. R101 (R103) high resistance. b. Input impedance of Volume, Balance, and Times Ten Board too low.
2. Insufficient Attenuation in Low Gain.	a. R101 (R103) low resistance. b. Input impedance of Volume, Balance and Times Ten Board too high.
3. No Input to Times Ten Board.	a. R103 (R104) open. b. Mode Switch -S101 — defective. c. Balance Control defective. d. Volume Control defective. e. J103 not making proper connection.
4. Loudness Contour, No High frequency boost.	a. R107 (R109) open. b. C101 (C103) open. c. Open circuit of R107 (R109) and C101 (C103).
5. Loudness Contour, No Low frequency boost.	a. C102 (C104) shorted. b. R108 (R110) open.

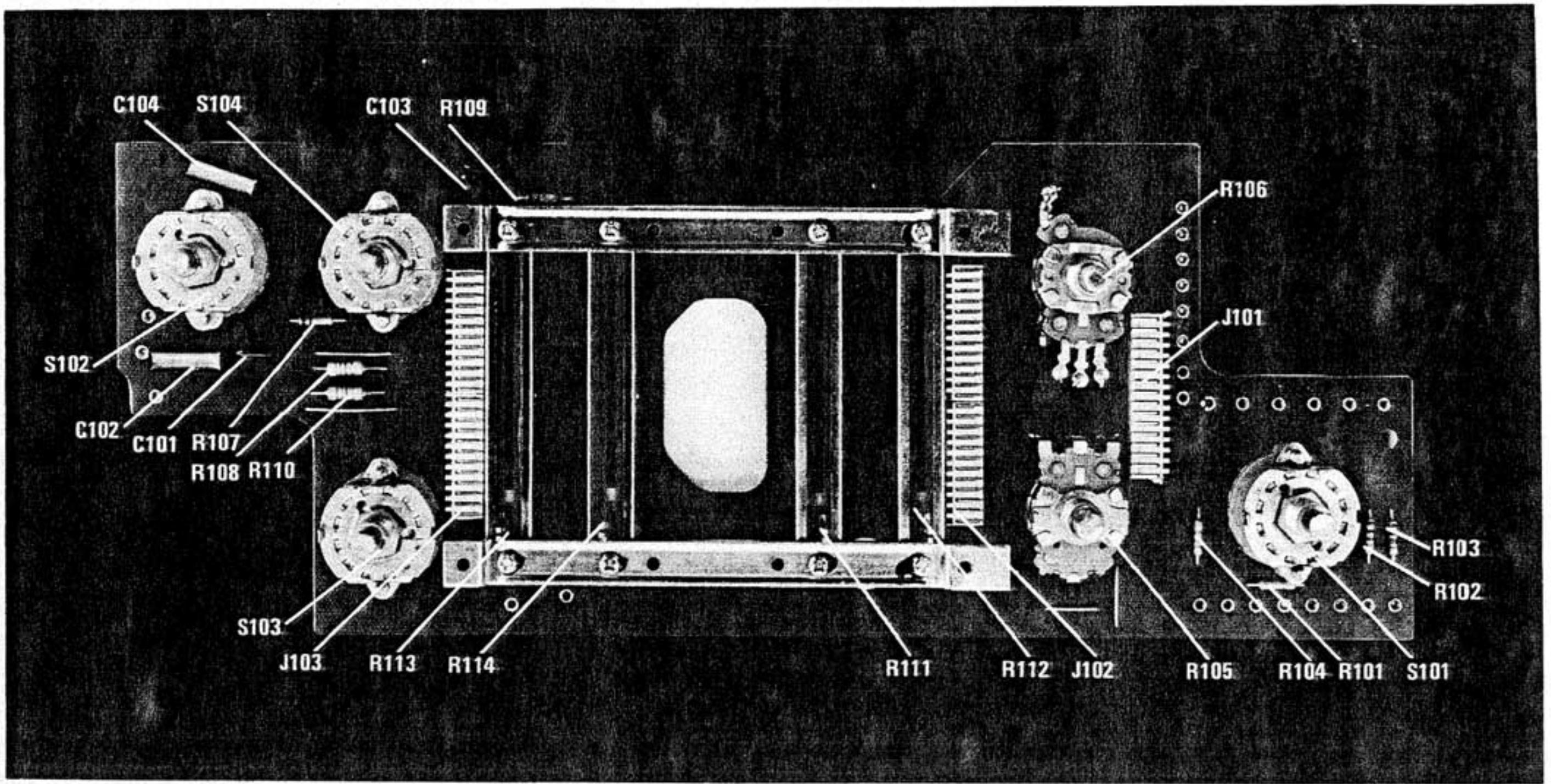


Figure 28 Interconnect Board, Component Side

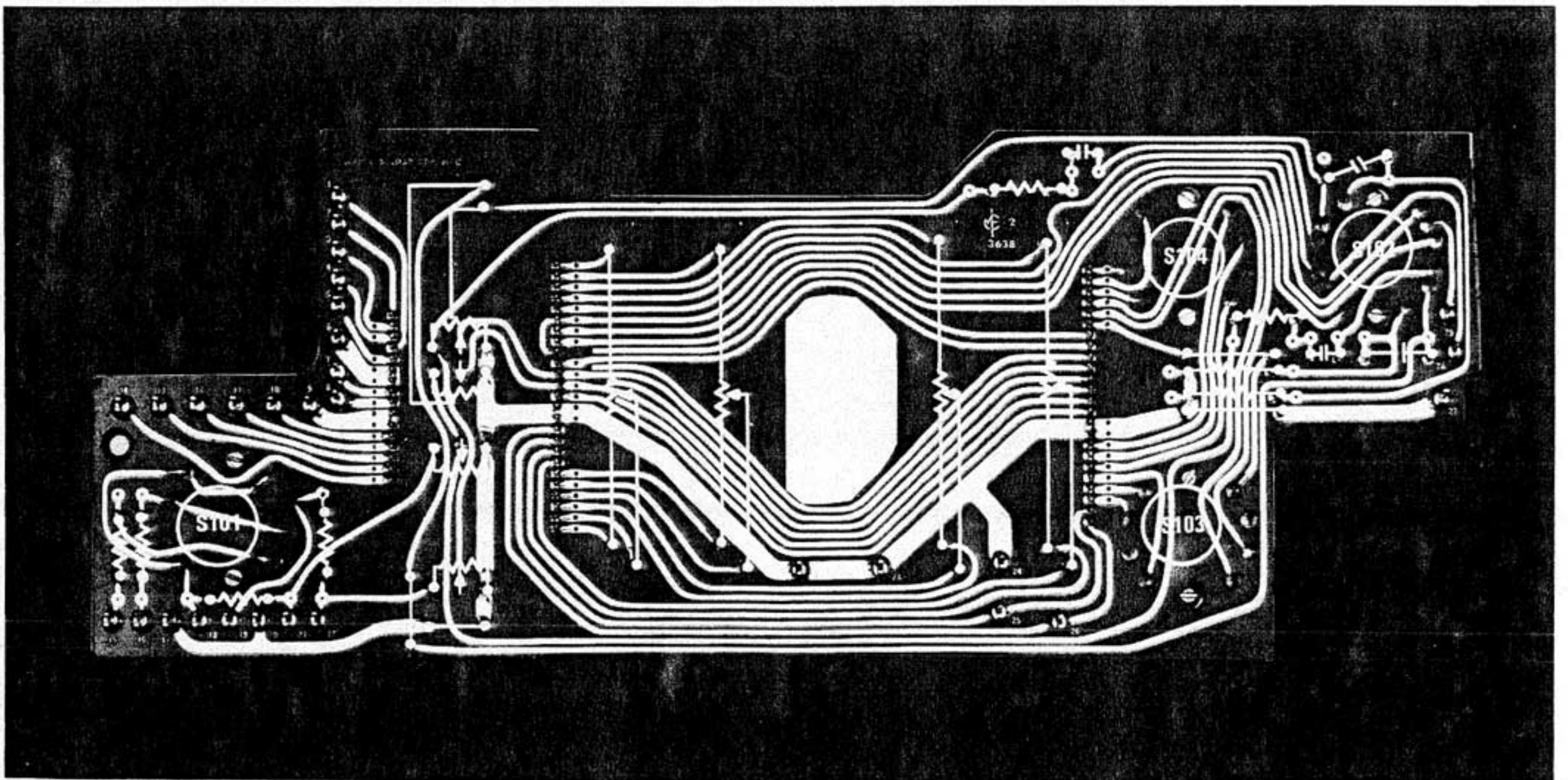
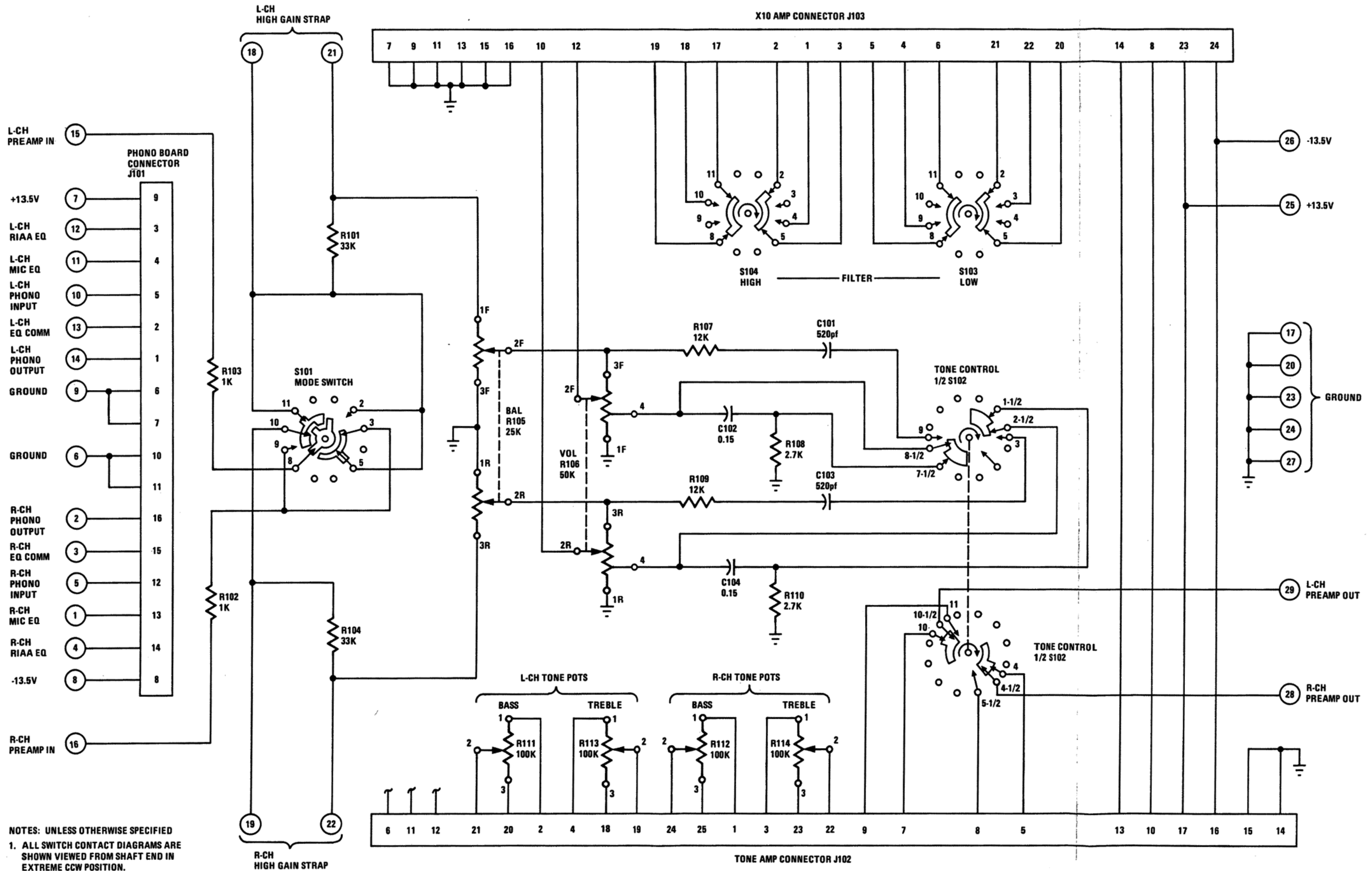


