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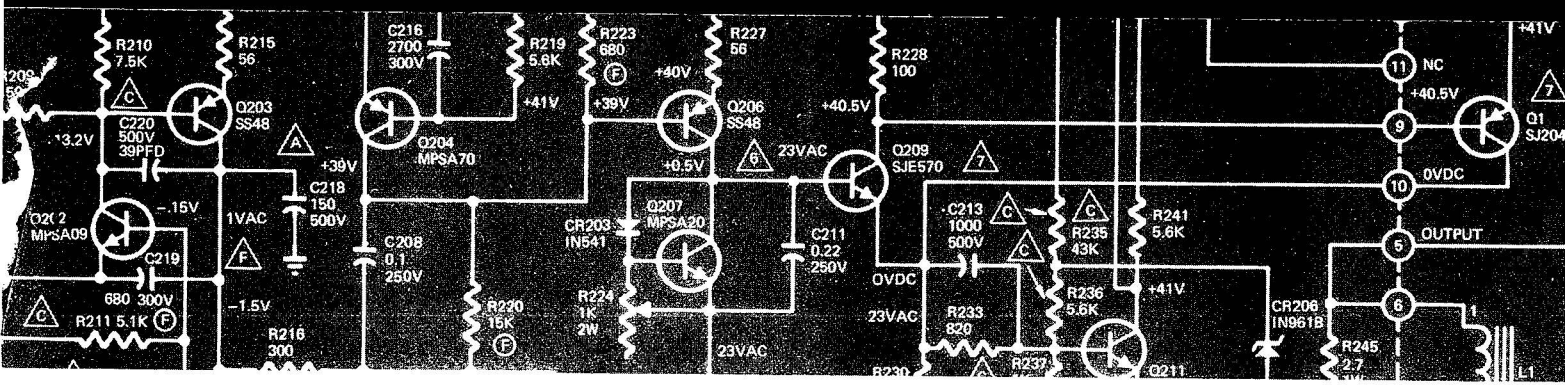
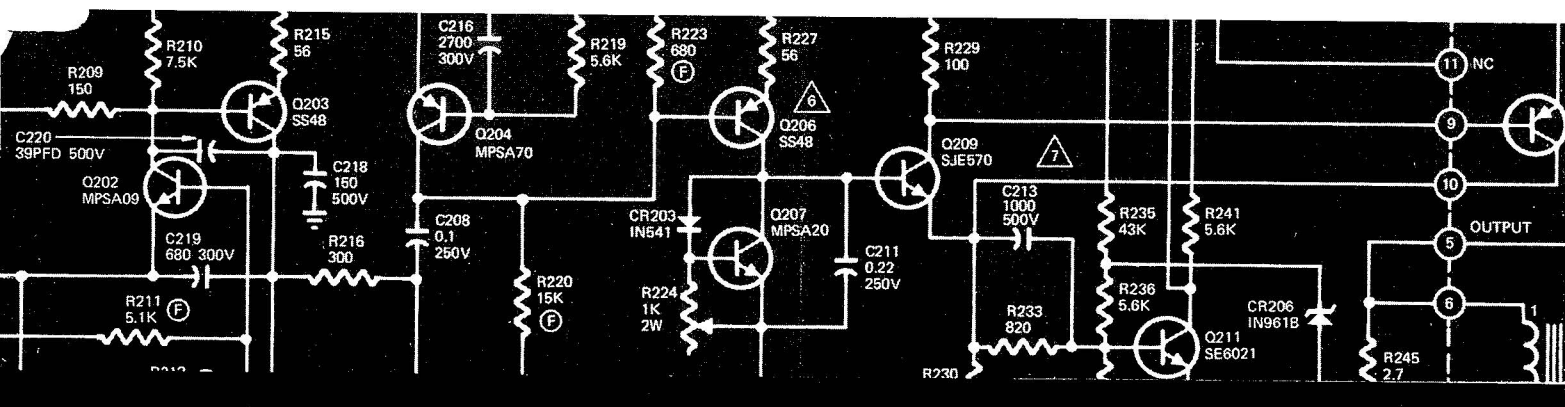
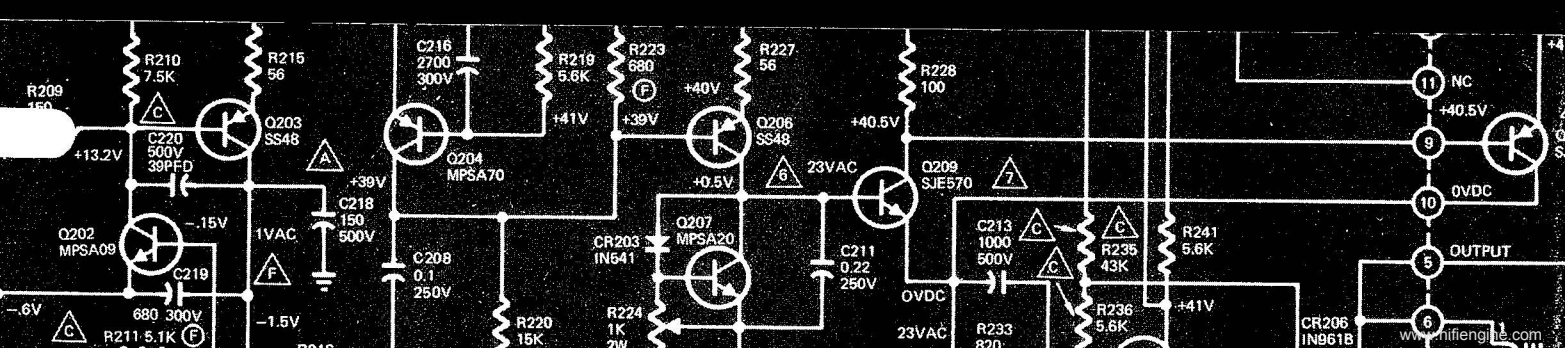


model thirty

SERVICE MANUAL 30



Stereo Console Amplifier



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INTRODUCTION

This service manual is intended for use by authorized warranty stations. The manual contains service information for the Marantz Model 30 Stereo Console Amplifier, manufactured by the Marantz Company, a subsidiary of Superscope Incorporated, Sun Valley, California 91352.

Adjustment, maintenance, and troubleshooting information listed herein should be attempted only by the experienced technician, one 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 remedies) listed in the troubleshooting 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 Service Manager at our Sun Valley location.

CIRCUIT DESCRIPTION

The following circuit description will be based on Channel A only. Both channels of the BALANCE and VOLUME controls, TONE CONTROL switch, and DUBBING IN and DUBBING OUT jacks function simultaneously; thus, both channels will be shown in diagrams. HIGH and LOW filter switches are ganged for both channels, but only channel A will be shown.

PRE-AMPLIFIER

Program source signals from the 6 jacks (3 low level and 3 high level) on the rear panel are supplied to the SELECTOR switch, Figure 1. The 3 low-level inputs are applied to the low-level amplifier. A section of the SELECTOR switch selects the appropriate (NAB, RIAA) equalization network. The low-level amplifier comprises a single-ended differential amplifier (Q101, Q102), an inverter (Q103), and an emitter-follower (Q104). This amplifier provides a gain of 40dB. The output of the low-level amplifier is applied to another section of the SELECTOR switch.

This section of the SELECTOR switch applies either the output of the low-level amplifier or one of the high-level inputs to the TAPE MONITOR switch and the TAPE OUT jacks.

The TAPE MONITOR switch applies either the TAPE IN or program source signals to the DUBBING IN jack. This jack contains a built-in switch which disconnects the program source signals when a plug is inserted into the jack. The signal from the DUBBING IN jack is applied to the MODE switch. This switch applies A/B (mono), STEREO, or STEREO REVERSE signals to the BALANCE control.

The BALANCE control is a full range control that permits full attenuation of either channel without affecting the other channel. The output of this control is applied to the VOLUME control. This precision tracking control maintains the stereo balance dictated by the BALANCE control within 2dB from maximum to 50dB from maximum. The output of the VOLUME control is applied to the pre-amplifier (X10 amplifier).

The X10 amplifier, Figure 2, comprises a single-ended differential amplifier (Q105, Q106) and an inverter (Q107). The frequency response of the X10 amplifier is affected by the high and low filters. These filters are controlled by the three position HIGH and LOW filter switches. The filter outputs are applied as negative feedback to Q106. The filters effect on the frequency response of the unit is shown in Figure 3. The X10 amplifier

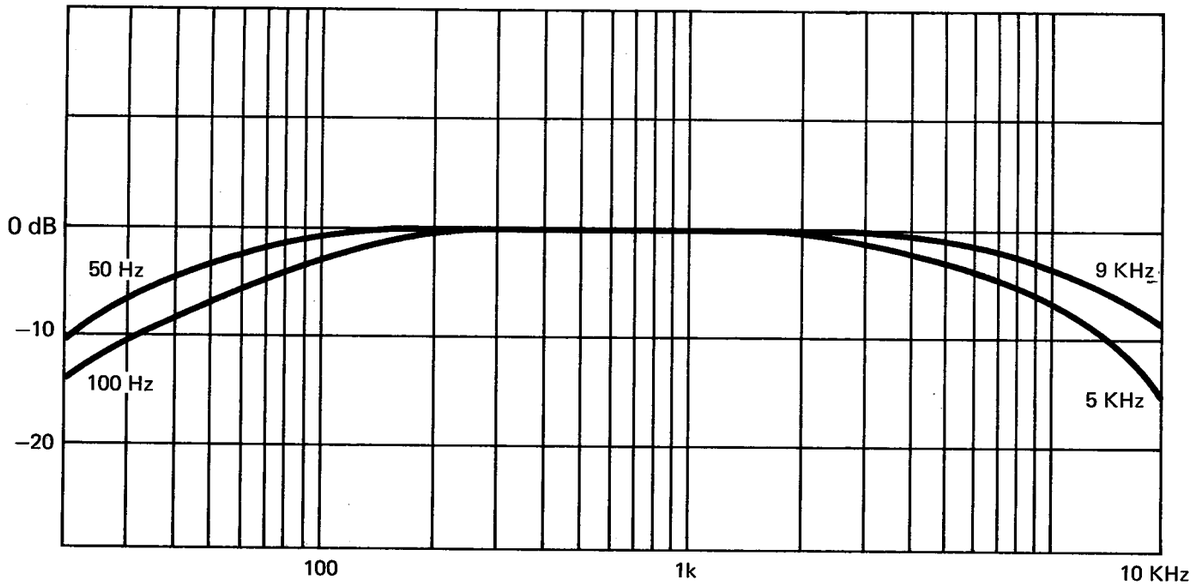


Figure 3. Filter Response Curve.

provides a gain of 20dB. The output of the X10 amplifier is applied to the TONE CONTROL switch and the tone amplifier.

With the TONE CONTROL switch set to OUT, the output of the X10 amplifier is applied directly to the PRE-AMP OUT and DUBBING OUT jacks.

The unity gain tone amplifier, Figure 4, comprises a single-ended differential amplifier (Q108, Q109) and an inverter (Q110). The frequency response of the tone amplifier is adjusted by the BASS and TREBLE controls. The frequency response curves for each 2dB of adjustment are shown in Figure 6.

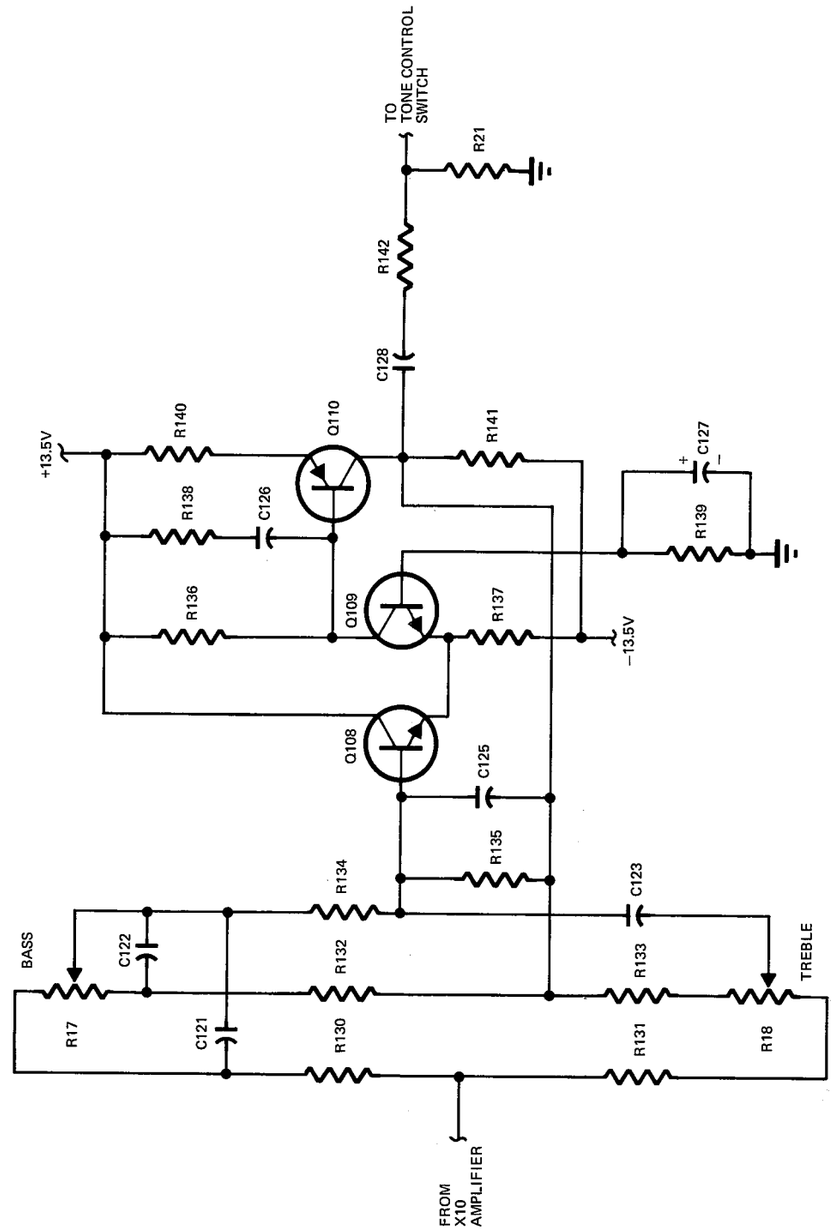


Figure 4. Tone Amplifier Simplified Schematic.

