SERVICE MANUAL 120B

marantz

model 120B

Fm / Am Stereophonic Tuner

marantz

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1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model 120B 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 parts list 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 portion of the 120B is composed of one IC circuit (including RF amplifier, local oscillator, mixer, IF amplifier, detector, and a signal strength indication amplifier) and one transistor amplifier to amplify the detected audio signals.

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 input of RF amplifier (pin ①) through a capacitor of C151 and amplified to the level required for overcoming the conversion noises, thus giving good S/N performance. The tuned circuits inserted in both output and input circuit of RF amplifier assure very high image and spurious rejection performance.

Thus amplified and selected AM signals are then applied to one input of Mixer section (pin ⑥) through a coupling capacitor C158. While the local oscillator voltage is injected to the other input of the section (pin ⑤) through a capacitor C157. Then both AM signals and oscillating voltage are mixed and converted into 455 KHz intermediate frequency. The resulting IF signal is applied to the first IF transformer L153 consisting of one ceramic filter and two tuned circuits.

The output of L153 is led to the IF amplifier's input (pin ⑦) through a coupling capacitor C169 and amplified to the sufficient level to drive the detector. The output of IF amplifier (pin ⑧) is led to the detector's input (pin ⑫) through IF filter L154. The detected audio signal derived from pin ⑪ is filtered and amplified and final audio output is obtained from the collector of H152 and applied to the output jacks through the function switch and OUTPUT LEVEL controllers R010/R011 and output amplifier HD01, HD02. The DC component of the detected IF signal is used as a AGC voltage to control emitter current of RF and IF amplifier through the resistor R154 and R155. A part of the DC component is also applied to the signal strength indication amplifier incorporated in the IC. The output appears at pin ⑭ and is level adjusted by R152, indicated on the display scope H001 through vertical scope amplifier.

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 test point Ⓑ 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 1.5 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 120B 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 ANTENNA 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 H310 through resistor R378 and capacitor C333, (b) QUADRADIAL OUTPUT Jack on the rear panel through resistor R379, (c) MPX stereo decoding IC (H321) through R301 and H301.

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 120B. 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 rectifing a part of IF output signal from the H205 and H206 is applied to the base of H308 and turns on it, if the IF output is greater than predetermined level (muting threshold level). When the H308 is turned on the H309 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 H301, decreasing the source-drain resistance to near zero ohm and allowing the audio signal applied to the source to flow to the pin ② of decoding IC 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 H308 turn on, thus the H308 keeps its turn-off state and this makes H309 turn on, decreasing the collector voltage and turning of H301. 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 C333 and amplified by the noise amplifier transistor H310 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 H311, decreasing the emitter-collector

resistance to zero. This means the collector of H309 is short-circuited to the ground, therefore the H301 is turned off and any audio signals having excessive high frequency noises can not go through the FET's source-drain path.

The transistor H317 also turns off when the transistor H309 or H311 turns on, and makes the transistor H303 turn on, which is connected to pin ⑧ on the MPX decoding IC. Therefore, pin ⑧ is equivalently ground, and the operation of the IC becomes monaural. This permits misoperation of stereo due to undesirable noises during deviation of tuning.

The third input is obtained from the FM discriminator circuit. The DC output so called "S" curve is applied to the gate of H312 through a resistor R273 and dividing network (R361 & R362). The DC output is zero with a station corectly tuned in, but will vary from negative to positive values or vice versa when the tuning point is deviated toward either plus or minus frequency from the correct tuning frequency.

When the DC output is increased to a greater level then that of predetermined, the increased source potential of H312 makes the transistor H315 turn on (this means the collector of H309 is short-circuited to the ground), - - - H301 turn off, - - - H317 turn off, - - - H303 turn on, this means the MPX Stereo Decoding IC is grounded at pin ⑧ and operates in the monaural mode of operation, and the stereo indicator lamp does not light. When the DC output is increased to the negative predetermined level, the decreased source potential turn off the H313 which in turn makes the H314 turn on (this means the collector of H309 is short-circuited to the ground). The subsequent changes are exactly the same as that 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 monaural/stereo switching transistor H303 automatically operated and open the circuits.

With the station correctly tuned in, the bias current of the FET H312 is adjusted so that both transistor H314 and H315 are not turned on, giving no effect on the transistor H309.

3.3 MPX Stereo Decoding Circuit

The stereo composite signal from the buffer amplifier undergoes a phase compensation by R301 and C301, is applied through the muting switching FET H301 to the input terminal, pin ②, of the MPX stereo decoding IC H321 on a PLL (Phase Locked Loop) basis, and decoded into the left and right stereo signals, which become available at pins ④ and ⑤ respectively. These decoded left and right stereo audio signals are introduced through a low pass filter composed of L301 to L304 and C311 to C320 for elimination of undesirable residual switching signal and through a de-emphasis network consisting of R325, R326, C321 and C322, into the npn-pnp direct coupled audio amplifier, where the signals are amplified to a required level for the output from J311 and J313. From these jacks, the audio signals are further led through the function switch and OUTPUT LEVEL control R010/R011 into the output amplifiers HD01 and HD02, where are signals are amplified to be fed to the output terminals.

Figure 1 presents an internal block diagram showing the functions of the PLL basis MPX stereo decoding IC HA1156. The input stereo composite signal, amplified by the audio amplifier, is delivered to the phase detectors PD-1 and PD-2. A part of the stereo composite signal is also applied to the stereo decoder section. The VCO (Voltage Control Oscillator) produces a free run oscillation in the neighborhood of 76 KHz with the time constant determined by a capacitor C305 and resistors R311 and R312 set on the outside of pin ⑭. The VCO output has its frequency divided into 19 KHz through the two stages of the frequency divider (DIV-1 & DIV-2), and is reverted to the phase detector PD-1, which contains two input terminals designed to produce an output in proportion to the product of the two input signals.

The signal applied to one of the inputs of PD-1 is the 19 KHz square wave formed through frequency division of the 76 KHz VCO output signal by the two stages of the frequency divider DIV-1 and DIV-2, and the 19 KHz pilot signal included in the stereo composite signal as a

reference signal is applied to the other input. Therefore, the output of PD-1 which has passed through the low pass filter LPF-1 provides DC output voltage in proportion to the phase variance between the two inputs. This DC output voltage is amplified by the DC amplifier, and supplied to the 76 KHz VCO as a control voltage. This means that the output frequency and phase of the VCO have been phase-locked to the input pilot signal. The 38 KHz sub-carrier reproduced by PLL as stated above is delivered through the stereo switch to the stereo decoder section as a switching signal, thus driving the decoder section. One of the inputs of PD-2 is given the 19 KHz resulting from the frequency division completed by DIV-1 and DIV-3, whereas the other input gets the 19 KHz output contained in the composite signal, and the output is provided with a DC output in proportion to the amplitude of the pilot signal. This DC output is furnished through LPF-2 to the trigger amplifier which drives the stereo indicator lamp and stereo switch. Therefore, insufficient supply of the pilot signal results in failure to light the stereo indicator and to turn on the stereo switch located in the path of the 38 KHz switching signal, thereby avoiding a wrong stereo operation.

H303 attached on the outside of pin ⑧ is a switching transistor for automatic monaural-stereo switchover. When the intensity of an incoming signal from an FM station is weaker than a predetermined level, this H303 is turned on and pin ⑧ is grounded, thereby developing a condition for monaural reception. For a forced monaural operation, switch the MODE switch to "MONO," and H303 comes into an "On" condition with the positive bias voltage applied to the base, and pin ⑧ is grounded, thereby establishing monaural operation.

The transistor H302 connected externally to pin ⑭ is intended to stop the 76 KHz oscillation of the VCO which interferes an AM signal during the reception of an AM station. When the function switch is set to "AM" position, a positive bias is charged on the base of H302, H302 is turned on, and pin ⑭ is grounded. Thus, the oscillation of the VCO is stopped, ending the interference with AM reception.

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.

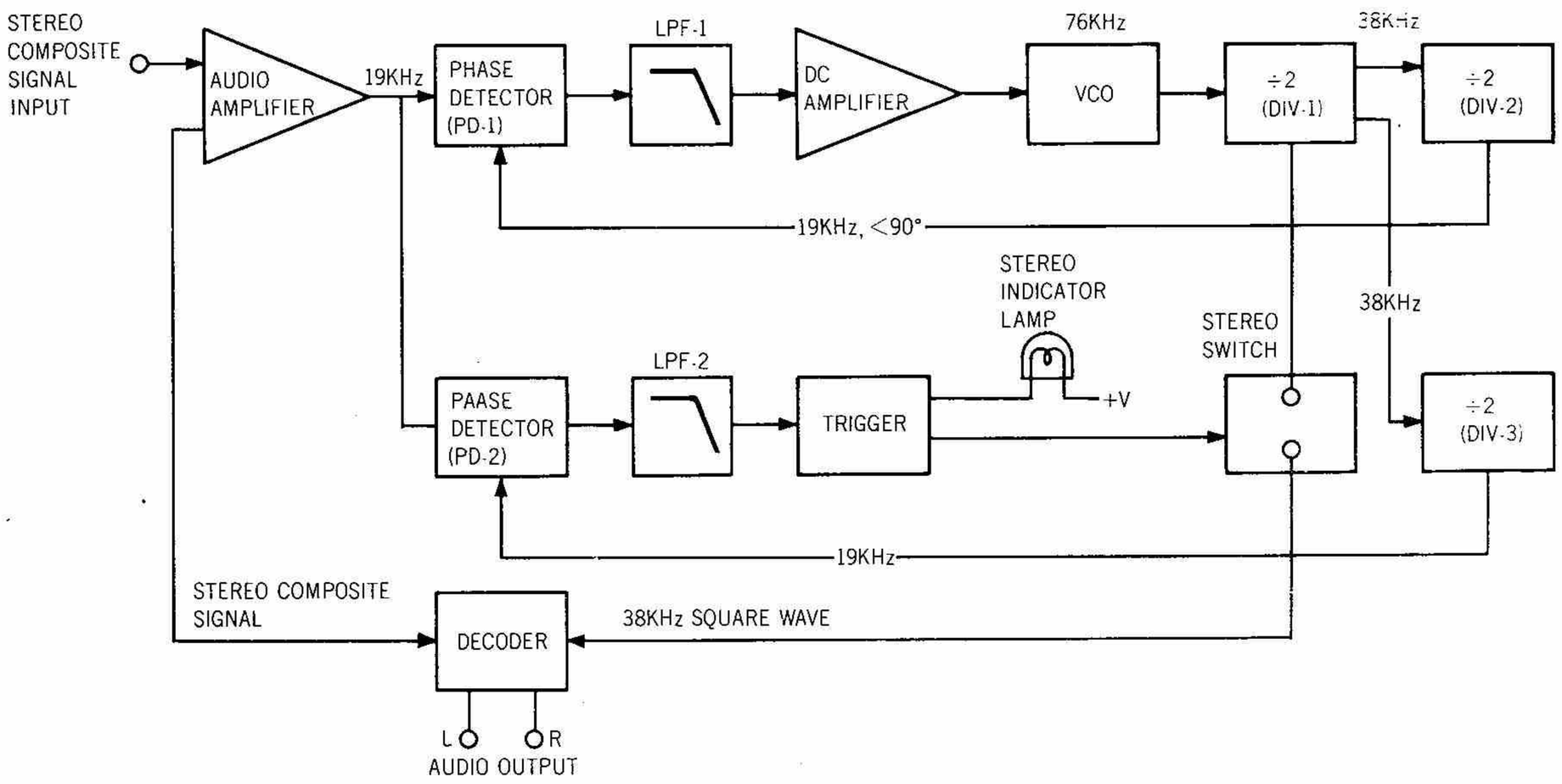

Figure 1. Block Diagram of the HA1156

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 SCOPE INPUTS jacks (FRONT L or R) on the rear panel with the "EXT 2 CH" 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 VCO output signal (J310), using an oscilloscope and frequency counter.

