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SERVICE MANUAL 120



marantz

model 120

*Fm / Am
Stereophonic Tuner*

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1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model 120 Stereophonic Tuner.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of the operation in the tuner.

The part lists furnish information by which replacement parts may be ordered from the Marantz Company. A simple description is included for parts which can be usually obtained through local suppliers.

2. AM TUNER

The AM Tuner section of this model is identical with that of Marantz's new integrated Tuner/Amplifier Model 2270. All components except Tuning capacitor and ferrite bar antenna are mounted on a printed circuit board P150.

The AM signals induced in a ferrite bar antenna are applied to the base of RF amplifier transistor H151 through a capacitor of C151 and amplified to the level required for overcoming the conversion noises, thus giving good S/N performance.

Thus amplified and selected AM signal is then applied to the base of converter transistor H152 through a coupling capacitor C156. The local oscillator voltage is injected to the emitter of H152 through a capacitor C157. Both AM signal and oscillating voltage are mixed at the base-emitter junction of the converter transistor and converted into a 455 KHz intermediate frequency. The resulting IF signal is then applied to the first IF transformer L153 consisting of one ceramic filter and two tuned circuits. The output of the L153 is led to the H153 which in turn apply its output to the transistor of next stage H154. Thus fully amplified IF signal is then applied to the diode H157 through the detector transformer L154 and detected. The detected signal is then filtered and amplified, thus obtained final audio output is applied to the TAPE OUT jacks and the function push switch.

The DC component of the detected IF signal is used as a AGC voltage to control the emitter current of H153 which in turn controls the bias current of the RF amplifier through the resistors R179 and R151.

A part of IF signal output is also applied to the diodes H158 and H160 through a capacitor C167 and rectified to obtain DC voltage for driving the vertical amplifier of the scope display circuit.

2.1 Suggestions for AM Tuner Trouble Shooting

Symptom: No reception

Check for broken AM bar antenna, next try to tune station by rotating fly-wheel tuning knob slowly and observe the spot on the oscilloscope whether it deflects up and down or not. If the spot moves up and down as you tune past each station, no failure may exist in the stages at least preceding final IF transformer L154. Next connect a high sensitive oscilloscope to the pin terminal J162 or J157 and check for the detected audio signals with the tuner correctly tuned to a station. If the spot does not moves up and down when you tune past each station, check the local oscillator circuit. Normal oscillating voltage at the hot end of the oscillator tuning capacitor is about 2 to 3 volts, depending upon the tuning capacitor position. When measuring oscillating voltage use a RF VTVM, no circuit tester gives correct readings. If the local oscillator voltage is normal, check all voltage distributions in the AM circuits by using a DC VTVM and compare the measured values with those given in the schematic diagram.

3. FM TUNER

3.1 RF and IF Circuit

The FM Tuner section of the Model 120 is divided into five functional blocks: FM Front End, IF Amplifier, Detector, Muting Control, and MPX Stereo Decoding Circuit.

FM signals induced by a FM antenna are led to FM antenna coil L101 through an attenuator switch and a Balun coil. These signals are then applied to the FET RF amplifier which in turn applies its output to the next FET Mixer H102 through the triple tuned high selective circuits. The FET Mixer converts its input signal into 10.7 MHz intermediate frequency and amplifies it at the same time. The H103 is a local oscillator and its output is injected into the source of the FET Mixer, the injection voltage is about 700mV. The 10.7 MHz front end output is led to the next IF amplifier unit through a coaxial cable.

The IF amplifier unit consists of six stages of IF amplifier and one stage of AGC amplifier. Eight pieces of ceramic filters are also used to obtain high selectivity, three stages of symmetrical diode limiters are also employed for the best limiting characteristics, improved capture ratio and AM good suppression.

A part of FM Front End output is applied to the AGC amplifier H207 and rectified its output is fed back to the gate of FET RF amplifier to decrease the gain with increased signal strength.

The signals required for multipath indication are obtained from the three stages of IF amplifiers through coupling capacitors C234, C236 and C238 respectively and rectified by three pair of full wave diode circuits. Thus obtained three AM components in the FM signal are appropriately mixed and applied to the vertical amplifier for multipath display.

The IF signal sufficiently amplified through each stage of IF amplifier is finally applied to the IC limiter on the Detector Unit. The detected audio output is led to the buffer amplifier H502 and its buffered output is led to; (a) noise amplifier H551 through resistor R551 and capacitor C551, (b) Quad Radial Jack on the rear panel through resistor R563, (c) MPX stereo decoding circuit through R563.

3.2 Audio Muting and Stereo mode auto-selecting circuit

The muting circuit consisting of all solid-state electrical switching has been incorporated in the Model 120. Three inputs control the muting function. The first is related to signal strength, the second to the noise condition at the detector and the third is derived from the DC component of the detector output. These inputs are properly matrixed and gated to provide muting free from noise and transients.

The first input of DC voltage obtained by rectifying a part of IF output signal from the H206 is applied to the base of H306 and turns on it, if the IF output is greater than predetermined level (muting threshold level). When the H306 is turned on the H307 is turned off, allowing the emitter-collector resistance increasing and the collector voltage rises about 9.7V. The increased collector voltage increases the gate bias voltage and turns on the switching FET H308, decreasing the sourcedrain resistance to near zero ohm and allowing the audio signal applied to the source to flow to the center of 38 KHz switching transformer through the source-drain path.

When the input signal is lower than predetermined level, the DC output obtained is small and can not make the H306 turn on, thus the H306 keeps its turn-off state and this makes H307 turn on, decreasing the collector voltage and turning of H308. Thus no audio signals can pass through the FET. This is the fundamental principle of the muting operation but for more elaborate muting operation the second and the third inputs are necessary.

The second input is used to protect the muting operation and MPX stereo beacon lamps from misoperation due to undesirable noises. The high frequency noises included in the detected audio signals are separated by a small capacitor C551 and amplified by the noise amplifier transistor H551 and its output is rectified by the two diodes. The rectified DC output is proportional to the noise components in the audio signals.

When there are excessive noises in the audio signals such as obtained with a station uncorrectly tuned in, the rectified DC output turns on the transistor H522, decreasing the emitter-collector resistance to zero. This means the collector of H307 is short-circuited to the ground, therefore the H308 is turned off and any audio signals having excessive high frequency noises can not go through the FET's source-drain path.

The transistor H303 connected in series with the 19 KHz pilot signal amplifier transistor H302 is also turned off (when the transistor H522 or H307 are turned on.) and no current flows in the H302, resulting in turning off the stereo beacon lamps.

Thus misoperation due to undesirable noises is also avoided.

The third input is obtained from the FM discriminator circuit.

The DC output so called "S" curve is applied to the gate of H558 through a resistor R523 and dividing network (R565 & R566). The DC output is zero with a station correctly tuned in, but will vary from negative to positive values or vice versa when a station is tuned past from right to left or vice versa.

When the DC output is increased to a greater level than that predetermined, the increased source potential of H558 makes the H560 turn on and the H306 is turned off. The subsequent changes are exactly the same as those just described above.

Thus when the tuning is shifted or deviated to the certain frequencies in which undesirable noisy side-audio signals are produced, both muting and 19 KHz switching transistors are automatically operated and open the circuits.

With the station correctly tuned in, the bias current of the FET H558 is adjusted so that both transistor H560 and H561 are not turned on, giving no effect on the transistor H306.

3.3 MPX Stereo Decoding Circuit

The buffered and non-equalized audio signals are applied to the first amplifier H301 which serve as a tuned amplifier for the pilot signal in the composite signals and as a buffer amplifier for the audio signals. The amplified 19 KHz pilot signal is led to the second 19 KHz amplifier H302 and further amplified if switching transistor H303 is turned on by the DC controlling signal as described in the preceding chapter. The final 19 KHz pilot signal is rectified by the doubler circuit consisting of the H315 and H316 to obtain synchronized 38 KHz driving signal.

The H304 is the 38 KHz tuned amplifier and supplies its output to the switching matrix circuit consisting of four diodes. While the composite signals are applied to the center tap of switching transformer 1/2 L302. The right and left stereo signals decoded by the switching circuit are led to the crosstalk cancelling amplifier which utilizes complementary configuration with NPN and PNP transistors through de-emphasis networks consisting of C315 and R335, and C316 and R336. L305 is a low-pass filter networks having very sharp cut off characteristics and eliminates undesirable residual switching signals. Transistors H313 and H314 are buffer amplifiers and their outputs are led to FM push switch.

3.4 Suggestion for Trouble Shooting of FM Tuner

3.4.1 Symptom: No FM Reception

Turn on the POWER switch.

Turn on (depress) two scope display switches "ON" and "TUNING".

First try to tune to some FM stations.

Rotate the fly-wheel tuning knob slowly and observe the spot on the oscilloscope whether it follows an approximately rectangular path as you tune past each station or not. If it moves as described, the tuner circuits preceding the discriminator circuit may have no failure. If not, there would be some defects in the front end or IF amplifier stages, or oscilloscope circuits. To localize the defects in the former case, check FM local oscillator circuit, using RF VTVM. The normal local oscillator voltage is one or two volts (rms) at the tuning capacitor, depending on the tuning capacitor position. If the local oscillator voltage is normal, next check all voltage

distribution in the front end and IF amplifier stages and compare them with those shown in the circuit diagram.

For localizing the defects in the latter case it is one of methods to apply a audio signal to the external audio jacks on the rear panel with the "EXTERNAL" scope display switch depressed.

The detected audio signals can also be checked by depressing the scope display switch "AUDIO" if scope circuit operate without any defects.

3.4.2 Symptom: No Stereo Separations

First check the "MONO" switch is in normal out position.

Connect a FM RF signal generator output modulated by a stereo modulator to the rear FM antenna terminals, and check the stereo beacon is turned on or not. If not turned on, check for 19 KHz pilot signal and 38 KHz switching signal, using an oscilloscope.

4. SCOPE DISPLAY CIRCUIT

Please, refer to the operating manual on general operating instructions for "SCOPE DISPLAY".

4.1 AM Tuning Display

AM signal strength and the correct tuning point are displayed on the scope through the following signal routine:

Rectified DC output at pin terminal J159 → R709 (330K ohm) → R708 (180K ohm) → AM push switch → TUNING push switch → EXTERNAL push switch → scope ON switch → Pin terminal J802 → J906 → H902 vertical amplifier

Note: C703 and C702 are filtering capacitors.

4.2 FM Tuning Display

FM signal strength and correct center tuning signals are applied to the oscilloscope's vertical and horizontal deflection plates through the following routines;

- a. Rectified DC output for FM signal strength at the pin terminal J208 → R559 (trimming resistor) → AM push switch TUNING push switch → EXTERNAL push switch → SCOPE ON push switch → R802 (270K ohm) → pin terminal J802 → J906 → Vertical amplifier (for signal strength)
- b. DC plus and minus output for center tuning at the pin terminal J504 → R809 → TUNING push switch → EXTERNAL push switch → scope ON push switch → R801 → Pin terminal J801 → J905 → Horizontal Amplifier (for center tuning)

Note 1. C804 and C805 are filtering capacitors for audio signals.

Note 2. For easy-to-see spot display, the display spot is modulated to have a slight length in vertical direction for FM tuning or in horizontal direction for AM tuning. This is done by applying a small amount of AC voltage for pilot lamps to the vertical (for FM) or Horizontal (for AM) amplifier input terminal J902 or J901 respectively.

AC voltage for pilot lamps → R803 → C803 → TUNING push switch → AM push switch → J902 (for FM) or J901 (for AM)

* R852 is the DC bias adjusting resistor which corrects the spot position at no signal.

4.3 FM MULTI-PATH DISPLAY

The multi-path display circuit is almost the same as the FM TUNING DISPLAY circuit except the following:

- a. AC voltage for tuning spot modulation is cut off (R803 and C803 are disconnected) from the circuit by depressing the MULTI-PATH push switch.
- b. Audio signal pass filter (C804 & C805) are also cut off, this means audio signals developed at J504 are applied to the horizontal amplifier.

The vertical signal which contains multi-path information is the same as that of signal strength and supplied to the R559 through the pin terminal J208.

5. SCOPE CIRCUIT DESCRIPTION

5.1 Vertical Amplifier

The vertical amplifier consists of two stages of direct-coupled differential amplifiers, the first stage using two FETs (H902 and H912) and the second two transistors (H904 and H906). This amplifiers signals of from DC to AC frequency with very stability. The over-all gain is 46 dB for DC and 49 dB for AC signals (including attenuator network consisting of R802 and R902).

The vertical signal selected by a function push switch and led to the scope display switch is applied to the input circuit of the FET differential amplifier through the attenuator net work (R802 and R902). The fist differential amplifier operates as a source follower and no voltage gain is obtained. The signal passed the first stage is directly fed to the second stage and amplified. The gain of this stage is 56 dB for DC signals and 59 dB for AC signals. The finally amplified signal is then applied to the oscilloscope tube.

- * R918 is a DC gain adjusting resistor and should be set for the gain of 290mV/cm.
- * The AC gain has been set about 3 dB higher than DC gain by a RC network consisting of R912, C907 and C905.
- * R930 is provided for adjusting DC balance between H902 and H912 and should be set so that the voltage difference between the source terminals of H902 and H912 is less than 0.05 volt with two centering control knobs placed in their mechanical center.

5.2 Horizontal Amplifier

The circuitry of horizontal amplifier is almost the same as that of the vertical amplifier.

- * R917 is DC gain adjusting resistor and should be set for 400mV/cm.
- * The AC gain has been adjusted 5 dB higher than DC gain by the RC network consisting of R911, C906 and C904.
- * R929 is the DC balance control between H901 and H911 and should set so that the voltage difference between source terminals of H901 and H911 is less than 0.05 volt with two centering control knobs placed in their mechanical center.

6. POWER SUPPLY CIRCUIT

- a. Power source for tuner (+13.5V) and stereo beacon (12.5V) is zener-regulated and then filtered by a transistor ripple filter circuit consisting of H405.
- b. Power source for MPX Pre-Amp (+35V) and Pre-Amp (+36V) is fed through a transistor ripple filter circuit consisting of H406.
- c. Both DC plus and minus 13.5V for the first differential amplifiers are zener-regulated by two zener diodes, H003 and H410, respectively.
- d. DC +200V for collector circuits of the vertical and horizontal amplifies and DC -500V for CRT's anode are fed by the power supply circuit.

7. TROUBLE SHOOTING OF OSCILLOSCOPE CIRCUIT

7.1 Symptom: No spot obtained

If no spot is obtained with centering knobs (V and H) placed in their mechanical center and BRIGHTNESS control on the rear panel at maximum, there would be defects in the CRT's circuit, vertical and/or horizontal amplifier. To localize the defects proceed as follows:

- a. Short both collector terminals of H904 and H906, and if the spot appear the vertical amplifier would be defective.
- b. Short both collector terminals of H903 and H905, and if the spot appear the horizontal amplifier would be defective.
- c. If no spot is still obtained, the CRT circuit would be defective.

7.2 Symptom: Blurred spot

First adjust FOCUS control on the rear panel and if no sharp spot is obtained, check whether the voltage between cathode of CRT (No. 3 terminal) and plate (No. 4 terminal) can be varied from 150V to 250V or not by adjusting FOCUS control on the rear panel. If the voltage varies within the limit above, the oscilloscope circuit is normal. Please, try to replace the CRT with new one.

CAUTION

1. Do not leave the scope turned ON with brightness control set maximum.

Do not make the spot left for a long time with its brightness maximum and its focus pin-pointed to avoid possible desensitization of the phosphor. In the case where the scope has to be turned for a long time decrease the brightness of the spot. Turn the scope off when not in use.

2. High Voltage, Danger

When removing the top and/or bottom cover, always remove the power cord from the AC outlet to avoid possible electrical shock from high voltage for oscilloscope circuit.

3. Do not place the set (CRT) in a powerful magnetic field.

If placed, the electron beam in the CRT will be bent and the spot is shifted from the correct position. The trace may also be distorted.

8. SCOPE DISPLAY ALIGNMENT

8.1 Depress both scope display switches "ON" and "EXTERNAL".

8.2 Adjust two centering knobs to bring the spot into the center of small circular.

8.3 Adjust "BRIGHT" control (R007) on the rear panel to make the brightness of the spot dimmer.

8.4 Adjust "FOCUS" control (R006) to make the spot smaller and more circular.

8.5 Feed in DC 290mV to the "SCOPE INPUT, HORIZ" jack and adjust R917 (HORIZ) to obtain a horizontal deflection of about 2cm, then connect the same DC input voltage to the "VERT" jack and adjust R918 (VERT) for the same vertical deflection.

8.6 Set both the centering knobs at their mechanical center, and adjust R929 (HORIZ) and R930 (VERT) to bring the spot into the center of small circular.