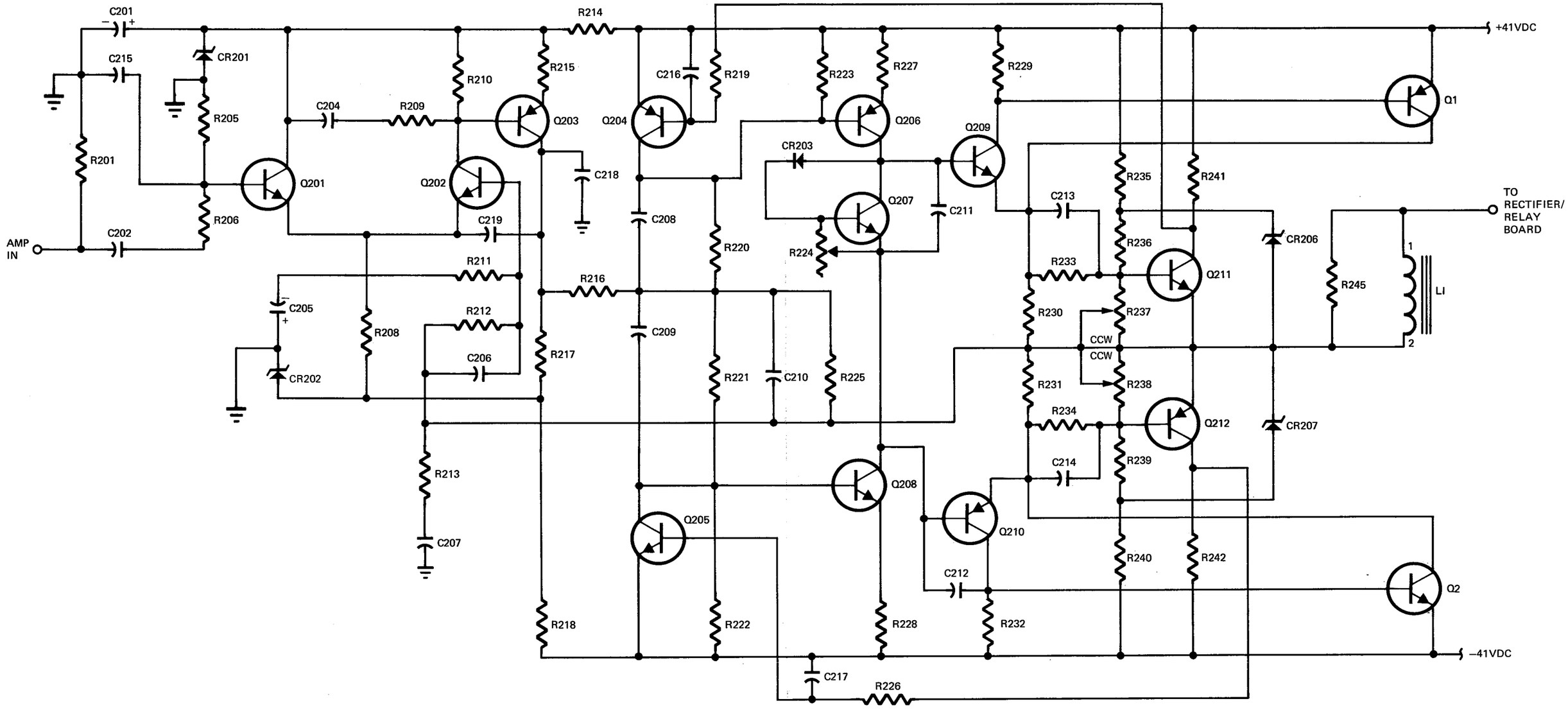


Figure 5. Amplifier Simplified Schematic.

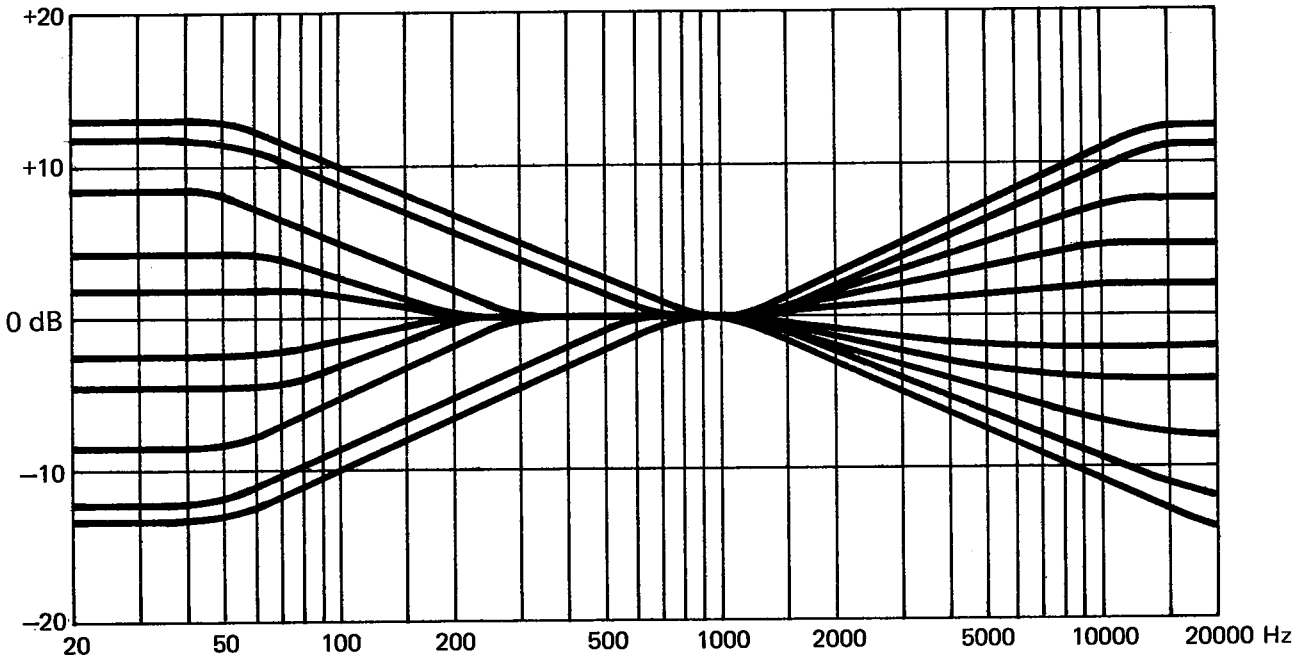


Figure 6. Tone Control Response Curves.

AMPLIFIER

The PRE-AMP OUT jack is connected to the AMP IN jack with external jumper. The input stage of the amplifier, Figure 5, comprises a differential amplifier (Q201, Q202), and an inverter. The inverter output is applied to the pre-drivers (Q206, Q208). DC balance between the two pre-drivers is maintained by the dynamic bias network comprising Q207, CR203, R224, and C211.

The output of the pre-drivers is applied to their respective drivers (Q209, Q210). The output from the drivers is applied to their respective power transistors (Q1, Q2).

Output current and voltage regulation are accomplished through a complex network. Excessive voltage levels are detected by Zener diodes CR206 and CR207. Excessive current levels are detected by resistors R230 and R231.Voltages developed by these components are applied to voltage-current (E-I) sensors Q211, and Q212.

When excessive levels are detected, Q211 and Q212 develop clipping signals. These signals are applied limiting is accomplished at approximately 70 watts 8 ohms.

Feedback for the amplifier is developed at the junction of R230 and R231. The feedback is applied across two loops. Feedback applied across R225 and C210 completes the amplifier loop. Feedback applied across R212 and C206 completes the loop for the entire power amplifier section.

RECTIFIER-RELAY BOARD

The output of the power amplifier is applied to the wipers of relay K301 on the rectifier relay board, Figure 7. Relay K301 energizes after a minimum delay of two seconds after turn on. The length of the delay is a factor of the time constant of R306, R309, and C302. This delay at turn-on is to prevent any transient surges from reaching the output terminals. Additionally, resistors R302 and R305 sample the audio output signals, should a constant DC level over + 4.5 volts or a high amplitude signal below 10Hz be present, Q301 will turn on, shorting the base of Q303 to ground. C302 begins to discharge and K301 de-energizes. If a constant DC level over -4.5 volts is present, the voltage drop across R304 bucks the voltage present at the base of Q303 and K301 de-energizes. The output from K301 is applied to the SPEAKER select switch. Additionally, it is applied across resistor loads to the CENTER CHANNEL VOLUME CONTROL and to the HEADPHONE jack.

Sixty volts AC is applied to CR301 which develops the +41 and -41 volts for the power amplifier board. CR202 and CR303 develop the positive voltage to energize K301.

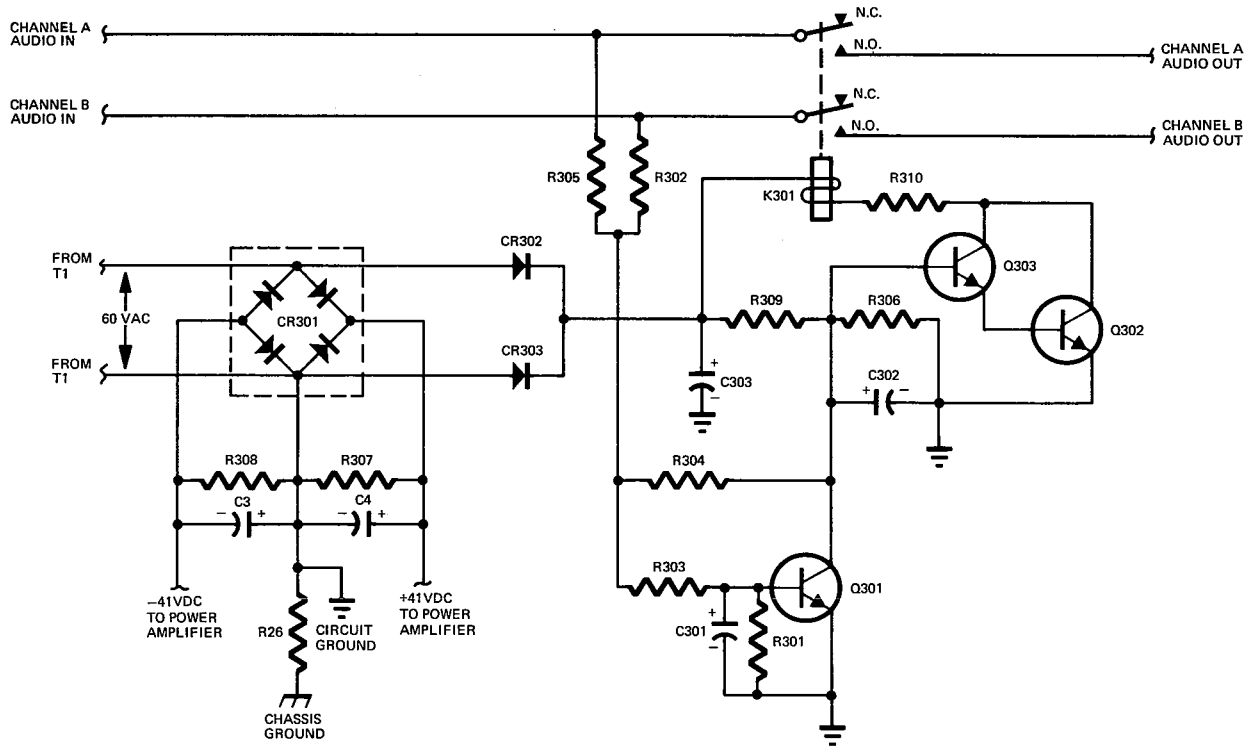


Figure 7. Rectifier/Relay Board Simplified Schematic.

POWER SUPPLY BOARD

The power supply board, Figure 8, supplies nominal +13.5 and -13.5 volts to the low-level amplifier and pre-amplifier/tone amplifier section of the pre-amplifier. Thirty-seven volts is applied to rectifiers CR401, 402, 403, and 404. Positive and negative regulation of the diode bridge output is accomplished by Q401 and Q402 respectively. The voltage reference for these two transistors is supplied by Zener diodes CR405 and CR406.

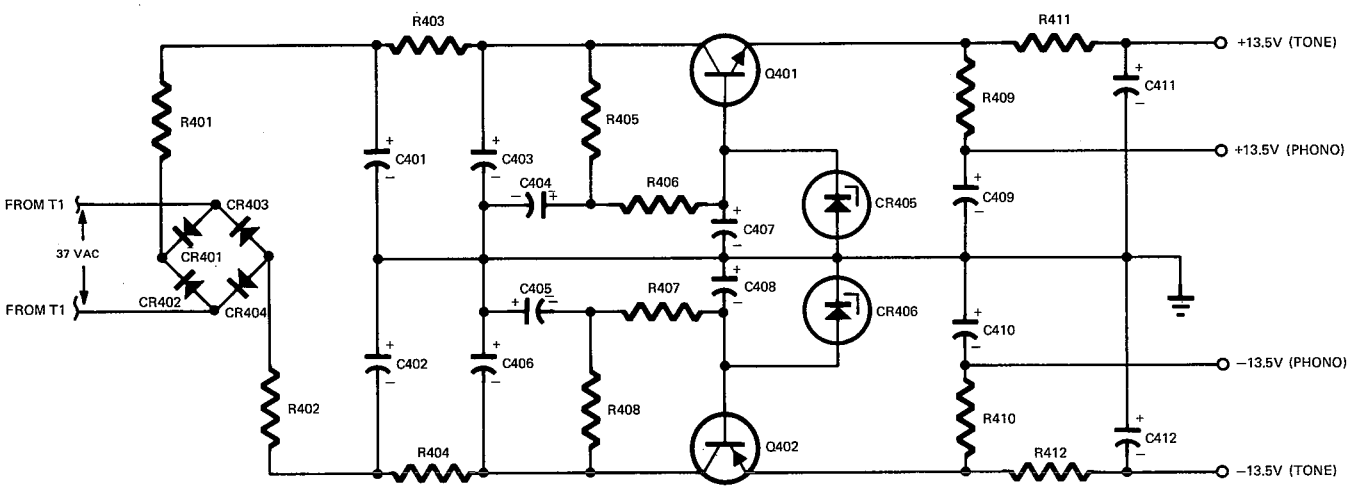


Figure 8. Power Supply Simplified Schematic.