4. SCOPE DISPLAY CIRCUIT

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

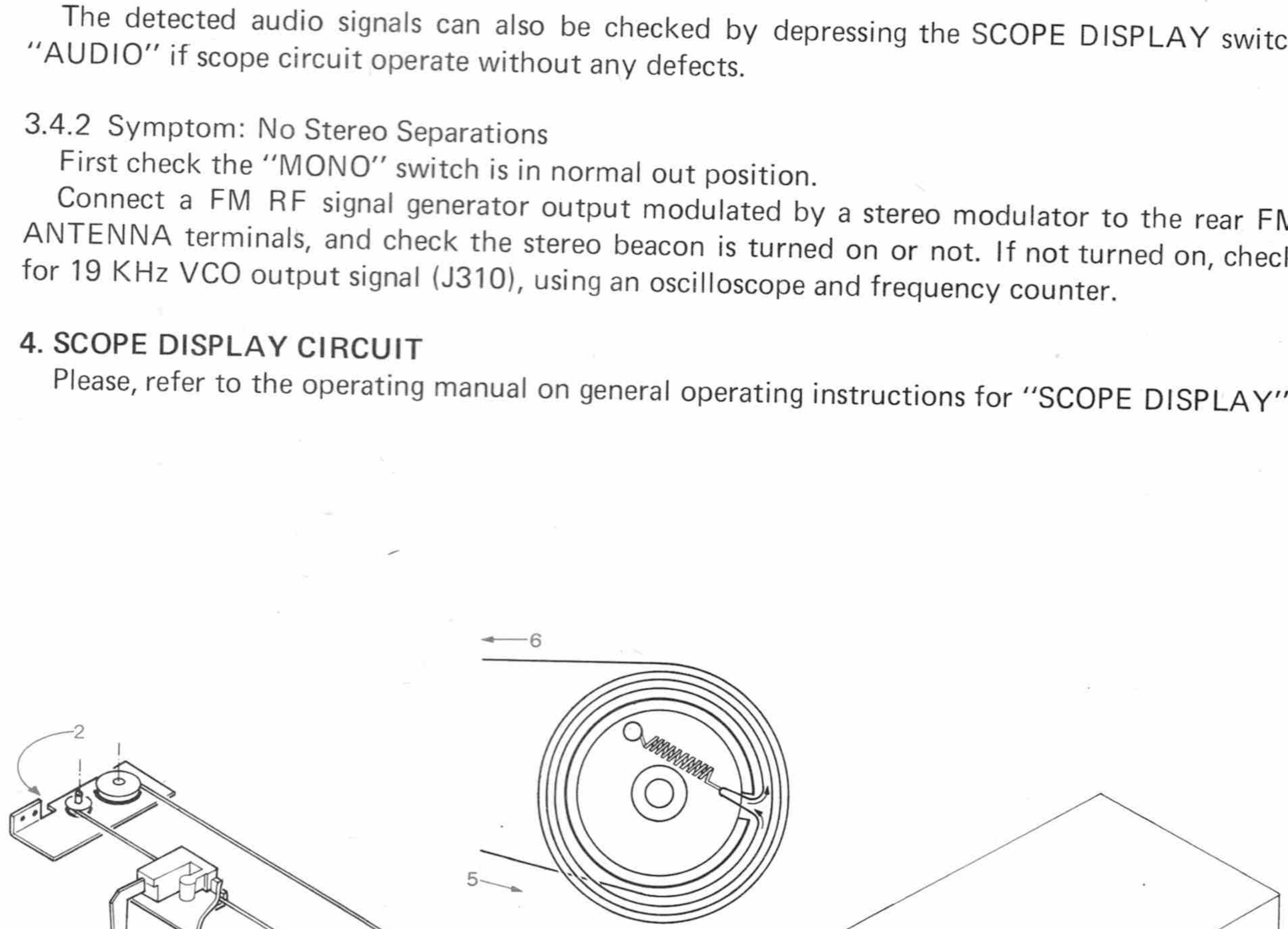

Figure 2. Dial Stringing

4.1 External Display (2 CH, 4 CH)

a. 2 CH Display

The signal coming into the SCOPE INPUTS Terminal FRONT L (FRONT R) on the rear panel is displayed on the scope through the following signal path.

SCOPE INPUTS FRONT L (FRONT R) Terminal→R014 (ganged variable resistor)→Pin Terminal JT06 (JT03)→CT06 (CT08, 0.01μF)→RT25 (RT38, 100KΩ)→HT05 (HT07, FET)→CT10 (CT12, 10μF)→2 CH DISPLAY switch→RT20 (RT21, 270KΩ)→Pin Terminal J904 (J903)→Vertical amplifier (Horizontal amplifier).

b. 4 CH Display

For the 4 CH display is used a diode matrix circuit consisting of four diodes and twelve resistors. In this circuit, the signals coming into the SCOPE INPUTS Terminals FRONT L and R and REAR L and R are arranged to have the same polarity on the positive side and are halved. In turn, the signals are led to the positive or negative side of the differential scope amplifier, in which the signals are individually vector composed and displayed.

Now, the signal path of each channel will be shown when the signals of the same phase and same level are fed to the channels at different times.

b-1 SCOPE INPUTS Terminal FRONT L→R014 (Gang, Variable Resistor)→Pin Terminal JT06→CT06 (0.01μF)→RT25 (100KΩ)→HT05 (FET Pre-Amplifier)→CT10 (10μF)→2 CH DISPLAY switch→HT04 (Diode)→RT15 (5.6KΩ)→4 CH DISPLAY switch →
2 CH DISPLAY switch→Pin Terminal J904→Vertical Amplifier (plus side).
→RT16 (5.6KΩ)→4 CH DISPLAY switch→Pin Terminal J905→Horizontal Amplifier (minus side).

b-2 SCOPE INPUTS Terminal REAR L→R015 (Gang, Variable Resistor)→Pin Terminal JT07→CT07 (0.01μF)→RT26 (100KΩ)→HT06 (FET Pre-Amplifier)→CT11 (10μF)→HT02 (Diode)→RT09 (5.6KΩ)→4 CH DISPLAY switch→Pin Terminal J906→Vertical Amplifier (minus side).
→RT10 (5.6KΩ)→4 CH DISPLAY switch→Pin Terminal J905→Horizontal Amplifier (plus side).

b-3 SCOPE INPUTS Terminal FRONT R→R014 (Gang, Variable Resistor)→Pin Terminal JT03→CT08 (0.01μF)→RT38 (100KΩ)→HT07 (FET Pre-Amplifier)→CT12 (10μF)→2 CH DISPLAY switch→HT03 (Diode)→RT11 (5.6KΩ)→4 CH DISPLAY switch→2 CH DISPLAY switch→Pin Terminal J903→Horizontal Amplifier (plus side).
→RT12 (5.6KΩ)→4 CH DISPLAY switch→2 CH DISPLAY switch→Pin Terminal J904→Vertical Amplifier (plus side).

b-4 SCOPE INPUTS Terminal REAR R→R015 (Gang, Variable Resistor)→Pin Terminal JT10→CT09 (0.01μF)→RT39 (100KΩ)→HT08 (FET, Pre-Amplifier)→CT13 (10μF)→HT01 (Diode)→RT05 (5.6KΩ)→4 CH DISPLAY switch→2 CH DISPLAY switch→Pin Terminal J903→Horizontal Amplifier (plus side).
→RT06 (5.6KΩ)→4 CH DISPLAY switch→Pin Terminal J906→Vertical Amplifier (minus side).

4.2 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 J151→AM push switch→TUNING DISPLAY switch→RT17 (270KΩ)→EXT. 4 CH DISPLAY switch→EXT. 2 CH DISPLAY switch→Pin Terminal J904→H902 vertical amplifier.

4.3 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→Pin Terminal J315 →R373 (33KΩ)→H316 buffer amplifier→R374 (trimming resistor)→Pin Terminal J316→AM push switch→TUNING DISPLAY switch→RT17 (270KΩ)→EXT. 4 CH DISPLAY switch→ EXT. 2 CH DISPLAY switch→Pin Terminal J904→Vertical amplifier (for signal strength)

b. DC plus and minus output for center tuning at the Pin Terminal J504→Pin Terminal JT11→ RT31 (trimming resistor)→TUNING DISPLAY switch→RT23 (270KΩ)→EXT. 4 CH DISPLAY switch→EXT. 2 CH DISPLAY switch→Pin Terminal J903→Horizontal amplifier (for center tuning)

Note 1. CT05 is filtering capacitor 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 J908 or J907 respectively.
AC voltage for pilot lamps→RT24→CT01→TUNING DISPLAY switch→AM push switch→J908 (for FM) or J907 (for AM)

* RT03 is the DC bias adjusting resistor which corrects the spot position at no signal.

4.4 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 (RT24 and CT01 are disconnected) from the circuit by depressing the MULTI-PATH push switch.

b. Audio signal pass filter (CT05) is 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 R374 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 H904) and the second two transistors (H906 and H908).
It amplifiers signals of from DC to AC frequency with very high stability.
The first 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 47 dB for DC signal and 39 dB for AC signal. The finally amplified signal is then applied to the oscilloscope tube.

* R916 is a gain adjusting resistor and should be set for the gain of 34mV/cm. (at 1 KHz, 2 CH DISPLAY position)

* R906 is provided for adjusting DC balance between H902 and H904 and should be set so that the voltage difference between the source terminals of H902 and H904 is less than 0.05 volt with vertical centering control knob pleaced in its mechanical center.

5.2 Horizontal Amplifier

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

* R915 is gain adjusting resistor and should be set for 34mV/cm. (at 1 KHz, 2 CH DISPLAY position).

* R905 is the DC balance control between H901 and H903 and should be set so that the voltage difference between source terminals of H901 and H903 is less than 0.05 volt with horizontal centering control knob placed in its mechanical center.

6. POWER SUPPLY CIRCUIT

6.1 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 H801.

6.2 Power source for MPX Pre-Amp (+35V) and Pre-Amp (+36V) is fed through a transistor ripple filter circuit consisting of H802.

6.3 Both DC plus and minus 13.5V for the first differential amplifiers are zener-regulated by two zener diodes, H805 and H804, respectively.
Same plus 13.5V is also used for the external scope amplifier.

6.4 DC plus 200V for collector circuit of the vertical and horizontal amplifier and DC minus 970V for CRT's anode are fed by the power supply circuit on PP01.

6.5 Power source (plus and minus) for trace rotation are fed through a resistor R813 and R812 in the power supply circuit an P800.