9. TUNING DISPLAY ALIGNMENT

9.1 Depress both scope display switches "ON" and "TUNING" and mode selection switch "AM".

9.2 Adjust R854 to bring the spot on the lower center of the base line with no station tuned in.

10. FM TUNING DISPLAY ALIGNMENT

10.1 Depress both scope display switches "ON" and "TUNING" and mode selection switch "FM".

10.2 Connect FM signal input of 100 K μ V (98 MHz, 400 Hz, 30% Mod.) to the FM ANT terminal and adjust R559 so that the spot does not frame out.

10.3 FM Multipath display alignment: Adjust R809 to obtain full deflection of the trace within both side marks, applying FM signal (1 K μ V, 400 Hz 100% Mod.) to the FM antenna terminals.

10.4 Connect FM signal (98 MHz, 400 Hz 100% Mod, 1 K μ V) to the antenna terminals and tune the same frequency, then rotate the tuning knob slowly and adjust R917 so that maximum deflection of the spot moving toward left or right direction does not frame out.

11. AM ALIGNMENT

AM IF Alignment:

- 11.1 Connect a sweep generator to the J151 and an alignment scope to the J162.
- 11.2 Rotate each core of IF transformer L153 and L154 for maximum height and flat top symmetrical response.

AM Frequency Range and Tracking Alignment:

- 11.3 Set AM signal generator to 525 KHz. Turn the tuning capacitor fully closed (place the tuning pointer at the low end.) and adjust the oscillator coil L152 for maximum audio output.
- 11.4 Set the signal generator to 1650 KHz. Place the tuning pointer in the high frequency end and adjust the oscillator trimmer on the oscillator tuning capacitor for maximum audio output.
- 11.5 Repeat the step 1 and 2 until no further adjustment is necessary.
- 11.6 Set the generator to 600 KHz and tune the receiver to the same frequency and adjust a slug core of AM ferrite rod antenna and RF coil L151 for maximum output.
- 11.7 Set the generator to 1400 KHz and tune the receiver to the same frequency and adjust both trimming capacitors of Antenna and RF tuned circuit for maximum output.
- 11.8 Repeat the step 4 and 5 until no further adjustment is necessary.

Note: During tracking alignment reduce the signal generator output as necessary to avoid AGC action.

12 FM ALIGNMENT

- 12.1 Connect a FM signal generator to the FM antenna terminals and a oscilloscope and an audio distortion analyzer to the tape output jacks on the rear panel.
- 12.2 Set the FM SG to 87.5 MHz and provide about 3 to $5\mu\text{V}$. Place the tuning pointer at the low frequency end by rotating the tuning knob and adjust the core of oscillator coil L105 to obtain maximum audio output.
- 12.3 Set the FM SG to 108.5 MHz and provide about 3 to $5\mu\text{V}$ output. Rotate the tuning knob and place the tuning pointer at the high frequency end and adjust the trimming capacitor C106 for maximum output.
- 12.4 Repeat the step 2 and 3 until no further adjustment is necessary.
- 12.5 Set the FM SG to 90 MHz and tune the receiver to the same frequency. Decrease signal generator output until the audio output level decreases with the decreasing generator output. Adjust the antenna coil L101, RF coil L102, L103 and L104 and IF transformer L106 for minimum audio distortion.
- 12.6 Set the FM SG to 106 MHz and tune the receiver to the same frequency. Adjust the trimming capacitor C102, C103, C104 and C105 for minimum distortion.
- 12.7 Connect a VTVM (with DC 1 V range) across the pin terminal J504 and common ground. Adjust the secondary core (black) of discriminator transformer L501 so that the VTVM indicates null reading (zero reading) at no signal. Set the FM SG to 98 MHz and increase its output level to 1 $\text{KK}\mu\text{V}$ and tune the receiver to the same frequency so that the VTVM gives null reading. Next adjust the primary core (pink) of L501 for minimum distortion. (Scope display can, of course, be used as tuning indicator instead of the VTVM, if the scope unit has been correctly adjusted as instructed in the SCOPE DISPLAY ALIGNMENT.)

13. STEREO SEPARATION ALIGNMENT

- 13.1 Set the FM SG to provide 1 $\text{K}\mu\text{V}$ at 90 MHz. Tune the receiver to the same frequency so that The VTVM (see 12.7) indicates null reading.
- 13.2 Modulate the FM SG with stereo composite signal consisting of only subchannel signal (pilot signal must be included). Adjust the core of L301 for maximum audio output, then modulate the FM signal generator with a stereo composite signal consisting of only L channel

signal and again adjust the core of L301 for maximum audio output.

13.3 Adjust the trimming resistor R365 for maximum and same separation in both channels.

14. MUTING CIRCUIT ALIGNMENT

14.1 Connect a VTVM across the resistor R853 and adjust the resistor R853 until the meter reads 0.75V DC at no signal.

14.2 Set the FM SG to provide 1 K μ V at 98 MHz and tune the receiver to the same frequency correctly.

14.3 Turn on MUTING push switch. Shift the FM signal generator frequency to plus and minus and note both plus and minus shifted frequencies at which undesirable audio side responses are muted out. Adjust the R853 so that each shifted frequency range becomes equal.

15. VOLTAGE CONVERSION

This model is equipped with a universal power transformer to permit operation at 100, 120, 200, 220 and 240V AC 50 to 60 Hz.

To convert the Model 2270 to the required voltage perform the following steps:

- (1) Remove the top cover.
- (2) Remove the Transformer Wire Connection Terminal Cover, loosen two Cover mounting screws on the rear panel, see Fig. 1.
- (3) Change the jumper wires as illustrated in Fig. 2. for the required AC voltage and replace the fuse as instructed.

CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE.

16. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the Model 120 Tuner.

Item	Manufacturer and Model No.	Use
AM Signal Generator		Signal source for AM alignment
Test Loop		Used with AM Signal generator
FM Signal Generator	Less than 0.3% distortion	Signal source for FM alignment
Stereo Modulator	Less than 0.3% distortion	Stereo separation alignment and trouble shooting
Audio Oscillator	Weston Model CVO-100P, less than 0.02% residual distortion is required.	Sinewave and squarewave signal source.
Oscilloscope	High sensitivity with DC horizontal and vertical amplifiers.	Waveform analysis and trouble shooting, and ASO alignment.
VTVM	With AC, DC, RF range	Voltage measurements.
Circuit Tester		Trouble Shooting