TECHNICAL SPECIFICATIONS

Power Output (each channel, both channels driven, at rated distortion, 20Hz to 20KHz)

Load	RMS	IHF
4 ohms	60W	90W
8 ohms	60W	90W
16 ohms	30W	45W

Total Harmonic Distortion . . . . . at or below rated power,
(including pre-amplifier . . . . . 20HZ to 20 KHz.
less than 0.15%

Intermodulation Distortion . . . . . at or below rated power,
(including pre-amplifier) . . . . . SMPTE, any combination of two frequencies,
20Hz to 20KHz: less than 0.15%

Frequency Response . . . . . +0 -3dB 7Hz to 60KHz,
±.25dB 20Hz to 20KHz

Input Sensitivity and Impedance . . . . . Phono 1.0mV, 47K ohms
High Level . . . . . 100 mV, 100K ohms

Output Level and Impedance (volts RMS)
Tape Recorder . . . . . 5V, 300 ohms

Headphones . . . . . 12V, 10 ohms

Center Channel . . . . . 5V, 300 ohms

Tone Controls (Switch Defeatable) . . . . . Treble ±10dB at 10KHz
Bass ± 10dB at 100Hz

Filters: . . . . .
High Filters . . . . . .5KHz and 9KHz
Low Filters . . . . . 50Hz and 100Hz

GENERAL

Total Noise . . . . . Phono (input loaded & shielded)
2μV equiv. input

Power Requirements . . . . . 120V AC, 250W, 50/60 Hz

Dimensions . . . . . 15-3/8" w. x 5-3/4" h.
x 14" deep

Unit Weight . . . . . .27 pounds

Shipping Weight . . . . . .33 pounds

240-Volt AC Conversion
Split primary windings permit easy conversion from 120-Volt to 240-volt operation.

TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the Model 30 Stereo Console Amplifier. The wattmeter, ac voltmeter, and variac may be assembled as a test fixture as shown schematically in Figure 9, and the load resistors and ac ammeter may be assembled into a second test fixture as shown in Figure 10.

Item	Manufacturer and Model No. (or equivalent)	Use
Distortion Analyzer	Hewlett Packard, Model 331A or 333A	Measures distortion and voltage of amplifier output.
Audio Oscillator	Weston Model CVO-100P (NOTE: Less than 0.02 percent residual distortion is required.)	Sinewave and squarewave signal source.
Oscilloscope	Tektronix, Model 503; Data, Model 555	Waveform analysis and troubleshooting
VTVM	RCA Senior Volt-Ohmyst, Model WV-98C	Voltage and resistance measurements.
AC Wattmeter	Simpson, Model 390	Monitors primary power consumption of amplifier.
AC Ammeter (0 to 10 amps)	Commercial Grade	Monitors amplifier output under short circuit condition.
Line Voltmeter (0 to 150 vac)	Commercial Grade	Monitors potential of primary power to amplifier.
Variable Autotransformer (0 to 140 vac, 10 amps)	Powerstat, Model 116B	Adjusts level of primary power to amplifier.
Shorting Plug	Use phono plug with 600 ohms across center pin and shell.	Shorts amplifier input to eliminate noise pickup.
Power Supply Bleeder Resistor (10 ohms at 1 W)	Commercial Grade	Discharges power supply filter capacitors prior to disassembly or resistance measurements.
Output Load Resistor (8 ±0.5%, 250 W)	Commercial Grade	Provides 8-ohm load for amplifier output termination.
Output Load Resistor (4 ±0.5%, 250 W)	Commercial Grade	Provides 4-ohm load for amplifier output termination.
Output Load Capacitor (0.5 mfd)	Mylar	Provides capacitive load for instability checks.
AC Power Control Box	Optional Item. Fabricate in accordance with Figure 9.	Monitors and controls primary power for amplifier.
Amplifier Output Load Box	Optional Item. Fabricate in accordance with Figure 10.	Provides various amplifier loads and can monitor shorted output.

240-VOLT AC CONVERSION

To convert the Model 30 to 240-volt operation, perform the following steps:

1. Remove the top cover.
2. Remove the remaining 8 screws holding the right hand heatsink in place.
3. Remove the heatsink.

   NOTE: Do not disconnect wires. Simply lay the heatsink next to the unit.

4. Using the 240-volt AC conversion kit, part number 105-1001-1, attach the standoff terminal, part number 359-1002, to the screw attaching E1 to chassis.

   NOTE: On units with serial numbers below 1201, use No. 6-32 x 1/8 screw supplied with the accessory kit in the No. 6 hole between the transformer and the chassis edge.

5. Unsolder the white wire from the fuse holder. Unsolder the brown wire from J4 pin 2.
6. Solder the white and brown wire to the standoff terminal.
7. Re-attach the heatsink and top cover.
8. Replace the 4 amp, 250V fuse in the unit with the 3 amp, 250V fuse, part number 451-1001, supplied with the conversion kit.
9. Remove the protective back from the caution label and place it on the top cover.

The Model 30 is now ready for 240-volt operation.

PERFORMANCE VERIFICATION

TEST PROCEDURE

A. Test equipment.
Refer to Table I for required test equipment.

B. Preliminary Procedures.

1. Make the test setup shown in Figure 11 with the instrument controls set in the following positions:

Line Switch	off
Variable – line switch	variable
Watt Meter Switch	on
Variac	0 (fully CCW)
Load	4 ohms (0.5 mfd – 0ff)
Audio Generator	Frequency 2 KHz
Output	5V range
Gain Minimum	
AC Volt Meter	30V range

2. Make sure that connections between the resistive load and the system terminals of the Model 30 have negligible resistance compared with the resistance of the load itself. Appreciable resistance in wiring adds to the total load, resulting in inaccurate measurement of output power.
3. Connect amplifier output to load and connect AC cord to line power. Connect a shorting plug (600 ohms) to the Phono 1 input jack of the model 30.
4. Remove the top cover.

C. Bias Adjustment Test

1. Using a long insulated screwdriver, preset bias adjust potentiometer R224 on each amplifier board fully CCW.
2. Use bleeder resistor to discharge filter capacitors. Disconnect the red and blue wires from the capacitor terminals.
3. Turn line switch on (Figure 9) and slowly advance variac while observing the volt meter and watt meter. When the line voltage reaches approximately 105-Volts, the amplifier should turn on and the line watt meter should indicate between 8 and 12-watts. If the watt meter indicates either 0 or greater than the 20-watts, a defect exists. Turn off variac and refer to the trouble analysis section of this manual.
4. Set line switch to off. Use bleeder resistor to discharge filter capacitors. Connect red and blue wires for left channel only to the filter capacitors.

5. Set line switch to on. Advance variac until volt-meter indicates 120V. Adjust left channel bias potentiometer R224 until watt meter indicates between 23 and 27-watts.

   NOTE: AC line voltage must be maintained at 120-Volts at all times during remaining tests.

6. Set line switch to off. Use bleeder resistor to discharge filter capacitors. Connect remaining red and blue wires to filter capacitors.

7. Set line switch to on. Adjust right channel potentiometer R224 until watt meter indicates between 38 and 42-watts.

D. DC Balance Tests

1. With an oscilloscope connected to the junction of R119 and C110, set the oscilloscope in the DC amplification position. Select the greatest gain position.

2. Turn the amplifier on and adjust potentiometer R115 on the pre-amplifier board for an indication of OV ±10mV as displayed on the oscilloscope.

3. Connect the oscilloscope to the junction of R161 and C140. Adjust R157 on the pre-amp board for an indication of OV ± 10mV as displayed on the oscilloscope.

4. Turn amp off. Disconnect oscilloscope. Install jumper cables between PRE-AMP OUT and AMP IN jacks. Connect oscilloscope to channel A SYSTEM 1 output terminals.

5. Turn amplifier on and set SPEAKER switch to SYSTEM 1. Adjust channel A amplifier board potentiometer R203 for an indication of OV ±50mV as indicated on oscilloscope.

6. Connect oscilloscope to channel B SYSTEM 1 output terminals. Adjust channel B amplifier board potentiometer R203 for an indication of OV ±50mV as indicated on oscilloscope.

   NOTE: Remaining tests are to be repeated for both channels.

E. Total Hum and Noise Test

1. With 600 ohms shorting plugs connected to the PHONO 1 input jacks and a 4-ohm resistive load connected across the SYSTEM 1 output terminals, connect a distortion analyzer across the load.

   NOTE: In this test and tests that follow, if distortion analyzer used does not contain a built-in voltmeter, a VTVM may be substituted.

2. Set the distortion analyzer controls for voltage measurements and apply power to the amplifier. Set the volume control fully CCW. Set the SELECTOR switch to PHONO 1.

3. If the distortion analyzer indicates more than two millivolts, refer to trouble analysis section of this manual.

4. Set the volume control fully CW. If the distortion analyzer indicates more than 40 millivolts refer to the trouble analysis section of this manual.

F. Maximum Power Output

1. Connect the audio oscillator to the AUX 1 input. Set audio oscillator frequency to 2KHz. Set SELECTOR switch to AUX 1.

2. With the distortion analyzer connected across the output load (4 ohms), set the analyzer on the 30V AC scale.

3. Turn potentiometers R237 and R238 fully CCW.

4. Turn the analyzer on and increase the audio oscillator output until the analyzer indicates 20.0 volts AC.

5. Adjust potentiometer R237 CW until the positive peak of the wave form as observed on the oscilloscope just begins to clip.

6. Adjust potentiometer R238 CW until the negative peak just begins to clip.

7. Change output load to 8 ohms. Set analyzer sequentially to 20Hz, 2KHz, and 20KHz. Output voltage should be greater than 21.9 volts AC.

8. Reduce audio oscillator output to minimum.

G. Relay Operation

1. Set line switch to off. Wait approximately two minutes.

2. Using a stop watch or the sweep second hand on a watch, time the relay delay from the time that the line switch is turned on.

3. Turn the line switch on, time delay should be between two and ten seconds.

4. Set audio oscillator for 10Hz. Slowly increase output of oscillator until relay de-energizes. Distortion analyzer should indicate between 15 and 22 volts just prior to relay cut off.

NOTE: The frequency of the audio oscillator may require varying, in increments of 1Hz, down to 5Hz for the relay to open.

H. Harmonic Distortion Test

1. Set the frequency of the audio oscillator and the distortion analyzer to 20KHz.
2. Set the controls of the analyzer for voltage measurement on the 30-volt scale.
3. Adjust the audio oscillator output level until the analyzer meter indicates 21.9 volts.
4. Switch the distortion analyzer to SET LEVEL-MANUAL mode, and adjust SENSITIVITY for full scale reading on 0-1 scale.
5. Measure the total harmonic distortion with the analyzer and verify it is less than 0.15 percent.

NOTE: Any parasitic oscillation in the amplifier will be displayed on the oscilloscope when capacitance is switched into the load.

6. Switch 0.5 MFD across the load (Figure 10) and verify distortion is no greater than 0.3 percent. Switch 0.5 MFD out of the load.
7. Switch the distortion analyzer back to SET LEVEL MANUAL. (Do not adjust SENSITIVITY of analyzer.)
8. Change the frequency of the audio oscillator and distortion analyzer to 2KHz. Adjust audio oscillator output as necessary to have a full scale reading on the 0-1 scale on the analyzer.
9. Measure the distortion, verifying it is no greater than 0.15 percent.
10. Repeat steps 8 and 9, changing frequency to 20 Hz. Distortion should be no more than 0.15 percent.
11. Switch 0.5 MFD across the load and verify distortion is no more than 0.3 percent.
12. Check for parasitic oscillations; there should be none.

I. Short Circuit Test

1. Switch back to a 4-ohm load and set the audio oscillator to 400Hz. Adjust output level of oscillator just below clipping of the output wave as displayed on the oscilloscope.

CAUTION: Do not perform short circuit test if amplifier shows any sign of parasitic oscillation.

2. Press the momentary switch (Figure 10) to a short circuit condition for no longer than three seconds. Verify the ac ammeter indicates no more than 4.5 amperes.

J. FREQUENCY RESPONSE

1. Set LOAD to 8 ohms.
2. Set audio oscillator to 20Hz.
3. Adjust oscillator output for an indication of 21.9 volts AC on distortion analyzer.
4. Sweep frequency up to 20KHz.
5. Output should remain within 20.67 volts to 23.61 volts AC.
6. Connect audio oscillator to PHONO 1 input jacks, set SELECTOR switch to Phono 1.
7. Set audio oscillator to 1KHz ±10Hz.
8. Adjust audio oscillator output for 1 millivolt. Distortion analyzer should indicate between .81 and 1.19 volts.
9. Adjust audio oscillator output for an indication of 0dB on analyzer.
10. Set audio oscillator to 20Hz.
11. Sweep frequency up to 20KHz.
12. Output should follow curve shown in figure 12 (±2dB) as indicated on distortion analyzer.

K. FUNCTIONAL TEST

1. Perform functional tests on MODE, SELECTOR, HIGH and LOW filter, SPEAKER, TONE CONTROL, and TAPE MONITOR switches.
2. Perform functional tests on HEADPHONE and CENTER CHANNEL OUTPUT jacks and VOL. CONTROL CENTER CHANNEL.

L. FILTERS AND TONE CONTROLS

1. Set audio oscillator to 50 Hz and connect to Aux 1 inputs.

2. Set SELECTOR switch to AUX 1. Note output as displayed on distortion analyzer.

3. Set LOW filter switch to 50.

4. Distortion analyzer should indicate a drop of -3 ±1.5dB.

5. Set LOW filter switch to OUT.

6. Set audio oscillator to 100Hz. Note output as displayed on distortion analyzer.

7. Set LOW filter switch to 100.

8. Distortion analyzer should indicate -3 ±1.5dB.

9. Set LOW filter switch to OUT.

10. Set TONE CONTROL switch to IN. Set BASS controls to maximum and then to minimum. Distortion analyzer should indicate +10 ±2dB and then -10 ±2dB. Set TONE CONTROL switch to OUT.