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 BRIGHT 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 H906 and H908, and if the spot appear the vertical amplifier would be defective.

b. Short both collector terminals of H905 and H907, 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 44V to 420V 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 BRIGHT 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 desensitivity 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 "EXT. 2 CH".
8.2 Adjust two CENTERING knobs to bring the spot into the center of small circular.
8.3 Adjust "BRIGHT" control (R009) on the rear panel to make the brightness of the spot dimmer.
8.4 Adjust "FOCUS" control, (R008) to make the spot smaller and more circular.
8.5 Feed in 130mV (1 KHz) to the "SCOPE INPUTS, FRONT R" jack and adjust R915 (HORIZ) to obtain a horizontal deflection of about 4cm, then connect the same input voltage to the "VERT" jack and adjust R916 (VERT) for the same vertical deflection.
8.6 Set both the centering knobs at their mechanical center, and adjust R905 (HORIZ) and R906 (VERT) to bring the spot into the center of small circular.

9. AM TUNING DISPLAY ALIGNMENT

9.1 Depress both SCOPE DISPLAY switches "ON" and "TUNING" and MODE SELECTION switch "AM".
9.2 Adjust RT03 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 100KμV (98 MHz, 400 Hz, 30% Mod.) to the FM ANTENNA terminal and adjust R374 so that the spot does not frame out.
10.3 FM Multipath display alignment: Adjust RT31 to obtain full deflection of the trace within both side marks, applying FM signal (1 KμV, 400 Hz, 100% Mod.) to the FM ANTENNA terminals.

11. AM ALIGNMENT

AM IF Alignment:
11.1 Connect a sweep generator to the J153 and an alignment socpe to the test point Ⓑ.
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.

11.9 AM Signal Strength Display Adjustment:
Set the AM signal generator to 1000 KHz, 100 dB and adjust R152 so that the spot may meet upper mark.

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 TUNER output jacks on the rear panel.

12.2 Set the FM SG to 87.5 MHz and provide about 3 to 5μV. 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 5μV 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 KμV 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 KμV at 90 MHz. Tune the receiver to the same frequency so that the tuning pointer indicates its center. Then, turn off the modulation of the FM SG. Connect a frequency counter to test point J310 (point ⓒ) and adjust R311 so that the frequency counter may a precisely read 19 KHz.

13.2 Modulate the FM SG with stereo composite signal consisting of only L or R channel (pilot signal must be included).

13.3 Adjust the trimming resistor R301 for maximum and same separation in both channels.

14. MUTING CIRCUIT ALIGNMENT

14.1 Connect a VTVM across the resistor R363 and adjust the resistor R363 until the meter reads 0.75V DC at no signal.

14.2 Set the FM SG to provide 1 KμV at 98 MHz and tune the receiver to the same frequency connectly.

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 R363 so that each shifted frequency range becomes equal.

14.4 Adjust R362 for preferred frequency shift at which the muting circuit operates.

15. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the Model 120B 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.
Frequency Counter		MPX oscillator Adjustment (VCO).
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.
VTVM	With AC, DC, RF range.	Voltage measurements.
Circuit Tester		Trouble shooting.

Table 1. Test Equipment Required for Servicing

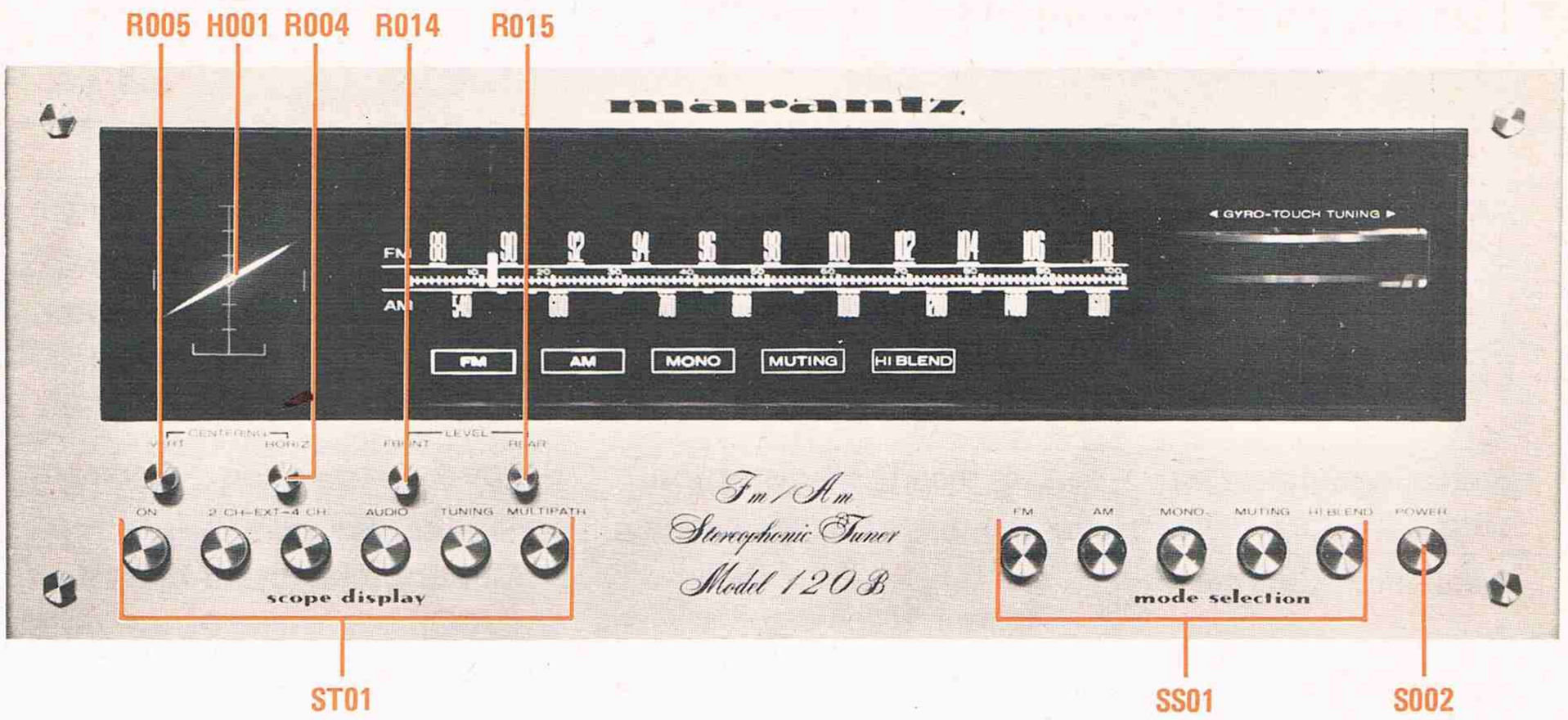

Figure 3. Front Panel Adjustment and Component Locations

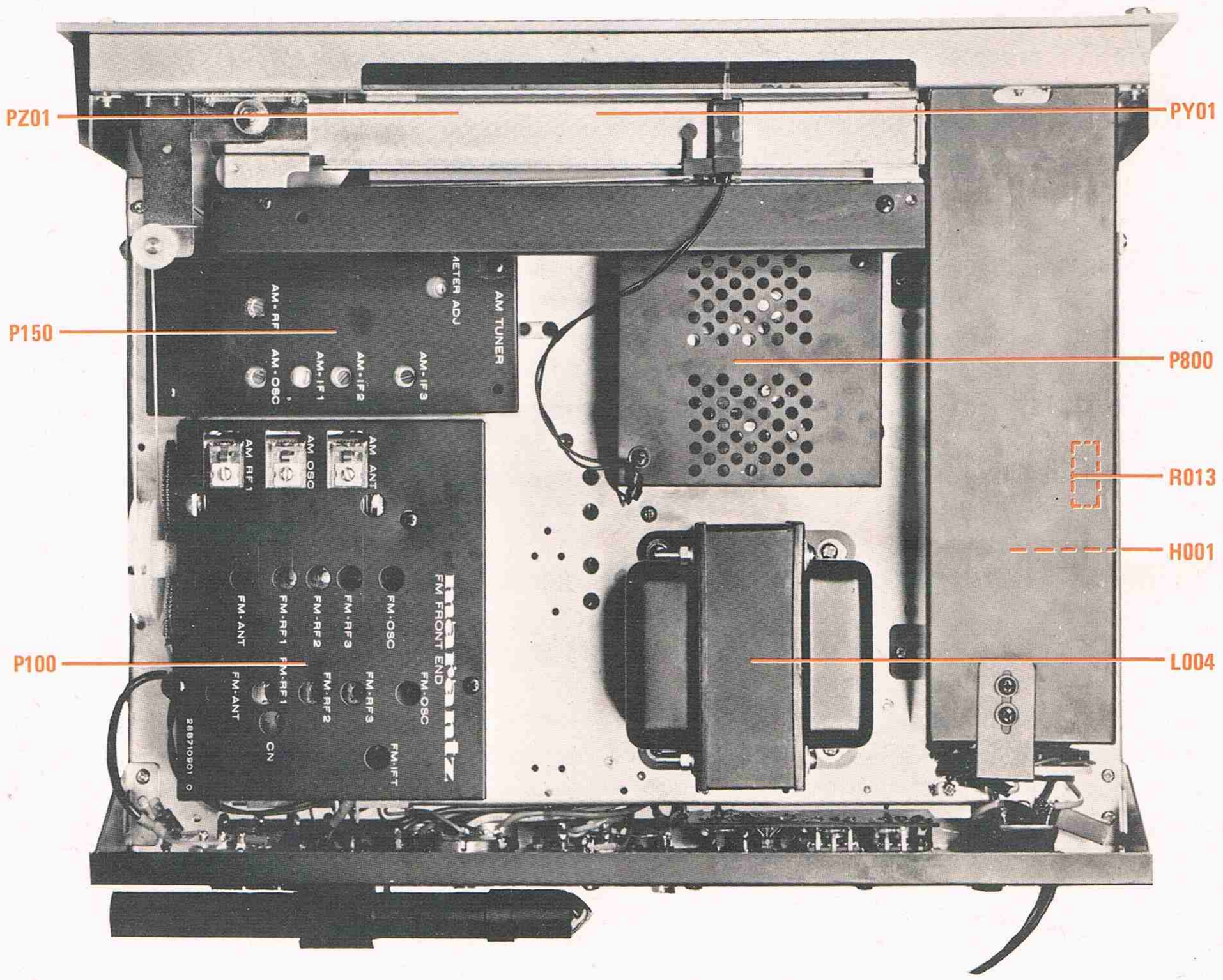

Figure 4. Main Chassis Component Locations (Top View)