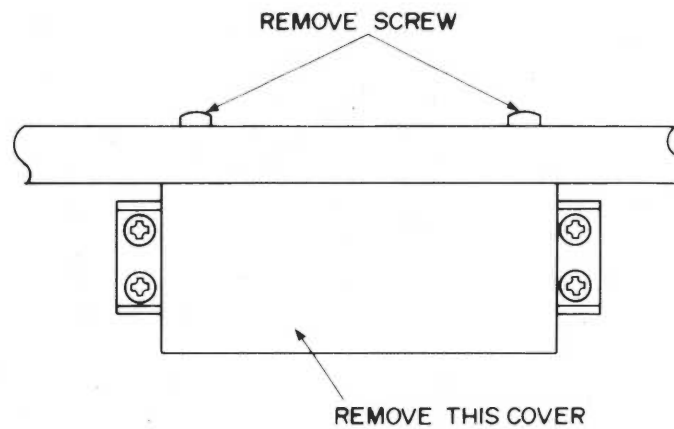


Figure 1. Remove the Terminal Cover

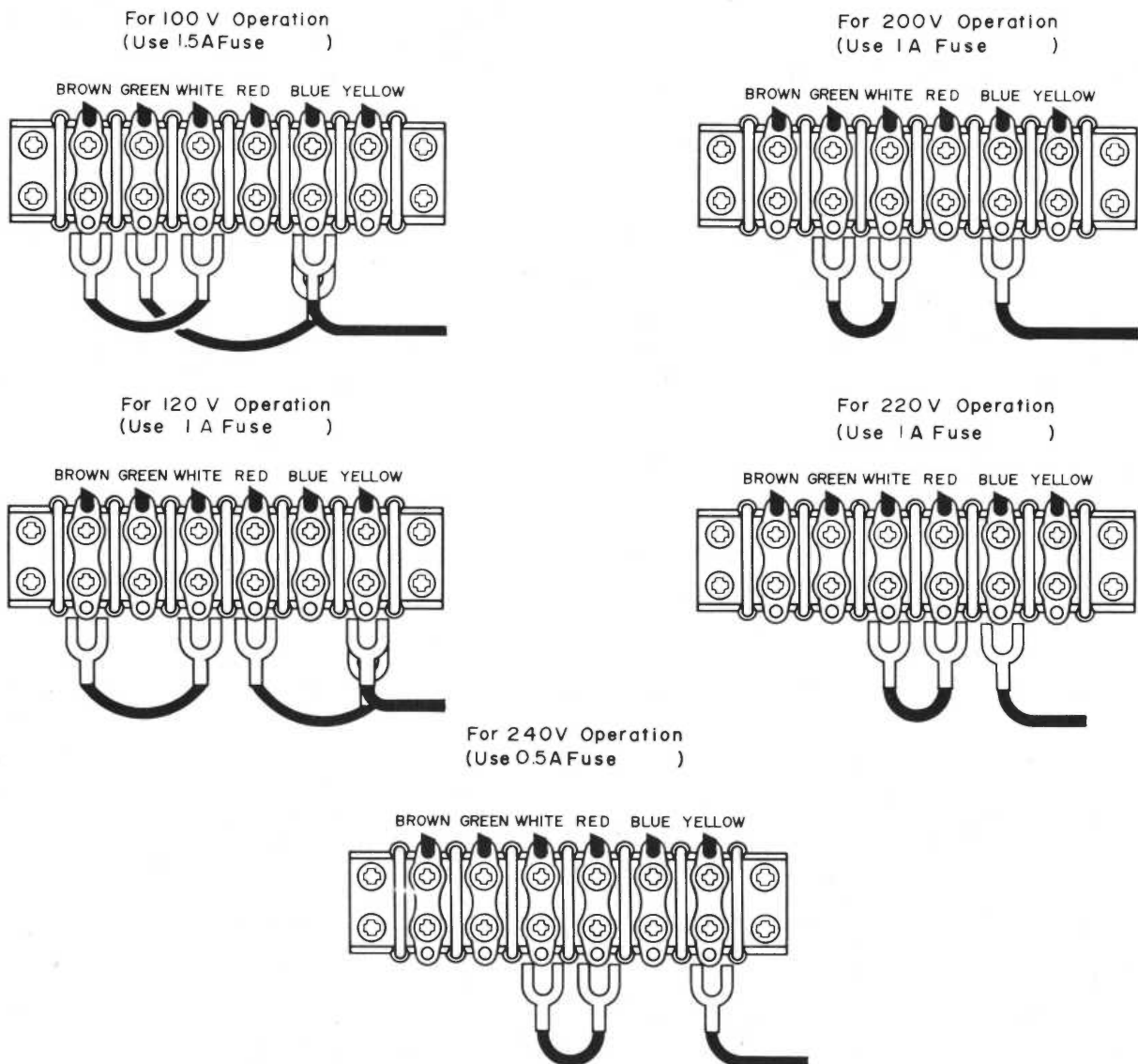


Figure 2. Voltage Conversion Chart

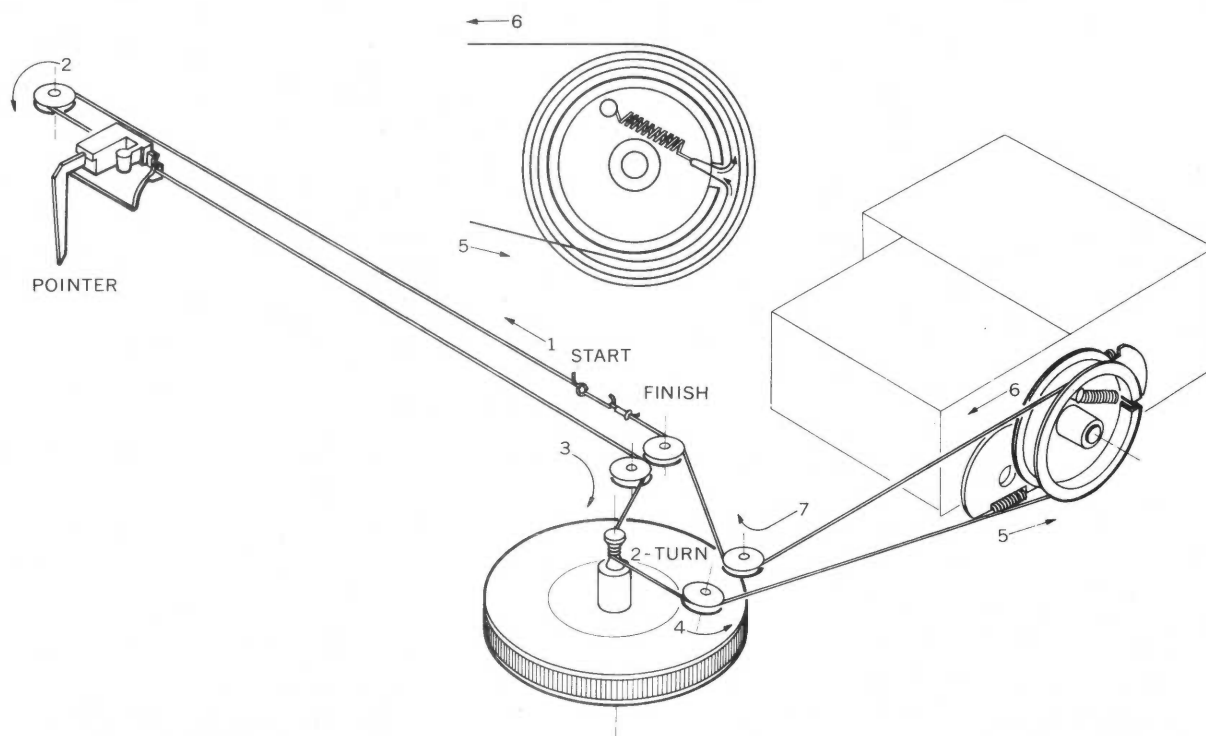


Figure 3. Dial Stringing

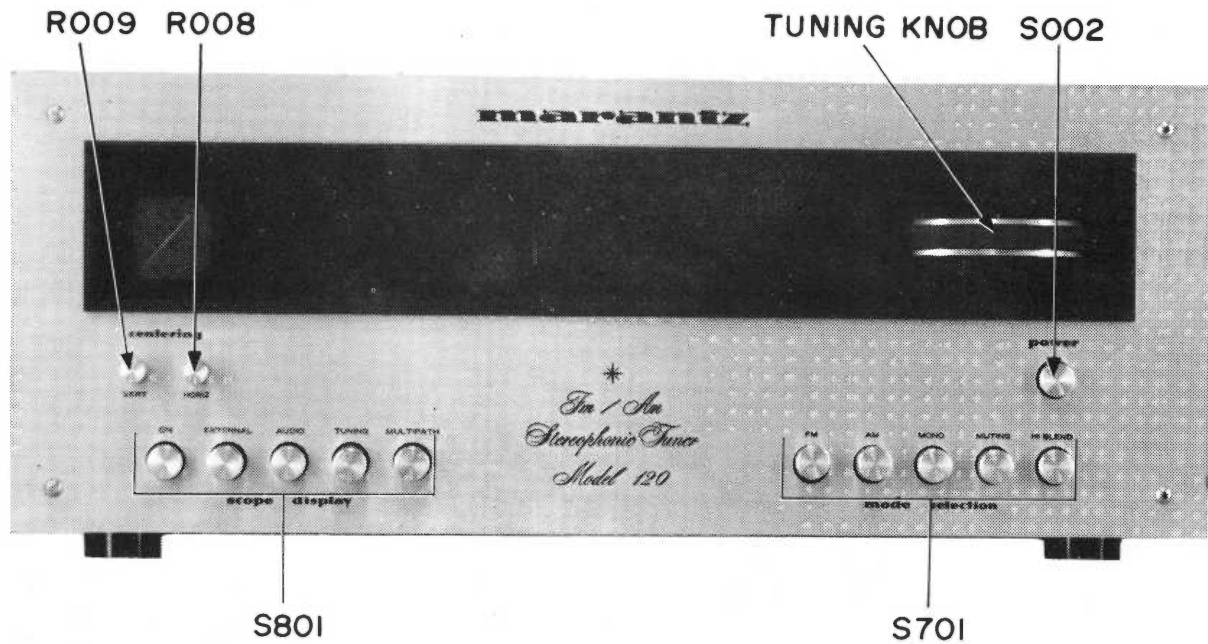


Figure 4. Front Panel Adjustment and Component Locations

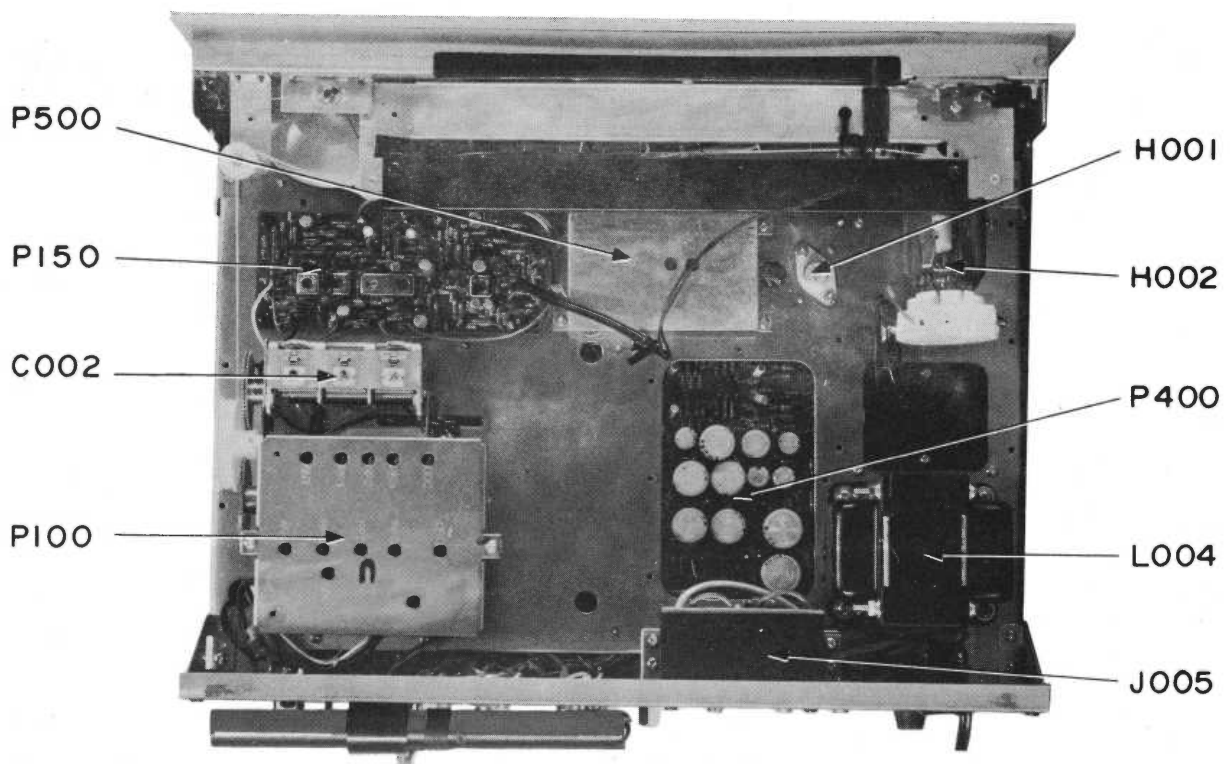


Figure 5. Main Chassis Component Locations (Top View)

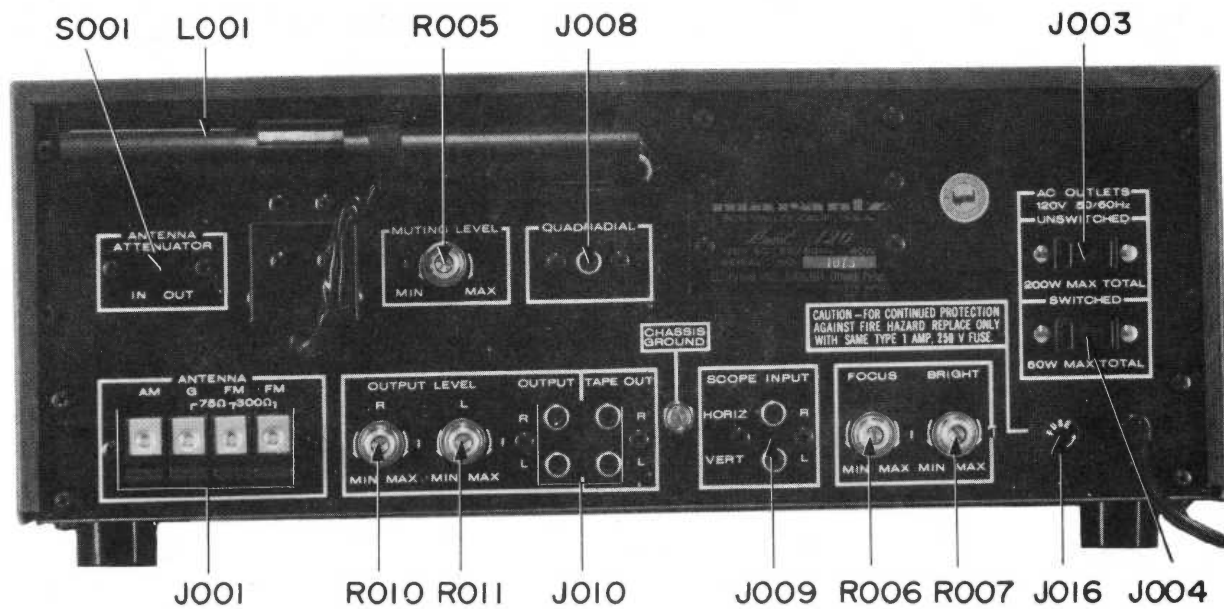


Figure 6. Rear Panel Adjustment and Component Locations

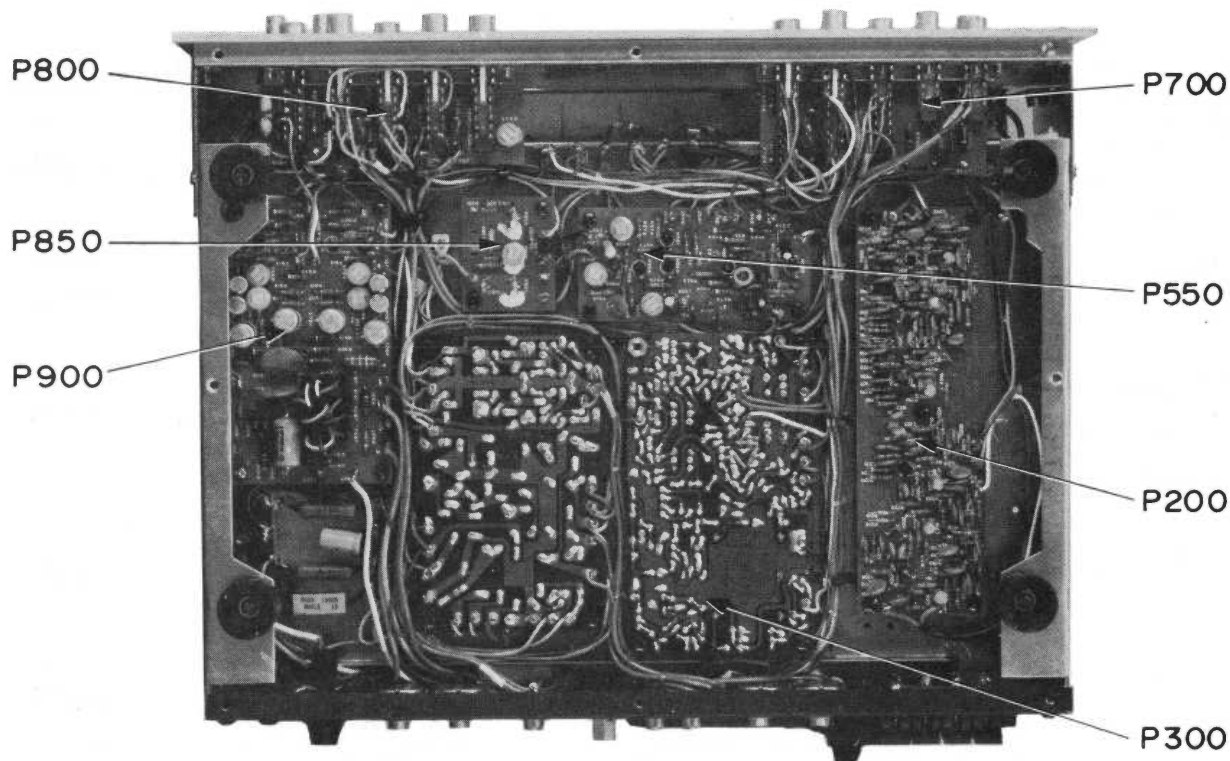


Figure 7. Main Chassis Component Locations (Bottom View)