11. Set audio oscillator to 5KHz. Note output as displayed on distortion analyzer.

12. Set HIGH filter switch to 5K.

13. Distortion analyzer should indicate -3 ±1.5dB.

14. Set HIGH filter switch to OUT.

15. Set audio oscillator to 9KHz. Note output as indicated on distortion analyzer.

16. Set HIGH filter switch to 9K.

17. Distortion analyzer should indicate -3 ±1.5dB.

18. Set HIGH filter switch to OUT. Set TONE CONTROL switch to IN.

19. Set audio oscillator to 10KHz. Note output as indicated on distortion analyzer.

20. Set TREBLE controls to maximum and then to minimum.

21. Distortion analyzer should indicate +10 ±2dB and then -10 ±2dB.

M. BALANCE

1. Set audio oscillator to 1KHz.

2. Set BALANCE control to mechanical center (line on knob pointing to dot on panel).

3. Difference between channel outputs as indicated on distortion analyzer should be 0 ±2dB.

N. LOUDNESS

1. With audio oscillator at 1KHz note output as indicated on distortion analyzer.

2. Set TONE CONTROL switch to LOUDNESS.

3. Distortion analyzer should indicate -8 ±2dB.

4. Set TONE CONTROL switch to OUT.

O. CHANNEL SEPARATION

1. Set audio oscillator to 20KHz. Connect oscillator to channel A AUX1 input only, with shorting plug in channel B AUX 1 input. Connect distortion analyzer to PREAMP OUT channel A.

2. Adjust oscillator output until distortion analyzer indicates 0dB.

3. Measure channel B preamp out. Distortion analyzer should indicate -40dB or greater.

4. If indication is less than -40dB, adjust input wires to preamp board until reading is -40dB or greater.

5. Connect distortion analyzer to channel A SYSTEM 1 jacks.

6. Re-connect jumper between PREAMP OUT and AMP IN jacks.

7. Adjust oscillator output for an indication of +20dB on distortion analyzer.

8. Connect distortion analyzer to channel B SYSTEM 1 jacks.

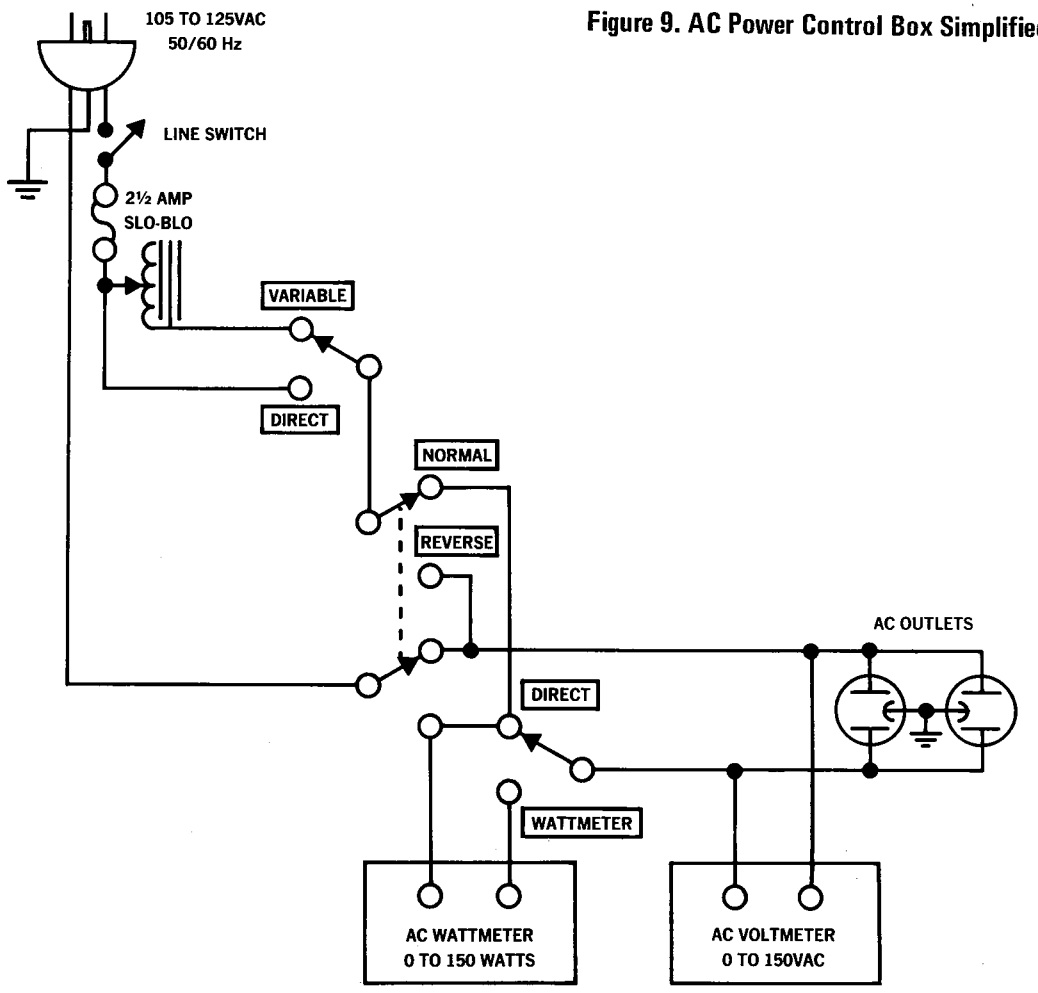
9. Distortion analyzer should indicate -40dB or greater.

10. If indication is less than -40dB, adjust power supply wiring until reading is -40dB or greater.

11. Repeat steps 5, 7, 8, and 9 at 20Hz.

12. If indication is less than -48dB, check power supply filter capacitors.

Figure 9. AC Power Control Box Simplified Schematic.



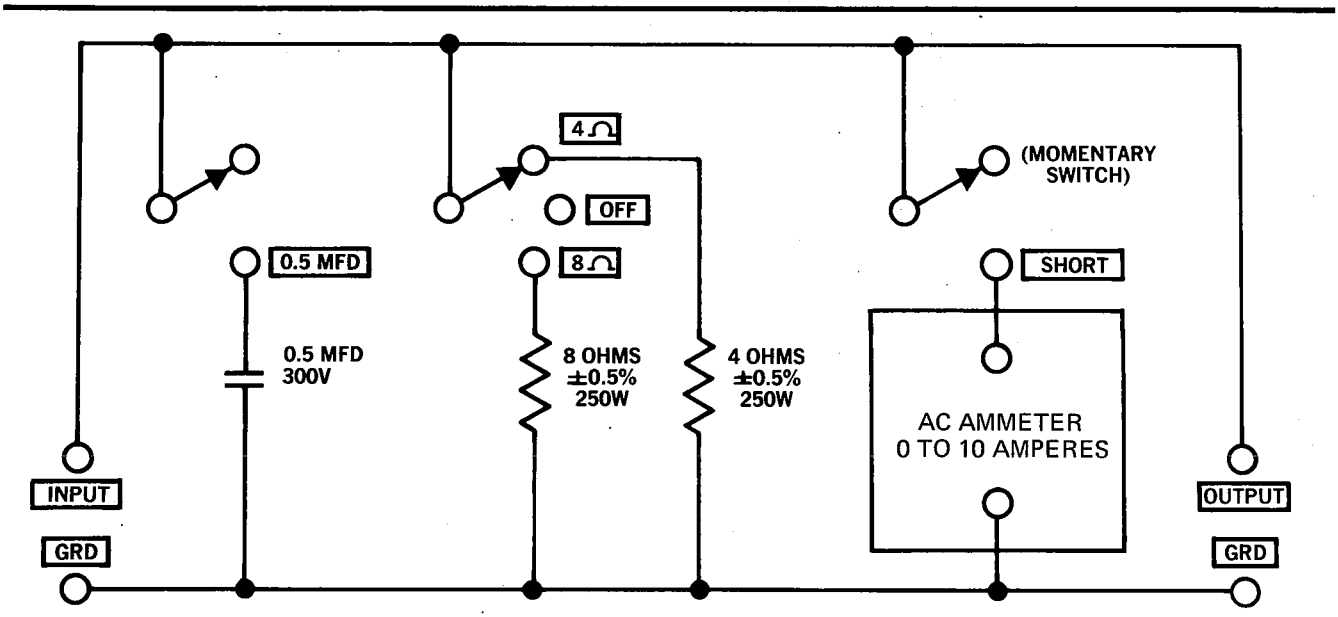


Figure 10. Amplifier Output Load Box Simplified Schematic.

TROUBLE ANALYSIS

The following section is designed to assist in locating troubles. 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 trouble-shooting 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.

SYMPTOM	PROCEDURE
1. Excessive line consumption (100 watts or more).	a. Check for shorted rectifiers CR301 and CR401 through CR404, also check C3, C4.
	b. Check for shorted transistors Q1, Q2, Q206 through Q210. Check for open control R224 and bias diode CR203. Check T1 for short.

CAUTION: Because the driver and output stages are direct coupled, components may fail as a direct result of an initial component failure. If a shorted transistor or Zener diode is found, or control, or bias diode, be sure to check the remaining driver and output components for short or open circuits before re-energizing the amplifier. After replacement of any of these components, increase the Variac voltage slowly while monitoring the wattmeter as described in paragraph C of Performance Verification.

2. No line consumption or zero bias.	a. Check line cord, fuse, transistors Q1, Q2, Q206 through Q212, bias diode CR203.
	b. Check for open rectifiers CR301 and CR401 through CR404, or open T1.
3. High d-c voltage at loudspeaker terminals before time delay circuit is deactivated.	a. Check transistors Q301 through Q303 for leakage, shorted, or open.
4. High d-c voltage at loudspeaker at all times.	a. Check R301 through R305 for open and Q301 for leakage, or open.
5. No D-C Balance.	a. Check Q201, Q202, R203, and Zener diodes CR201 and CR202 (amplifier). Check Q101, Q102, Q111, Q112, R115, and R157 (preamplifier).
	b. Check R202, R204 (amplifier).

PARTS LIST

Reference Designation	Description and/or Remarks	Marantz Part Number
A1	Pre-Amplifier Board, Component Assembly	200-1007-1
A2	Heatsink Assembly	215-1002-1
A3	Heatsink Assembly	215-1002-1
A4	Power Amplifier Board, Component Assembly	200-1006-1
A5	Power Amplifier Board, Component Assembly	200-1006-1
A6	Rectifier/Relay Board, Component Assembly	200-1008-1
A7	Power Supply Board, Component Assembly	200-1014-1
C1	Cap., .03 MFD, 100V, 20%	383-1002
C2	Cap., .03 MFD, 100V, 20%	383-1002
C3	Cap., Elect., 6800 MFD, 50V	381-1007
C4	Cap., Elect., 6800 MFD, 50V	381-1007
C5	Cap., .01 MFD, 1400V	383-1006
C101	Cap., Elect., 10 MFD, 16V	381-1015
C102	Cap., 3600 PFD, 300V, 10%	385-1021
C103	Cap., 1600 PFD, 300V, 10%	385-1020
C104	Cap., .0027 MFD, 100V, 10%	385-1024
C105	Cap., .03 MFD, 100V, 20%	383-1002
C106	Cap., .03 MFD, 100V, 20%	383-1002
C107	Cap., 680 PFD, 300V, 5%	385-1003
C108	Cap., Elect., 32 MFD, 10V	381-1016
C109	Cap., Elect., 100 MFD, 6.4V	381-1006
C110	Cap., 1.0 MFD, 250V, 20%	386-1008
C111	Cap., Elect., 1 MFD, 25V	381-1017
C112	Cap., Elect., 1 MFD, 25V	381-1017
C113	Cap., Elect., 47 MFD, 3V	381-1019
C114	Cap., Elect., 1 MFD, 25V	381-1017
C115	Cap., 680 PFD, 300V, 5%	385-1003
C116	Cap., Elect. 100 MFD, 3V	381-1018
C117	Cap., 100 PFD, 500V, 10%	385-1001
C118	Cap., 2000 PFD, 300V, 10%	385-1025
C119	Cap., 1100 PFD, 300V, 10%	385-1014
C120	Cap., Elect., 2.2 MFD, 25V	381-1020
C121	Cap., .033 MFD, 100V, 20%	385-1022
C122	Cap., .033 MFD, 100V, 20%	385-1022
C123	Cap., .001 MFD, 100V, 10%	385-1023
C124	Cap., Elect., 1 MFD, 25V	381-1017
C125	Cap., 27 PFD, 300V, 10%	385-1005
C126	Cap., 680 PFD, 300V, 5%	385-1003
C127	Cap., Elect., 10 MFD, 16V	381-1011
C128	Cap., 1.0 MFD, 250V, 20%	386-1008
C129	Cap., .03 MFD, 100V, 20%	383-1002
C130	Cap., .03 MFD, 100V, 20%	383-1002
C131	Cap., Elect., 10 MFD, 16V	381-1015
C132	Cap., 3600 PFD, 300V, 10%	385-1021
C133	Cap., 1600 PFD, 300V, 10%	385-1020
C134	Cap., .0027 MFD, 100V, 10%	385-1024
C135	Cap., .03 MFD, 100V, 20%	383-1002
C136	Cap., .03 MFD, 100V, 20%	383-1002
C137	Cap., 680 PFD, 300V, 5%	385-1003
C138	Cap., Elect., 32 MFD, 10V	381-1016
C139	Cap., Elect., 100 MFD, 6.4V	381-1006
C140	Cap., 1.0 MFD, 250V, 20%	386-1008
C141	Cap., Elect., 1 MFD, 25V	381-1017
C142	Cap., Elect., 1 MFD, 25V	381-1017
C143	Cap., Elect., 47 MFD, 3V	381-1019
C144	Cap., Elect., 1 MFD, 25V	381-1017
C145	Cap., 1100 PFD, 300V, 10%	385-1014
C146	Cap., 2000 PFD, 300V, 10%	385-1025
C147	Cap., 680 PFD, 300V, 5%	385-1003
C148	Cap., 100 PFD, 500V, 10%	385-1001
C149	Cap., Elect., 100 MFD, 3V	381-1018
C150	Cap., Elect., 2.2 MFD, 25V	381-1020
C151	Cap., .033 MFD, 100V, 20V	385-1022
C152	Cap., .033 MFD, 100V, 20V	385-1022
C153	Cap., .001 MFD, 100V, 10%	385-1023
C154	Cap., Elect., 1 MFD, 25V	381-1017
C155	Cap., 27 PFD, 300V, 10%	385-1005
C156	Cap., 680 PFD, 300V, 5%	385-1003
C157	Cap., Elect., 10 MFD, 16V	381-1011
C158	Cap., 1.0 MFD, 250V, 20%	386-1008
C159 *	Cap., 270 PFD, 500V, 10%	385-1006
C160 *	Cap., 270 PFD, 500V, 10%	385-1006
C161 *	Cap., 240 PFD, 500V, 10%	385-1034
C162	NOT USED	
C163 *	Cap., 240 PFD, 500V, 10%	385-1034
C164	NOT USED	
C201	Cap., Elect., 10 MFD, 16V	381-1015
C202	Cap., 1.0 MFD, ±10%, 250V	386-1003
C203	Cap., Elect., 10 MFD, 16V	381-1015
C204	Cap., 1300 PFD, 10%, 300V	385-1033
C205	Cap., Elect., 50 MFD, 6.4V	381-1012
C206	Cap., 5 PFD, ±10%, 300V	385-1009
C207	Cap., 0.1 MFD, ±10%, 250V	386-1000
C208	Cap., 0.1 MFD, ±10%, 250V	386-1000
C209	Cap., 0.1 MFD, ±10%, 250V	386-1000
C210	Cap., 120 PFD, ±10%, 300V	385-1017
C211	Cap., 0.22 MFD, ±10%, 250V	386-1001
C212 *	NOT USED	
C213 *	Cap., 1000 PFD, ±10%, 500V	385-100
C214 *	Cap., 1000 PFD, ±10%, 500V	385-10
C215	Cap., 150 PFD, 500V, 10%	385-10
C216	Cap., 2700 PFD, ±10%, 300V	385-101
C217	Cap., 2700 PFD, ±10%, 300V	385-1015
C218 *	NOT USED	
C219	NOT USED	
C220 *	Cap., 39 PFD, 500V, 10%	385-103
C301	Cap., Elect., 33 MFD, 10V	381-102
C302	Cap., Elect., 125 MFD, 16V	381-1005
C303	Cap., Elect., 10 MFD, 64V	381-1010
C401	Cap., Elect., 500 MFD, 25V	381-1014
C402	Cap., Elect., 500 MFD, 25V	381-1014
C403	Cap., Elect., 500 MFD, 25V	381-1014
C404	Cap., Elect., 100 MFD, 40V	381-1013
C405	Cap., Elect., 100 MFD, 40V	381-1013
C406	Cap., Elect., 500 MFD, 25V	381-1014
C407	Cap., Elect., 500 MFD, 25V	381-1014