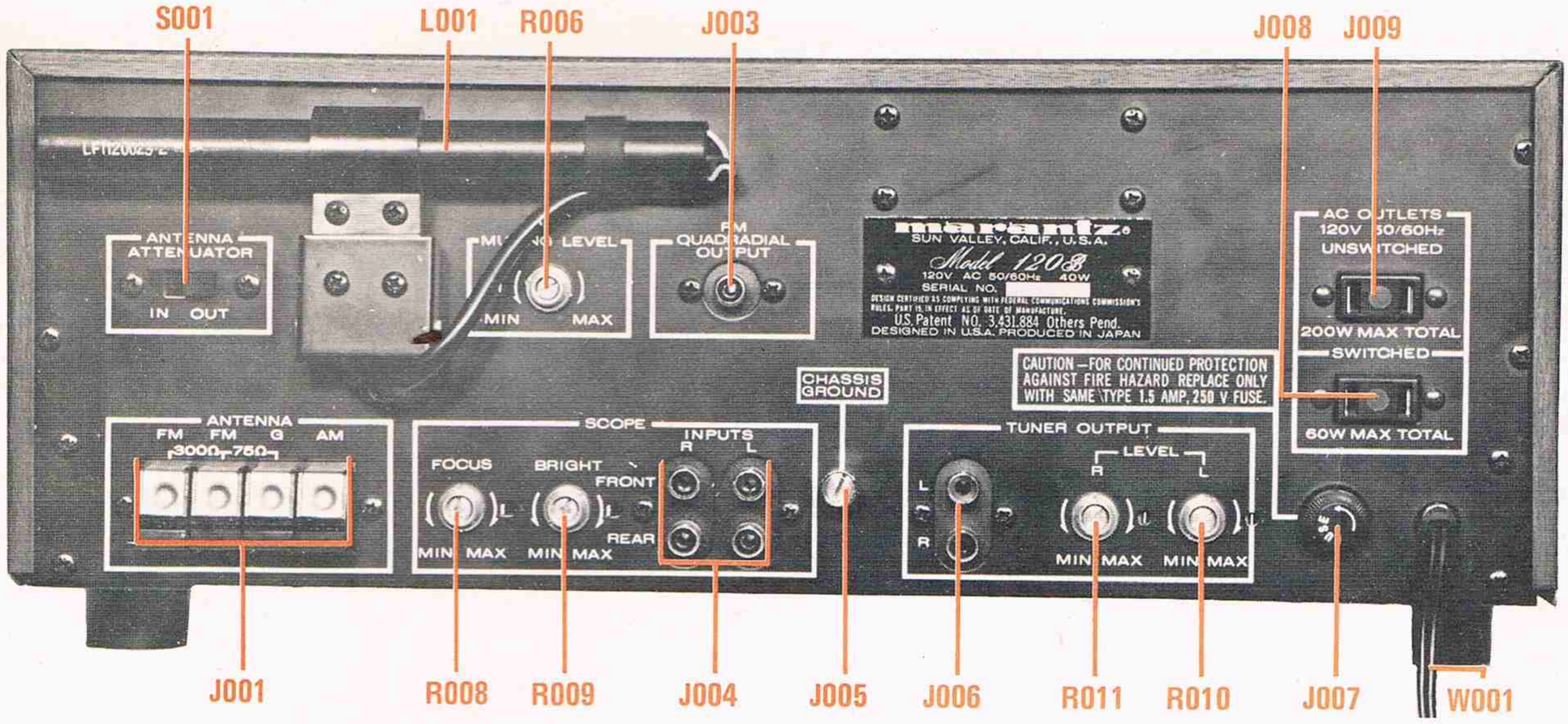

Figure 5. Rear Panel Adjustment and Component Locations

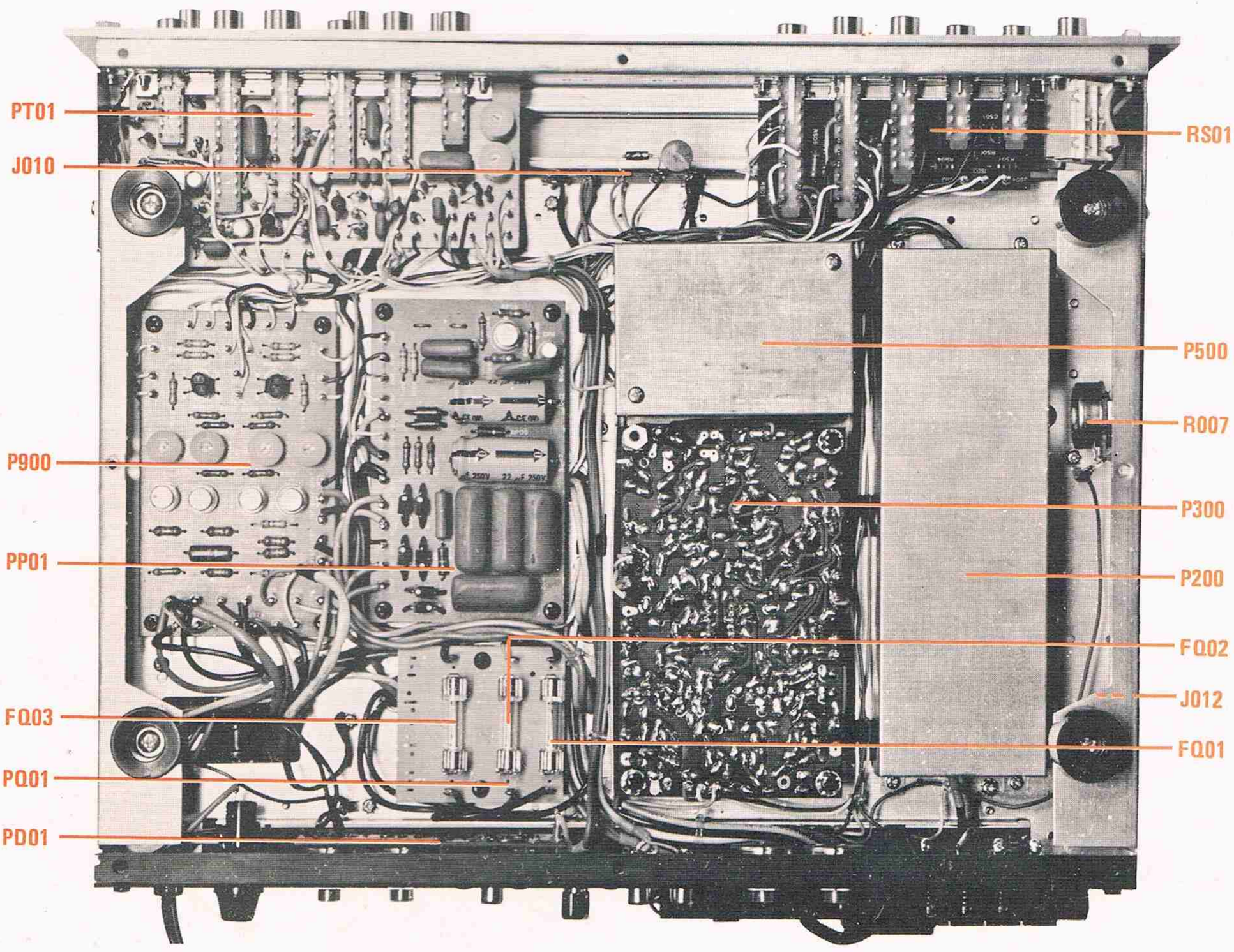

Figure 6. Main Chassis Component Locations (Bottom View)