Figure 29 Interconnect Board, Circuit Side



NOTES: UNLESS OTHERWISE SPECIFIED
 1. ALL SWITCH CONTACT DIAGRAMS ARE SHOWN VIEWED FROM SHAFT END IN EXTREME CCW POSITION.

Figure 30 Interconnect Board, Complete Schematic

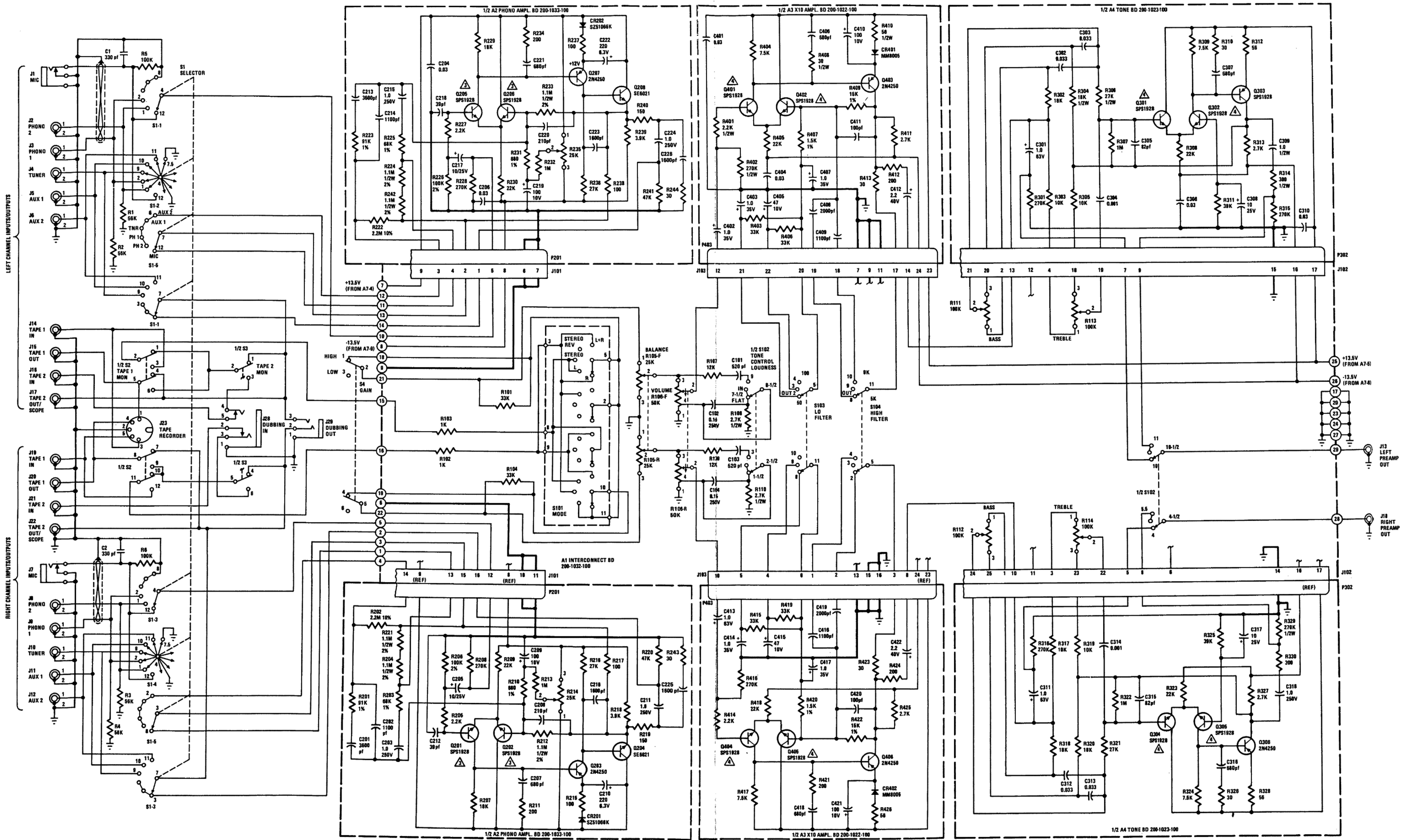
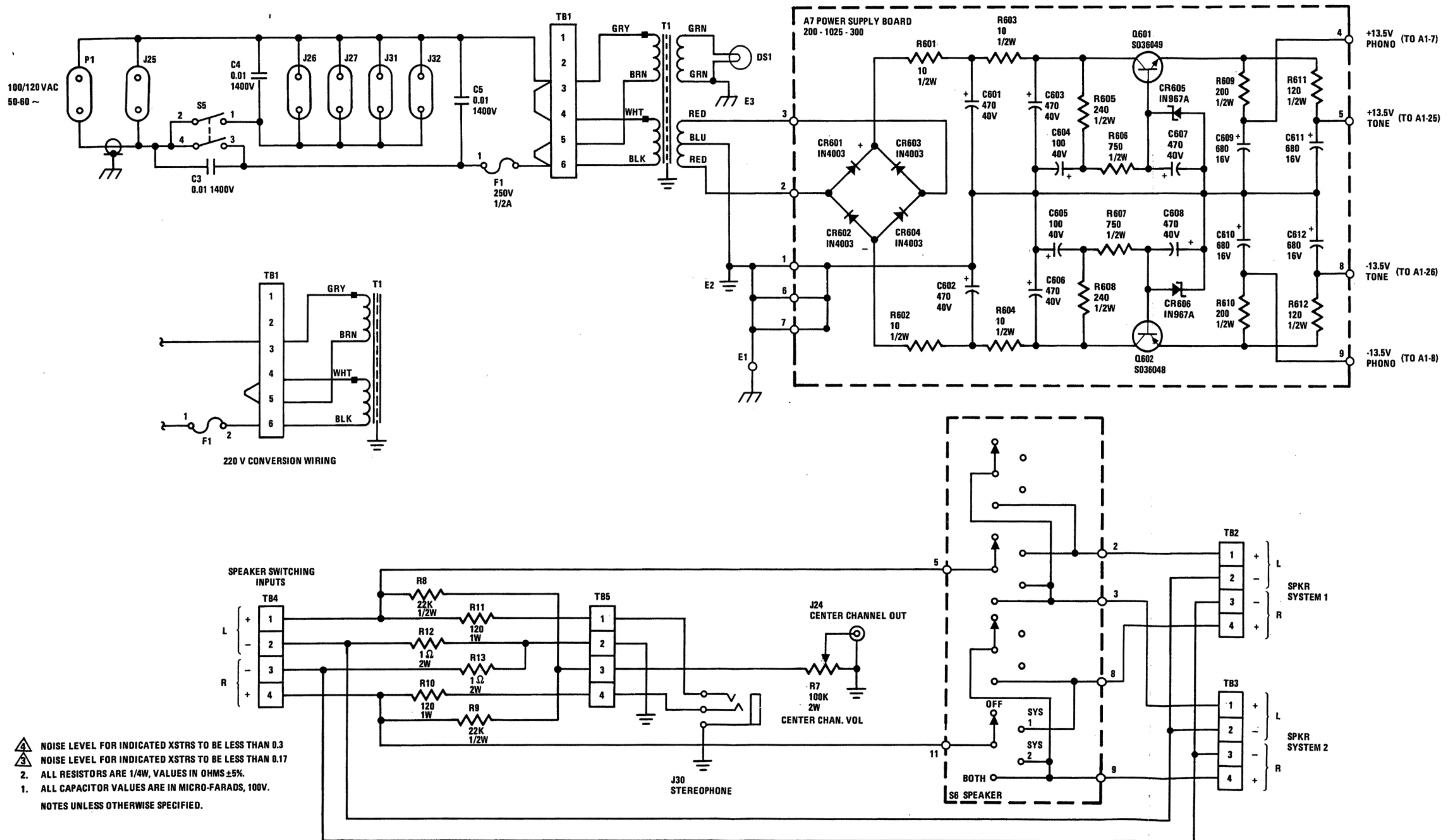


Figure 31 Complete Schematic, Sheet 1



- 4 NOISE LEVEL FOR INDICATED XSTRS TO BE LESS THAN 0.3
 - 3 NOISE LEVEL FOR INDICATED XSTRS TO BE LESS THAN 0.17
 - 2. ALL RESISTORS ARE 1/4W, VALUES IN OHMS ±5%.
 - 1. ALL CAPACITOR VALUES ARE IN MICRO-FARADS, 100V.
- NOTES UNLESS OTHERWISE SPECIFIED.

Figure 32 Complete Schematic, Sheet 2

REPAIR PROCEDURES

Top Cover Removal

To remove top cover, take out all self-tapping machine screws on top of unit and on each side. Do not remove any machine screws from bottom plate or rear panel.

Front Panel Removal

To remove front panel, proceed as follows:

1. Remove all knobs; Tape 1 Monitor, Tape 2 Monitor, Bass Controls, Treble Controls and Power Switch Knobs are friction fit; all other knobs are held in place with a set screw, use a No. 8 Allen wrench to remove these knobs.
2. Using a 1/2" wrench, remove all (8) hex nuts from control shafts.
3. Carefully remove front panel so as not to scratch it.
4. Save the six plastic spacers that are on the control shafts. Speaker Switch and Selector Switch have hex nuts instead of spacers.