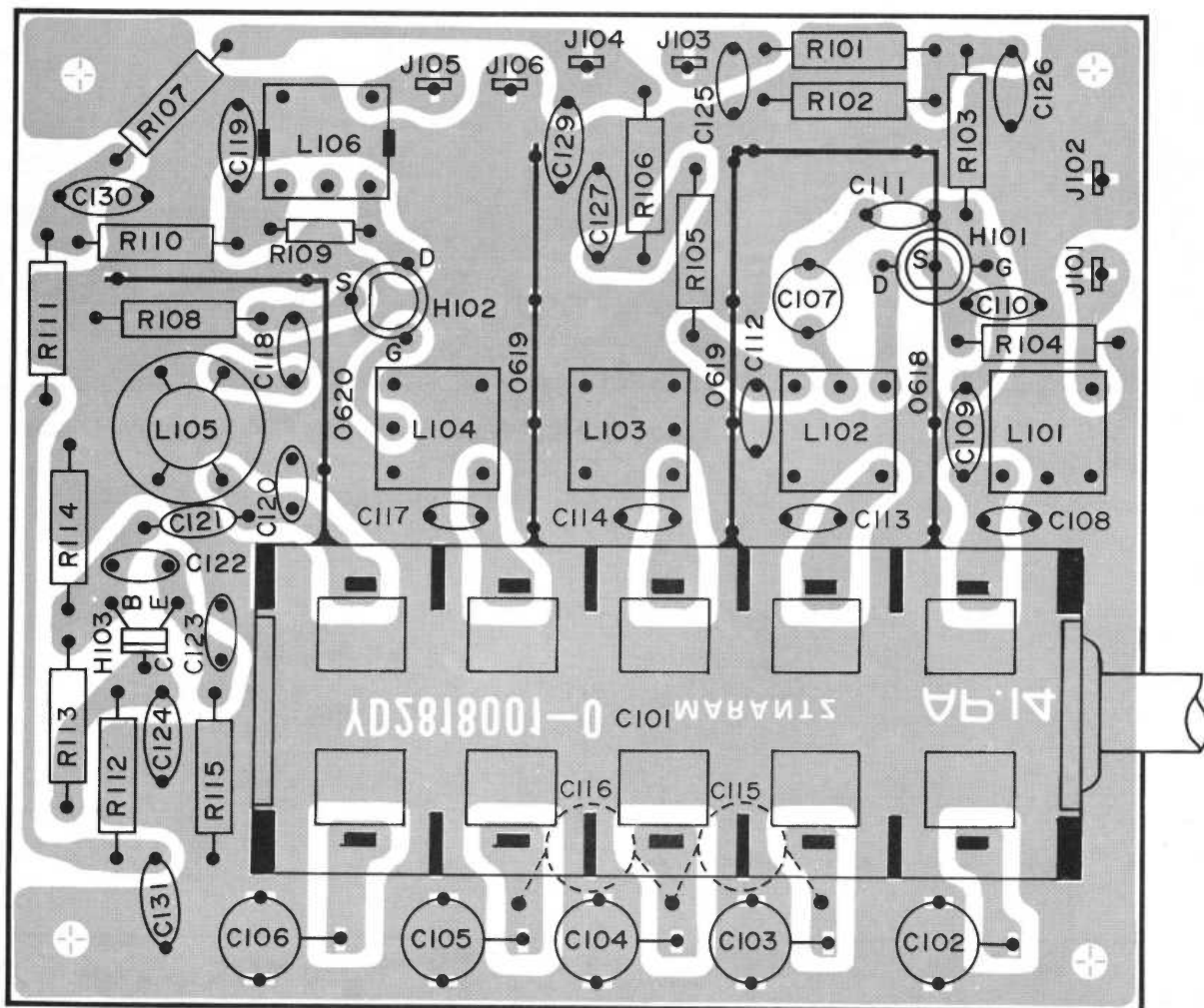


Figure 8. FM Front End Assembly P100 Component Locations

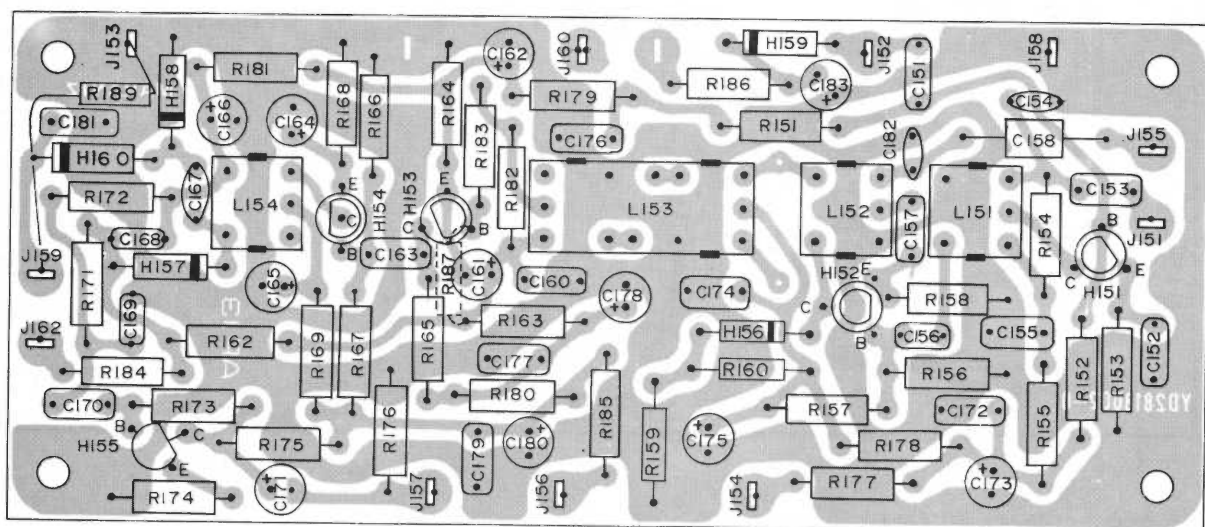


Figure 9. AM Tuner Unit Assembly P150 Component Locations

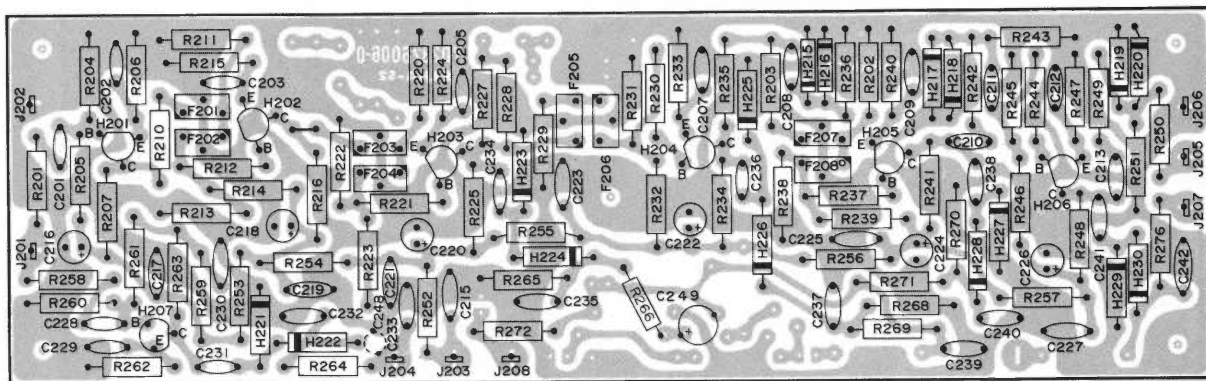


Figure 10. FM IF Amplifier Assembly P200 Component Locations

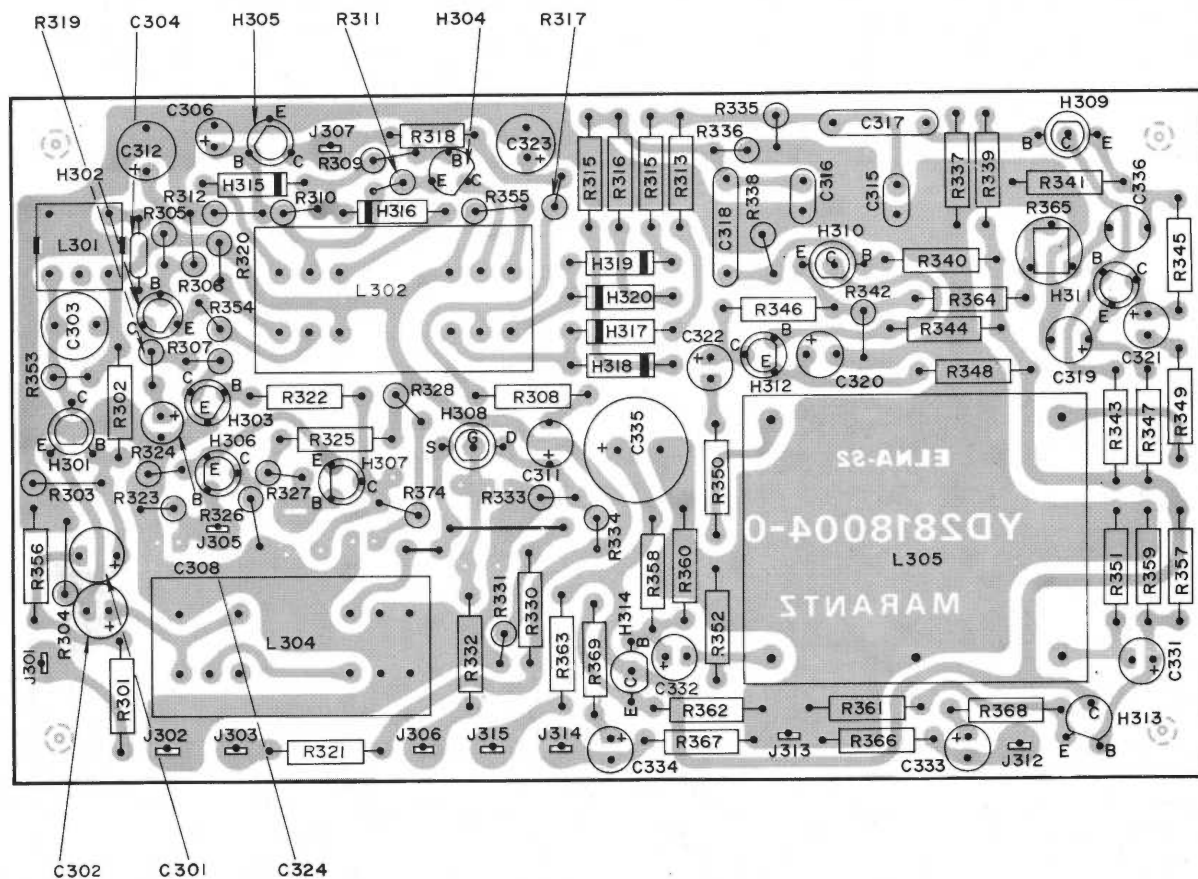


Figure 11. MPX Stereo Decoding Amplifier Assembly P300 Component Locations

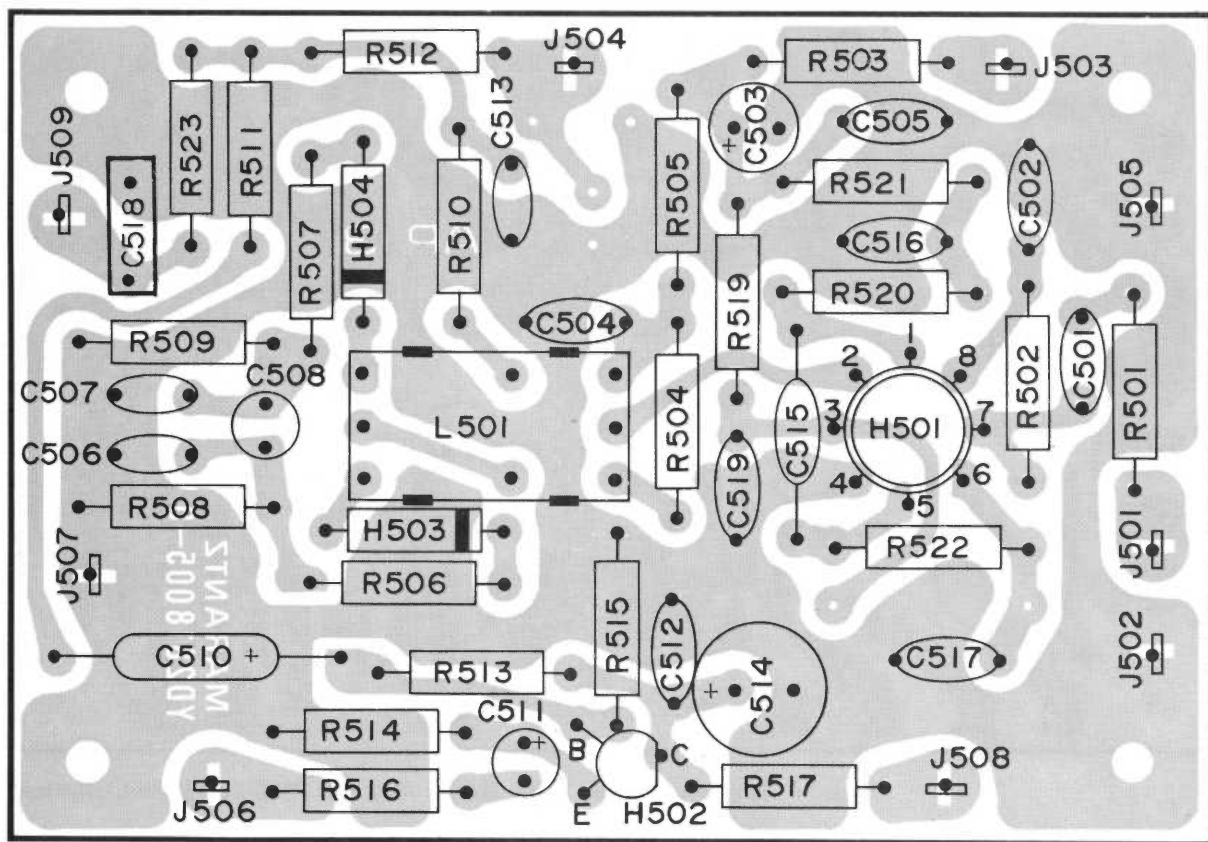


Figure 12. FM Detector Assembly P500 Component Locations

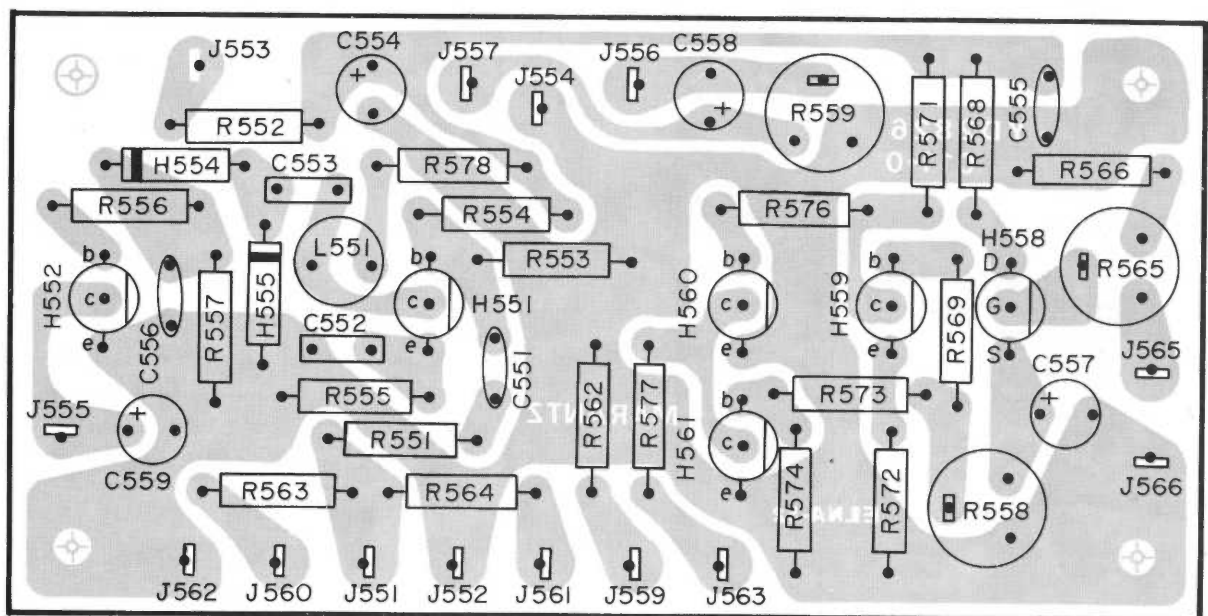


Figure 13. FM Noise and DC Amplifier Assembly P550 Component Locations

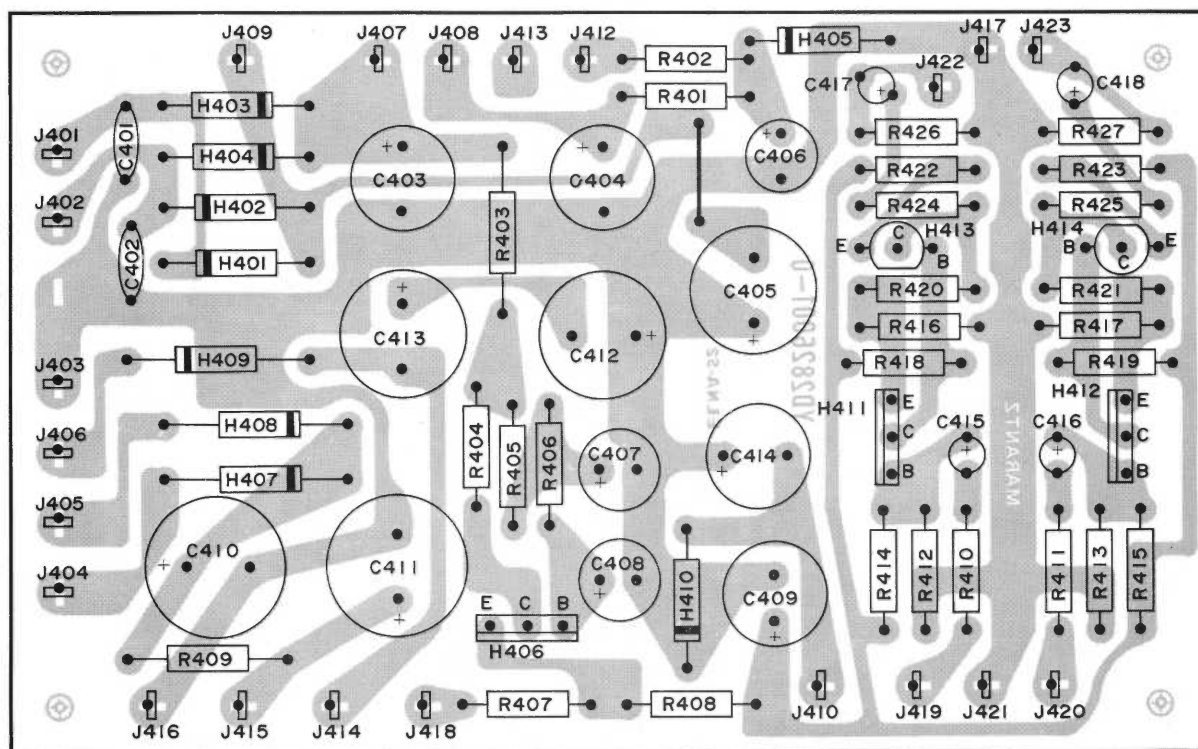


Figure 14. Pre-Amplifier and Power Supply Assembly P400 Component Locations

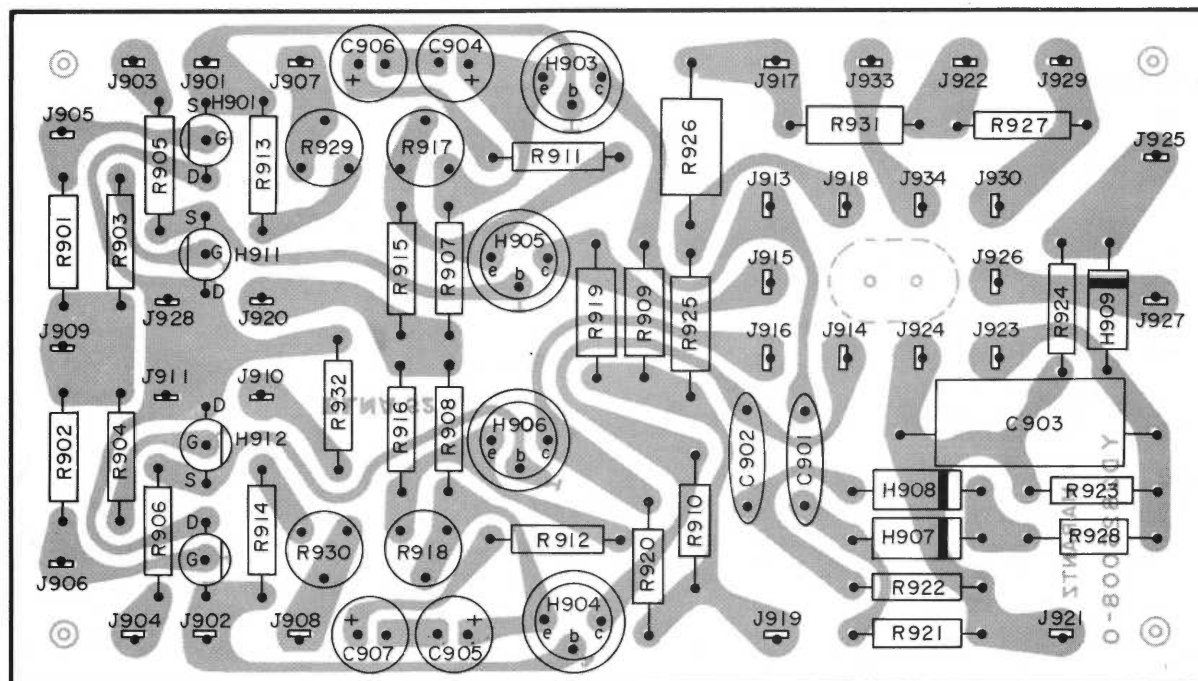


Figure 15. Scope Display Assembly P900 Component Locations

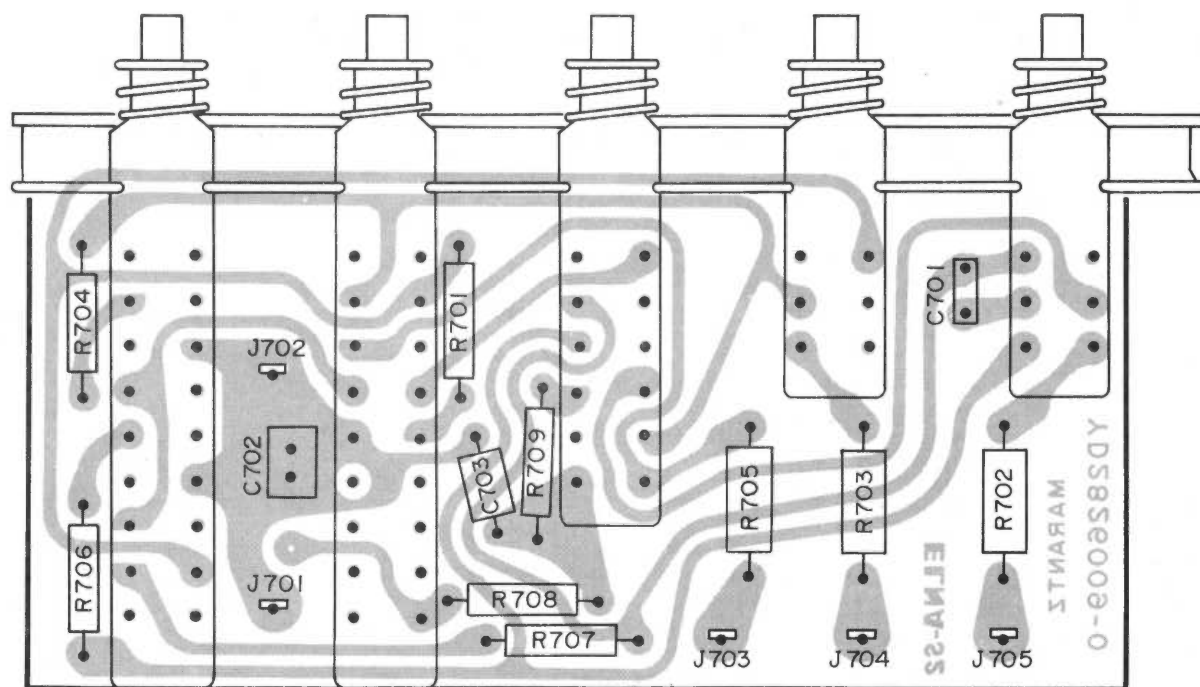


Figure 16. Function Switch Assembly P700 Component Locations

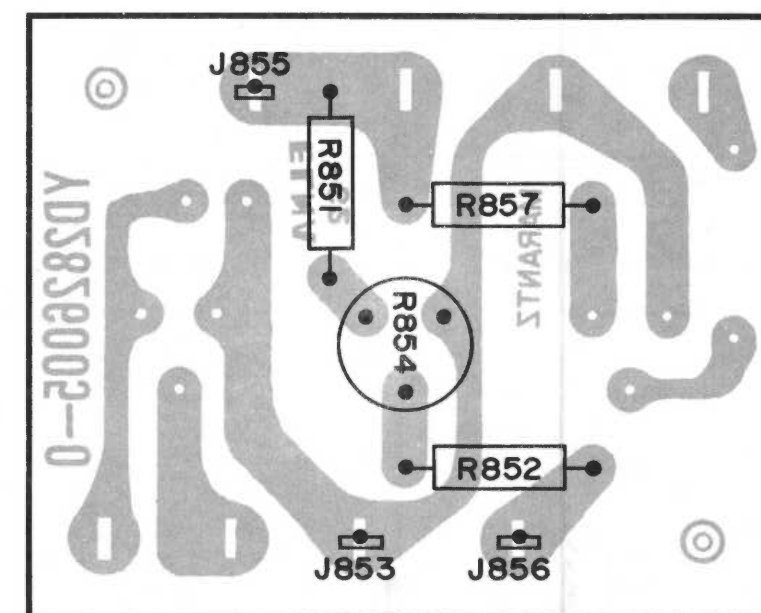


Figure 18. Muting and DC Level Adjustment Assembly P850 Component Locations

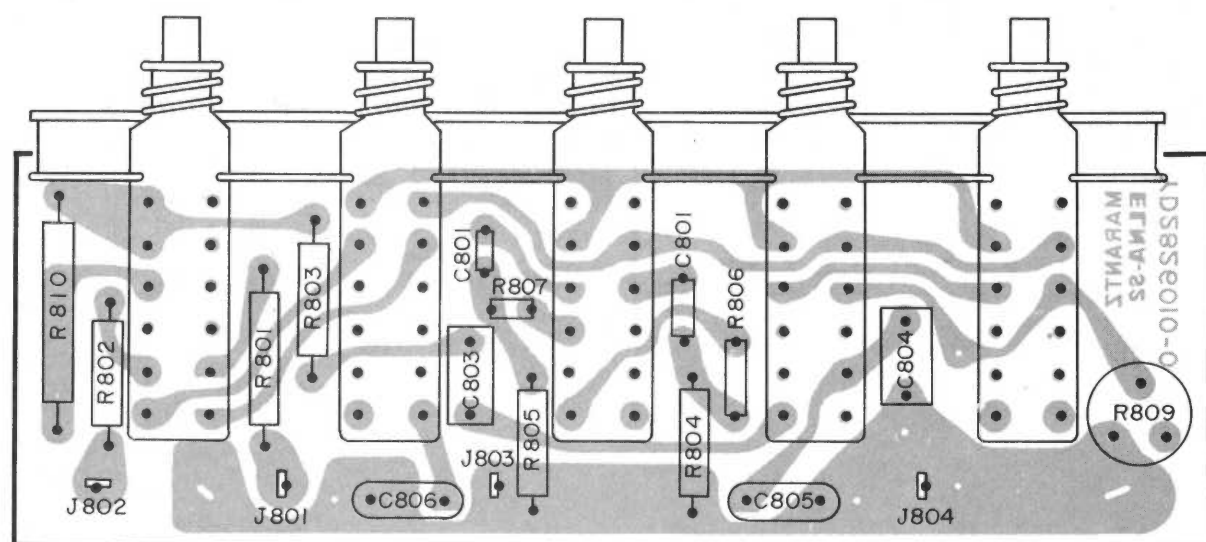


Figure 17. Display Switch Assembly P800 Component Locations

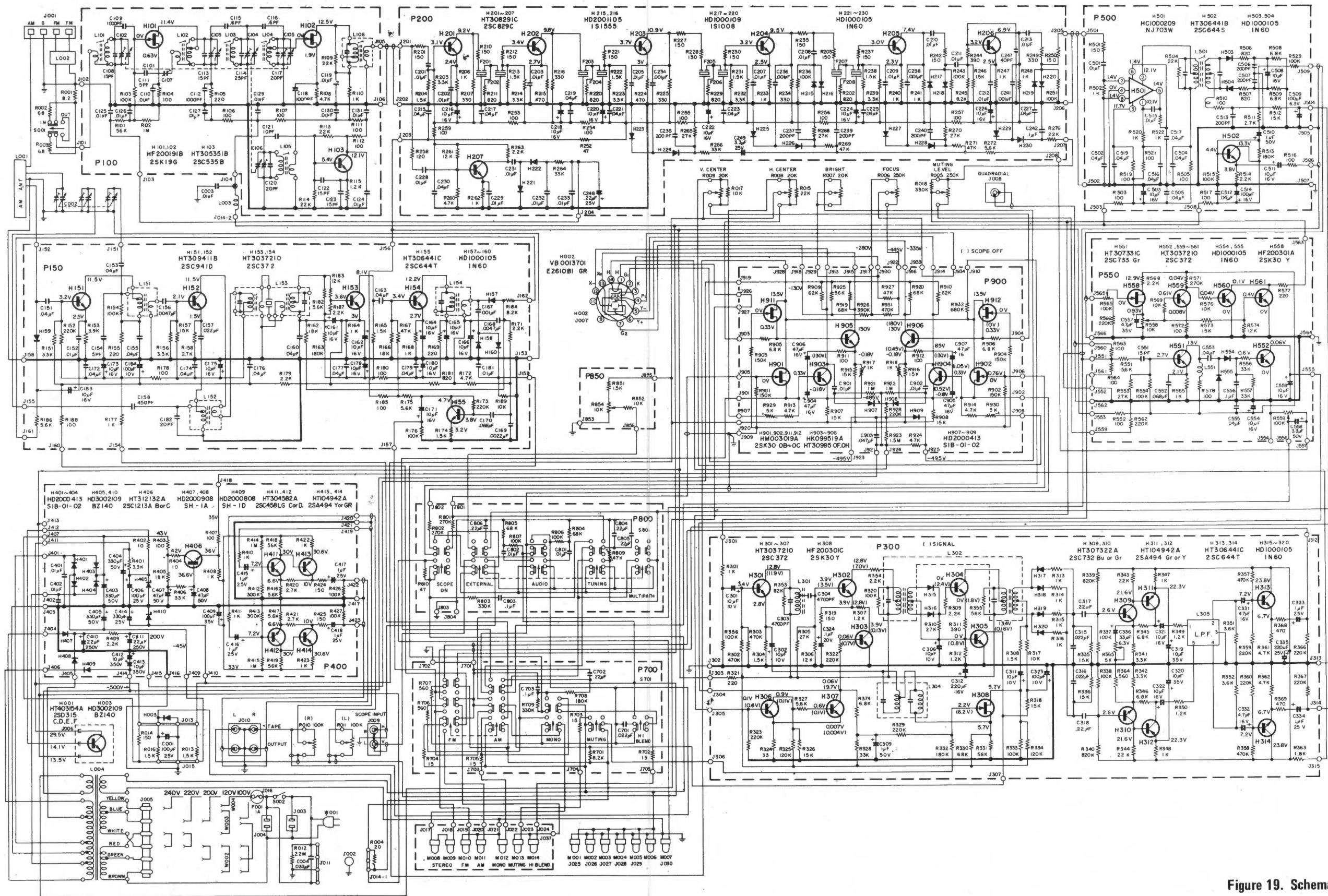


Figure 19. Schematic Diagram

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
A	282640140	Escutcheon Assembly
0102	282606301	Escutcheon
0202	282640101	Frame
0204	282615801	Window
0222	282605302	Cover
0704	51122608E	T H M Screw x 4
B	282616040	Bear Bracket Assembly
0311	282616002	Bracket
J003	YJ0400018	AC Outlet x 2
0905	55060307F	T R Rivet x 4
C	282627340	Fly Wheel Assembly
0118	257706302	Escutcheon (UP)
0119	257706303	Escutcheon (Bottom)
0120	257727301	Fly Wheel
0411	282611201	Shaft
0814	54040402N	Spring Washer
0815	53110403E	Hexagon Nut
D	282610340	Pointer Assembly
0211	282610301	Pointer
0212	281810301	Pointer
0213	281805301	Cover
M006	IN1008007	8V Lamp
E	282600640	Dial String Assembly
0522	120225801	Hook
0521	72081602A	String 150
0634	71101569M	Spring
1128	56382540G	Eyelet
F	281805840	Gear Assembly
0626	281805850	Gear K x 2
0630	711016690	Spring x 2
1021	51650304D	Set Screw H P x 4
0104	282606302	Escutcheon
0105	282615401	Knob x 2
0107	281815401	Knob x 10
0108	281815402	Knob
0113	282625701	Lid
0114	282625702	Lid
0120	257727301	Fly Wheel
0124	282626501	Indicator
0206	281810701	Sheet
0217	282630201	Dial
0218	282630202	Dial
0221	282605301	Cover
0224	281825905	Bush x 11
0226	275905701	Leg x 4
0231	318827102	Holder
0303	282610550	Chassis K
0316	282616003	Bracket
0317	282616004	Bracket
0318	257816010	Bracket

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0319	257816011	Bracket
0321	282616053	Bracket K
0326	281827401	Reflector
0328	281827101	Holder
0329	282627101	Holder
0330	281927107	Holder
0401	282605150	Guide K
0405	282626901	Protector
0406	281810650	Bearing K
0414	141511801	Spacer
0415	257710602	Bearing
0419	282626250	Pulley K
0423	257726201	Pulley x 5
0426	282616006	Bracket
0428	282616008	Bracket
0429	282612001	Insulator
0430	282605601	Buffer
0433	282610101	Support x 4
0434	282610102	Support
0435	282610104	Support
0501	257816052	Bracket K
0506	281927103	Holder
0508	53228059E	Nut x 5