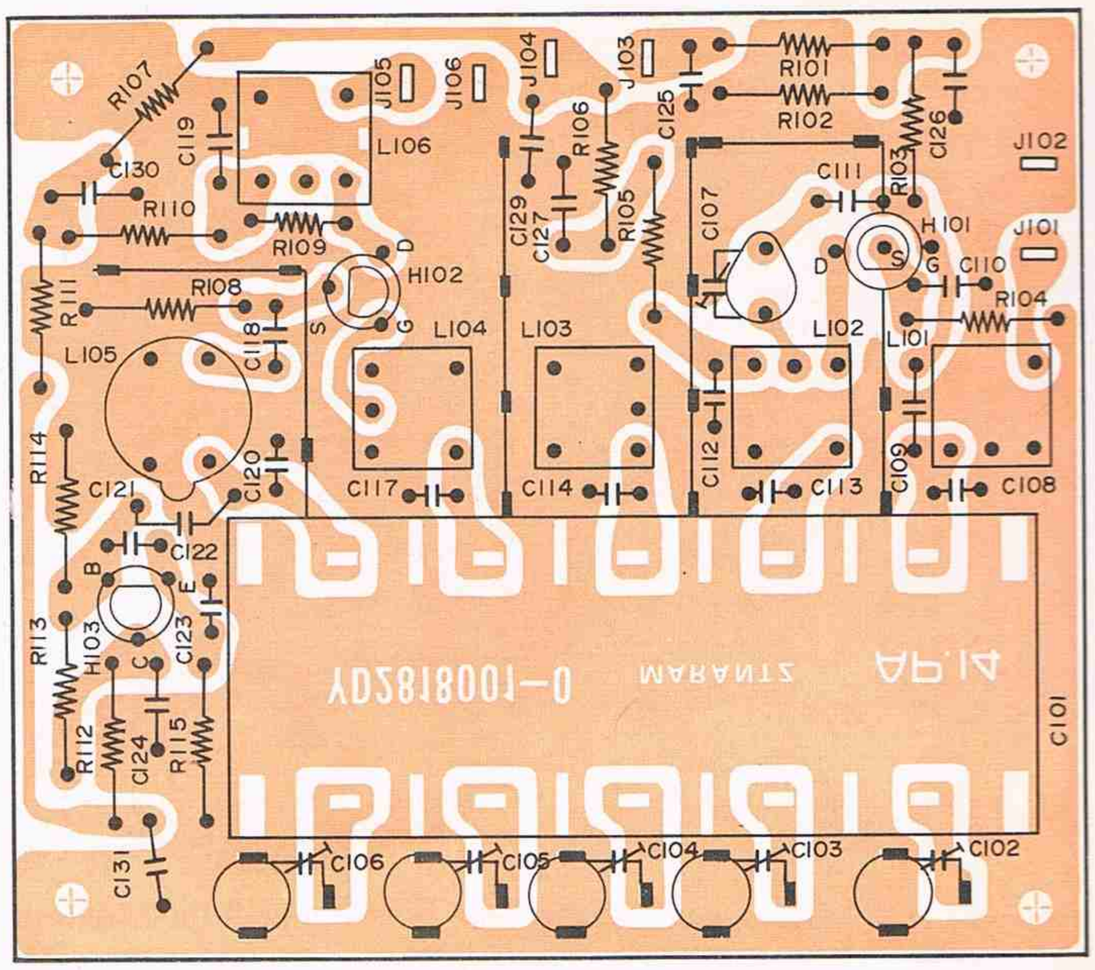

Figure 7. FM Front End Assembly P100 Component Locations

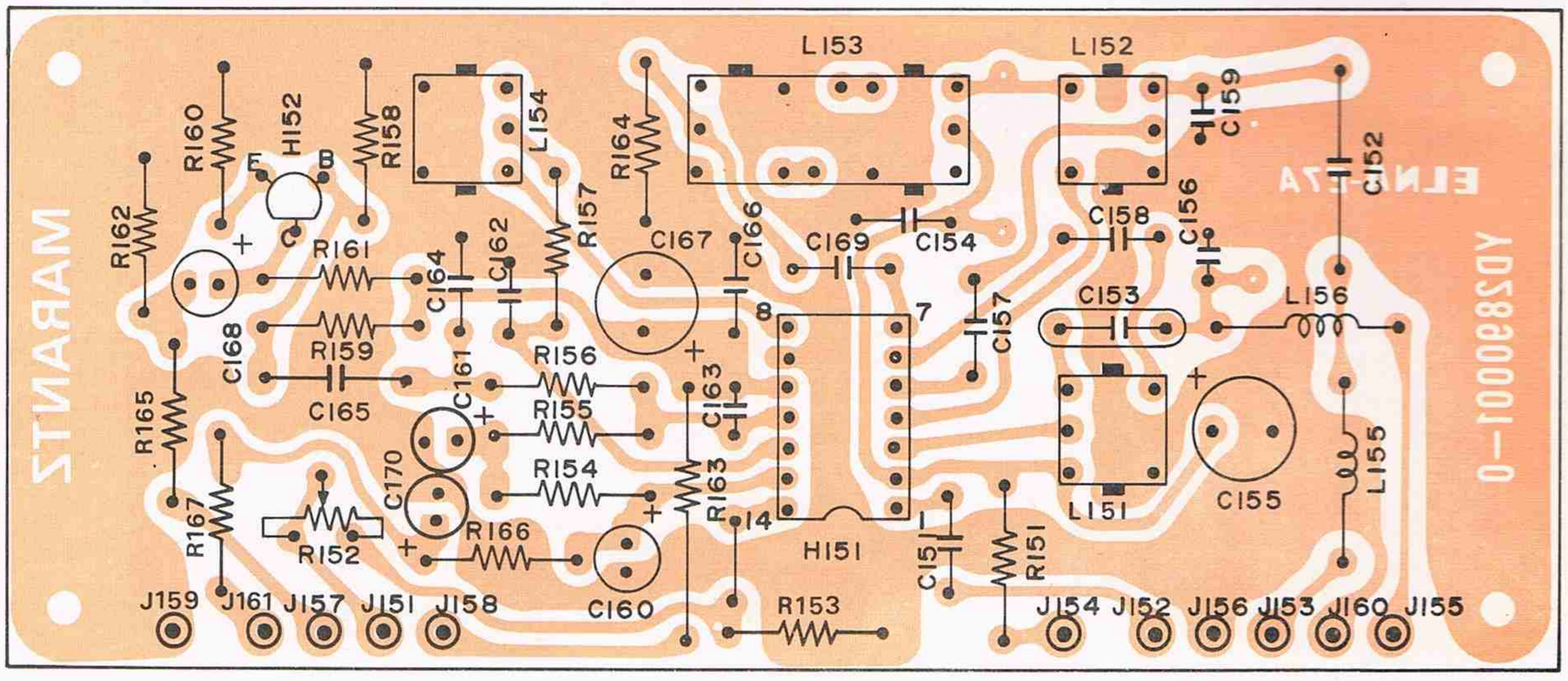

Figure 8. AM Tuner Unit Assembly P150 Component Locations

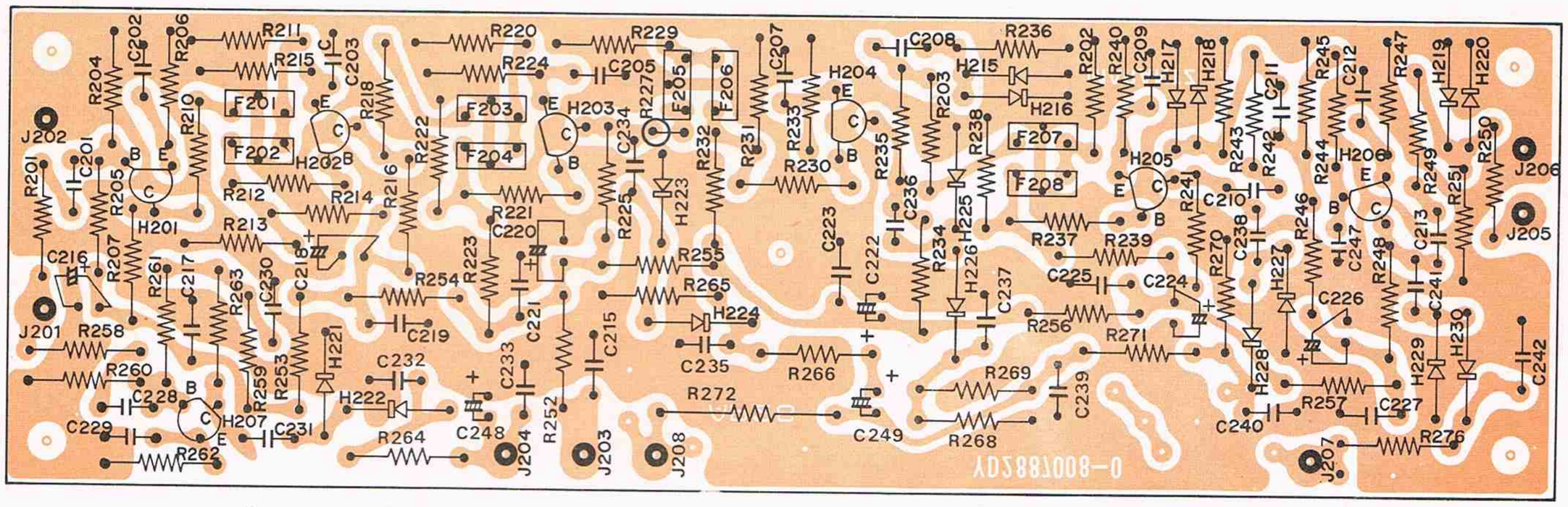

Figure 9. FM IF Amplifier Assembly P200 Component Locations

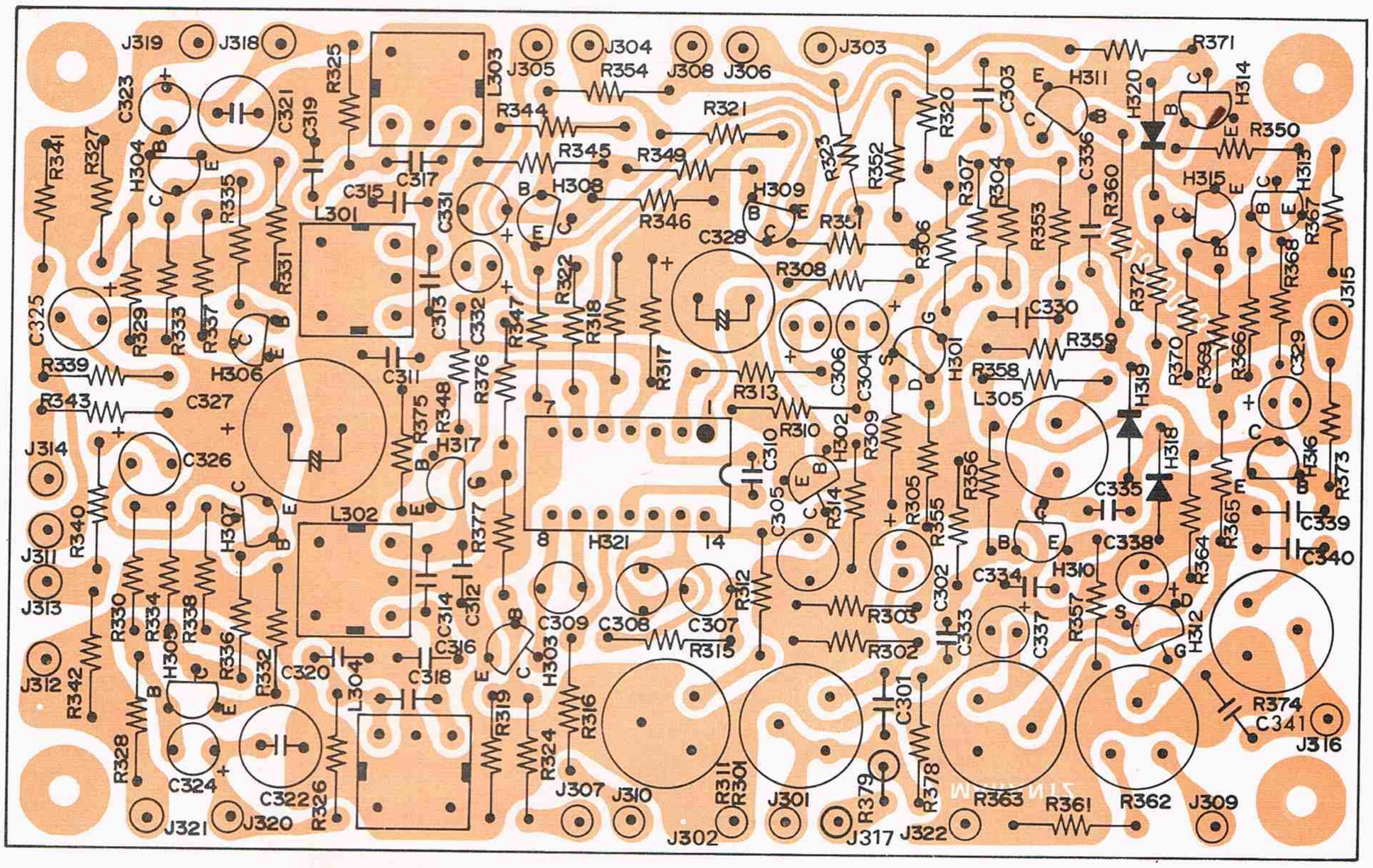

Figure 10. MPX Stereo Decoding and Noise DC Amplifier Assembly P300 Component Locations