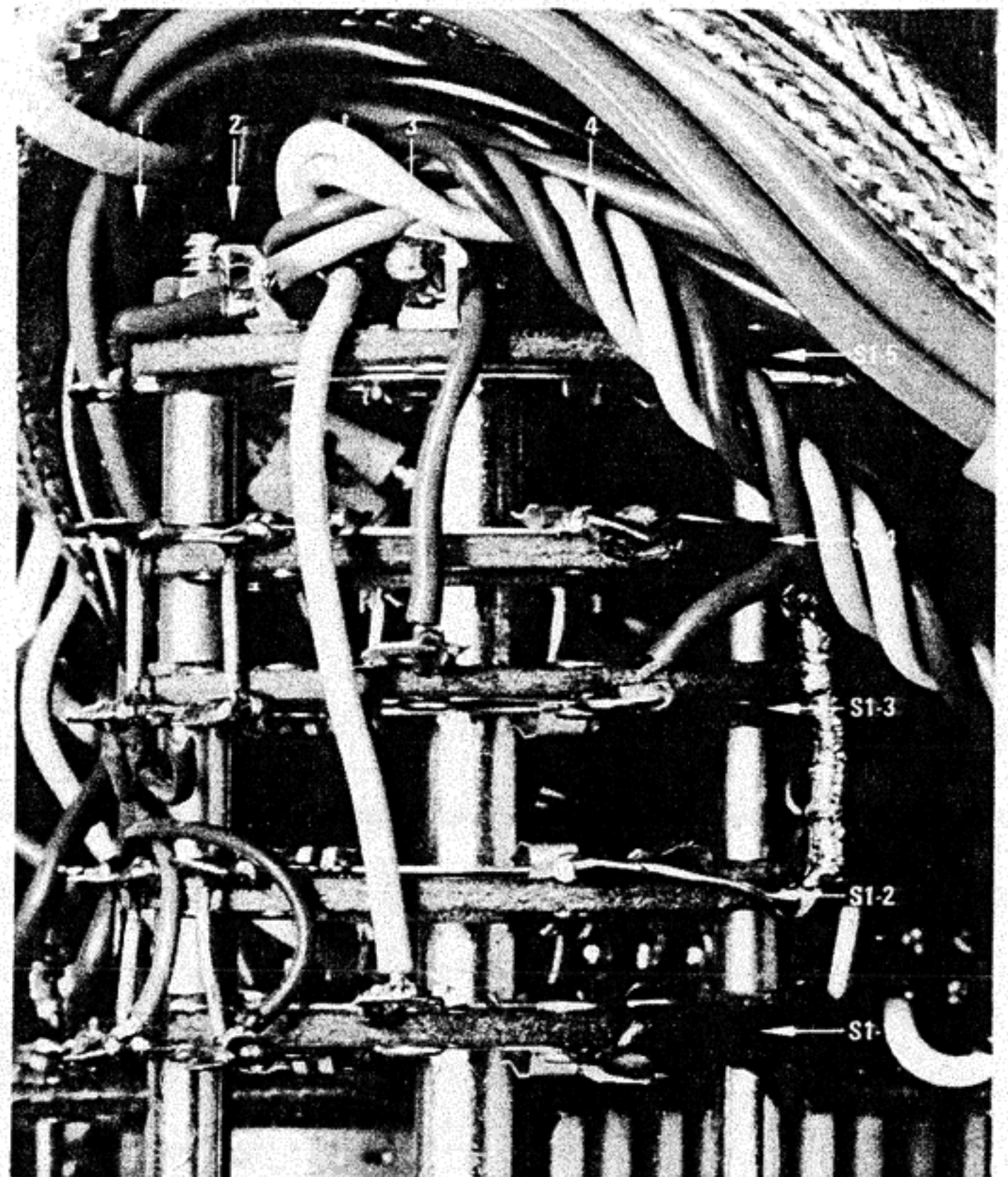
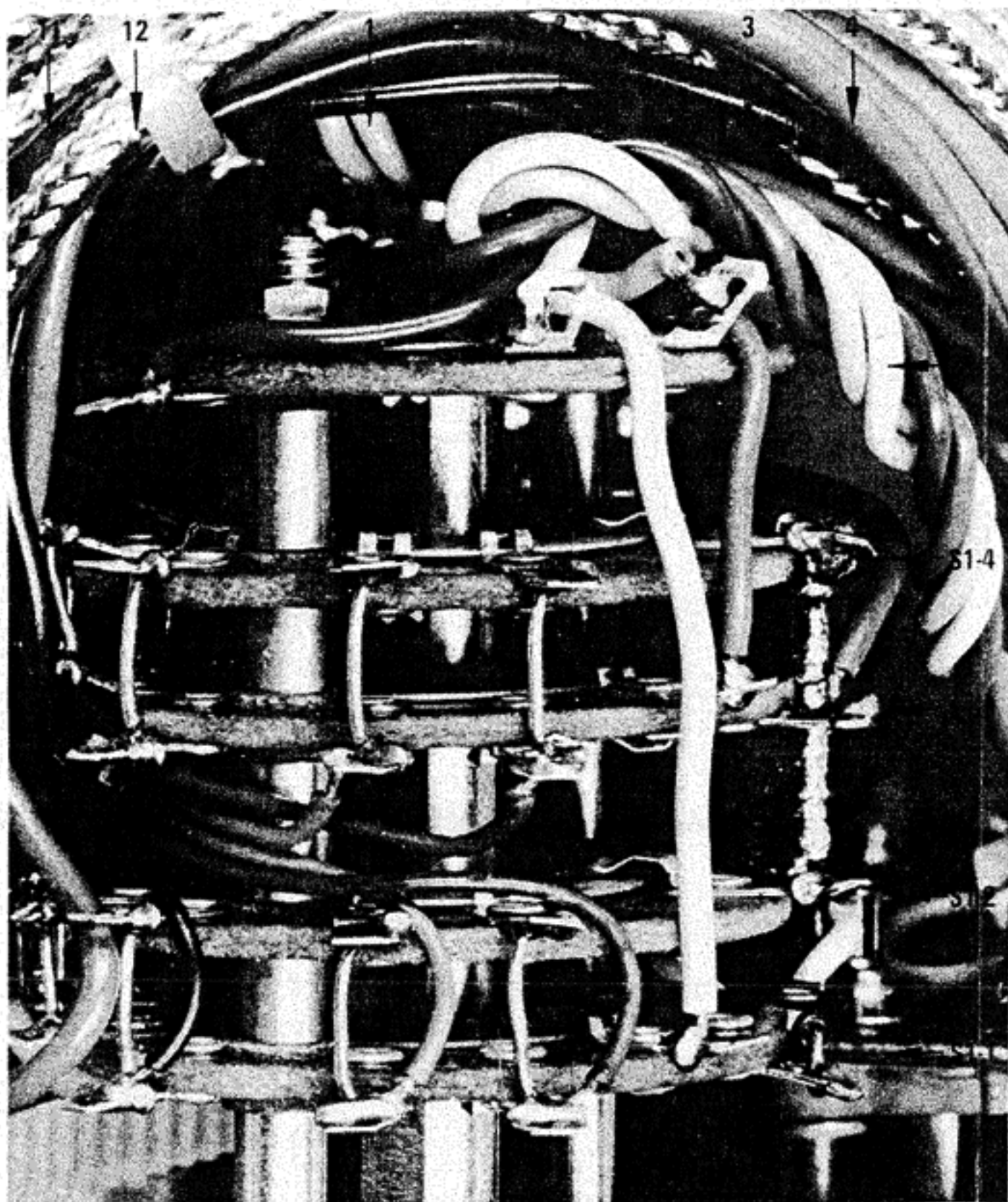
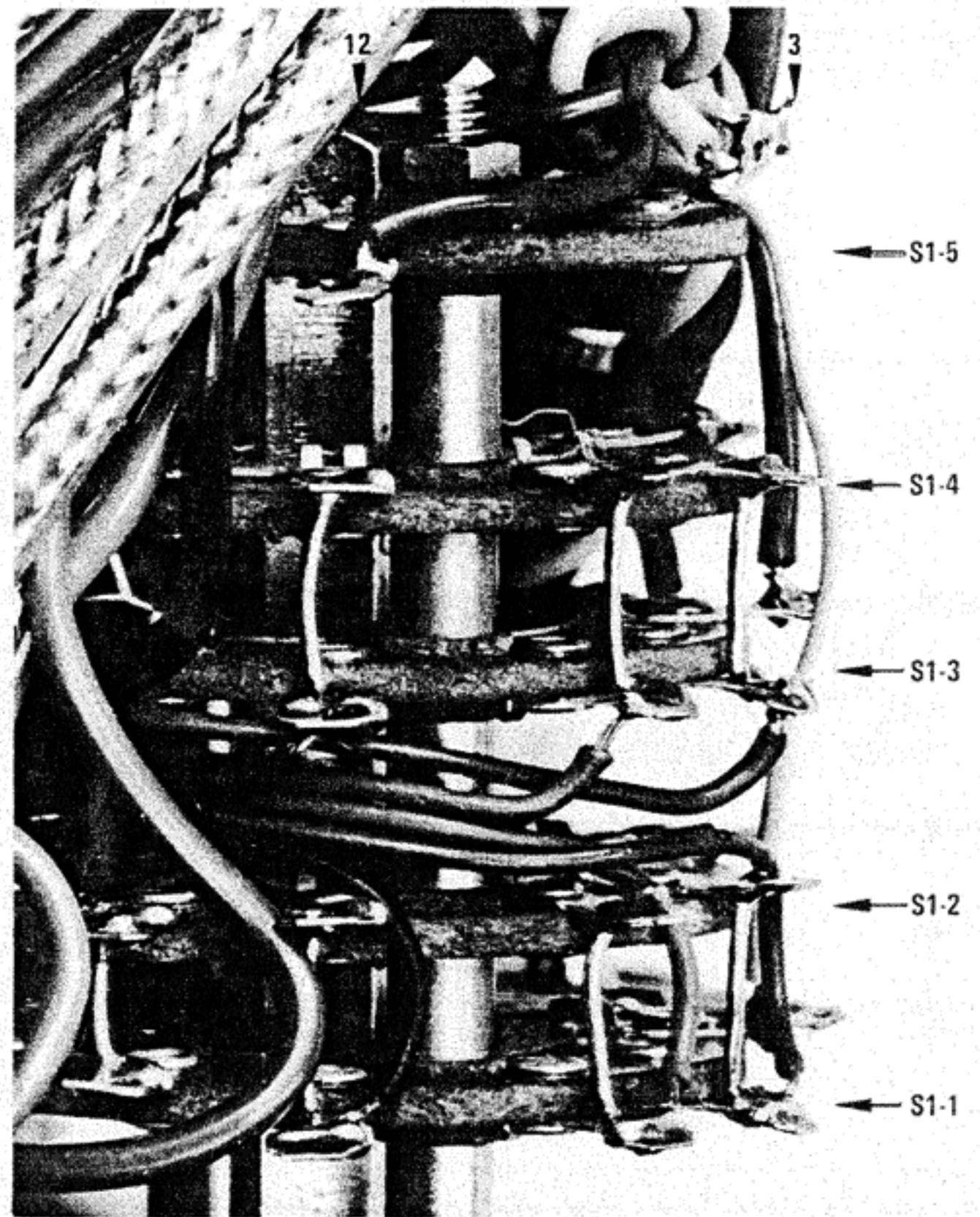


Figure 33 Selector Switch Assembly

Selector Switch Removal

When repairing or replacing the Selector Switch, caution should be exercised to maintain the original wiring configuration (lead length, routing, etc.). Figure 33 has been provided to indicate the proper wiring configuration. To remove the Selector Switch, it is necessary to first remove the front panel, then remove the 1/2" hex nut securing the switch to the front chassis. Save lockwasher between Selector Switch and Chassis.