Reference Designation	Description and/or Remarks	Marantz Part Number
R145	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R146	Res., C/F, 22K, 1/2W, 5%	433-5222
R147	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R148	Res., C/F, 100K, 1/2W, 5%	433-6102
R149	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R150	Res., C/F, 18K, 1/2W, 5%	433-5182
R151	Res., C/F, 22K, 1/2W, 5%	433-5222
R152	Res., C/F, 30 ohm, 1/2W, 5%	433-2302
R153	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R154	Res., C/F, 470 ohm, 1/2W, 5%	433-3472
R155	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R156	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R157	Res., Var., 25K, 1/4W	420-1005
R158	Res., C/F, 12K, 1/2W, 5%	433-5122
R159	Res., C/F, 3.9K, 1/2W, 5%	433-4392
R160	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R161	Res., C/F, 150 ohm, 1/2W, 5%	433-3152
R162	Res., C/F, 270K, 1/2W, 5%	433-6272
R163	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R164	Res., C/F, 7.5K, 1/2W, 5%	433-4752
R165	Res., C/F, 22K, 1/2W, 5%	433-5222
R166	Res., C/F, 1.5K, 1/2W, 5%	433-4152
R167 *	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R168	Res., C/F, 15K, 1/2W, 5%	433-5152
R169	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R170	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R171	Res., C/F, 2.7K, 1/2W, 5%	433-4272
R172	Res., C/F, 18K, 1/2W, 5%	433-5182
R173	Res., C/F, 10K, 1/4W, 5%	434-5102
R174	Res., C/F, 18K, 1/2W, 5%	433-5182
R175	Res., C/F, 10K, 1/4W, 5%	434-5102
R176	Res., C/F, 27K, 1/2W, 5%	433-5272
R177	Res., C/F, 1 MEG, 1/4W, 5%	434-7102
R178	Res., C/F, 7.5K, 1/4W, 5%	434-4752
R179	Res., C/F, 22K, 1/4W, 5%	434-5222
R180	Res., C/F, 30 ohm, 1/4W, 5%	434-2302
R181	Res., C/F, 39K, 1/2W, 5%	433-5392
R182	Res., C/F, 56 ohm, 1/2W, 5%	433-2562

Reference Designation	Description and/or Remarks	Marantz Part Number
R410	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R411	Res., C/F, 120 ohm, 1/2W, 5%	433-3122
R412	Res., C/F, 120 ohm, 1/2W, 5%	433-3122
S1	Switch, Rotary (Selector)	453-1000
S2	Switch, Lever (Tape Monitor)	453-1006
S3	Switch, Rotary (Mode)	453-1001
S4	Switch, Rotary (Tone)	453-1002
S5	Switch, Rotary (Lo Filter)	453-1007
S6	Switch, Rotary (Hi Filter)	453-1007
S7	Switch, Push On – Push Off	452-1000
S8	Switch, Rotary (Speaker)	453-1003
T1	Transformer, Power	440-1002 (Rev. B or later)
TB1	Terminal Board, 4 Position	362-1002
TB2	Terminal Board, 4 Position	362-1002
XDS1	Socket Assembly, Light	481-1002
XF1	Fuseholder (With Mtg Hdwe)	367-1001
XQ1	Socket, Transistor	368-1000
XQ2	Socket, Transistor	368-1000
None	Panel, Front	134-1005-1
None	Knob, Large	174-1001
None	Knob, Small	174-1002
None	Knob Assembly, Blade (For tone Controls)	174-1004
None	Knob Assembly, Push Button (For on/off)	174-1005
None	Knob, Center Channel Volume	580-1000
None	Foot	567-1000

* Indicates a change in some S/N's. See ECN Change Record.

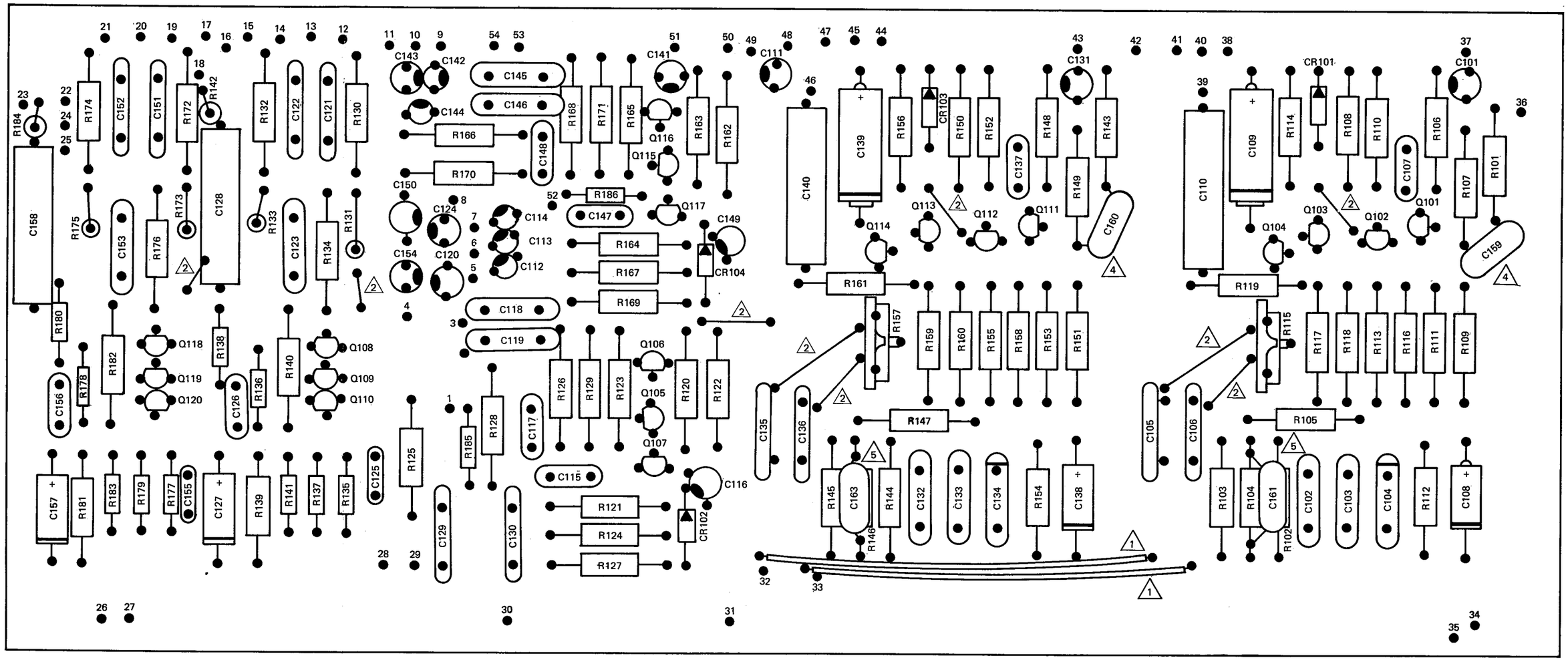
Reference Designation	Description and/or Remarks	Marantz Part Number
C408	Cap., Elect., 500 MFD, 25V	381-1014
C409	Cap., Elect., 680 MFD, 16V	381-1008
C410	Cap., Elect., 680 MFD, 16V	381-1008
C411	Cap., Elect., 680 MFD, 16V	381-1008
C412	Cap., Elect., 680 MFD, 16V	381-1008
CR101	Diode, Rectifier	460-1004
CR102	Diode, Rectifier	460-1009
CR103	Diode, Rectifier	460-1004
CR104	Diode, Rectifier	460-1009
CR201	Diode, Zener	459-1000
CR202	Diode, Zener	459-1000
CR203	Diode, Rectifier	460-1010
CR204	NOT USED	
CR205	NOT USED	
CR206	Diode, Zener, 10V	459-1003
CR207	Diode, Zener, 10V	459-1003
CR301	Bridge Assembly, Rectifier	468-1000
CR302	Diode, Rectifier	460-1006
CR303	Diode, Rectifier	460-1006
CR401	Diode, Rectifier	460-1006
CR402	Diode, Rectifier	460-1006
CR403	Diode, Rectifier	460-1006
CR404	Diode, Rectifier	460-1006
CR405	Diode, Zener	459-1001
CR406	Diode, Zener	459-1001
DS1	Lamp, Minature Bayonet	482-1001
F1	Fuse, 4 Amp, 250V	451-1003
K301	Relay, DPDT, 24VDC	410-1000
L1	Toroid	147-1000
Q1	Transistor, PNP Output	461-1010
Q2	Transistor, NPN Output	462-1015
Q101	Transistor, NPN	462-1010-8
Q102	Transistor, NPN	462-1010-8
Q103	Transistor, PNP	461-1006-3
Q104	Transistor, NPN	462-1010-2
Q105	Transistor, NPN	462-1010-4
Q106	Transistor, NPN	462-1010-4
Q107	Transistor, PNP	461-1006-3
Q108	Transistor, NPN	462-1010-4
Q109	Transistor, NPN	462-1010-4
Q110	Transistor, PNP	461-1006-2
Q111	Transistor, NPN	462-1010-8
Q112	Transistor, NPN	462-1010-8
Q113	Transistor, PNP	461-1006-3
Q114	Transistor, NPN	462-1010-2
Q115	Transistor, NPN	462-1010-4
Q116	Transistor, NPN	462-1010-4
Q117	Transistor, PNP	461-1006-3
Q118	Transistor, NPN	462-1010-4
Q119	Transistor, NPN	462-1010-4
Q120	Transistor, PNP	461-1006-2
Q201	Transistor, NPN	462-1010-5
Q202	Transistor, NPN	462-1010-5
Q203	Transistor, PNP (Beta >111)	461-1007
Q204	Transistor, PNP	461-1006-1
Q205	Transistor, NPN	462-1009-1
Q206	Transistor, PNP	461-1007
Q207	Transistor, NPN	462-1009-4
Q208	Transistor, NPN	462-1007
Q209	Transistor, NPN	462-1012
Q210	Transistor, PNP	461-1008
Q211	Transistor, NPN	462-1016
Q212	Transistor, PNP	461-1012
Q301	Transistor, NPN	462-1000
Q302	Transistor, NPN (Beta >30)	462-1007
Q303	Transistor, NPN	462-1000
Q401	Transistor, NPN	462-1013
Q402	Transistor, PNP	461-1009
R1	Res., C/F, 56K, 1/2W, 5%	433-5562
R2	Res., C/F, 56K, 1/2W, 5%	433-5562
R3	Res., C/F, 47K, 1/2W, 5%	433-5472
R4	Res., C/F, 56K, 1/2W, 5%	433-5562
R5	Res., C/F, 56K, 1/2W, 5%	433-5562
R6	Res., C/F, 47K, 1/2W, 5%	433-5472
R7	Res., C/F, 8.2K, 1/2W, 5%	433-4822
R8	Res., C/F, 8.2K, 1/2W, 5%	433-4822
R9	Res., Var., Tandem, 100K, 2W	420-1008
R10	Res., Var., Tandem, 250K, 2W	420-1007
R11	Res., C/F, 10K, 1/2W, 5%	433-5102
R12	Res., C/F, 10K, 1/2W, 5%	433-5102
R13	Res., C/F, 33K, 1/2W, 5%	433-5332
R14	Res., C/F, 33K, 1/2W, 5%	433-5332
R15	Res., C/F, 33K, 1/2W, 5%	433-5332
R16	Res., C/F, 33K, 1/2W, 5%	433-5332
R17	Res., Variable, Slide, 100K	420-1003
R18	Res., Variable, Slide, 100K	420-1003
R19	Res., Variable, Slide, 100K	420-1003
R20	Res., Variable, Slide, 100K	420-1003
R21	Res., C/F, 270K, 1/2W, 5%	433-6272
R22	Res., C/F, 270K, 1/2W, 5%	433-6272
R23	Res., C/F, 270K, 1/2W, 5%	433-6272
R24	Res., C/F, 270K, 1/2W, 5%	433-6272
R25	Res., Variable, 100K, 2W	420-1006
R26 *	Res., W/W, 1.2 ohm, 2W	436-1123
R101	Res., C/F, 270K, 1/2W, 5%	433-6272
R102	Res., C/F, 68K, 1/2W, 5%	433-5682
R103	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R104	Res., C/F, 22K, 1/2W, 5%	433-5222
R105	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R106	Res., C/F, 100K, 1/2W, 5%	433-6102