0510	281816006	Bracket
0511	282126902	Protector
0512	282112001	Insulator
0514	273025901	Bush x 2
0515	145525901	Bush x 2
0517	281810906	Shield
0518	281810907	Shield
0526	138200503	Clamper x 10
0528	281912002	Insulator
0531	257711803	Spacer x 4
0532	282711801	Spacer
0533	281910701	Sheet
0534	282610701	Sheet
0602	281810950	Shield K
0606	281810902	Shield
0608	281816008	Bracket x 2
0609	281811201	Shaft
0611	281810903	Shield
0612	281810904	Shield x 2
0613	281810905	Shield
0618	281810908	Shield
0619	114325901	Bush x 2
0620	114325902	Bush x 2
0622	281805102	Guide
0632	281815901	Drum
0706	51100406S	B H M Screw x 9
0709	51100406S	B H M Screw x 4
0710	54020401S	Flat Washer P x 4
0713	51570410B	P H Tapt Screw x 4

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0714	54020401E	Flat Washer x 4	1026	54040402N	Spring Washer
0715	54040402N	Spring Washer x 4	1027	53110403E	Hexagon Nut
0803	51570305B	P H Tapt Screw x 6	1103	51100306S	B H M Screw x 5
0805	51570306B	P H Tapt Screw x 6	1104	51100306S	B H M Screw x 4
0807	51060406E	P H M Screw x 6	1105	51100306S	B H M Screw x 4
0808	51570306B	P H Tapt Screw x 6	1106	51100306S	B H M Screw x 4
0810	54050300R	T L Washer OR x 2			
0811	51100306S	B H M Screw x 2	1107	51100306S	B H M Screw x 4
			1108	51100306S	B H M Screw x 4
0812	51040306A	F H M Screw x 2	1109	51100306S	B H M Screw x 4
0813	51640412D	Set Screw C P	1110	51100306S	B H M Screw x 2
0817	53110603A	Hexagon Nut	1112	51570408B	P H Tapt Screw x 4
0818	54020602A	Spring Washer	1113	54020401E	Flat Washer x 4
0819	54020601E	Flat Washer P	1114	54040402N	Spring Washer x 4
0820	54040302N	Spring Washer	1116	51570306B	P H Tapt Screw x 2
0821	51042606S	F H M Screw x 5	1117	51570306B	P H Tapt Screw x 4
0822	51570306B	P H Tapt Screw x 7	1118	51570306B	P H Tapt Screw x 3
0824	51100306S	B H Tapt Screw x 2			
0826	51570306B	P H Tapt Screw x 2	1121	51570306B	P H Tapt Screw x 10
			1122	51570306B	P H Tapt Screw x 8
0827	64002400R	RG Ring E x 5	1123	51570306B	P H Tapt Screw x 2
0829	51042606S	F H M Screw x 2	1125	51570306B	P H Tapt Screw x 4
0830	51570306B	P H Tapt Screw x 2	1126	54040302N	Spring Washer x 4
0831	51570306B	P H Tapt Screw			
0832	54020301E	Flat Washer P x 3			
0834	51060312E	P H M Screw			
0903	51100308S	B H M Screw x 8			
0904	53110303E	Hexagon Nut x 8			
0906	54050300R	T L Washer OR x 4			
0907	51100306S	B H M Screw x 2			
0909	51100306S	B H M Screw x 2			
0911	51100306S	B H M Screw x 4			
0912	51100306S	B H M Screw x 4			
0913	51570306B	P H Tapt Screw x 4			
0921	51100306S	B H M Screw x 2			
0922	51100306S	B H M Screw x 2			
0923	51570312B	P H Tapt Screw x 4			
0924	54060300R	T L Washer IR x 5			
0926	51100306S	B H M Screw x 3			
0927	51100308S	B H M Screw x 2			
0928	54050300R	T L Washer OR x 2			
0929	53110303E	Hexagon Nut x 2			
0930	51100310S	B H M Screw x 2			
0931	53110303E	Hexagon Nut x 2			
0934	54050400R	T L Washer OR			
1003	51100306S	B H M Screw x 4			
1006	51570306B	P H Tapt Screw x 4			
1007	51570306B	P H Tapt Screw x 4			
1008	51570306B	P H Tapt Screw x 2			
1011	51570305B	P H Tapt Screw x 2			
1012	51040308A	F H M Screw x 2			
1014	51100304E	B H M Screw x 2			
1015	51060305E	P H M Screw x 3			
1023	64000400R	R G Ring E x 3			