Tape Monitor Switch Assembly Removal

Procedure:

1. Remove front panel.
2. Remove the two machine screws holding the vertical mounting bracket — Figure 35, Item A.
3. Pull the Assembly through the front chassis to gain access to the machine screws securing the Switch Assembly to the Vertical mounting bracket, remove these screws.
4. Disconnect from the Interconnect Board, the Bus Bar that connects the shields of the Tape Monitor Cables, — Figure 36, Item A.

5. Pull the Tape Monitor Switch Assembly through the Interconnect Board and repair or replace using Figure 34 as a wiring guide.

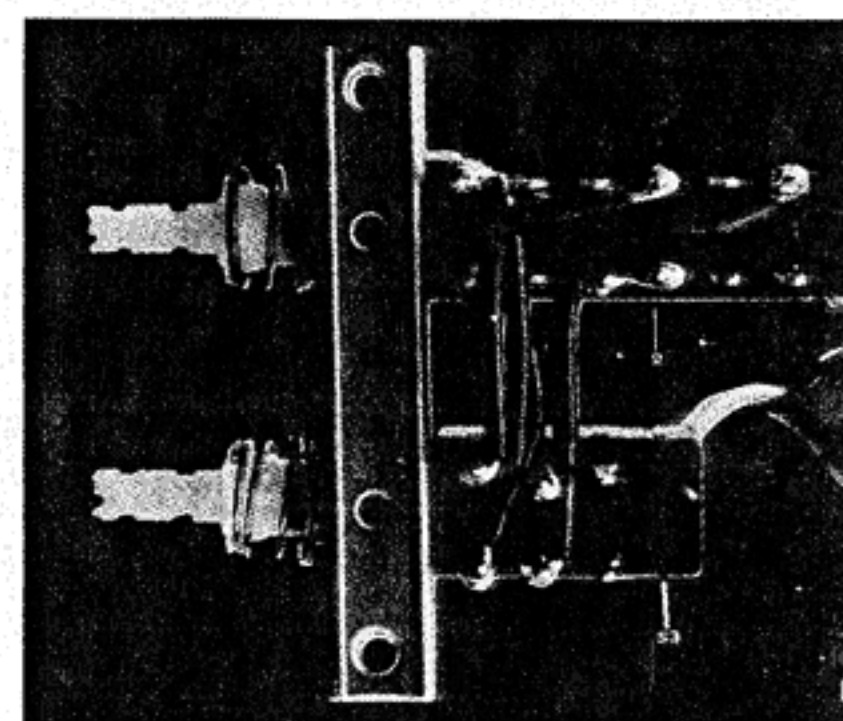
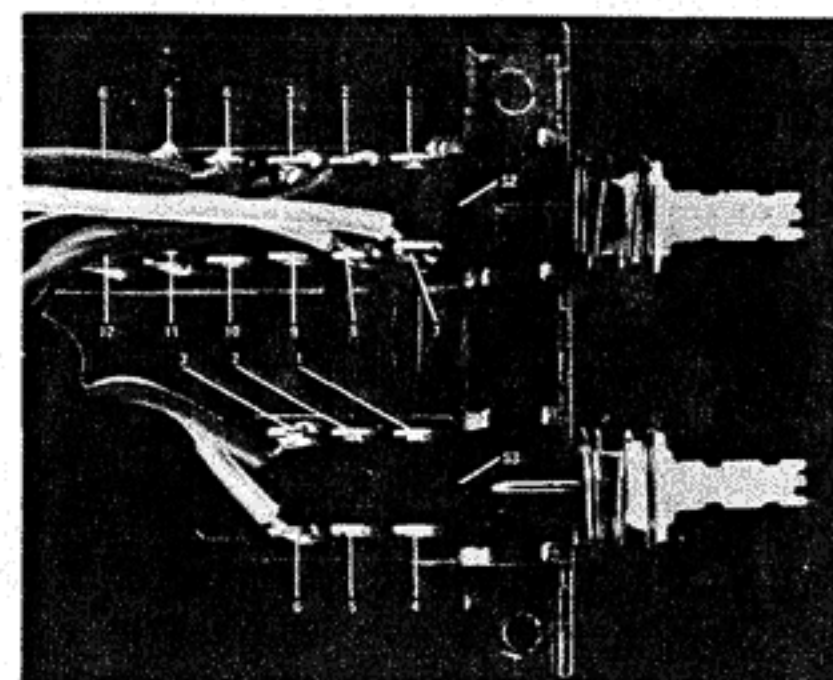


Figure 34 Tape Monitor Switch Assembly

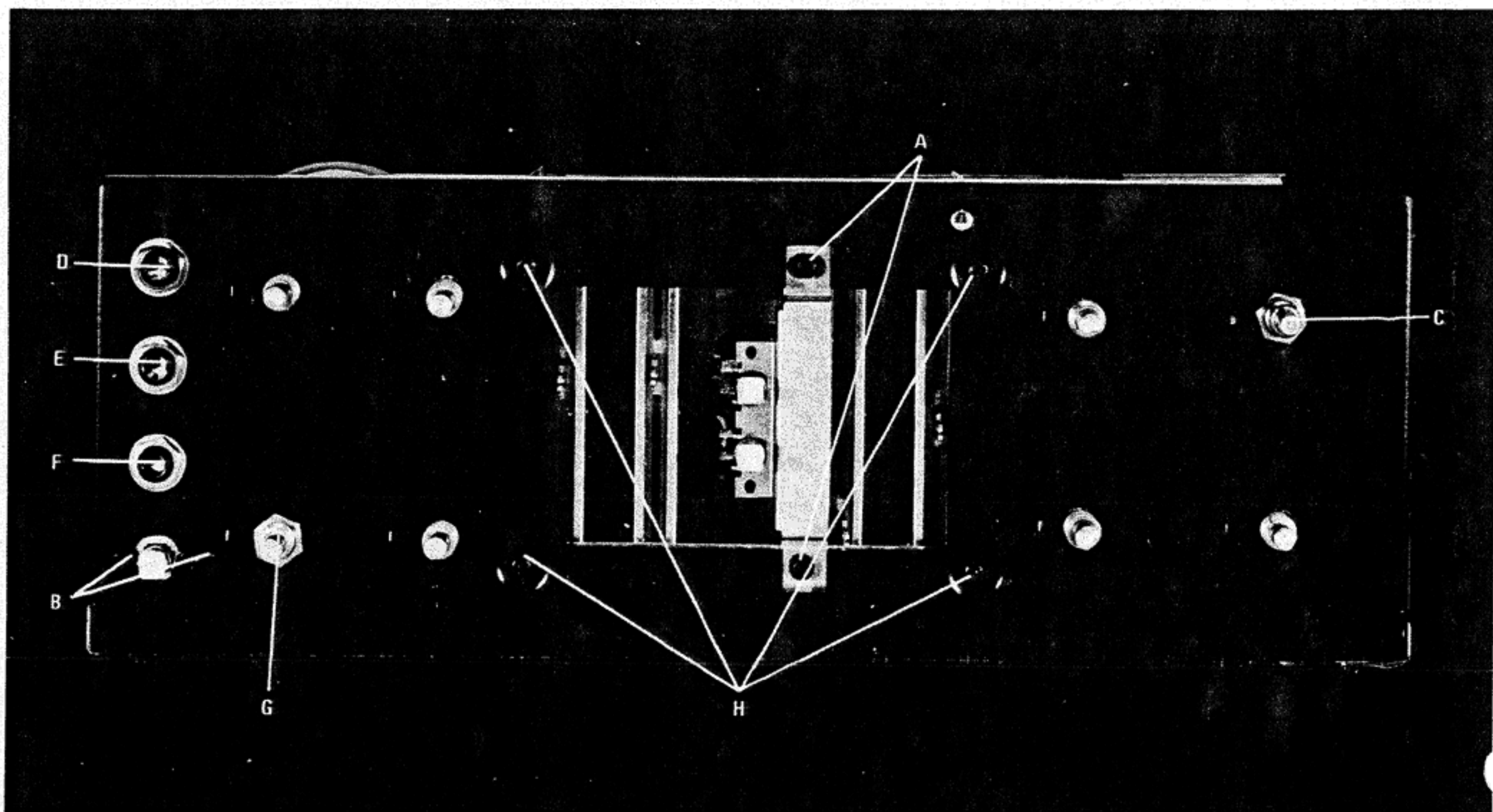


Figure 35 Model 3300 Front Chassis (Without Decor Panel)

Speaker Switch Removal

To gain access to the Speaker Switch, remove the shield that is secured to the bottom chassis by two self-tapping machine screws. To remove the switch it will be necessary to remove the front panel to gain access to the 1/2" hex nut holding the switch to the front chassis (Figure 35, Item G). Save lockwasher between Speaker Switch and Chassis.

Power Switch Removal

To remove the Power Switch, first remove the front panel and then remove the two retaining machine screws — Figure 35, Item B.

Plug-in Board Removal

To remove the Phono, Tone or Times Ten Board, remove the appropriate board retainer, Figure 36, Items B, C or D, and un-plug board from Interconnect Board.