PARTS LIST

Reference Designation	Description and/or Remarks	Marantz Part Number
R107	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R108	Res., C/F, 18K, 1/2W, 5%	433-5182
R109	Res., C/F, 22K, 1/2W, 5%	433-5222
R110	Res., C/F, 30 ohm, 1/2W, 5%	433-2302
R111	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R112	Res., C/F, 470 ohm, 1/2W, 5%	433-3472
R113	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R114	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R115	Res., Var., 25K, 1/4W	420-1005
R116	Res., C/F, 12K, 1/2W, 5%	433-5122
R117	Res., C/F, 3.9K, 1/2W, 5%	433-4392
R118	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R119	Res., C/F, 150 ohm, 1/2W, 5%	433-3152
R120	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R121	Res., C/F, 7.5K, 1/2W, 5%	433-4752
R122	Res., C/F, 270K, 1/2W, 5%	433-6272
R123	Res., C/F, 22K, 1/2W, 5%	433-5222
R124 *	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R125	Res., C/F, 1.5K, 1/2W, 5%	433-4152
R126	Res., C/F, 15K, 1/2W, 5%	433-5152
R127	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R128	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R129	Res., C/F, 2.7K, 1/2W, 5%	433-4272
R130	Res., C/F, 18K, 1/2W, 5%	433-5182
R131	Res., C/F, 10K, 1/4W, 5%	434-5102
R132	Res., C/F, 18K, 1/2W, 5%	433-5182
R133	Res., C/F, 10K, 1/4W, 5%	434-5102
R134	Res., C/F, 27K, 1/2W, 5%	433-5272
R135	Res., C/F, 1 MEG, 1/4W, 5%	434-7102
R136	Res., C/F, 7.5K, 1/4W, 5%	434-4752
R137	Res., C/F, 22K, 1/4W, 5%	434-5222
R138	Res., C/F, 30 ohm, 1/4W, 5%	434-2302
R139	Res., C/F, 39K, 1/2W, 5%	433-5392
R140	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R141	Res., C/F, 2.7K, 1/4W, 5%	434-4272
R142	Res., C/F, 300 ohm, 1/2W, 5%	433-3302
R143	Res., C/F, 270K, 1/2W, 5%	433-6272
R144	Res., C/F, 68K, 1/2W, 5%	433-5682

Reference Designation	Description and/or Remarks	Marantz Part Number
R145	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R146	Res., C/F, 22K, 1/2W, 5%	433-5222
R147	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R148	Res., C/F, 100K, 1/2W, 5%	433-6102
R149	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R150	Res., C/F, 18K, 1/2W, 5%	433-5182
R151	Res., C/F, 22K, 1/2W, 5%	433-5222
R152	Res., C/F, 30 ohm, 1/2W, 5%	433-2302
R153	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R154	Res., C/F, 470 ohm, 1/2W, 5%	433-3472
R155	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R156	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R157	Res., Var., 25K, 1/4W	420-1005
R158	Res., C/F, 12K, 1/2W, 5%	433-5122
R159	Res., C/F, 3.9K, 1/2W, 5%	433-4392
R160	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R161	Res., C/F, 150 ohm, 1/2W, 5%	433-3152
R162	Res., C/F, 270K, 1/2W, 5%	433-6272
R163	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R164	Res., C/F, 7.5K, 1/2W, 5%	433-4752
R165	Res., C/F, 22K, 1/2W, 5%	433-5222
R166	Res., C/F, 1.5K, 1/2W, 5%	433-4152
R167 *	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R168	Res., C/F, 15K, 1/2W, 5%	433-5152
R169	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R170	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R171	Res., C/F, 2.7K, 1/2W, 5%	433-4272
R172	Res., C/F, 18K, 1/2W, 5%	433-5182
R173	Res., C/F, 10K, 1/4W, 5%	434-5102
R174	Res., C/F, 18K, 1/2W, 5%	433-5182
R175	Res., C/F, 10K, 1/4W, 5%	434-5102
R176	Res., C/F, 27K, 1/2W, 5%	433-5272
R177	Res., C/F, 1 MEG, 1/4W, 5%	434-7102
R178	Res., C/F, 7.5K, 1/4W, 5%	434-4752
R179	Res., C/F, 22K, 1/4W, 5%	434-5222
R180	Res., C/F, 30 ohm, 1/4W, 5%	434-2302
R181	Res., C/F, 39K, 1/2W, 5%	433-5392
R182	Res., C/F, 56 ohm, 1/2W, 5%	433-2562

Reference Designation	Description and/or Remarks	Marantz Part Numb
R107	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R108	Res., C/F, 18K, 1/2W, 5%	433-5182
R109	Res., C/F, 22K, 1/2W, 5%	433-5222
R110	Res., C/F, 30 ohm, 1/2W, 5%	433-2302
R111	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R112	Res., C/F, 470 ohm, 1/2W, 5%	433-3472
R113	Res., C/F, 1 MEG, 1/2W, 5%	433-7102
R114	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R115	Res., Var., 25K, 1/4W	420-1005
R116	Res., C/F, 12K, 1/2W, 5%	433-5122
R117	Res., C/F, 3.9K, 1/2W, 5%	433-4392
R118	Res., C/F, 100 ohm, 1/2W, 5%	433-3102
R119	Res., C/F, 150 ohm, 1/2W, 5%	433-3152
R120	Res., C/F, 2.2K, 1/2W, 5%	433-4222
R121	Res., C/F, 7.5K, 1/2W, 5%	433-4752
R122	Res., C/F, 270K, 1/2W, 5%	433-6272
R123	Res., C/F, 22K, 1/2W, 5%	433-5222
R124 *	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R125	Res., C/F, 1.5K, 1/2W, 5%	433-4152
R126	Res., C/F, 15K, 1/2W, 5%	433-5152
R127	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R128	Res., C/F, 200 ohm, 1/2W, 5%	433-3202
R129	Res., C/F, 2.7K, 1/2W, 5%	433-4272
R130	Res., C/F, 18K, 1/2W, 5%	433-5182
R131	Res., C/F, 10K, 1/4W, 5%	434-5102
R132	Res., C/F, 18K, 1/2W, 5%	433-5182
R133	Res., C/F, 10K, 1/4W, 5%	434-5102
R134	Res., C/F, 27K, 1/2W, 5%	433-5272
R135	Res., C/F, 1 MEG, 1/4W, 5%	434-7102
R136	Res., C/F, 7.5K, 1/4W, 5%	434-4752
R137	Res., C/F, 22K, 1/4W, 5%	434-5222
R138	Res., C/F, 30 ohm, 1/4W, 5%	434-2302
R139	Res., C/F, 39K, 1/2W, 5%	433-5392
R140	Res., C/F, 56 ohm, 1/2W, 5%	433-2562
R141	Res., C/F, 2.7K, 1/4W, 5%	434-4272
R142	Res., C/F, 300 ohm, 1/2W, 5%	433-3302
R143	Res., C/F, 270K, 1/2W, 5%	433-6272
R144	Res., C/F, 68K, 1/2W, 5%	433-5682



1. INSTALL SOLID 24 AWG BLACK INSULATED WIRE JUMPER, ON COMPONENT SIDE.

2. INSTALL SOLID 24 AWG WIRE JUMPER ON COMPONENT SIDE.

3. ALL TAG STYLE CAPACITORS, (EXAMPLE C101) POLARITY IS INDICATED BY COLORED DOT ON ONE SIDE, HOLDING THE CAPACITOR WITH THE COLORED DOT TOWARD THE VIEWER THE POSITIVE LEAD IS ON THE RIGHT.

4. C160 LEADS TO BE SOLDERED BETWEEN LEADS OF R143 & R149. C159 LEADS TO BE SOLDERED BETWEEN LEADS OF R101 & R107.

5. C161 LEADS TO BE SOLDERED ACROSS R104 LEADS. C163 LEADS TO BE SOLDERED ACROSS R146 LEADS.

6. BETA RANGE Q105, Q106, Q108, Q109, Q115, Q116, Q118 & Q119 TO BE >200. BETA RANGE Q104 & Q114 TO BE >100.

7. Q101 THRU Q120 ARE TO BE INSTALLED WITHOUT CUTTING TRANSISTOR LEADS. HEIGHT OF THE TRANSISTOR OFF THE BOARD NOT TO EXCEED 1/2".

Figure 13. Preamplifier board component Assembly Diagram.

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

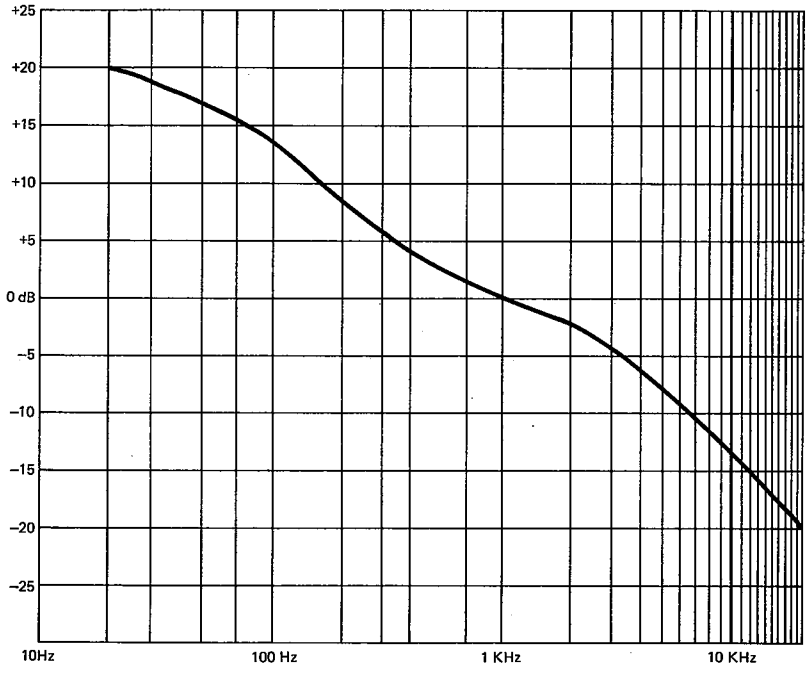
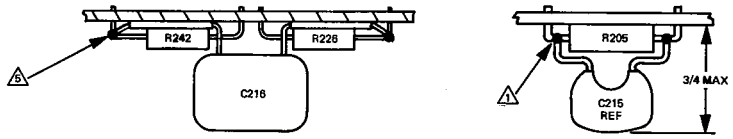
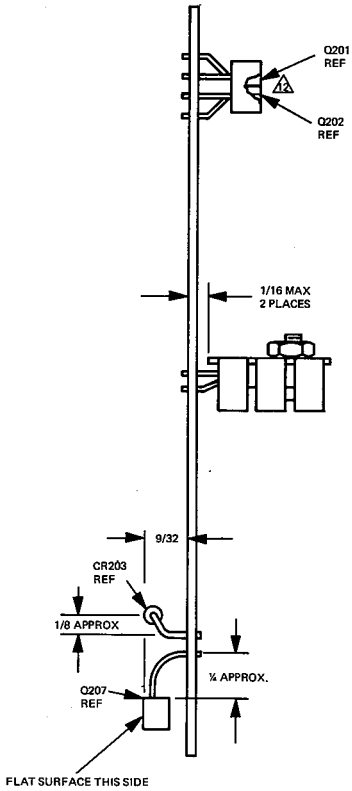
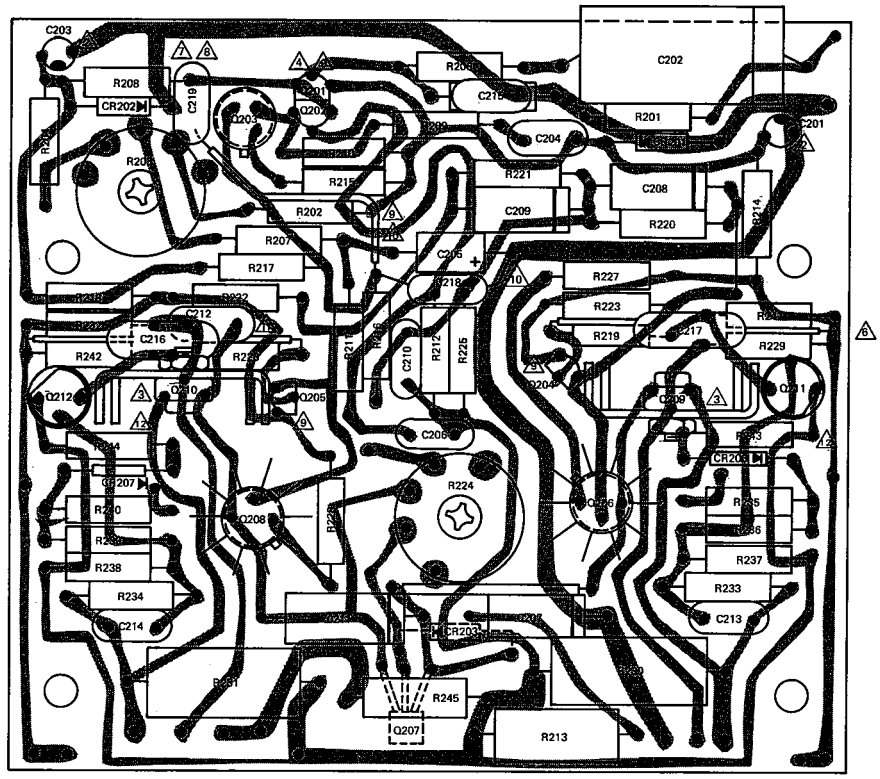


Figure 12. RIAA Equalization Curve.