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P100	YD2818001 (ZZ2818001)	P. C. Board P. C. Board Assembly	R151	RT1033214	RESISTORS	C170	DF1668301	Mylar, 0.068μF, ±10%
R101	RT1056314	Carbon, 56KΩ, ±10%, 1/4W	R152	RT1022414	Carbon, 220KΩ, ±10%, 1/4W	C171	EA1060169	Elect., 10μF, 16V
R102	RT1010514	Carbon, 1MΩ, ±10%, 1/4W	R153	RT1039214	Carbon, 3.9KΩ, ±10%, 1/4W	C172	DF1740301	Mylar, 0.04μF, ±20%
R103	RT1010414	Carbon, 100KΩ, ±10%, 1/4W	R154	RT1010414	Carbon, 100KΩ, ±10%, 1/4W	C173	EA1060169	Elect., 10μF, 16V
R104	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R155	RT1022114	Carbon, 220Ω, ±10%, 1/4W	C174	DF1740301	Mylar, 0.04μF, ±20%
R105	RT1022114	Carbon, 220Ω, ±10%, 1/4W	R156	RT1033214	Carbon, 3.3KΩ, ±10%, 1/4W	C175	EA1060169	Elect., 10μF, 16V
R106-R107	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R157	RT1015314	Carbon, 15KΩ, ±10%, 1/4W	C176-C177	DF1740301	Mylar, 0.04μF, ±20%
R108	RT1047214	Carbon, 4.7KΩ, ±10%, 1/4W	R158	RT1027214	Carbon, 2.7KΩ, ±10%, 1/4W	C178	EA1060169	Elect., 10μF, 16V
R109	RT1022314	Carbon, 22KΩ, ±10%, 1/4W	R162	RT1018314	Carbon, 18KΩ, ±10%, 1/4W	C179	DF1640301	Mylar, 0.04μF, ±20%
R110	RT1010214	Carbon, 1KΩ, ±10%, 1/4W	R163	RT1018414	Carbon, 180KΩ, ±10%, 1/4W	C180	EA1060169	Elect., 10μF, 16V
R111-R112	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R164	RT1010214	Carbon, 1KΩ, ±10%, 1/4W	C181	DF1710301	Mylar, 0.01μF, ±20%
R113	RT1022314	Carbon, 22KΩ, ±10%, 1/4W	R165	RT1015214	Carbon, 1.5KΩ, ±10%, 1/4W	C182	DD1620001	Ceramic, 20pF, ±10%
R114	RT1022314	Carbon, 22KΩ, ±10%, 1/4W	R166	RT1018314	Carbon, 18KΩ, ±10%, 1/4W	C183	EA1060169	Elect., 10μF, 16V
R115	RT1012214	Carbon, 1.2KΩ, ±10%, 1/4W	R167	RT1047314	Carbon, 47KΩ, ±10%, 1/4W	C184	EA1070109	Elect., 100μF, 10V
C101	CA5000001	CAPACITORS	R168	RT1010214	Carbon, 1KΩ, ±10%, 1/4W	L151	LA1001017	TRANSFORMERS
C102-C106	CT1100001	Variable, FM 5 Gang	R169	RT1022114	Carbon, 220Ω, ±10%, 1/4W	L152	LO1001042	RF Coil, 200μH
C107	CT1100002	Trimmer, 1.5~11.5pF, NPO	R171	RT1022214	Carbon, 2.2KΩ, ±10%, 1/4W	L153	LI1028002	OSC Coil, 120μH
C108	DD1615001	Trimmer, 1.5~11.5pF, NPO	R172	RT1047214	Carbon, 4.7KΩ, ±10%, 1/4W	L154	LI1001048	IFT
C109	DK1710201	Ceramic, 15pF, ±10%, 50V	R173	RT1022414	Carbon, 220KΩ, ±10%, 1/4W	H151-H152	HT309411B	SEMICONDUCTORS
C110	DK1710301	Ceramic, 1000pF, ±10%, 50V	R174	RT1015214	Carbon, 1.5KΩ, ±10%, 1/4W	H153-H154	HT3036210	Transistor, 2SC941 (O)
C111	DD1105001	Ceramic, 0.01μF, ±20%, 50V	R175	RT1056214	Carbon, 5.6KΩ, ±10%, 1/4W	H155	HT306441C	Transistor, 2SC372
C112	DK1710201	Ceramic, 5pF, ±0.5pF, SL	R176	RT1010414	Carbon, 100KΩ, ±10%, 1/4W	H156-H160	HD1000105	Transistor, 2SC644 (T)
C113	DK1710201	Ceramic, 1000pF, ±20%, YY	R177	RT1010214	Carbon, 1KΩ, ±10%, 1/4W	J151-J162	YP1000094	Diode, 1N60
C114	DD1615001	Ceramic, 15pF, ±10%, SL	R178	RT1010114	Carbon, 100Ω, ±10%, 1/4W	P200	YD2826006 (ZZ826006)	MISCELLANEOUS
C115-C116	DD1625001	Ceramic, 25pF, ±10%, SL	R179	RT1022214	Carbon, 2.2KΩ, ±10%, 1/4W	R201	RT1015114	Plug
C117	DD1600601	Ceramic, 0.6pF, ±10%, AK	R180	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R202	RT1082114	P. C. Board
C118	DD1620001	Ceramic, 20pF, ±10%, SL	R181	RT1082114	Carbon, 820Ω, ±10%, 1/4W	R203	RT1015114	P. C. Board Assembly
C119	DK1710201	Ceramic, 1000pF, ±20%, YY	R182	RT1056214	Carbon, 5.6KΩ, ±10%, 1/4W	R204	RT1015214	RESISTORS
C120	DK1710301	Ceramic, 0.01μF, ±20%, YY	R183	RT1012314	Carbon, 12KΩ, ±10%, 1/4W	R205	RT1033214	Carbon, 150Ω, ±10%, 1/4W
C121	DD1620003	Ceramic, 20pF, ±10%, SH	R184	RT1082214	Carbon, 8.2KΩ, ±10%, 1/4W	R206	RT1010214	Carbon, 820Ω, ±10%, 1/4W
C122-C123	DD1210006	Ceramic, 10pF, ±10%, CH	R185	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R207	RT1010214	Carbon, 150Ω, ±10%, 1/4W
C124-C127	DD1615003	Ceramic, 15pF, ±10%, CH	R186	RT1056214	Carbon, 5.6KΩ, ±10%, 1/4W	R210	RT1033114	Carbon, 330Ω, ±10%, 1/4W
C129-C131	DK1710301	Ceramic, 0.01μF, ±20%, YY	R187	RT1022214	Carbon, 2.2KΩ, ±10%, 1/4W	R211	RT1015114	Carbon, 150Ω, ±10%, 1/4W
L101	LA1027801	Ceramic, 0.01μF, ±20%, YY	R188	RT1010114	Carbon, 100Ω, ±10%, 1/4W	R212	RT1082114	Carbon, 820Ω, ±10%, 1/4W
L102	LA1027802	Ceramic, 0.01μF, ±20%, YY	R189	RT1010314	Carbon, 10KΩ, ±10%, 1/4W	R213	RT1015214	Carbon, 150Ω, ±10%, 1/4W
L103	LA1027803	TRANSFORMERS	C151	DF1740301	CAPACITORS	R214	RT1015214	Carbon, 1.5KΩ, ±10%, 1/4W
L104	LA1027804	Ant. Coil	C152	DF1710301	Mylar, 0.04μF, ±20%	R215	RT1033214	Carbon, 3.3KΩ, ±10%, 1/4W
L105	LI1202604	RF Coil	C153	DF1740301	Mylar, 0.01μF, ±20%	R216	RT1047114	Carbon, 470Ω, ±10%, 1/4W
L106	LI1001601	RF Coil	C154	DD1105001	Mylar, 0.04μF, ±20%	R220	RT1033114	Carbon, 330Ω, ±10%, 1/4W
H101-H102	HF200191B	OSC Coil	C155	DF1740301	Ceramic, 5pF, ±0.5pF	R221	RT1082114	Carbon, 820Ω, ±10%, 1/4W
H103	HT305351B	IFT	C156	DF1747201	Mylar, 0.04μF, ±20%	R222	RT1015114	Carbon, 150Ω, ±10%, 1/4W
J101-J106	YP1000094	SEMICONDUCTORS	C157	DF1722301	Mylar, 0.0047μF, ±20%	R223	RT1015214	Carbon, 1.5KΩ, ±10%, 1/4W
P150	YD2818002 (ZZ2818002)	Transistor, 2SK19G	C158	DF1722301	Mylar, 0.022μF, ±20%	R224	RT1033214	Carbon, 3.3KΩ, ±10%, 1/4W
		Transistor, 2SC535B	C159	DF6545101	Mylar, 450pF, ±5%	R225	RT1047114	Carbon, 470Ω, ±10%, 1/4W
		MISCELLANEOUS	C160	DF1740301	Mylar, 0.04μF, ±20%		RT1033114	Carbon, 330Ω, ±10%, 1/4W
		Plug	C161-C162	EA1060169	Elect., 10μF, 16V			
			C163	DF1740301	Mylar, 0.04μF, ±20%			
			C164-C166	EA1060169	Elect., 10μF, 16V			
			C167	DK1710201	Ceramic, 0.001μF, ±20%			
			C168	DF1747201	Mylar, 0.0047μF, ±20%			
			C169	DF1722201	Mylar, 0.0022μF, ±20%			

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION			REF. DESIG.	MARANTZ PART NO.	DESCRIPTION			REF. DESIG.	MARANTZ PART NO.	DESCRIPTION		
R227-R228	RT1015114	Carbon, 150Ω,	±10%,	1/4W	C224	EA1060169	Elect., 10μF,	16V		R326	RT1015314	Carbon, 15KΩ,	±10%,	1/4W
R229	RT1082114	Carbon, 820Ω,	±10%,	1/4W	C225	DK1840302	Ceramic, 0.04μF,	+100%, -0%		R327	RT1056214	Carbon, 5.6KΩ,	±10%,	1/4W
R230	RT1015114	Carbon, 150Ω,	±10%,	1/4W	C226	EA1060169	Elect., 10μF,	16V		R328	RT1033314	Carbon, 33KΩ,	±10%,	1/4W
R231	RT1015214	Carbon, 1.5KΩ,	±10%,	1/4W	C227	DK1840302	Ceramic, 0.04μF,	+100%, -0%		R329	RT1022414	Carbon, 220KΩ,	±10%,	1/4W
R232	RT1033214	Carbon, 3.3KΩ,	±10%,	1/4W	C228-C229	DK1710301	Ceramic, 0.01μF,	±20%		R330	RT1068314	Carbon, 68KΩ,	±10%,	1/4W
R233	RT1010214	Carbon, 1KΩ,	±10%,	1/4W	C230	DK1840302	Ceramic, 0.04μF,	+100%, -0%		R331	RT1056314	Carbon, 56KΩ,	±10%,	1/4W
R234	RT1033114	Carbon, 330Ω,	±10%,	1/4W	C231-C233	DK1710301	Ceramic, 0.01μF,	±20%		R332	RT0518414	Carbon, 180KΩ,	±5%,	1/4W
R235	RT1015114	Carbon, 150Ω,	±10%,	1/4W	C234	DK1710201	Ceramic, 0.001μF,	±20%		R333	RT1010414	Carbon, 100KΩ,	±10%,	1/4W
R236	RT1010414	Carbon, 100KΩ,	±10%,	1/4W						R334	RT1012414	Carbon, 120KΩ,	±10%,	1/4W
R237	RT1015114	Carbon, 150Ω,	±10%,	1/4W	C235	DD1620101	Ceramic, 200pF,	±10%		R335-R336	RT0515314	Carbon, 15KΩ,	±5%,	1/4W
					C236	DK1710201	Ceramic, 0.001μF,	±20%		R337-R338	RT0510414	Carbon, 100KΩ,	±5%,	1/4W
R238	RT1015214	Carbon, 1.5KΩ,	±10%,	1/4W	C237	DD1620101	Ceramic, 200pF,	±10%		R339-R340	RN0582414	Carbon, 820KΩ,	±5%,	1/4W
R239	RT1033214	Carbon, 3.3KΩ,	±10%,	1/4W	C238	DK1710201	Ceramic, 0.001μF,	±20%		R341-R342	RT0512214	Carbon, 3.3KΩ,	±5%,	1/4W
R240-R241	RT1010214	Carbon, 1KΩ,	±10%,	1/4W	C239-C240	DD1620101	Ceramic, 200pF,	±10%		R343-R344	RN0522314	Carbon, 22KΩ,	±5%,	1/4W
R242	RT1015114	Carbon, 150Ω,	±10%,	1/4W	C241	DK1710201	Ceramic, 0.001μF,	±20%		R345-R346	RT0568214	Carbon, 6.8KΩ,	±5%,	1/4W
R243	RT1010414	Carbon, 100KΩ,	±10%,	1/4W	C242	DK1810402	Ceramic, 0.1μF,	+100%, -0%		R347-R348	RT0510214	Carbon, 1KΩ,	±5%,	1/4W
R244	RT1039114	Carbon, 390Ω,	±10%,	1/4W	C247	DD1540001	Ceramic, 40pF,	±2%		R349-R350	RT0512214	Carbon, 1.2KΩ,	±5%,	1/4W
R245	RT1082214	Carbon, 8.2KΩ,	±10%,	1/4W	C248	EM2240251	Elect., 0.22μF,	25V		R351-R352	RT0536214	Carbon, 3.6KΩ,	±5%,	1/4W
R246	RT1015314	Carbon, 15KΩ,	±10%,	1/4W	C249	EV3350251	Elect., 3.3μF,	25V		R353	RT1082314	Carbon, 82KΩ,	±10%,	1/4W
R247-R248	RT1010214	Carbon, 1KΩ,	±10%,	1/4W										
R249	RT1033114	Carbon, 330Ω,	±10%,	1/4W										
R250	RT1015114	Carbon, 150Ω,	±10%,	1/4W	H201-H207	HT308291C	Transistor,	2SC829C		R354	RT1022214	Carbon, 2.2KΩ,	±10%,	1/4W
R251	RT1010414	Carbon, 100KΩ,	±10%,	1/4W	H215-H216	HD2001105	Transistor,	1S1555		R355	RT1056314	Carbon, 56KΩ,	±10%,	1/4W
R252	RT1047014	Carbon, 47Ω,	±10%,	1/4W	H217-H220	HD1000100	Diode,	1S1008		R356	RT1010414	Carbon, 100KΩ,	±10%,	1/4W
R253-R257	RT1010114	Carbon, 100Ω,	±10%,	1/4W	H221-H230	HD1000105	Diode,	1N60		R357-R358	RN1047414	Carbon, 470KΩ,	±10%,	1/4W
R258	RT1012114	Carbon, 120Ω,	±10%,	1/4W						R359-R360	RN1022414	Carbon, 220KΩ,	±10%,	1/4W