Interconnect Board Removal

To remove the Interconnect Board, proceed as follows:

1. Remove the Phono, Tone and Times Ten Boards.
2. Remove the front panel.

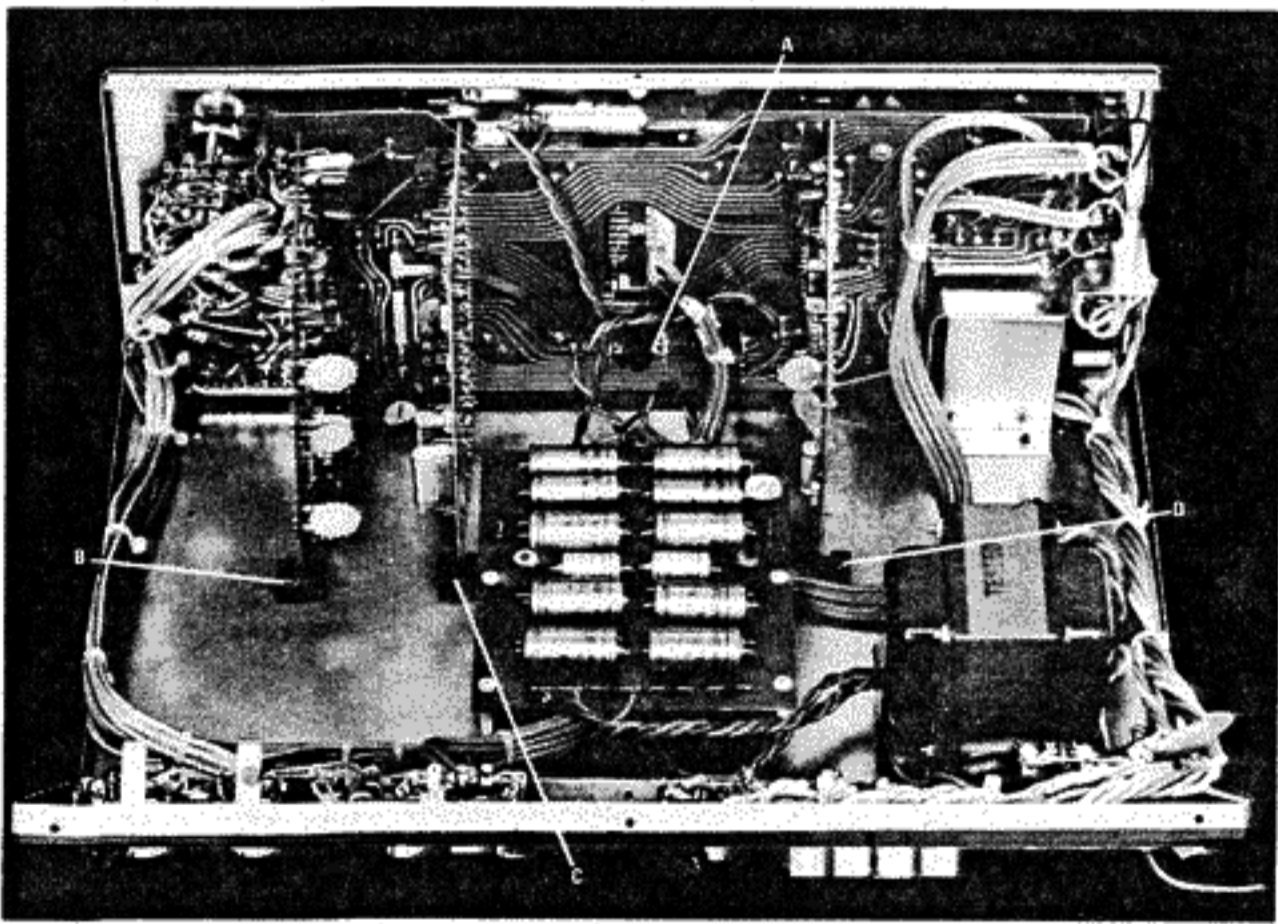


Figure 36 Interconnect Board, Installed

3. Remove the 1/2" hex nuts securing the Selector Switch, Dubbing In jack and Dubbing Out jack, Figure 35, Items C, D, E.
4. Remove the four machine screws holding the tone potentiometer bracket, Figure 35, Item H.
5. Remove the six plastic spacers from the appropriate controls.
6. Remove the Interconnect Board taking care not to lose the lockwashers on the controls.

Interconnect Board Component Replacement

Minor component replacement (resistor or capacitor) does not require the removal of the Interconnect Board. Figure 37 shows a typical in-field replacement of a resistor. The procedure to replace a known defective part is:

1. Cut the printed circuit with a sharp knife between the solder joint and the connected empty pad. Cutting only one side is sufficient.
2. Trim the leads of the replacement part so that when installed, only a small amount will extend through the board.
3. Install the component in the unused pads and solder.

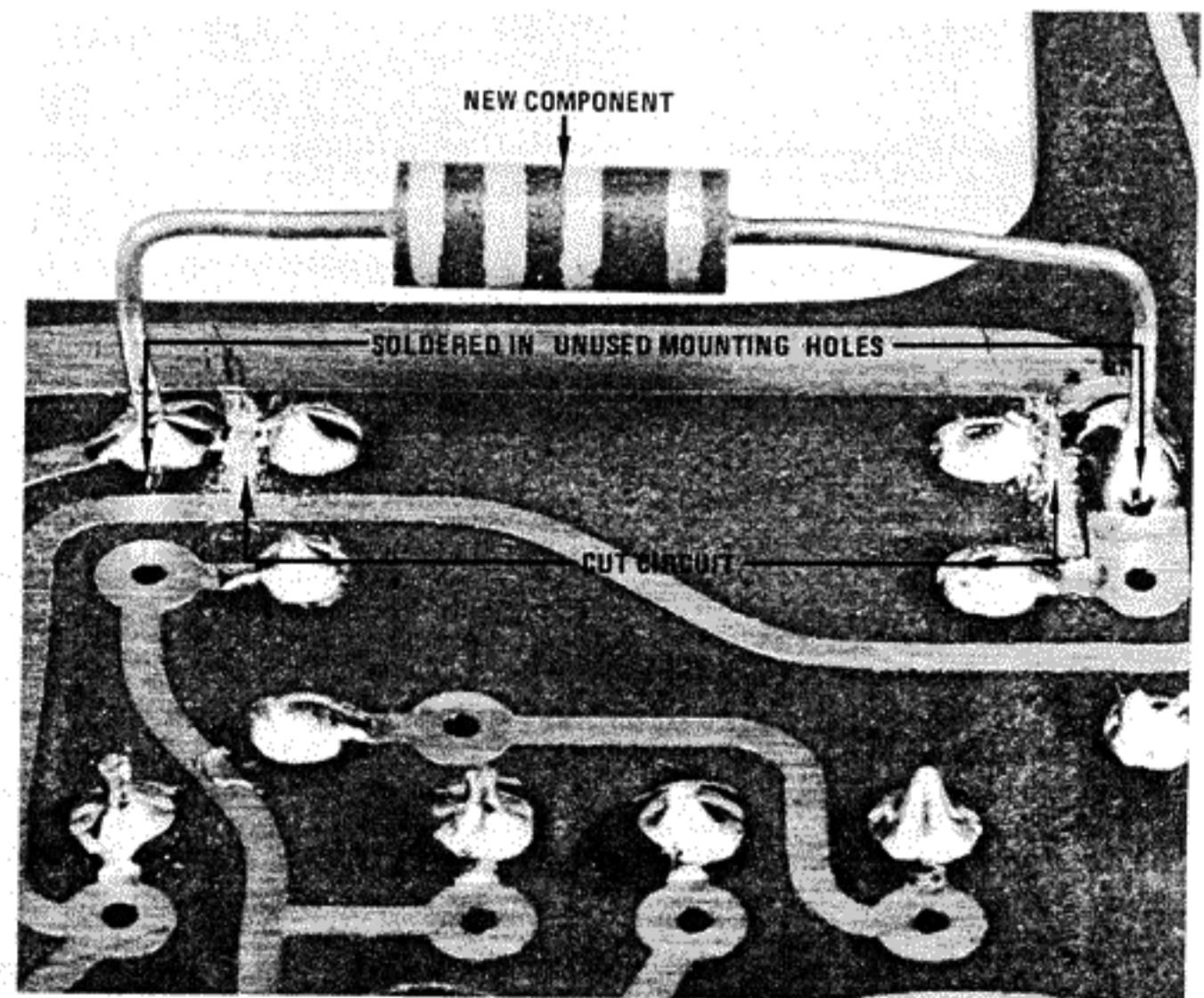


Figure 37 Interconnect Board, Component Replacement

RECOMMENDED TEST EQUIPMENT

TABLE 1. The Model 3300 Stereo Control Console should be serviced only with test equipment capable of measuring the specifications. Most equipment common in shops repairing high quality components will be sufficient. A list is included in Table 1 for reference.

Item	Manufacturer and Model No. (or equivalent)	Use
Distortion Analyzer	Hewlett Packard Model 331A or 333A. Must be capable of measuring 0.02% THD	Measure distortion of preamplifier
AC Voltmeter	Hewlett Packard Model 400F. Must be capable of measuring 30 mv (noise) accurately	Measure preamplifier output
Audio Oscillator	Weston Model CVO-100P. Residual distortion must be less than 0.02%	Sinewave signal source
Oscilloscope	Tektronix Model 503; Data Model 555	Waveform analysis and troubleshooting
VTVM	RCA Senior Volt-Ohmyst Model 555; Simpson 312	Voltage and resistance measurements
Variable Autotransformer (0-140 VAC)	Powerstat Model 116B	Adjusts level of primary power to preamplifier
AC Wattmeter 0-30W	Simpson Model 1379 Catalog No. 10950	Monitor primary power consumption of unit
Line Voltmeter 0-150 VAC	Simpson Model 1359 Catalog No. 10320	Monitor line input voltage
AC Power Control Box (optional)	Fabricate in accordance with Figure 13 (page 8)	Monitor and control primary power to preamp
Shorting Plug (4)	Use phono plug with 600 ohm resistor across center pin and shell	Shorts preamplifier input to eliminate noise pickup
Noise Filter 20 Hz to 20 KHz 12 dB/octave	Commercial grade, must have less than $3\mu\text{V}$ residual noise input	Noise measurements

220 VOLT AC CONVERSION

To convert the Model 3300 to 220 volt operation, perform the following steps:

1. Remove the top cover.
2. Orient the Model 3300 so that the front panel is facing to the right of the viewer.
3. Locate TB 1, see Figure 14, the terminal strip near the transformer.
4. Remove the jumper connecting pins 3 and 4 (counting from the rear of the Model 3300) and the jumper connecting pins 5 and 6, of TB 1.
5. Connect a jumper across pins 4 and 5 of TB 1.
6. Re-attach the top cover.
7. Attach to the Model 3300, the labels included in the 220 volt conversion kit, Marantz Part No. 104-1002-1.