1. INSTALL C215 APPROX. AS SHOWN, WITH LEADS SOLDERED TO R205 LEADS.

2. C201 AND C203 POLARITY IS INDICATED BY COLORED DOT ON ONE SIDE HOLDING THE CAPACITOR WITH THE COLORED DOT TOWARD THE VIEWER THE POSITIVE LEAD IS ON THE RIGHT.

3. METAL SIDE OF Q209 AND Q210 TO BE NEXT TO HEAT DISSIPATER.

4. Q201 AND Q202 LOCATED AS SHOWN, WITH CASES TOUCHING. INSTALL HEAT SHRINKABLE TUBING OVER Q201 AND Q202 AND SHRINK.

5. INSTALL C216 APPROX. AS SHOWN, WITH LEADS SOLDERED TO R226 AND R242. C216 LEADS TO BE SLEEVED.

6. INSTALL C217 IN SIMILAR MANNER AS SHOWN FOR C216 WITH LEADS SOLDERED TO R219 AND R229. C217 LEADS TO BE SLEEVED.

7. C219 OPTIONAL ITEM.

8. INSTALL C219 AS SHOWN (BETWEEN R208 & R209 SLEEVE LEADS.

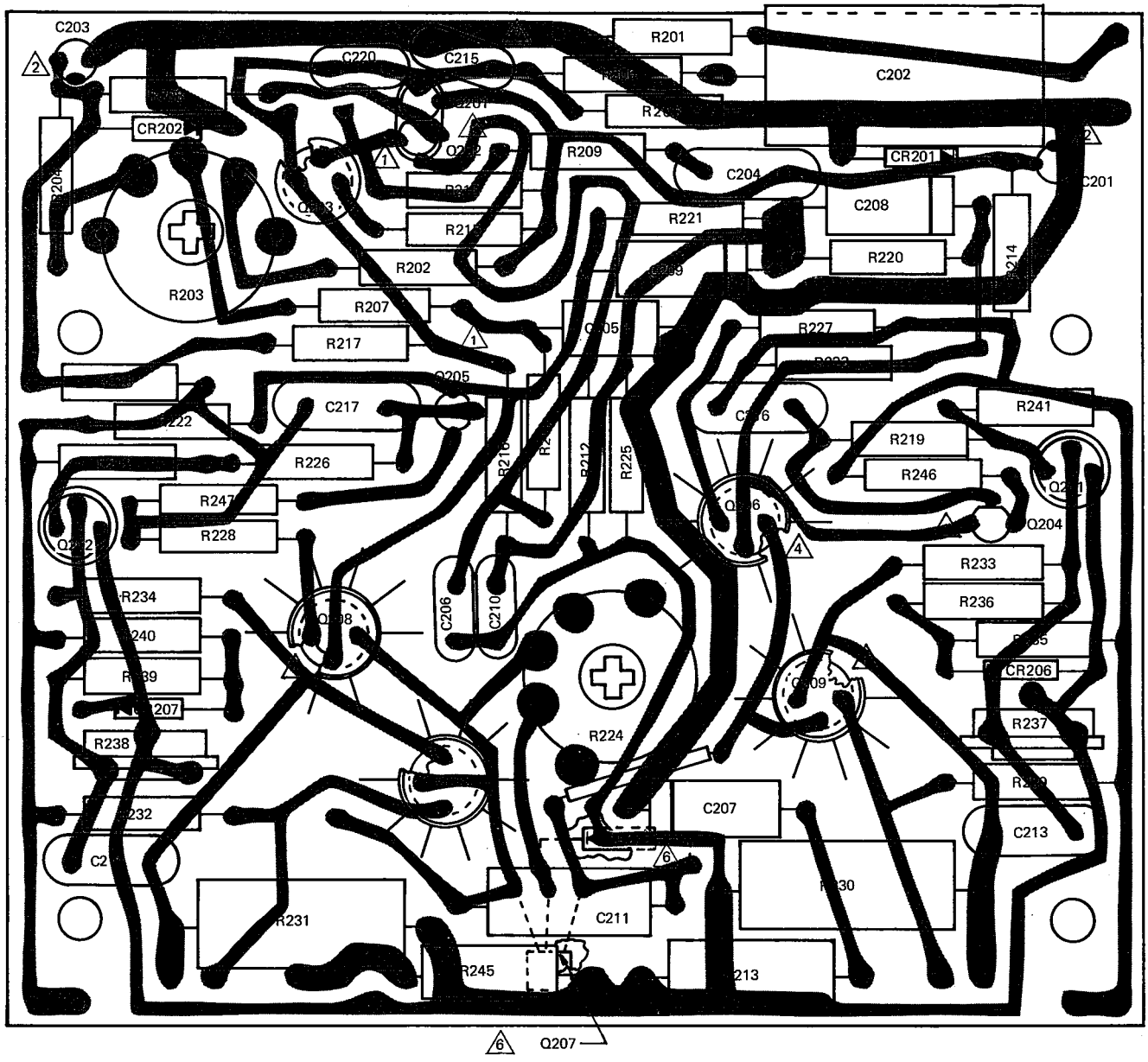
9. Q201, Q202, Q204, AND Q205 ARE TO BE INSTALLED WITHOUT CUTTING TRANSISTOR LEAD HEIGHT OF THE TRANSISTOR OFF THE BOARD NOT TO EXCEED 1/2".

10. S/N 1053 TO 1200 ONLY.

11. S/N 1001 - 1200 ONLY.

12. S/N 1001 - 1351 ONLY.

Figure 14. Power Amplifier Board Component Assembly Diagram Revision 1.



1. Q201, Q202, Q204, AND Q205 ARE TO BE INSTALLED WITHOUT CUTTING TRANSISTOR LEADS. HEIGHT OF THE TRANSISTOR OFF THE BOARD NOT TO EXCEED 1/2".

2. C201 AND C203 POLARITY IS INDICATED BY COLORED DOT ON ONE SIDE, HOLDING THE CAPACITOR WITH THE LEADS DOWN AND THE COLORED DOT TOWARD THE VIEWER, THE POSITIVE LEAD IS ON THE RIGHT.

3. Q201 AND Q202 LOCATED AS SHOWN, WITH CASES TOUCHING. INSTALL HEAT SHRINKABLE TUBING OVER Q201 AND SHRINK.

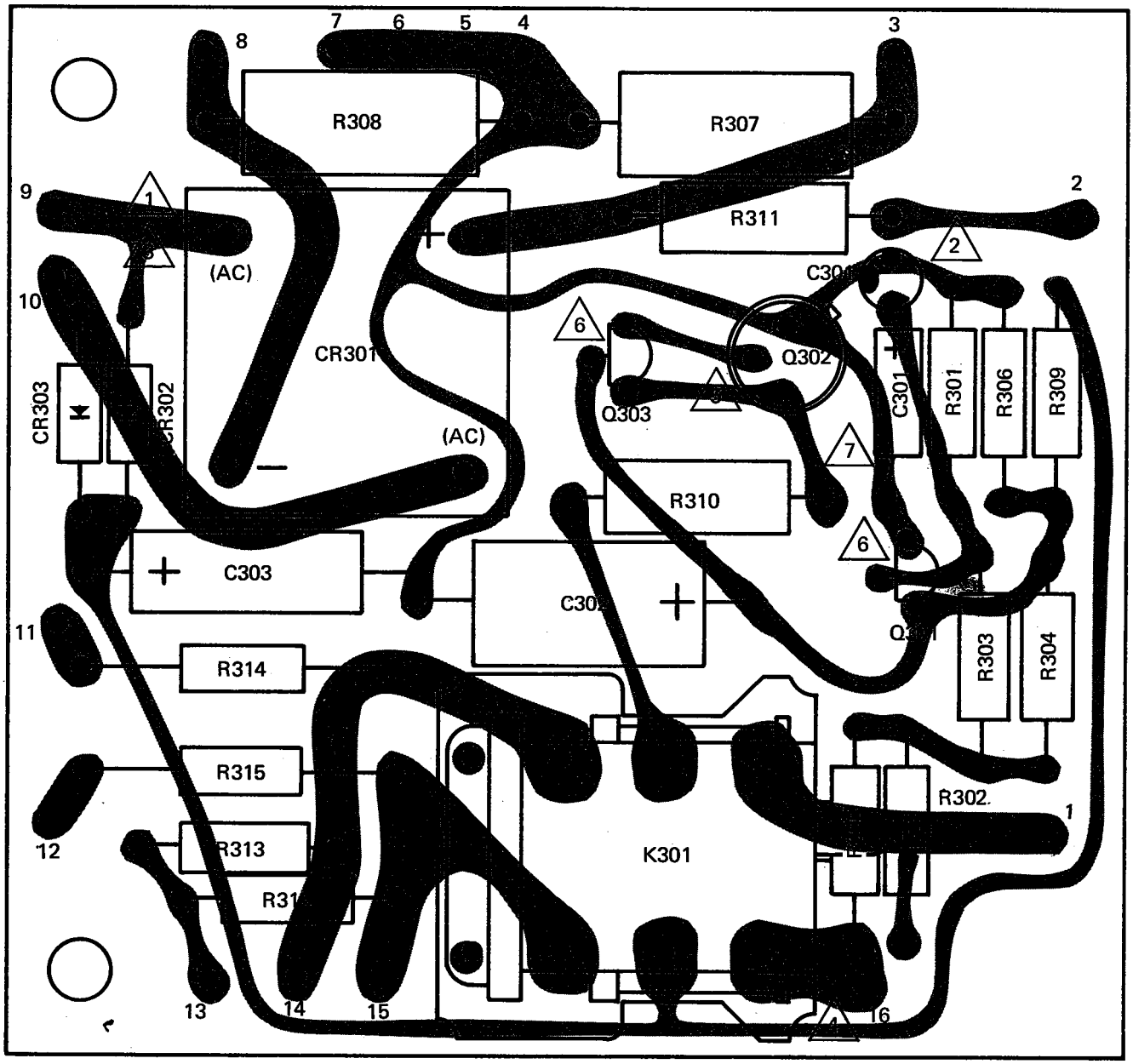
4. Q206 AND Q208 TO BE MATCHED WITHIN 1 (ONE) BETA RANGE. Q209 AND Q210 TO BE MATCHED IN SAME BETA RANGE. BETA RANGES ARE 40-99, 100-149, 150-199, 200-399 AND 400 OR GREATER.

5. USE BOARDS FABRICATED FROM A/W 115-1006 REV G ONLY FOR ASSEMBLY CONFIGURATION SHOWN.

6. CR 203 AND Q207 ARE INSTALLED IN SAME MANNER AS SHOWN IN FIGURE 14.

7. C215 OPTIONAL ITEM.

Figure 15. Power Amplifier Board Component Assembly Diagram Revision 2.



1. RED DOT INDICATES POSITIVE LEAD OF CR301 & MAY BE LOCATED ON LEAD SIDE OR OPPOSITE LEAD SIDE OF COMPONENT.

2. CR301 POLARIZATION IS DETERMINED BY HOLDING THE COMPONENT WITH THE BLACK MARKING TOWARD VIEWER – IN THIS POSITION THE POSITIVE LEAD IS ON THE RIGHT.

3. CR301 TO BE INSTALLED FLUSH TO 1/8" ABOVE BOARD.

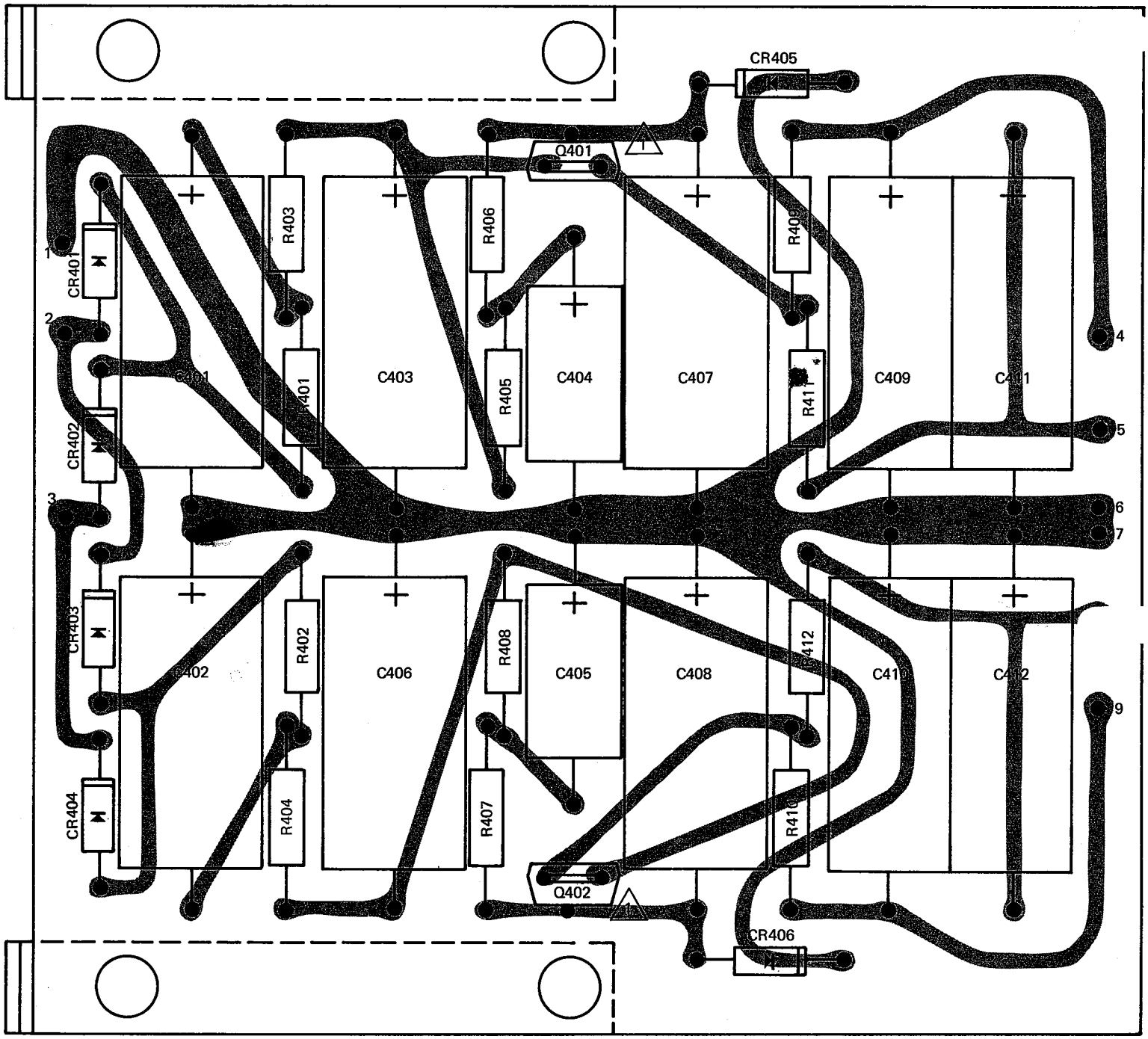
4. RELAY TERMINALS NEED NOT BE TRIMMED.