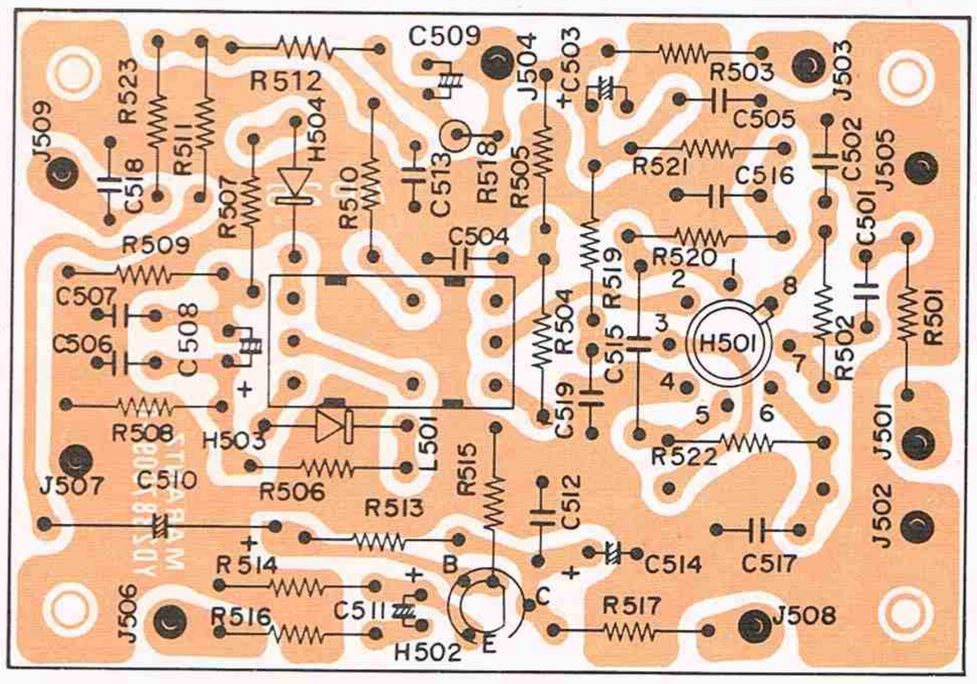

Figure 11. FM Detector Assembly P500 Component Locations

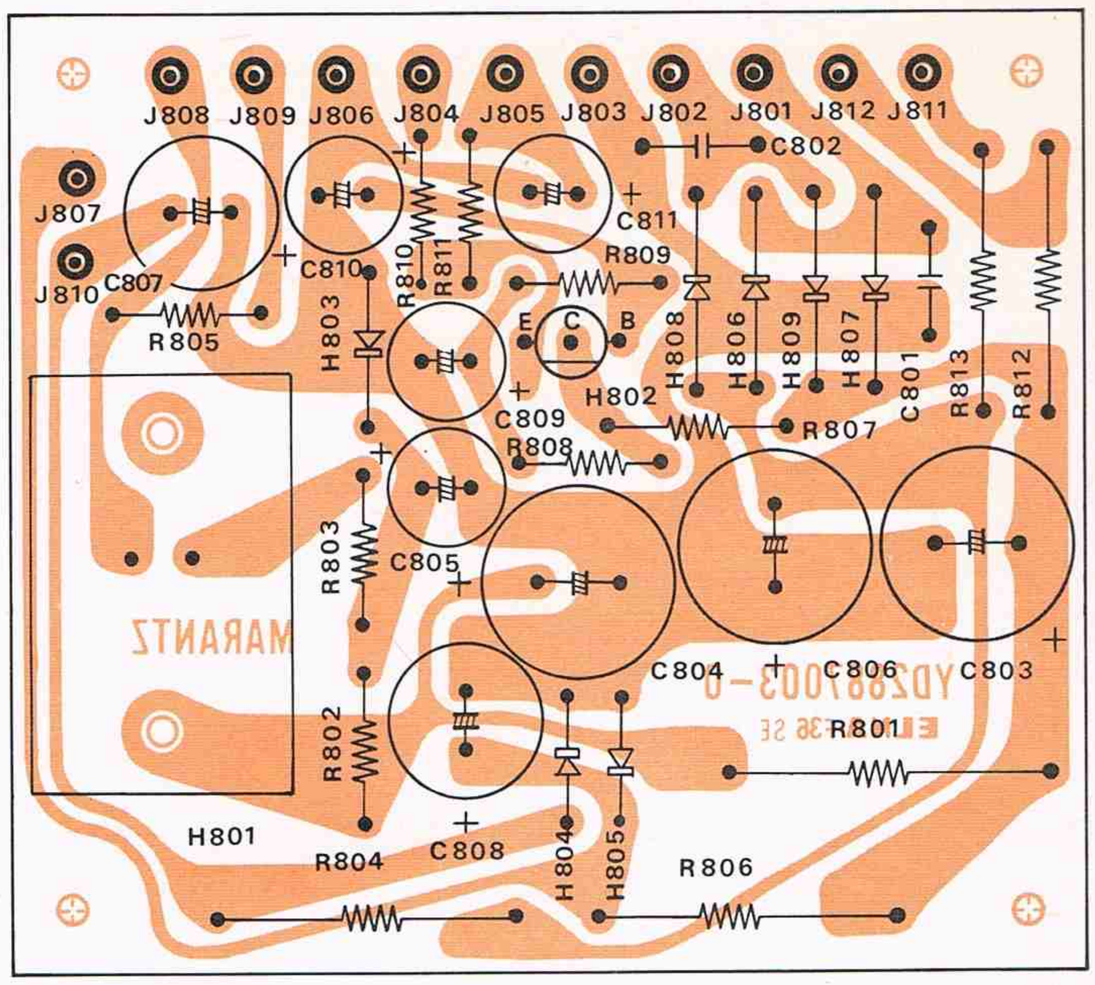

Figure 12. Power Supply Unit Assembly P800 Component Locations

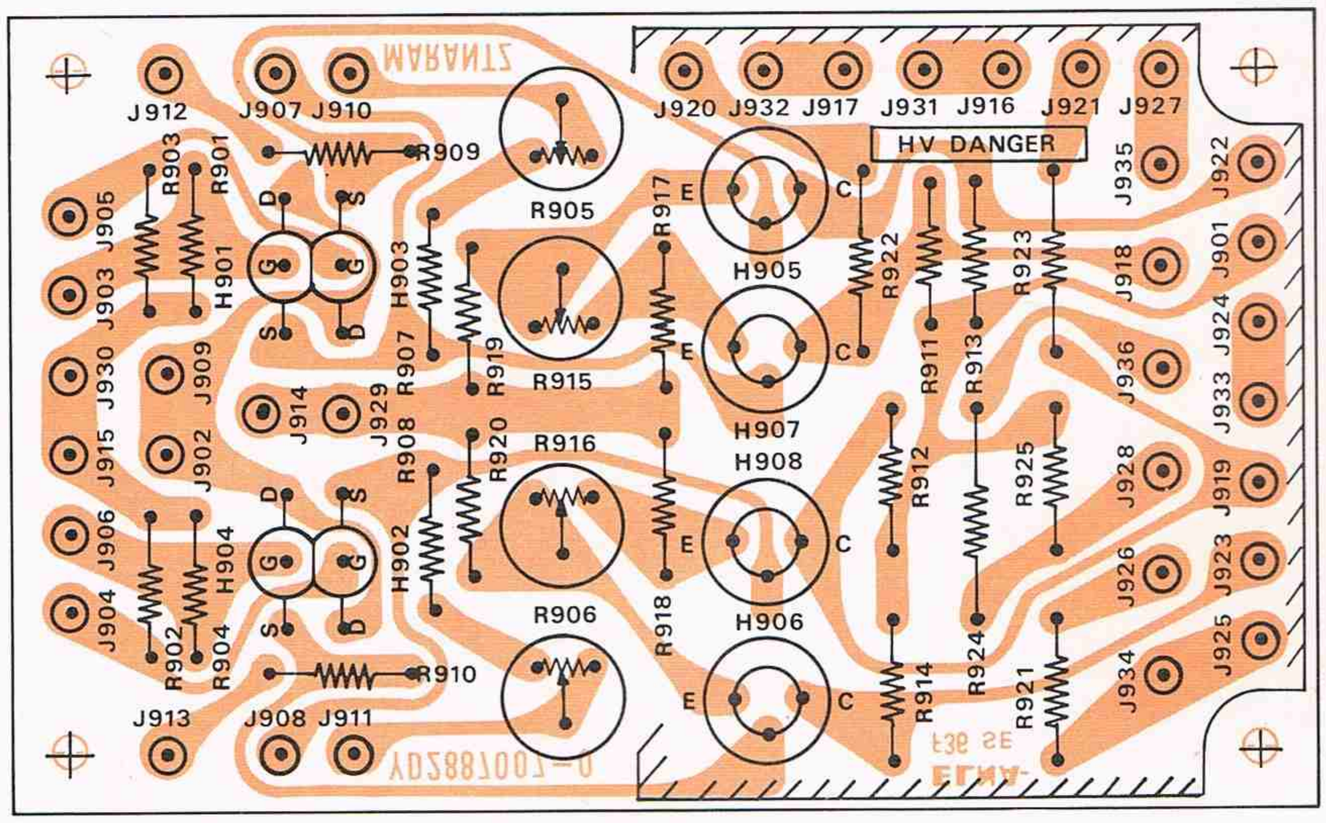

Figure 13. Scope Display Assembly P900 Component Locations

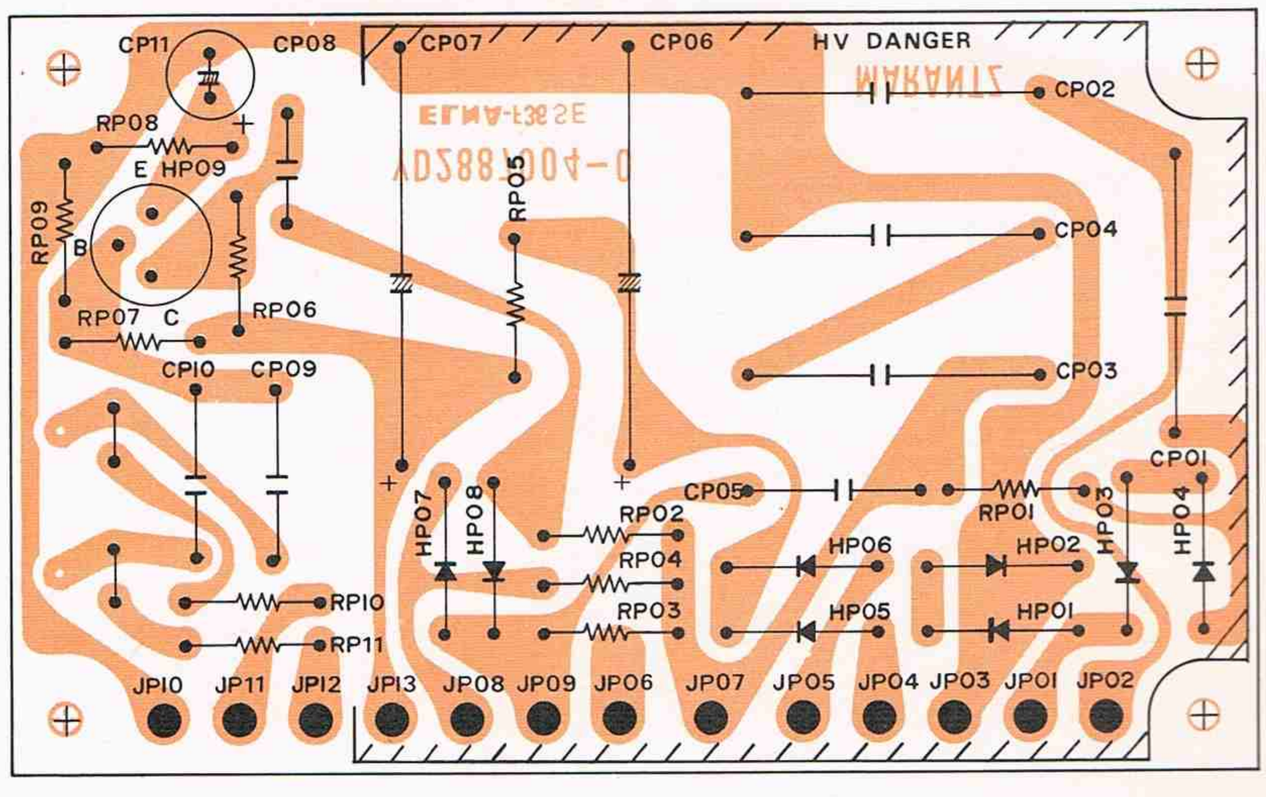

Figure 14. High Voltage Power Supply and Spot Killer Assembly PP01 Component Locations