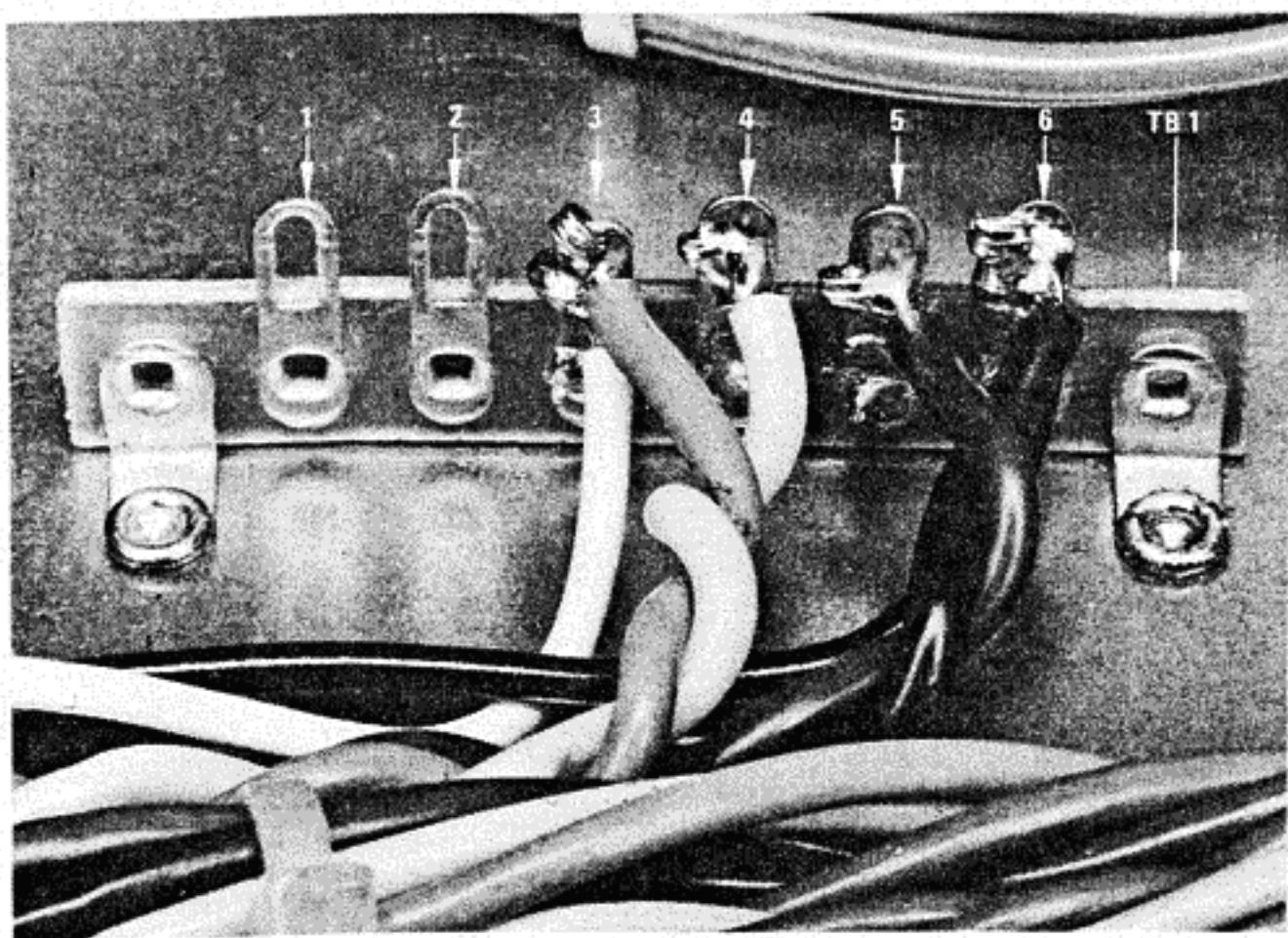


Figure 38 Primary Power Wiring (TB-1)

PHONO BOARD ADJUSTMENT

The bias adjust potentiometers, R235 and R214 (refer to Figure 15), are adjusted for the proper D.C. operating point of the Phono Amplifier. The adjustment is made as follows:

1. Select PHONO 1 input and insert a 20Hz, 3mV signal into both channels.
2. Set VOLUME Control to minimum (CCW).
3. Set MODE switch to Stereo.
4. Take output from TAPE 2/SCOPE OUT jacks to the distortion analyzer.
5. Adjust R235 for minimum 20Hz distortion of the left channel and R214 for the right channel.

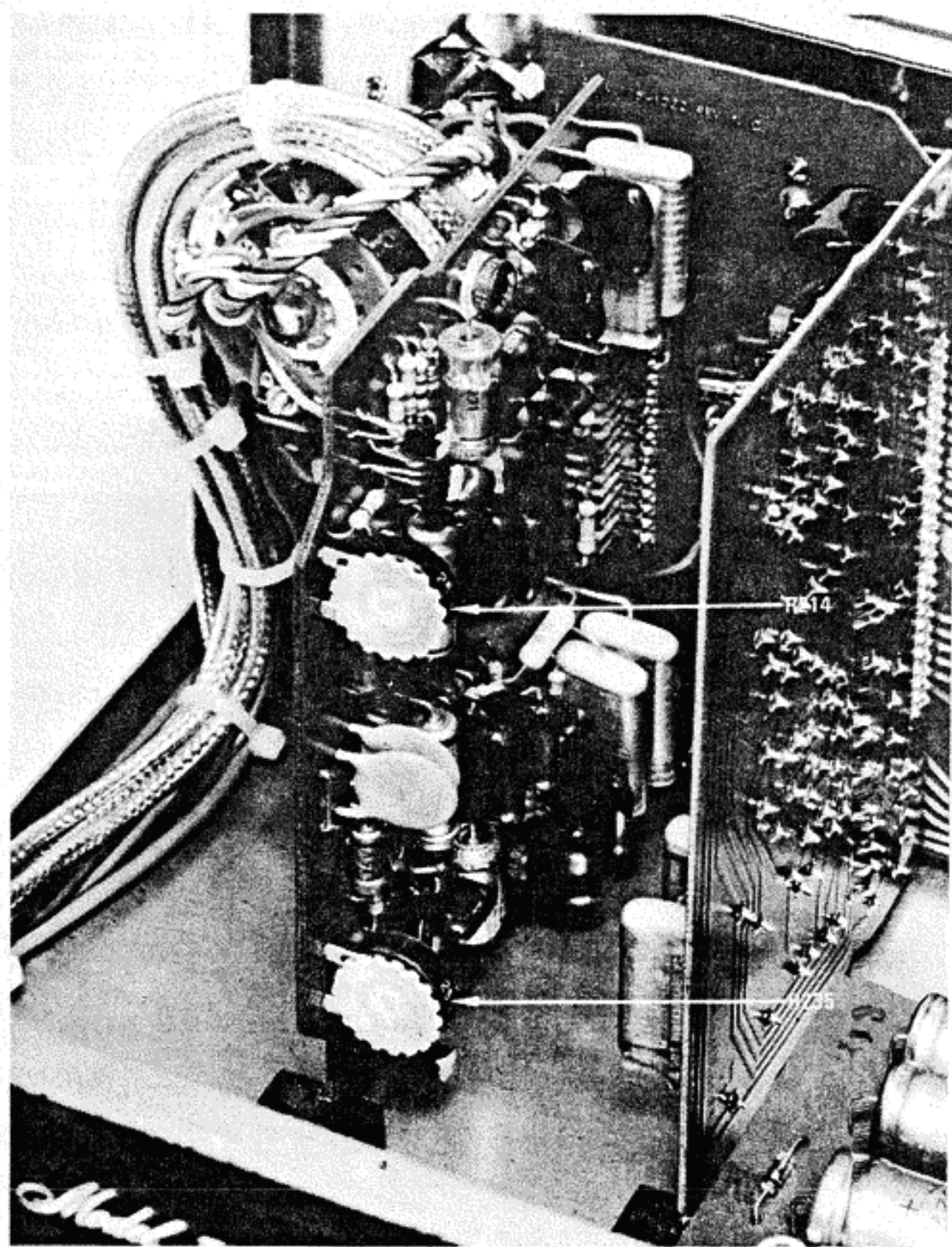


Figure 39 Phono Amp Adjustment

PARTS LIST

Reference Designation	Description and/or Remarks	Marantz Part Number
A1	INTERCONNECT BOARD COMPONENT ASSEMBLY	200-1032-100
	Circuit Board	125-1032-000
	Female Connector, 16 Pin	360-1019-000
	Female Connector, 13 Pin	360-1020-000
	Female Connector, 12 Pin	360-1021-000
	Bracket, Tone Pot Mounting	132-1019-100
C101	Cap. 520 PFD $\pm 10\%$, 100V	385-1069-000
C102	Cap. .15 MFD $\pm 20\%$, 250V	386-1022-000
C103	Cap. 520 PFD $\pm 10\%$, 100V	385-1069-000
C104	Cap. .15 MFD $\pm 20\%$, 250V	386-1022-000
R101	Res. C/F, 33K $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R102	Res. C/F, 1K $\pm 5\%$, $\frac{1}{4}W$	434-4102-000
R103	Res. C/F, 1K $\pm 5\%$, $\frac{1}{4}W$	434-4102-000
R104	Res. C/F, 33K $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R105	Res. Variable, Tandem 25K	420-1022-000
R106	Res. Variable, Tandem 50K	420-1023-000
R107	Res. C/F, 12K $\pm 5\%$, $\frac{1}{4}W$	434-5122-000
R108	Res. C/F, 2.7K $\pm 5\%$, $\frac{1}{2}W$	433-4272-000
R109	Res. C/F, 12K $\pm 5\%$, $\frac{1}{4}W$	434-5122-000
R110	Res. C/F, 2.7K $\pm 5\%$, $\frac{1}{2}W$	433-4272-000
R111	Res. Variable, 100K	420-1021-100
R112	Res. Variable, 100K	420-1021-100
R113	Res. Variable, 100K	420-1021-100
R114	Res. Variable, 100K	420-1021-100
S101	Switch, Rotary (Mode)	453-1014-000
S102	Switch, Rotary (Tone)	453-1015-000
S103	Switch, Rotary (Filter)	453-1016-000
S104	Switch, Rotary (Filter)	453-1016-000

Reference Designation	Description and/or Remarks	Marantz Part Number
A2	PHONO AMPLIFIER BOARD COMPONENT ASSEMBLY	200-1033-100
	Circuit Board	125-1033-000
	Male Connector Pin - "F" Post	360-1025-000
C201	Cap. 3600 PFD $\pm 5\%$, 100V	385-1057-000
C202	Cap. 1100 PFD $\pm 5\%$, 100V	385-1058-000
C203	Cap. 1.0 MFD $\pm 20\%$, 250V	386-1008-000
C204	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C205	Cap. Elect. 10 MFD, 25V	381-1034-000
C206	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C207	Cap. 680 PFD $\pm 5\%$, 100V	385-1042-000
C208	Cap. 210 PFD $\pm 10\%$, 100V	385-1063-000
C209	Cap. Elect. 100 MFD, 10V	381-1031-000
C210	Cap. Elect. 220 MFD, 6.3V	381-1044-000
C211	Cap. 1.0 MFD $\pm 20\%$, 250V	386-1008-000
C212	Cap. 39 PFD $\pm 10\%$, 100V	385-1053-000
C213	Cap. 3600 PFD $\pm 5\%$, 100V	385-1057-000
C214	Cap. 1100 PFD $\pm 5\%$, 100V	385-1058-000
C215	Cap. 1.0 MFD $\pm 20\%$, 250V	386-1008-000
C216	Cap. 1600 PFD $\pm 10\%$, 100V	385-1044-000
C217	Cap. Elect. 10 MFD, 25V	381-1034-000
C218	Cap. 39 PFD $\pm 10\%$, 100V	385-1053-000
C219	Cap. Elect. 100 MFD, 10V	381-1031-000
C220	Cap. 210 PFD $\pm 10\%$, 100V	385-1063-000