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
L302 L304 L305	LS1503002 LS1503001 LS3501002	MPX Coil, 19KHz, 38KHz, Block MPX Coil, 19KHz, 67KHz Trap. MPX Coil, L. P. F.	H501 H502 H503-H504	HC1000209 HT306441B HD1000105	SEMICONDUCTORS IC, NJ703W Transistor, 2SC644S Diode, 1N60	H558 H559-H561	HF200300A HT3037210	FET 2SK30 Transistor, 2SC372
H301-H307 H308 H309-H310 H311-H312 H313-H314 H315-H320	HT3037210 HF200301C HT307322A HT104942A HT306441C HD1000105	SEMICONDUCTORS Transistor, 2SC372 Transistor, 2SK30 Y Transistor, 2SC732 Bu or Gr Transistor, 2SA494 Gr or Y Transistor, 2SC644T Diode, 1N60	J501-J509 L501 P550	YP1000094 LI1018801 YD2826011 (ZZ2826011)	MISCELLANEOUS Plug IFT, FM Det. P. C. Board P. C. Board Assembly	J551-J557 J559-J563 J565-J566 P400	YP1000094 YP1000094 YP1000094 YD2826001 (ZZ2826001)	MISCELLANEOUS Plug Plug Plug P. C. Board P. C. Board Assembly
J301-J307 J312-J315 J301-J307 J312-J315	YP1000099 YP1000099 YP1000099 YP1000099	MISCELLANEOUS Plug Plug Plug Plug	R551 R552 R553 R554 R555 R556-R557 R558 R559 R562 R563-R564	RT1056214 RT1010114 RT1027314 RT1010414 RT1010214 RT1033314 RA0103007 RA0104012 RT1022414 RT1010114	RESISTORS Carbon, 5.6K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 27K Ω , $\pm 10\%$, 1/4W Carbon, 100K Ω , $\pm 10\%$, 1/4W Carbon, 1K Ω , $\pm 10\%$, 1/4W Carbon, 33K Ω , $\pm 10\%$, 1/4W Trimmer, 10K Ω , B Trimmer, 100K Ω , B Carbon, 220K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W	R401 R402 R403 R404 R405 R406 R407 R408 R409 R410-R411	RC1033212 RC1010012 RC1010112 RC1010012 RC1018312 RC1033312 RC1010112 RC1010212 RC1022212 RT1010214	RESISTORS Solid, 3.3K Ω , $\pm 10\%$, 1/2W Solid, 10 Ω , $\pm 10\%$, 1/2W Solid, 100 Ω , $\pm 10\%$, 1/2W Solid, 10 Ω , $\pm 10\%$, 1/2W Solid, 18K Ω , $\pm 10\%$, 1/2W Solid, 33K Ω , $\pm 10\%$, 1/2W Solid, 100 Ω , $\pm 10\%$, 1/2W Solid, 1K Ω , $\pm 10\%$, 1/2W Solid, 2.2K Ω , $\pm 10\%$, 1/2W Carbon, 1K Ω , $\pm 10\%$, 1/4W
P500	YD2818005 (ZZ2818005)	P. C. Board P. C. Board Assembly	R565 R566 R568 R569 R571 R572 R573 R574 R576 R577	RA0104012 RT1022414 RT1022214 RT0510314 RT0527414 RT1010114 RT0515314 RT0512314 RT0510314 RT1022114	Trimmer, 100K Ω , B Carbon, 220K Ω , $\pm 10\%$, 1/4W Carbon, 2.2K Ω , $\pm 10\%$, 1/4W Carbon, 10K Ω , $\pm 5\%$, 1/4W Carbon, 270K Ω , $\pm 5\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 15K Ω , $\pm 5\%$, 1/4W Carbon, 12K Ω , $\pm 5\%$, 1/4W Carbon, 10K Ω , $\pm 5\%$, 1/4W Carbon, 220 Ω , $\pm 10\%$, 1/4W	R412-R413 R414-R415 R416-R417 R418-R419 R420-R421 R422-R423 R424-R425 R426-R427	GT0503412 GT0510512 RT0556214 RT0556314 RT0527214 RT1010214 RT1015114 RT1010414	Carbon, 300K Ω , $\pm 5\%$, 1/2W Carbon, 1M Ω , $\pm 5\%$, 1/2W Carbon, 5.6K Ω , $\pm 5\%$, 1/4W Carbon, 56K Ω , $\pm 5\%$, 1/4W Carbon, 2.7K Ω , $\pm 5\%$, 1/4W Carbon, 1K Ω , $\pm 10\%$, 1/4W Carbon, 150 Ω , $\pm 10\%$, 1/4W Carbon, 100K Ω , $\pm 10\%$, 1/4W
R501 R502 R503 R504 R505 R506-R507 R508-R509 R510 R511 R512 R513 R514 R515 R516-R517 R519 R520 R521 R522 R523	RT1015114 RT1010214 RT1010114 RT1022314 RT1010114 RT0582114 RT0568214 RT1010114 RT1027214 RT1015314 RN1018414 RT1022214 RN1010414 RT1010114 RT1010114 RT1010114 RT1010214 RT1010114 RT1010214 RT1010414	RESISTORS Carbon, 150 Ω , $\pm 10\%$, 1/4W Carbon, 1K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 22K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 820 Ω , $\pm 5\%$, 1/4W Carbon, 6.8K Ω , $\pm 5\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 27K Ω , $\pm 10\%$, 1/4W Carbon, 15K Ω , $\pm 10\%$, 1/4W Carbon, 180K Ω , $\pm 10\%$, 1/4W Carbon, 2.2K Ω , $\pm 10\%$, 1/4W Carbon, 100K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 1K Ω , $\pm 10\%$, 1/4W Carbon, 100 Ω , $\pm 10\%$, 1/4W Carbon, 1K Ω , $\pm 10\%$, 1/4W Carbon, 100K Ω , $\pm 10\%$, 1/4W	C551 C552 C553 C554 C555 C556 C557 C558 C559 L551	DD1615001 DF1668301 DF1740301 EA1060169 DK1840302 DK1810401 EA4750359 EA3350509 EA1060169 LC2105001	CAPACITORS Ceramic, 15pF, $\pm 10\%$, SL Mylar, 0.068 μ F, $\pm 10\%$ Mylar, 0.04 μ F, $\pm 20\%$ Elect., 10 μ F, 16V Ceramic, 0.04 μ F, +100%, -0% Ceramic, 0.1 μ F, +100%, -0% Elect., 4.7 μ F, 35V Elect., 3.3 μ F, 50V Elect., 10 μ F, 16V TRANSFORMER Choke Coil, 1mH	C401-C402 C403-C405 C406 C407-C408 C409 C410-C411 C412-C413 C414 C415-C416 C417-C418 H401-H404 H405 H406 H407-H408 H409 H410 H411-H412 H413-H414	DK1810351 EA3370509 EA1070259 EA4760509 EA1070359 EA2262501 EA1063501 EA3370259 EV1050252 EV1050251 HD2000413 HD3002109 HT312132A HD2000908 HD2000808 HD3002109 HT304582A HT104942A	Ceramic, 0.01 μ F, $\pm 100\%$, 500V Elect., 330 μ F, 50V Elect., 100 μ F, 25V Elect., 47 μ F, 50V Elect., 100 μ F, 35V Elect., 22 μ F, 250V Elect., 10 μ F, 350V Elect., 330 μ F, 25V Elect., 1 μ F, 25V Elect., 1 μ F, 25V SEMICONDUCTORS Diode, SIB-01-02 Diode, BZ140 Transistor, 2SC1213A, B or C Diode, SH-1A, 600V Diode, SH-1D, 1200V Diode, BZ140 Transistor, 2SC458LG, C or D Transistor, 2SA494 Y or Gr
C501 C502 C503 C504-C505 C506-C507 C508 C509 C510 C511 C512 C513 C514 C515 C516-C519	DK1710301 DK1840302 EA1060169 DK1840302 DD1620101 EA1060169 EA1070109 ED1050509 EA1060169 DK1840302 DD1620101 EA1070169 DK1710301 DK1840301	CAPACITORS Ceramic, 0.01 μ F, $\pm 20\%$, YY Ceramic, 0.04 μ F, +100%, -0%, YY Elect., 10 μ F, 16V Ceramic, 0.04 μ F, +100%, -0% Ceramic, 200pF, $\pm 10\%$, SL Elect., 10 μ F, 16V Elect., 100 μ F, 10V Elect., 1 μ F, 50V Elect., 10 μ F, 16V Ceramic, 0.04 μ F, +100%, -0% Ceramic, 200pF, $\pm 10\%$ Elect., 100 μ F, 16V Ceramic, 0.01 μ F, $\pm 20\%$ Ceramic, 0.04 μ F, +100%, -0%	H551 H552 H554-H555	HT307331C HT3037210 HD1000105	SEMICONDUCTORS Transistor, 2SC733 Gr Transistor, 2SC372 Diode, 1N60	J401-J423	YP1000099	MISCELLANEOUS Plug

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P900	YD2826008 (ZZ2826008)	P. C. Board P. C. Board Assembly	S701 J701-J705	SP0605003 YP1000099	MISCELLANEOUS Push Switch Plug	R002-R003 R004 R005 R006 R007 R008 R009 R010-R011 R012 R013	RC1068012 RC1020012 RK0254002 RK0254002 RK0203016 RK0203025 RK0203025 RK0104003 GT0522501 RJ1015203	Solid, 68Ω, ±10%, 1/2W Solid, 20Ω, ±10%, 1/2W Variable, 250K (B) Variable, 250K (B) Variable, 20K (B) Variable, 20K (B) Variable, 20K (B) Variable, 100KΩ, (B) Carbon, 2.2MΩ, ±5%, 1W Carbon, 1.5KΩ, ±10%, 3W
R901-R904 R905-R906 R907-R908 R909-R910 R911-R912 R913-R914 R915-R916 R917-R918 R919-R920 R921-R922	RN1015414 RT1068214 RT0515314 GT0562312 RT0510114 RT1047214 RT0515314 RA0102015 RC1068312 RT1010514	Carbon, 150KΩ, ±10%, 1/4W Carbon, 6.8KΩ, ±10%, 1/4W Carbon, 15KΩ, ±5%, 1/4W Carbon, 62KΩ, ±5%, 1/4W Carbon, 100Ω, ±5%, 1/4W Carbon, 4.7KΩ, ±10%, 1/4W Carbon, 15KΩ, ±10%, 1/4W Trimmer, 1KΩ, Solid, 68KΩ, ±10%, 1/2W Carbon, 1MΩ, ±10%, 1/4W	P800 R801-R802 R803 R804-R805 R806-R807 R809 R810	YD2826010 (ZZ2826010) RT0527414 RT0533414 RT0568314 RT0510414 RA0503011 RJ1047002	P. C. Board P. C. Board Assembly RESISTORS Carbon, 270KΩ, ±5%, 1/4W Carbon, 330KΩ, ±5%, 1/4W Carbon, 68KΩ, ±5%, 1/4W Carbon, 100KΩ, ±5%, 1/4W Trimmer, 47KΩ, B Carbon, 47Ω, ±10%, 2W	R014 R015 R016 R018 R017	GS1015105 RJ0522314 RJ1015203 RJ1033414 RT0510314	Carbon, 150Ω, ±10%, 5W Carbon, 22KΩ, ±5%, 1/4W Carbon, 1.5KΩ, ±5%, 3W Carbon, 330KΩ, ±10%, 1/4W Carbon, 10KΩ, ±5%, 1/4W
R923 R924 R925 R926 R927 R928 R929-R930 R931 R932	RT0515514 RT0547214 RC1056312 GT1039401 RT0547314 RC1022412 RA0502013 RC1047412 RT1068414	Carbon, 1.5MΩ, ±5%, 1/4W Carbon, 4.7KΩ, ±5%, 1/4W Solid, 56KΩ, ±10%, 1/2W Carbon, 390KΩ, ±10%, 1W Carbon, 47KΩ, ±5%, 1/4W Solid, 220KΩ, ±10%, 1/2W Trimmer, 5KΩ Solid, 470KΩ, ±10%, 1/2W Carbon, 680KΩ, ±10%, 1/4W	C801-C802 C803 C804-C806	DF1710301 DF1710402 DF1722452	CAPACITORS Mylar, 0.01μF, ±20%, 50V Mylar, 0.1μF, ±20%, 50V Mylar, 0.22μF, ±20%, 50V	C001 C002 C003 C004D	EA1070259 CA0330002 DK1710301 DP0733380	CAPACITORS Elect., 100μF, 25V Variable, AM 3 Gang Ceramic, 0.01μF, 50V, YY Oil Paper, 0.033μF, 800VAC
C901-C902 C903 C904-C907	DK1810382 DO0747352 EA4760169	Ceramic, 0.01μF, +100%, -0% Oil Paper, 0.047μF Elect., 47μF, 16V	S801 J801-J804	SP0405006 YP1000099	MISCELLANEOUS Push Switch Plug	W001 W002-W003 W004 W005 W006 F001 J001 J002 J004 J005	YC0240010 YB0007001 YB0027001 YW2826001 YX2826001 FS1010005 YT0304003 YL0301021 YJ0400018 YL0106004	MISCELLANEOUS AC Cord Connective Cord Connective Cord Wire Material Wire Material Fuse, 1A AM/FM Ant. Terminal Ground Terminal AC Outlet Jack Voltage Select Terminal
H901-H902 H903-H906 H907-H909 H911-H912	HM003019A HK099519A HD2000413 HM003019A	FET, 2SK30 Transistor, HT30995 OF OH Diode, SIB-0A-02 FET, 2SK30	P850 R851 R852 R854	YD2826005 (ZZ2826005) RT1015214 RT1010314 RA0103007	P. C. Board P. C. Board Assembly RESISTORS Carbon, 1.5KΩ, ±10%, 1/4W Carbon, 10KΩ, ±10%, 1/4W Trimmer, 10KΩ, B	J053 J055-J056	YP1000099 YP1000099	MISCELLANEOUS Plug Plug
T901-T904 J901-J910 J913-J930 J933-J934	257711806 YP1000099 YP1000099 YP1000099	MISCELLANEOUS Spacer Plug Plug Plug	H001 H002 H003	HT403154A VB0013701 HD3002109	SEMICONDUCTORS and TUBE Transistor, 2SD315 (C, D, E, F) Picture Tube, E2610B1 (Gr) Diode, BZ140, 14V, 1W	J006 J007 J008 J009 J010 J011 J013 J014 J015 J016	YJ0500017 YJ0500018 YT0201006 YT0202007 YT0204003 YL0104001 YL0104001 YL0107005 YL0103001 YJ0800012	Socket for Transistor Socket for Picture Tube Quadradial Terminal Scope Input Terminal Tape Output Terminal AC Line Terminal Terminal Terminal Fuse Holder Socket
P700	YD2826009 (ZZ2826009)	P. C. Board P. C. Board Assembly	L001 L002 L003 L004	LF1120023 LB3007526 LC1302001 TS1800204	TRANSFORMERS AM Ant. Coil., AM, ANT. Balun Coil Choke Coil, 3μH Power Transf.	J017-J024 J025-J030 J037	YP1000094 YJ0800013 YP1000094	Plug Socket Socket
R701 R702-R705 R706-R707 R708 R709	RT1082214 RC1015012 RT1056114 RT1018414 RT1033414	Carbon, 8.2KΩ, ±10%, 1/4W Solid, 15Ω, ±10%, 1/4W Carbon, 560Ω, ±10%, 1/4W Carbon, 180KΩ, ±10%, 1/4W Carbon, 330KΩ, ±10%, 1/4W	M001-M005 M006 M007 M008-M014 S001 S002	IN1008007 IN1008007 IN1008018 IN1006301 SS0202017 SP0101010	MISCELLANEOUS Dial Lamp, 8V, 0.2A Dial Pointer Lamp, 8V, 0.06A Lamp, 8V, 0.2A Lamp, 6.3V, 0.04A Slide Switch Push Switch			
C701 C702 C703	DF1622301 DF1722452 DF1710401	Myar, 0.022μF, ±10% Myar, 0.22μF, ±20% Myar, 0.1μF, ±20%	R001	RC1008212	RESISTORS Carbon, 8.2Ω, ±10%, 1/2W			

SPECIFICATIONS

FM SECTION

Tuning Frequency Range	.88 MHz—108 MHz
IHF Usable Sensitivity	2.3 μ V
IHF Selectivity	80 dB
Capture Ratio	1.6 dB
Image Rejection Ratio at 106 MHz	93 dB
Signal to Noise Ratio in Mono	70 dB
Signal to Noise Ratio in Stereo	60 dB
Total Harmonic Distortion in Mono	0.15%
Total Harmonic Distortion in Stereo	0.3%
Frequency Response (ref. 75 μ sec. de-emphasis)	± 1 dB (50 to 15 KHz)
Stereo Separation	42 dB at 1 KHz 26 dB at 10 KHz 36 dB at 200 Hz

AM SECTION

Tuning Frequency Range	540 KHz—1605 KHz
Usable Sensitivity	.20 μ V
Selectivity	26 dB
Image Rejection Ratio at 1400 KHz	70 dB
Signal to Noise Ratio	46 dB
Frequency Response, -3 dB down	50 Hz—4 KHz
Total Harmonic Distortion	1%

OSCILLOSCOPE SECTION—EXTERNAL INPUT

1. Vertical Amplifier

Deflection Sensitivity	DC 290mV/cm, AC 65mV/cm
Input Impedance	420 K ohm
Input Capacitance	Less than 30 pF
Maximum Permissible Input Voltage	100V P-P (AC or DC)

2. Horizontal Amplifier

Deflection Sensitivity	DC 400mV/cm, AC 65mV/cm
Input Impedance	420 K ohm
Input Capacitance	Less than 30 pF
Maximum Permissible Input Voltage	100V P-P (AC or DC)

GENERAL

Power Requirements	100/120/200/220/240V AC 50 Hz to 60 Hz 40 Watts
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Dimensions

Panel Width	15.4 Inches
Panel Height	5.8 Inches
Depth	11.8 Inches

Weight

Unit Alone	21 lbs
Packed for Shipment	29.3 lbs

* These specifications and exterior designs may be changed for improvement without advance notice.



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120
MODEL 120 SERVICE MANUAL

This Service Manual is the first revised edition for model 120 (Applied to production serial No. from 1001 to 1510).

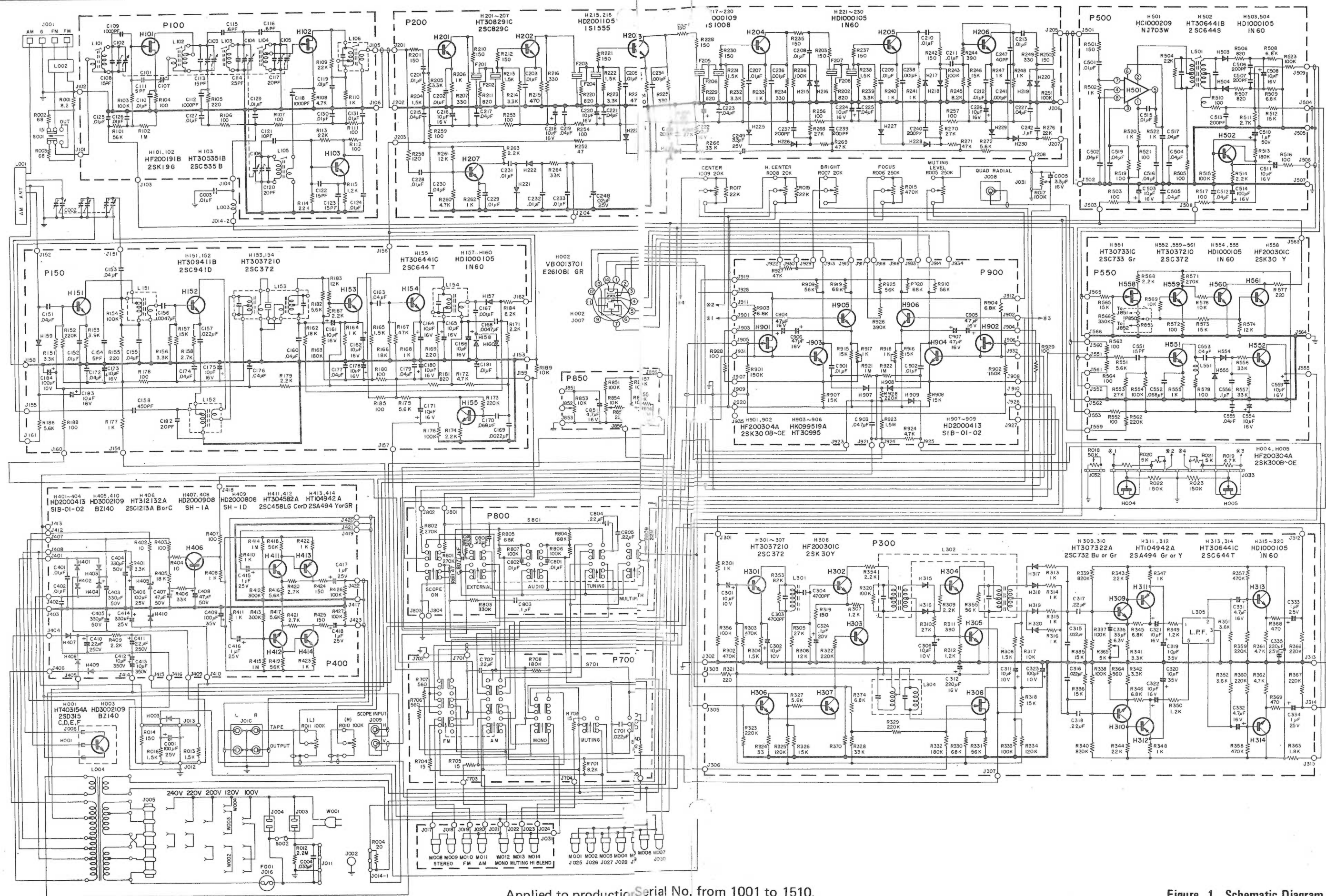
Included in this service manual are schematic diagram, individual parts list and P.C. Board-Component Assembly Diagram.