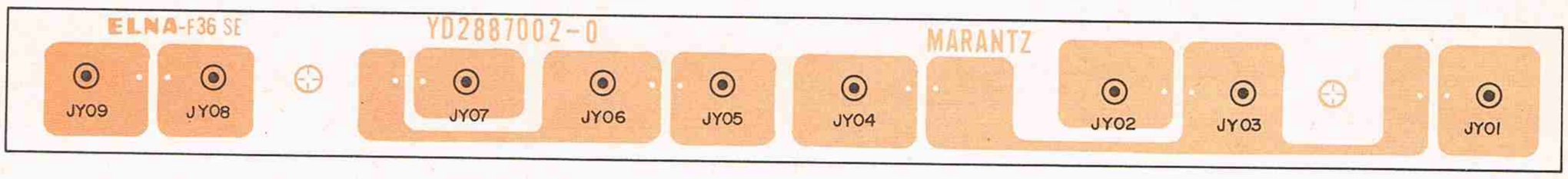

Figure 15. Function Lamp Assembly PY01 Component Locations

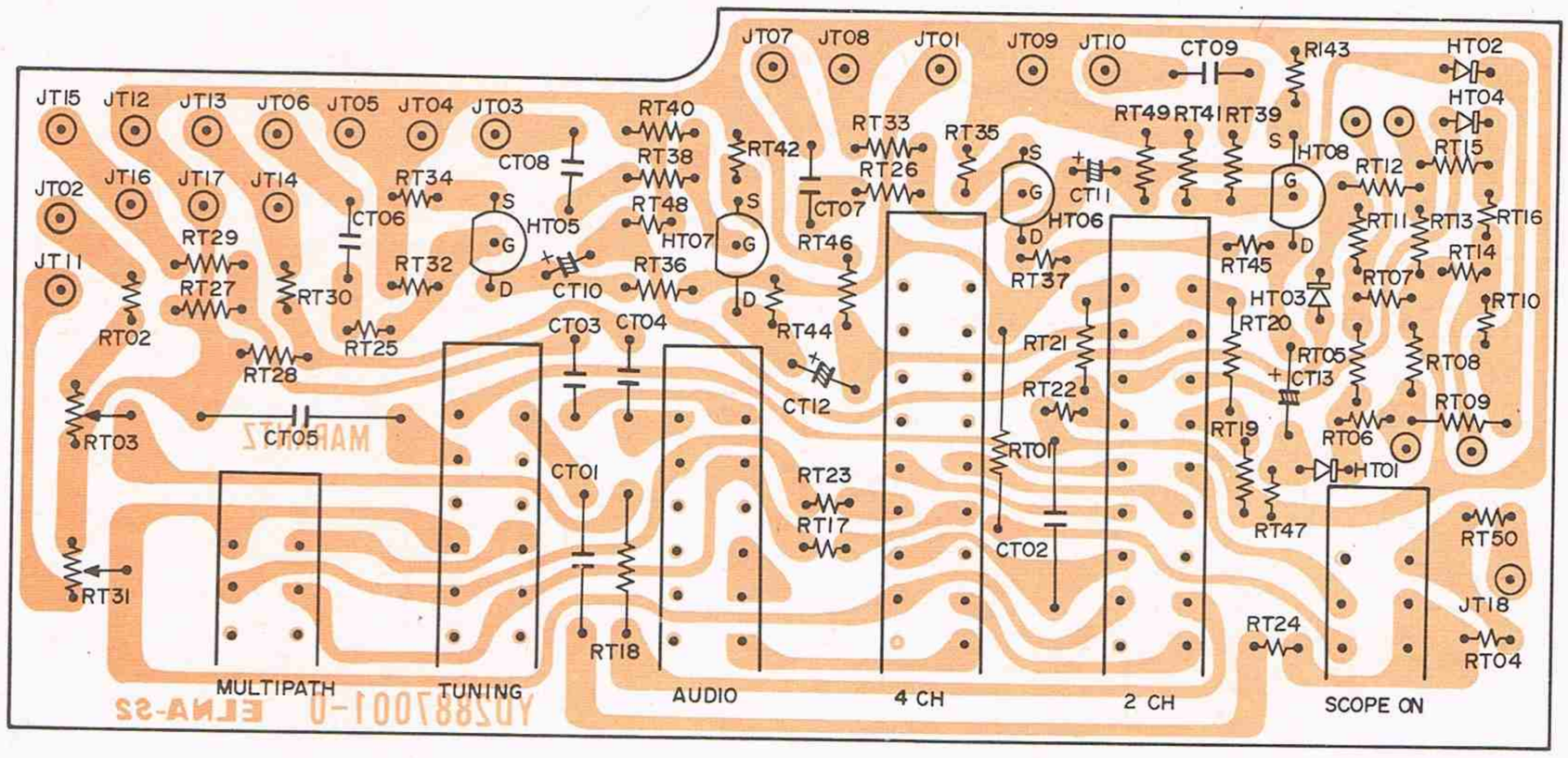

Figure 16. Display Switch Assembly PT01 Component Locations

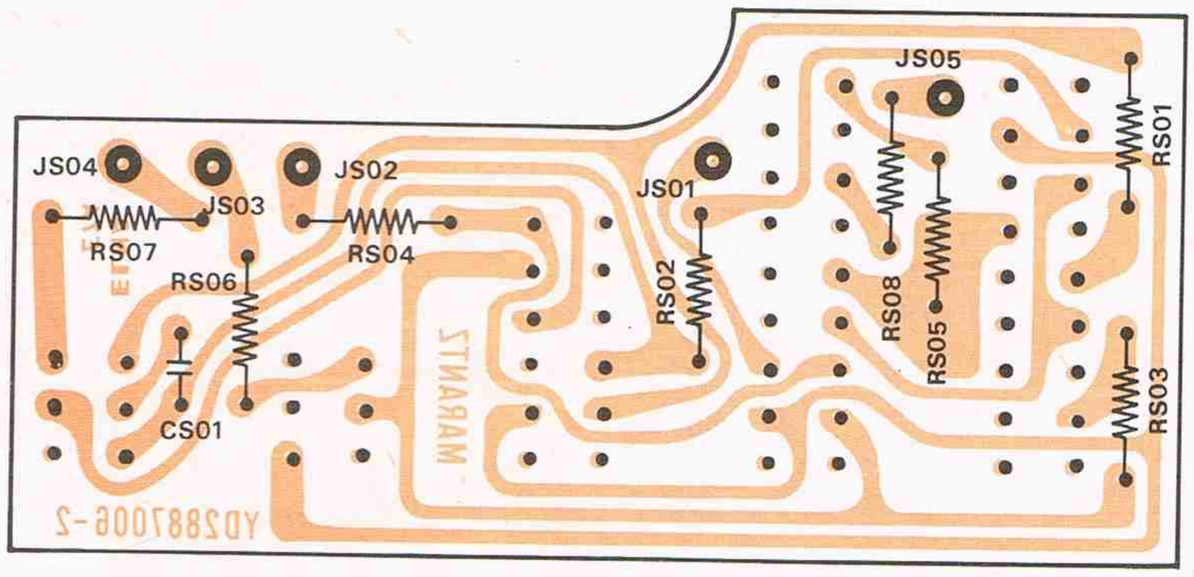

Figure 17. Function Switch Assembly PS01 Component Locations

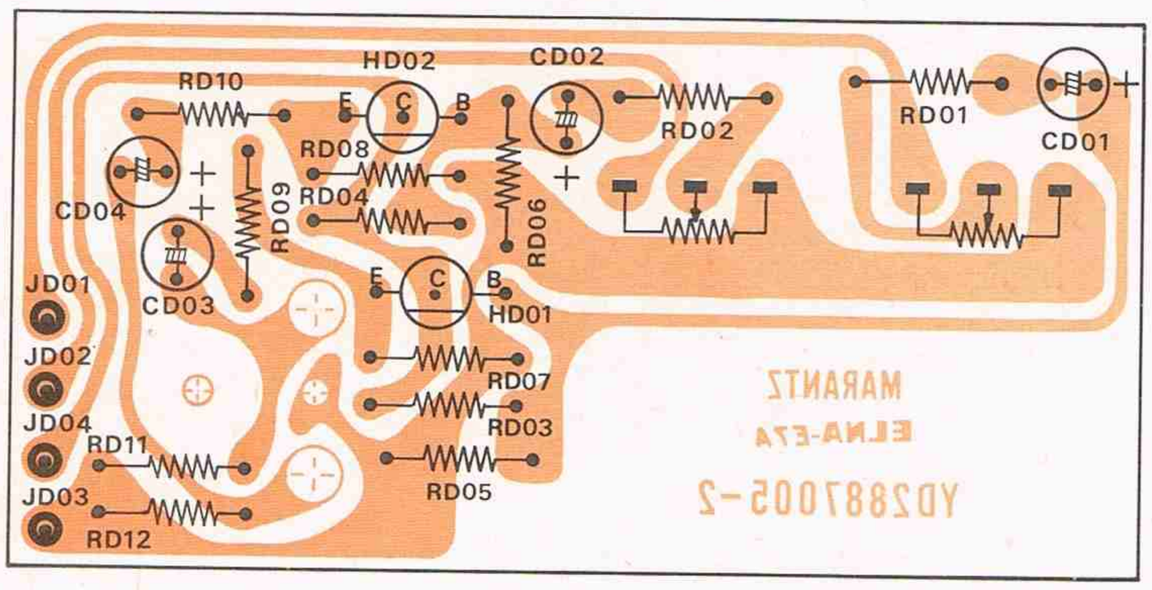

Figure 18. Buffer Amplifier Assembly PD01 Component Locations

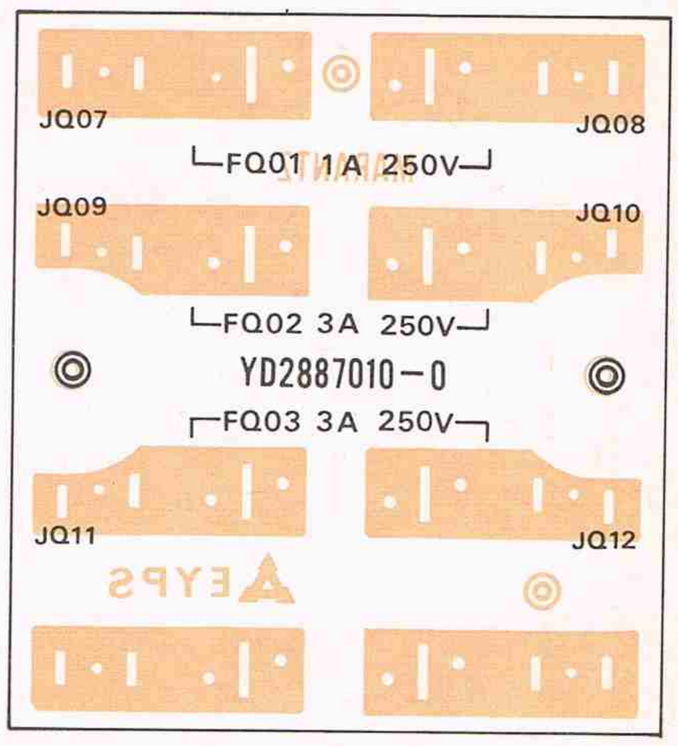

Figure 19. Fuse Mount Assembly PQ01 Component Locations

SERVICE NOTES

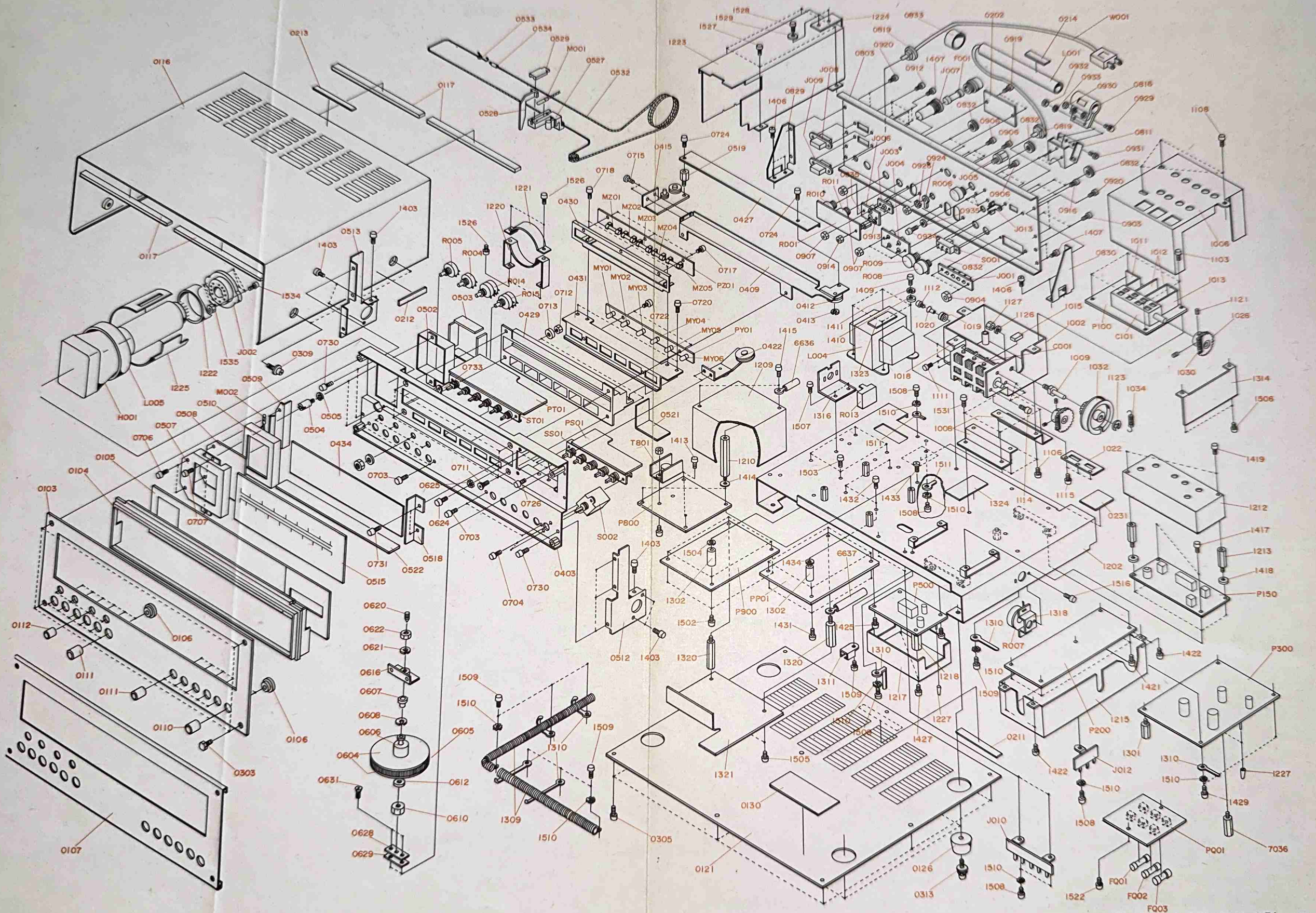

Figure 20. Exploded Mechanical Diagram

PARTS LIST

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
A	288706340	Front Panel Assembly
0103	288706301	Escutcheon
0104	285540101	Frame
0105	288715801	Window
0106	281825905	Bush x 12
0107	288705301	Cover
B	282610341	Pointer Assembly
0527	281810301	Pointer
0528	282610301	Pointer
0529	281805301	Cover
M001	IN1008030	Lamp
C	120200640	String Assembly
0532	72080802A	String
0533	120225801	Hook
D	285227340	Fly Wheel Assembly
0604	257706302	Escutcheon x 2
0605	257727301	Fly Wheel
0606	285211201	Shaft
0610	53110603E	Hexagon Nut
0611	54040602N	Spring Washer
0612	54020601E	Flat Washer P
E	288716040	Back Panel Assembly
0803	288716001	Bracket
0912	55060365S	T.R. Rivet x 4
J008	YJ0400018	Jack
J009	YJ0400018	Jack
P100	YD2818001	P.W. Board, FM RF
	ZZ2818001	P.W. Board Ass'y
		RESISTORS
		All resistors are ±5% and ¼W.
R101	RT0556314	56KΩ
R102	RT0510514	1MΩ
R103	RT0510414	100KΩ
R104	RT0510114	100Ω
R105	RT0522114	220Ω
R106	RT0510114	100Ω
R107	RT0510114	100Ω
R108	RT0547214	4.7KΩ
R109	RT0522314	22KΩ
R110	RT0510214	1KΩ
R111	RT0510114	100Ω
R112	RT0510114	100Ω
R113	RT0522314	22KΩ
R114	RT0522314	22KΩ
R115	RT0512214	1.2KΩ
		CAPACITORS
C101	CA5000001	Variable, FM 5 Gang
C102	CT1100001	Trimming, 1.5 ~ 11.5PF NPO
C103	CT1100001	Trimming, 1.5 ~ 11.5PF NPO
C104	CT1100001	Trimming, 1.5 ~ 11.5PF NPO
C105	CT1100001	Trimming, 1.5 ~ 11.5PF NPO
C106	CT1100001	Trimming, 1.5 ~ 11.5PF NPO
C107	CT1100002	Trimming, 1.5 ~ 11.5PF NPO
C108	DD1615001	Ceramic, 15PF ±10%
C109	DK1710201	Ceramic, 1000PF ±10%
C110	DK1710301	Ceramic, 0.01μF ±20%
C111	DD1105001	Ceramic, 5PF ±0.5PF
C112	DK1710201	Ceramic, 1000PF ±20%
C113	DD1615001	Ceramic, 15PF ±10%
C114	DD1625001	Ceramic, 25PF ±10%
C115	DD1000601	Ceramic, 1PF ±0.25PF
C116	DD1600601	Ceramic, 0.6PF ±10%
C117	DD1620001	Ceramic, 20PF ±10%
C118	DK1710201	Ceramic, 1000PF ±20%
C119	DK1710301	Ceramic, 0.01μF ±20%
C120	DD1620003	Ceramic, 20PF ±10%
C121	DD1210006	Ceramic, 10PF ±10%
C122	DD1615003	Ceramic, 15PF ±10%
C123	DD1615003	Ceramic, 15PF ±10%
C124	DK1710301	Ceramic, 0.01μF ±20%
C125	DK1710301	Ceramic, 0.01μF ±20%
C126	DK1710301	Ceramic, 0.01μF ±20%
C127	DK1710301	Ceramic, 0.01μF ±20%
C129	DK1710301	Ceramic, 0.01μF ±20%
C130	DK1710301	Ceramic, 0.01μF ±20%
C131	DK1710301	Ceramic, 0.01μF ±20%
		COILS & TRANSFORMER
L101	LA1027801	Ant Coil
L102	LA1027802	RF Coil
L103	LA1027803	RF Coil
L104	LA1027804	RF Coil
L105	LO1202604	OSC Coil
L106	LI1001601	IFT
		TRANSISTORS
H101	HF200191A	2SK 19Y
H102	HF200191A	2SK 19Y
H103	HT305351B	2SC535B
		MISCELLANEOUS
J101	YP1000094	Plug
J102	YP1000094	Plug
J103	YP1000094	Plug