Reference Designation	Description and/or Remarks	Marantz Part Number
C221	Cap. 680 PFD $\pm 5\%$, 100V	385-1042-000
C222	Cap. Elect. 220 MFD, 6.3V	381-1044-000
C223	Cap. 1600 PFD $\pm 10\%$, 100V	385-1044-000
C224	Cap. 1.0 MFD $\pm 20\%$, 250V	386-1008-000
C225	Cap. 1600 PFD $\pm 10\%$, 100V	385-1044-000
C226	Cap. 1600 PFD $\pm 10\%$, 100V	385-1044-000
CR201	Diode, Rectifier	460-1004-000
CR202	Diode, Rectifier	460-1004-000
R201	Res. Prec. 91K $\pm 1\%$, $\frac{1}{4}W$	431-5910-000
R202	Res. C/F, 2.2 Meg $\pm 10\%$, $\frac{1}{4}W$	434-7223-000
R203	Res. Prec. 68K $\pm 1\%$, $\frac{1}{4}W$	431-5680-000
R204	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{2}W$	439-1013-000
R205	Res. C/F, 2.2K $\pm 5\%$, $\frac{1}{4}W$	434-4222-000
R206	Res. Prec. 100K $\pm 2\%$, $\frac{1}{4}W$	431-6101-000
R207	Res. C/F, 18K $\pm 5\%$, $\frac{1}{4}W$	434-5182-000
R208	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R209	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R210	Res. Prec. 680 ohm $\pm 1\%$, $\frac{1}{4}W$	431-3680-000
R211	Res. C/F, 200 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3202-000
R212	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{2}W$	439-1013-000
R213	Res. C/F, 1 Meg $\pm 5\%$, $\frac{1}{4}W$	434-7102-000
R214	Res. Variable, 25K, $\frac{1}{4}W$	420-1024-000
R215	Res. C/F, 100 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000
R216	Res. C/F, 27K $\pm 5\%$, $\frac{1}{4}W$	434-5272-000
R217	Res. C/F, 100 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000
R218	Res. C/F, 3.9K $\pm 5\%$, $\frac{1}{4}W$	434-4392-000

Reference Designation	Description and/or Remarks	Marantz Part Number
R219	Res. C/F, 150 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3152-000
R220	Res. C/F, 47K $\pm 5\%$, $\frac{1}{4}W$	434-5472-000
R221	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{2}W$	439-1013-000
R222	Res. C/F, 2.2 Meg $\pm 10\%$, $\frac{1}{4}W$	434-7223-000
R223	Res. Prec. 91K $\pm 1\%$, $\frac{1}{4}W$	431-5910-000
R224	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{4}W$	439-1013-000
R225	Res. Prec. 68K $\pm 1\%$, $\frac{1}{4}W$	431-5680-000
R226	Res. Prec. 100K $\pm 2\%$, $\frac{1}{2}W$	431-6101-000
R227	Res. C/F, 2.2K $\pm 5\%$, $\frac{1}{4}W$	434-4222-000
R228	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R229	Res. C/F, 18K $\pm 5\%$, $\frac{1}{4}W$	434-5182-000
R230	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R231	Res. Prec. 680 ohm $\pm 1\%$, $\frac{1}{4}W$	431-3680-000
R232	Res. C/F, 1 Meg $\pm 5\%$, $\frac{1}{4}W$	434-7102-000
R233	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{2}W$	439-1013-000
R234	Res. C/F, 200 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3202-000
R235	Res. Variable, 25K, $\frac{1}{4}W$	420-1024-000
R236	Res. C/F, 27K $\pm 5\%$, $\frac{1}{4}W$	434-5272-000
R237	Res. C/F, 100 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000
R238	Res. C/F, 100 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000
R239	Res. C/F, 3.9K $\pm 5\%$, $\frac{1}{4}W$	434-4392-000
R240	Res. C/F, 150 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3152-000
R241	Res. C/F, 47K $\pm 5\%$, $\frac{1}{4}W$	434-5472-000
R242	Res. Prec. 1.1 Meg $\pm 2\%$, $\frac{1}{2}W$	439-1013-000
R243	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000
R244	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3102-000

Reference Designation	Description and/or Remarks	Marantz Part Number
Q201	Transistor, NPN	462-1038-100
Q202	Transistor, NPN	462-1038-100
Q203	Transistor, PNP	461-1013-000
Q204	Transistor, NPN	462-1016-000
Q205	Transistor, NPN	462-1038-100
Q206	Transistor, NPN	462-1038-100
Q207	Transistor, PNP	461-1013-000
Q208	Transistor, NPN	462-1016-000

Reference Designation	Description and/or Remarks	Marantz Part Number
A3	TIMES TEN AMPLIFIER BOARD COMPONENT ASSEMBLY	200-1022-100
	Circuit Board	125-1025-000
	Male Connector Pin - "F" Post	360-1025-000
C401	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C402	Cap. Elect. 1 MFD, 63V	381-1036-000
C403	Cap. Elect. 1 MFD $\pm 10\%$, 35V	381-1055-000
C404	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C405	Cap. Elect. 47 MFD, 10V	381-1037-000
C406	Cap. 680 PFD $\pm 5\%$, 100V	385-1042-000
C407	Cap. Elect. 1 MFD $\pm 10\%$, 35V	381-1055-000
C408	Cap. 2000 PFD $\pm 10\%$, 100V	385-1046-000
C409	Cap. 1100 PFD $\pm 5\%$, 100V	385-1058-000
C410	Cap. Elect. 100 MFD, 10V	381-1031-000
C411	Cap. 100 PFD $\pm 10\%$, 100V	385-1041-000
C412	Cap. Elect. 2.2 MFD, 40V	381-1038-000
C413	Cap. Elect. 1 MFD, 63V	381-1036-000
C414	Cap. Elect. 1 MFD $\pm 10\%$, 35V	381-1055-000
C415	Cap. Elect. 47 MFD, 10V	381-1037-000

Reference Designation	Description and/or Remarks	Marantz Part Number
C416	Cap. 1100 PFD $\pm 5\%$, 100V	381-1058-000
C417	Cap. Elect. 1 MFD $\pm 10\%$, 35V	381-1055-000
C418	Cap. 680 PFD $\pm 5\%$, 100V	385-1042-000
C419	Cap. 2000 PFD $\pm 10\%$, 100V	385-1046-000
C420	Cap. 100 PFD $\pm 10\%$, 100V	385-1041-000
C421	Cap. Elect. 100 MFD, 10V	381-1031-000
C422	Cap. Elect. 2.2 MFD, 40V	381-1038-000
CR401	Diode, Rectifier	460-1009-000
CR402	Diode, Rectifier	460-1009-000
R401	Res. C/F, 2.2K $\pm 5\%$, $\frac{1}{2}W$	433-4222-000
R402	Res. C/F, 270K $\pm 5\%$, $\frac{1}{2}W$	433-6272-000
R403	Res. C/F, 33K $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R404	Res. C/F, 7.5K $\pm 5\%$, $\frac{1}{4}W$	434-4752-000
R405	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R406	Res. C/F, 33K, $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R407	Res. Prec. 1.5K $\pm 1\%$, $\frac{1}{4}W$	431-4150-000
R408	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{2}W$	433-2302-000
R409	Res. Prec. 15K $\pm 1\%$, $\frac{1}{4}W$	431-5150-000
R410	Res. C/F, 56 ohm $\pm 5\%$, $\frac{1}{2}W$	433-2562-000
R411	Res. C/F, 2.7K $\pm 5\%$, $\frac{1}{4}W$	434-4272-000
R412	Res. C/F, 200 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3202-000
R413	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2302-000
R414	Res. C/F, 2.2K $\pm 5\%$, $\frac{1}{4}W$	434-4222-000
R415	Res. C/F, 33K $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R416	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R417	Res. C/F, 7.5K $\pm 5\%$, $\frac{1}{4}W$	434-4752-000
R418	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R419	Res. C/F, 33K, $\pm 5\%$, $\frac{1}{4}W$	434-5332-000
R420	Res. Prec. 1.5K $\pm 1\%$, $\frac{1}{4}W$	431-4150-000
R421	Res. C/F, 200 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3202-000
R422	Res. Prec. 15K $\pm 1\%$, $\frac{1}{4}W$	431-5150-000

Reference Designation	Description and/or Remarks	Marantz Part Number
R423	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2302-000
R424	Res. C/F, 200 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3202-000
R425	Res. C/F, 2.7K, $\pm 5\%$, $\frac{1}{4}W$	434-4272-000
R426	Res. C/F, 56 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2562-000
Q401	Transistor, NPN	462-1038-200
Q402	Transistor, NPN	462-1038-200
Q403	Transistor, PNP	461-1013-000
Q404	Transistor, NPN	462-1038-200
Q405	Transistor, NPN	462-1038-200
Q406	Transistor, PNP	461-1013-000

Reference Designation	Description and/or Remarks	Marantz Part Number
A4	TONE AMPLIFIER BOARD COMPONENT ASSEMBLY	200-1023-100
	Circuit Board	125-1026-000
	Male Connector Pin "F" Post	360-1025-000
C301	Cap. Elect. 1 MFD, 63V	381-1036-000
C302	Cap. .033 MFD $\pm 20\%$, 100V	385-1022-000
C303	Cap. .033 MFD $\pm 20\%$, 100V	385-1022-000
C304	Cap. .001 MFD $\pm 10\%$, 100V	385-1023-000
C305	Cap. 82 PFD $\pm 10\%$, 100V	385-1065-000
C306	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C307	Cap. 680 MFD $\pm 5\%$, 100V	385-1042-000
C308	Cap. Elect. 10 MFD, 25V	381-1034-000
C309	Cap. 1 MFD $\pm 20\%$, 250V	386-1008-000
C310	Cap. .03 MFD $\pm 20\%$, 100V	383-1002-000
C311	Cap. Elect. 1 MFD, 63V	381-1036-000
C312	Cap. .033 MFD $\pm 20\%$, 100V	385-1022-000
C313	Cap. .033 MFD $\pm 20\%$, 100V	385-1022-000