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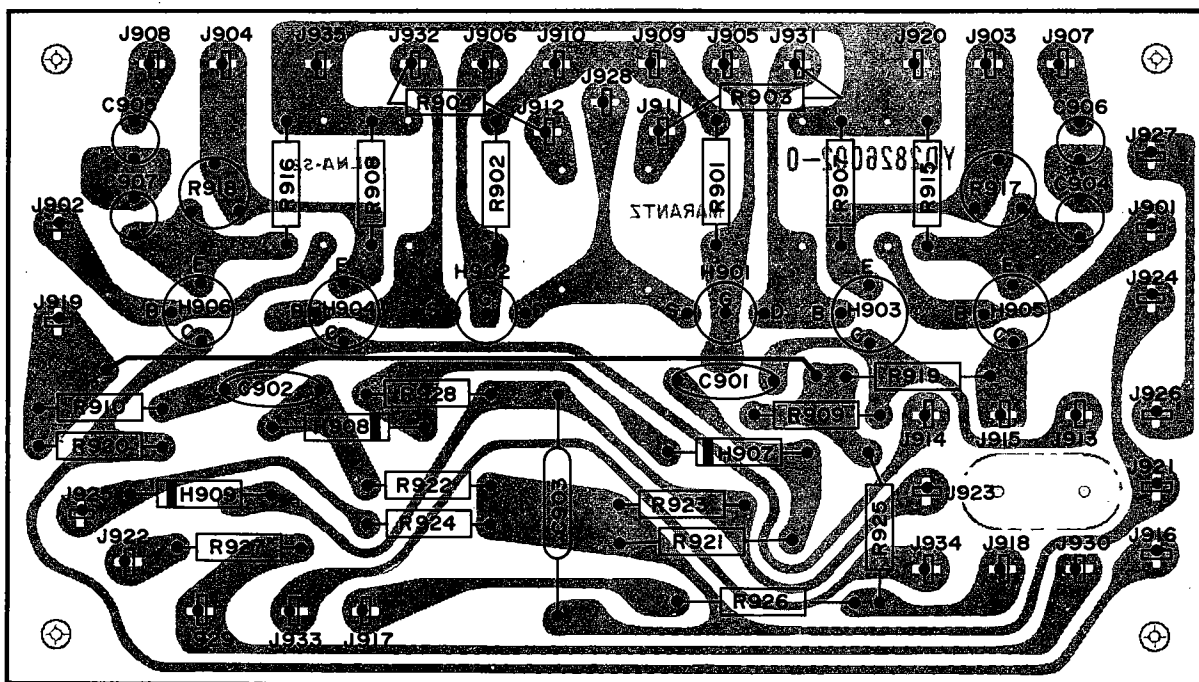
REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P550	YD2826007 (ZZ2826007)	P. C. Board P. C. Board Assembly	R919-R920	RC1068312	Solid, 68K Ω , $\pm 10\%$, 1/2W
			R921-R922	RT1010514	Carbon, 1M Ω , $\pm 10\%$, 1/4W
			R923	RT0515514	Carbon, 1.5M Ω , $\pm 5\%$, 1/4W
			R924	RT0547214	Carbon, 4.7K Ω , $\pm 5\%$, 1/4W
		RESISTORS			
R551	RT1056214	Carbon, 5.6K Ω , $\pm 10\%$, 1/4W	R925	RC1056312	Solid, 56K Ω , $\pm 10\%$, 1/4W
R552	RT1010114	Carbon, 100 Ω , $\pm 10\%$, 1/4W	R926	GT1039401	Carbon, 290K Ω , $\pm 10\%$, 1W
R553	RT1027314	Carbon, 27 Ω , $\pm 10\%$, 1/4W	R927	RT0547314	Carbon, 47K Ω , $\pm 5\%$, 1/4W
R554	RT1010414	Carbon, 100K Ω , $\pm 10\%$, 1/4W	R928	RC1022412	Solid, 220K Ω , $\pm 10\%$, 1/2W
R555	RT1010214	Carbon, 1K Ω , $\pm 10\%$, 1/4W	R929	RT0510114	Carbon, 100 Ω , $\pm 5\%$, 1/4W
R556-R557	RT1033314	Carbon, 33K Ω , $\pm 10\%$, 1/4W			CAPACITORS
R562	RT1022414	Carbon, 220K Ω , $\pm 10\%$, 1/4W	C901-C902	DK1810382	Ceramic, 0.01 μ F, 1KV
R563-R564	RT1010114	Carbon, 100 Ω , $\pm 10\%$, 1/4W	C903	DO0747352	Oil Paper, 0.047 μ F
R565	RT1015314	Carbon, 15K Ω , $\pm 10\%$, 1/4W	C904-C907	EA4760169	Elect., 47 μ F, 25V
R566	RT0533414	Carbon, 330K Ω , $\pm 5\%$, 1/4W			SEMICONDUCTORS
R568	RT1022214	Carbon, 2.2K Ω , $\pm 10\%$, 1/4W	H901-H902	HM003019A	FET, 2SK30Y
R569	RT0510314	Carbon, 10K Ω , $\pm 5\%$, 1/4W	H903-H906	HT309952H	Transistor, HT30995 OF, OH
R571	RT0527414	Carbon, 270K Ω , $\pm 5\%$, 1/4W	H907-H909	HD2000413	Diode, SIB-01-02
R572	RT1010114	Carbon, 100 Ω , $\pm 10\%$, 1/4W			MISCELLANEOUS
R573	RT0515314	Carbon, 15K Ω , $\pm 5\%$, 1/4W	T901-T904	257711806	Spacer
R574	RT0512314	Carbon, 12K Ω , $\pm 5\%$, 1/4W	J901-J935	YP1000099	Plug
R576	RT0510314	Carbon, 10K Ω , $\pm 5\%$, 1/4W			
R577	RT1022114	Carbon, 220 Ω , $\pm 10\%$, 1/4W	P700	YD2826004 (ZZ2826004)	P. C. Board P. C. Board Assembly
R578	RT1010114	Carbon, 100 Ω , $\pm 10\%$, 1/4W			RESISTORS
		CAPACITORS			
C551	DD1615001	Ceramic,	R701	RT1082214	Carbon, 8.2K Ω , $\pm 10\%$, 1/4W
C552	DF1668301	Mylar, 15pF, $\pm 10\%$	R702-R705	RC1015012	Solid, 15 Ω , $\pm 10\%$, 1/2W
C553	DF1740301	Mylar, 0.068 μ F, $\pm 10\%$	R706-R707	RT1056114	Carbon, 560 Ω , $\pm 10\%$, 1/4W
C554	EA1060169	Elect., 0.04 μ F, $\pm 20\%$	R708	RT1018414	Carbon, 180K Ω , $\pm 10\%$, 1/4W
C555	DK1840302	Ceramic, 10 μ F, 16V			CAPACITORS
C556	DK1810401	Ceramic, 0.1 μ F, +100%, -0%			
C559	EA1060169	Elect., 10 μ F, 16V			
		SEMICONDUCTORS			
H551	HT307331C	Transistor, 2SC733GR	C701	DF1622301	Mylar, 0.022 μ F, $\pm 10\%$
H552	HT3037210	Transistor, 2SC372	C702	DF1722401	Mylar, 0.22 μ F, $\pm 20\%$
H554-H555	HD1000105	Diode, 1N60			MISCELLANEOUS
H558	HF200300A	FET, 2SK30Y	S701	SP0605003	Push Switch
H559-H561	HT3037210	Transistor, 2SC372	J701-J705	YP1000099	Plug
		MISCELLANEOUS			
L551	LC2105001	Choke Coil, 1mH	P800	YD2826003 (ZZ2826003)	P. C. Board P. C. Board Assembly
J551-J553	YP1000094	Plug			RESISTORS
J555	YP1000094	Plug			
J559-J566	YP1000094	Plug			
P900	YD2826002 (ZZ2826002)	P. C. Board P. C. Board Assembly	R801-R802	RT0527414	Carbon, 270K Ω , $\pm 5\%$, 1/4W
		RESISTORS	R803	RT0533414	Carbon, 330K Ω , $\pm 5\%$, 1/4W
R901-R902	RN1015414	Carbon, 150K Ω , $\pm 10\%$, 1/4W	R804-R805	RT0568314	Carbon, 68K Ω , $\pm 5\%$, 1/4W
R903-R904	RT0568214	Carbon, 6.8K Ω , $\pm 5\%$, 1/4W	R806-R807	RT0510414	Carbon, 100K Ω , $\pm 5\%$, 1/4W
R907-R908	RT0515314	Carbon, 15K Ω , $\pm 5\%$, 1/4W	R809	RT1022514	Carbon, 2.2M Ω , $\pm 10\%$, 1/4W
R909-R910	RC1056314	Solid, 56K Ω , $\pm 10\%$, 1/4W	R810	RT1033414	Carbon, 330K Ω , $\pm 10\%$, 1/4W
R915-R916	RT0515314	Carbon, 15K Ω , $\pm 5\%$, 1/4W	R811	RJ1047002	Carbon, 47 Ω , $\pm 10\%$, 2W
R917-R918	RA0102015	Trimmer, 1K Ω			CAPACITORS
			C801-C802	DF1710301	Mylar, 0.01 μ F, $\pm 20\%$, 50V
			C803	DF1710402	Mylar, 0.1 μ F, $\pm 20\%$, 50V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C804-C806	DF1722401	Mylar, 0.22 μ F, $\pm$ 20%, 35V
C807	DF1710402	Mylar, 0.1 μ F, $\pm$ 20%, 50V
S801	SP0405006	MISCELLANEOUS Push Switch
J801-J804	YP1000099	Plug



Applied to production Serial No. from 1001 to 1510.

Figure 1. Schematic Diagram



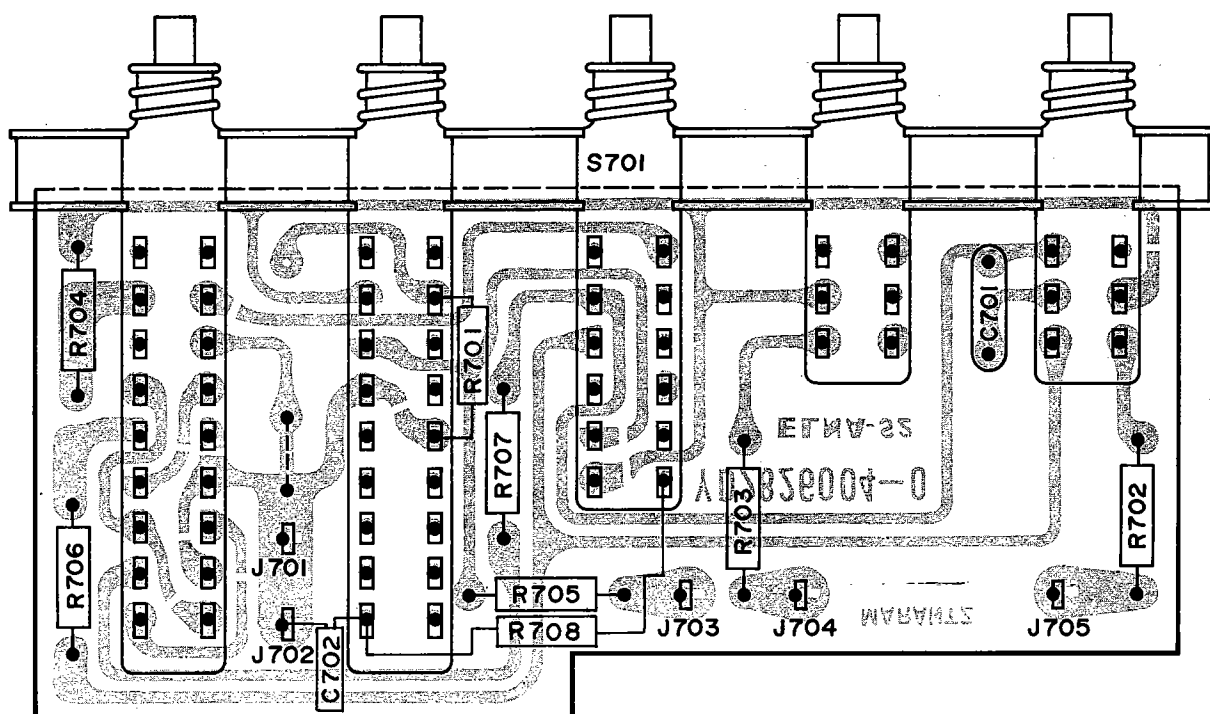


Figure 4. Function Switch Unit Assembly P700 Component Locations

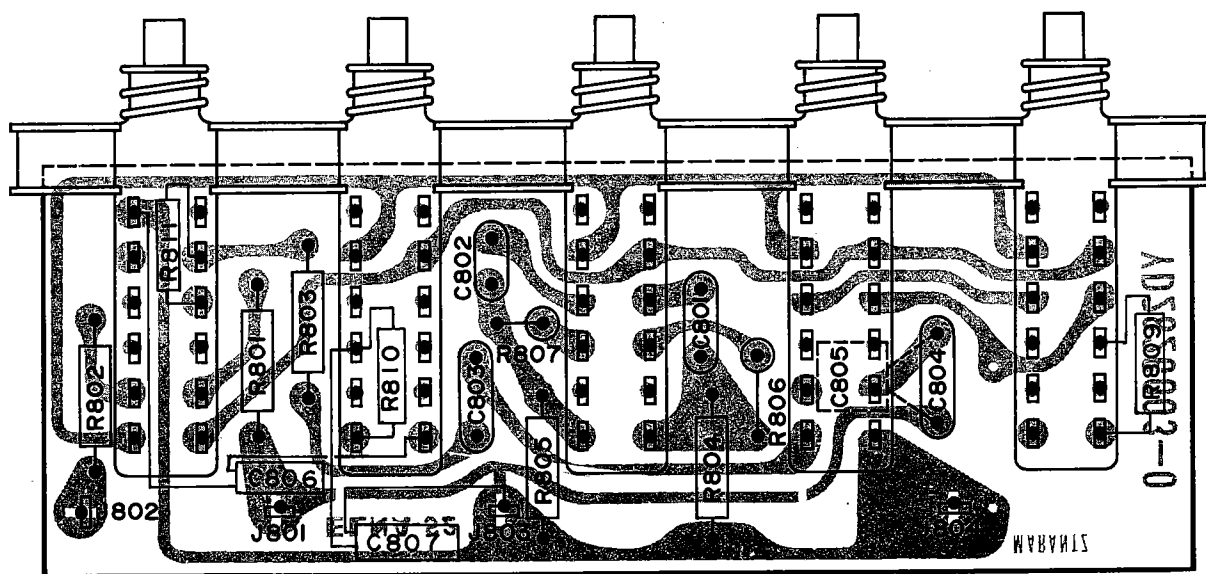


Figure 5. Display Switch Assembly P800 Component Locations