5. Q 302 TO HAVE A BETA GREATER THAN 30.

6. Q301 & Q303 ARE TO BE INSTALLED WITHOUT CUTTING TRANSISTOR LEADS. HEIGHT OF THE TRANSISTOR OFF THE BOARD NOT TO EXCEED 1/2".

7. S/N 1001 – 1100 ONLY (32μf, 10V).

Figure 16. Rectifier/Relay Board Component Assembly Diagram.



1. INSTALL Q401, Q402 3/16 TO 1/4 ABOVE BOARD.

Figure 17. Power Supply Board Component Assembly Diagram.

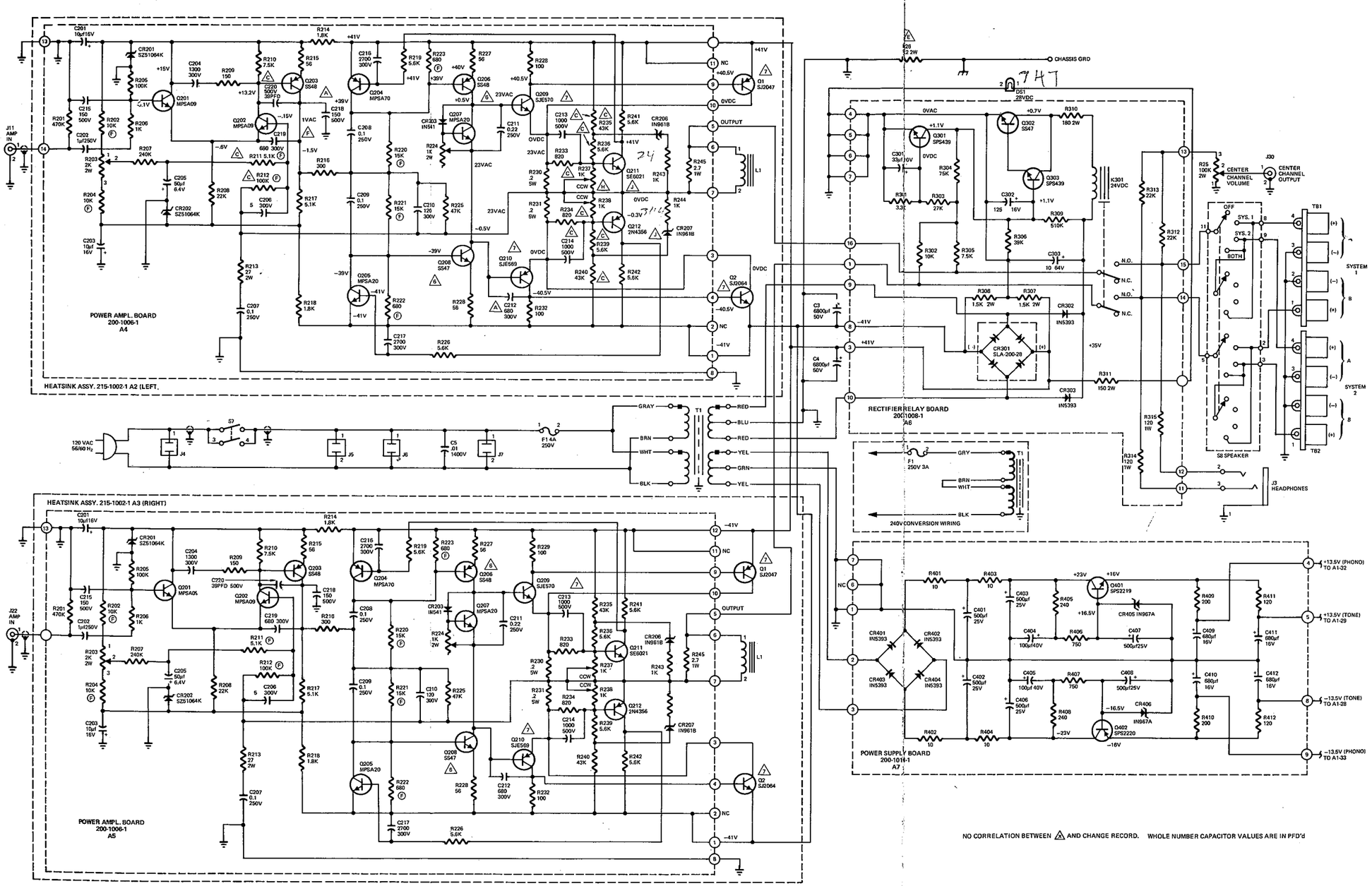


Figure 18. Model 30 Schematic.

△A 1001 TO 1200 ONLY

△B 1131 AND ON WAS 30Ω IS 200Ω

△C 1351 AND ON
R235 WAS 39K IS 43K
R236 WAS 75K IS 5.6K
R233 WAS 1K IS 820Ω
R234 WAS 1K IS 820Ω
R240 WAS 39K IS 43K
R239 WAS 7.5K IS 5.6K
C213, C214 WAS 680PF IS 1000PF
300V IS 500V
R211 WAS 3.9K 5% IS 5.K,2%
R212 WAS 100K 5% IS 100K 2%

△D 1285 AND ON.1001➡1284 TO BE REWORKED AS REQUIRED TO MEET NOISE SPEC's. Q104, Q114 WAS MPSA 10 BETA > 40 IS MPSA 09 BETA > 100

Q105, Q106, Q115, Q116, WAS MPSA 10 BETA > 130
Q108, Q109, Q118, Q119 IS MPSA 09 BETA > 200

△E 1196 AND ON R26 1.2 OR 2.0 Ω 2W

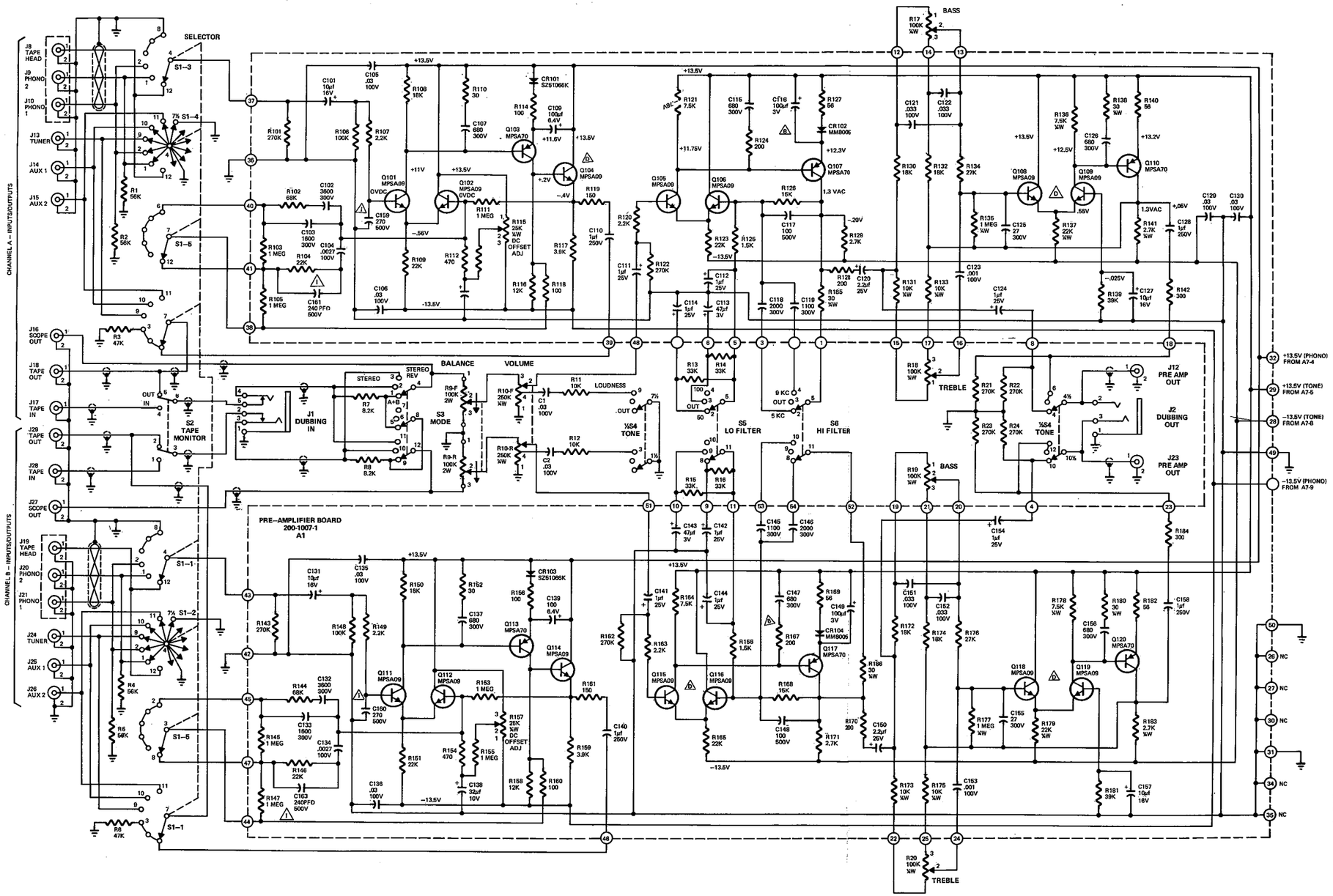
△F C219 1001 AND ON OPTIONAL ITEM TO ELIM. OSCILLATION

△G C220 3291 AND ON

△H R237, R238 WAS 470Ω IS 1K POT

△I 1053 AND ON C159 WAS 150 PF IS 270 PF
C160 WAS 150 PF IS 270 PF
ADDED C161, C163

△J EMITTER RESISTORS R243, R244 (1K, 1/2W, 5%)
1001➡1351 ONLY



NOTES: (UNLESS OTHERWISE SPECIFIED.)

1. ALL RESISTORS ARE ½ W; VALUES ARE IN OHMS.
2. CAPACITOR VALUES EXPRESSED DECIMALLY ARE IN MICRO-FARADS; OTHERS ARE IN PICO-FARADS.
3. (F) DENOTES PRECISION FILM RESISTORS.
4. LAST REFERENCE DESIGNATION USED:
   CHASSIS: A7, C5, DS1, F1, J30, P1, R26, S8, T1, TB2.
   A1: C163, CR104, Q120, R186. A2-A3: L1, Q2. A4-A5: C220, CR207, Q212, R245. A6: C303, CR303, Q303, R315, K301. A7: C412, CR206, Q402, R412.
5. REFERENCE DESIGNATION NOT USED:
   CR204, CR205, C212, C218, C162, R243, R244, C219.

△6. Q206 & Q208 ARE MATCHED WITHIN ONE BETA RANGE.

△7. Q1 & Q2, Q209 & Q210 ARE MATCHED PAIRS IN THE SAME BETA RANGE.

8. BETA RANGES ARE: 40-99, 100-149, 150-199, 200-399 & 400 OR GREATER.

REF. DES.	BETA (H_{FE})	REF. DES.	BETA (H_{FE})
Q101	>400	Q202	>400
Q102	>400	Q203	>111
Q103	>150	Q204	> 40
Q104	>100	Q205	> 40
Q105	>200	Q206	△6
Q106	>200		
Q107	>150		
Q108	>200	Q207	>200
Q109	>200	Q208	△6
Q110	>100		
Q111	>400	Q209	△7
Q112	>400		
Q113	>150	Q210	△7
Q114	>100		
Q115	>200	Q1	△7
Q116	>200		
Q117	>150	Q2	△7
Q118	>200		
Q119	>200	Q302	>30
Q120	>100		
Q201	>400		

Figure 18. Model 30 Schematic.

CHANGE RECORD

Enter changes on the Model 30 here for a permanent record. Insert pages into manual. Retain or discard old pages, as instructed.

ECN NO.	DATED	DESCRIPTION	INSERTED BY	DATE
1169	1/23/70	C159 was 150PF is 270PF C160 was 150PF is 270PF Added C161 240PF Added C 163 240PF S/N 1053 and on	KFH	1 May 70
1207	2/13/70	Deleted C212, C218 S/N 1201 and on C213 was 680PF is 1000PF C214 was 680PF is 1000PF Deleted R243, R244 R233 was 1K is 820 ohm R234 was 1K is 820 ohm R211 was 3.9K is 5.1K R236 was 7.5K is 5.6K R239 was 7.5K is 5.6K R235 was 39K is 43K R240 was 39K is 43K R212 was 5% is 2% S/N 1351 and on	KFH	1 May 70
1220	2/19/70	R124 was 30 ohm is 200 ohm R167 was 30 ohm is 200 ohm S/N 1131 and on	KFH	1 May 70
1230	2/27/70	Added R26 S/N 1196 and on	KFH	1 May 70
1261	3/30/70	Added C220 S/N 3291 and on	KFH	1 May 70
1311	5/11/70	R237 was 470 ohm is 1K var. R238 was 470 ohm is 1K var. S/N 1001 and on	KFH	1 May 70

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