Reference Designation	Description and/or Remarks	Marantz Part Number
C314	Cap. .001 MFD $\pm 10\%$, 100V	385-1023-000
C315	Cap. 82 PFD $\pm 10\%$, 100V	385-1065-000
C316	Cap. 680 PFD $\pm 5\%$, 100V	385-1042-000
C317	Cap. Elect. 10 MFD, 25V	381-1034-000
C318	Cap. 1 MFD $\pm 20\%$, 250V	386-1008-000
R301	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R302	Res. C/F, 18K $\pm 5\%$, $\frac{1}{4}W$	434-5182-000
R303	Res. C/F, 10K $\pm 5\%$, $\frac{1}{4}W$	434-5102-000
R304	Res. C/F, 18K $\pm 5\%$, $\frac{1}{2}W$	433-5182-000
R305	Res. C/F, 10K $\pm 5\%$, $\frac{1}{4}W$	434-5102-000
R306	Res. C/F, 27K $\pm 5\%$, $\frac{1}{2}W$	433-5272-000
R307	Res. C/F, 1 Meg $\pm 5\%$, $\frac{1}{4}W$	434-7102-000
R308	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R309	Res. C/F, 7.5K $\pm 5\%$, $\frac{1}{4}W$	434-4752-000
R310	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{2}W$	434-2302-000
R311	Res. C/F, 39K $\pm 5\%$, $\frac{1}{4}W$	434-5392-000
R312	Res. C/F, 56 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2562-000
R313	Res. C/F, 2.7K $\pm 5\%$, $\frac{1}{4}W$	434-4272-000
R314	Res. C/F, 300 ohm $\pm 5\%$, $\frac{1}{2}W$	433-3302-000
R315	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R316	Res. C/F, 270K $\pm 5\%$, $\frac{1}{4}W$	434-6272-000
R317	Res. C/F, 10K $\pm 5\%$, $\frac{1}{4}W$	434-5102-000
R318	Res. C/F, 18K $\pm 5\%$, $\frac{1}{4}W$	434-5182-000
R319	Res. C/F, 10K $\pm 5\%$, $\frac{1}{4}W$	434-5102-000
R320	Res. C/F, 18K $\pm 5\%$, $\frac{1}{4}W$	434-5182-000
R321	Res. C/F, 27K $\pm 5\%$, $\frac{1}{4}W$	434-5272-000
R322	Res. C/F, 1 Meg $\pm 5\%$, $\frac{1}{4}W$	434-7102-000
R323	Res. C/F, 22K $\pm 5\%$, $\frac{1}{4}W$	434-5222-000
R324	Res. C/F, 7.5K $\pm 5\%$, $\frac{1}{4}W$	434-4752-000
R325	Res. C/F, 39K $\pm 5\%$, $\frac{1}{4}W$	434-5392-000
R326	Res. C/F, 30 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2302-000
R327	Res. C/F, 2.7K $\pm 5\%$, $\frac{1}{4}W$	434-4272-000
R328	Res. C/F, 56 ohm $\pm 5\%$, $\frac{1}{4}W$	434-2562-000
R329	Res. C/F, 270K $\pm 5\%$, $\frac{1}{2}W$	433-6272-000
R330	Res. C/F, 300 ohm $\pm 5\%$, $\frac{1}{4}W$	434-3302-000

Reference Designation	Description and/or Remarks	Marantz Part Number
Q301	Transistor, NPN	462-1038-300
Q302	Transistor, NPN	462-1038-300
Q303	Transistor, PNP	461-1013-000
Q304	Transistor, NPN	462-1038-300
Q305	Transistor, NPN	462-1038-300
Q306	Transistor, PNP	461-1013-000

Reference Designation	Description and/or Remarks	Marantz Part Number
A7	POWER SUPPLY BOARD COMPONENT ASSEMBLY	200-1025-300
	Circuit Board	125-1012-100
C601	Cap. Elect. 470 MFD, 40V	381-1022-000
C602	Cap. Elect. 470 MFD, 40V	381-1022-000
C603	Cap. Elect. 470 MFD, 40V	381-1022-000
C604	Cap. Elect. 100 MFD, 40V	381-1013-000
C605	Cap. Elect. 100 MFD, 40V	381-1013-000
C606	Cap. Elect. 470 MFD, 40V	381-1022-000
C607	Cap. Elect. 470 MFD, 40V	381-1022-000
C608	Cap. Elect. 470 MFD, 40V	381-1022-000
C609	Cap. Elect. 680 MFD, 16V	381-1008-000
C610	Cap. Elect. 680 MFD, 16V	381-1008-000
C611	Cap. Elect. 680 MFD, 16V	381-1008-000
C612	Cap. Elect. 680 MFD, 16V	381-1008-000
CR601	Diode	460-1013-000
CR602	Diode	460-1013-000
CR603	Diode	460-1013-000
CR604	Diode	460-1013-000
CR605	Diode, Zener	459-1001-000
CR606	Diode, Zener	459-1001-000

Reference Designation	Description and/or Remarks	Marantz Part Number
R601	Res. C/F, 10 ohm \pm 5%, $\frac{1}{2}$ W	433-2102-000
R602	Res. C/F, 10 ohm \pm 5%, $\frac{1}{2}$ W	433-2102-000
R603	Res. C/F, 10 ohm \pm 5%, $\frac{1}{2}$ W	433-2102-000
R604	Res. C/F, 10 ohm \pm 5%, $\frac{1}{2}$ W	433-2102-000
R605	Res. C/F, 240 ohm \pm 5%, $\frac{1}{2}$ W	433-3242-000
R606	Res. C/F, 750 ohm \pm 5%, $\frac{1}{2}$ W	433-3752-000
R607	Res. C/F, 750 ohm \pm 5%, $\frac{1}{2}$ W	433-3752-000
R608	Res. C/F, 240 ohm \pm 5%, $\frac{1}{2}$ W	433-3242-000
R609	Res. C/F, 200 ohm \pm 5%, $\frac{1}{2}$ W	433-3202-000
R610	Res. C/F, 200 ohm \pm 5%, $\frac{1}{2}$ W	433-3202-000
R611	Res. C/F, 120 ohm \pm 5%, $\frac{1}{2}$ W	433-3122-000
R612	Res. C/F, 120 ohm \pm 5%, $\frac{1}{2}$ W	433-3122-000
Q601	Transistor, NPN	462-1019-000
Q602	Transistor, PNP	461-1014-000

Reference Designation	Description and/or Remarks	Marantz Part Number
	Chassis Assembly	
	Panel, Front Dress	134-1028-100
	Shield, Front Panel	136-1022-000
	Cover, Top	136-1025-000
	Spacer, Control	168-1007-000
	Lens, Light	170-1002-000
	Knob, Selector	174-1001-000
	Knob, Control	174-1002-000
	Knob Assembly, Blade	174-1004-100
	Knob Assembly, Pushbutton	174-1011-100
	Keeper, Circuit Board	132-1020-100
	Chassis, Base	133-1010-000
	Foot, Plastic	567-1000-000
	Shield, Speaker Switch	136-1029-000

Reference Designation	Description and/or Remarks	Marantz Part Number
	Chassis, Rear, Marked	133-1008-100
	Shield, Lamp	483-1000-000
	Bracket, Switch Mounting	132-1026-000
	Rear Panel Circuit Board Component Assembly	200-1034-100
	Chassis, Front	133-1009-000
C1	Cap. 330 PFD $\pm 10\%$, 100V	385-1062-000
C2	Cap. 330 PFD $\pm 10\%$, 100V	385-1062-000
C3	Cap. .01 MFD $+80\%$, 1400V -20%	383-1006-000
C4	Cap. .01 MFD $+80\%$, 1400V -20%	383-1006-000
C5	Cap. .01 MFD $+80\%$, 1400V -20%	383-1006-000
DS1	Lamp, Miniature Bayonet	482-1003-000
E1	Binding Post (w/Mounting Hardware)	359-1004-000
F1	Fuse $\frac{1}{2}$ Amp, 250V	451-1016-000
J1	Phone Jack, Single Closed Circuit	360-1028-000
J7	Phone Jack, Single Closed Circuit	360-1028-000
J23	Connector Receptacle (DIN)	360-1016-000
J25	A.C. Outlet, Accessory	360-1001-000
J26	A.C. Outlet, Accessory	360-1001-000
J27	A.C. Outlet, Accessory	360-1001-000
J28	Phone Jack, Double Closed Circuit (w/Mounting Hardware)	360-1004-000
J29	Phone Jack, Double Open Circuit (w/Mounting Hardware)	360-1005-000
J30	Phone Jack, Double Open Circuit (w/Mounting Hardware)	360-1005-000
J31	A.C. Outlet, Accessory	360-1001-000
J32	A.C. Outlet, Accessory	360-1001-000
R1	Res. C/F, 56K, $\pm 5\%$, $\frac{1}{4}$ W	434-5562-000
R2	Res. C/F, 56K $\pm 5\%$, $\frac{1}{4}$ W	434-5562-000
R3	Res. C/F, 56K $\pm 5\%$, $\frac{1}{4}$ W	434-5562-000
R4	Res. C/F, 56K $\pm 5\%$, $\frac{1}{4}$ W	434-5562-000

Reference Designation	Description and/or Remarks	Marantz Part Number
R5	Res. C/F, 100K $\pm 5\%$, $\frac{1}{4}$ W	434-6102-000
R6	Res. C/F, 100K $\pm 5\%$, $\frac{1}{4}$ W	434-6102-000
R7	Res. Variable, 100K	420-1015-000
R8	Res. C/F, 22K $\pm 5\%$, $\frac{1}{2}$ W	433-5222-000
R9	Res. C/F, 22K $\pm 5\%$, $\frac{1}{2}$ W	433-5222-000
R10	Res. C/C, 120 ohm $\pm 5\%$, 1W	423-3122-000
R11	Res. C/C, 120 ohm $\pm 5\%$, 1W	423-3122-000
R12	Res. W/W, 1 ohm $\pm 10\%$, 2W	436-1103-000
R13	Res. W/W, 1 ohm $\pm 10\%$, 2W	436-1103-000
S1	Switch, Rotary (Selector)	453-1018-000
S2/S3	Switch, Pushbutton, 2 Station	452-1007-000
S4	Switch, Slide, DPDT	452-1002-000
S5	Switch, Pushbutton (DPDT)	452-1008-000
S6	Switch, Rotary (Speaker)	453-1003-000
T1	Transformer, Power	440-1009-000
TB1	Terminal Strip	362-1007-000
TB2	Terminal Block	362-1002-000
TB3	Terminal Block	362-1002-000
TB4	Terminal Block	362-1002-000
TB5	Terminal Strip	362-1008-000
XDS1	Socket Assembly, Light	481-1002-000
XF1	Fuse Holder (w/Mounting Hardware)	367-1001-000

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