J104	YP1000094	Plug
J105	YP1000094	Plug
J106	YP1000094	Plug

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
1032	281815901	Drum
1034	71101569M	Spring
1011	281810903	Shield
1012	281810904	Shield x 2
1013	281810905	Shield
1026	281805850	Gear K x 2
1121	51064019A	Set Screw H.P. x 4
1103	51100306S	B.H.M. Screw x 4
1030	71101669Q	Spring x 2
1123	64000400R	R.G. Ring E
1002	281810950	Shield K
1008	281816008	Bracket x 2
1009	281811201	Shaft
1015	288705603	Buffer x 2
1018	288716004	Bracket
1019	114325901	Bush x 2
1020	114325902	Bush x 2
1022	281805102	Guide
1106	51570306B	P.H. Tapt Screw x 4
1111	51100305B	P.H. Tapt Screw x 2
1112	51040308A	F.H.M. Screw x 2
1114	51100304E	B.H.M. Screw x 3
1115	51060305E	P.H.M. Screw x 3
1126	54040402N	Spring Washer
1127	53110403E	Hexagon Nut
C001	CA0330002	Variable Cap., AM3 Gang
P150	YD2890001	P.W. Board, AM
	ZZ2887101	P.W. Board Ass'y
		RESISTORS
		All resistors are ±5% and ¼W, unless otherwise indicated.
R151	RT0515114	150Ω
R152	RA0103025	Trimming, 10KΩ (B)
R153	RT0556214	5.6KΩ
R154	RT0510314	10KΩ
R155	RT0510314	10KΩ
R156	RT0510214	1KΩ
R157	RT0530114	300Ω
R158	RT0533314	33KΩ
R159	RT0510414	100KΩ
R160	RT0515214	1.5KΩ
R161	RT0527214	2.7KΩ
R162	RT0510414	100KΩ
R163	RT0510114	100Ω
R164	RT0556214	5.6KΩ
R165	RT0510114	100Ω
R166	RT0510414	100KΩ

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R167	RT0512414	120KΩ
R168	RT0515214	1.5KΩ
		CAPACITORS
C151	DK1710301	Ceramic, 0.01μF ± 20%
C152	DF6545101	Film, 450PF ± 5%
C153	DF1747305	Film, 0.047μF ± 20%
C154	DK1840302	Ceramic, 0.04μF -80%, -20%
C155	EA1070169	Electroly, 100μF, 16V
C157	DK1710301	Ceramic, 0.01μF ± 20%
C158	DK1710301	Ceramic, 0.01μF ± 20%
C159	DD1620001	Ceramic, 20PF ± 10%
C160	EA4750359	Electroly, 4.7μF, 35V
C161	EA3350509	Electroly, 3.3μF, 50V
C162	DK1710201	Ceramic, 1000PF ± 20%
C163	DF1710301	Film, 0.01μF ± 20%
C164	DK1710301	Ceramic, 0.01μF ± 20%
C165	DF1610405	Film, 0.1μF ± 10%
C166	DK1840302	Ceramic, 0.04μF -80%, -20%
C167	EA1070169	Electroly, 100μF, 16V
C168	EA1050509	Electroly, 1μF, 50V
C169	DK1710301	Ceramic, 0.01μF ± 20%
C170	EA1050509	Ceramic, 1μF, 50V
		SEMICONDUCTORS
H151	HC1000301	IC, HA1151
H152	HT306441C	Transistor, 2SC644 (T)
		COILS & TRANSFORMERS
L151	LA1001017	RF Coil, AM
L152	LO1001048	OSC Coil, AM
L153	LI1028002	IFT, AM
L154	LI1001064	IFT, AM
L155	LC1332002	Choke Coil, 3.3μH
L156	LC1332002	Choke Coil, 3.3μH
		MISCELLANEOUS
J151 ~ J161	YP1000113	Plug
P200	YD2887008	P.W. Board, FM IF
	ZZ2887008	P.W. Board Ass'y
		RESISTORS
		All resistors are ±5% and ¼W.
R201	RT0515114	150Ω
R202	RT0582114	820Ω
R203	RT0515114	150Ω
R204	RT0515214	1.5KΩ
R205	RT0533214	3.3KΩ
R206	RT0510214	1KΩ
R207	RT0533114	330Ω
R211	RT0582114	820Ω
R212	RT0515114	150Ω
R213	RT0515214	1.5KΩ
R214	RT0533214	3.3KΩ
R215	RT0547114	470Ω
R216	RT0533114	330Ω
R220	RT0582114	820Ω
R221	RT0515114	150Ω
R222	RT0515214	1.5KΩ
R223	RT0533214	3.3KΩ
R224	RT0547114	470Ω

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R225	RT0522114	220Ω
R227	RT0515114	150Ω
R229	RT0582114	820Ω
R230	RT0515114	150Ω
R231	RT0515214	1.5KΩ
R232	RT0533214	3.3KΩ
R233	RT0510214	1KΩ
R234	RT0533114	330Ω
R235	RT0515114	150Ω
R236	RT0510414	100KΩ
R237	RT0515114	150Ω
R238	RT0515214	1.5KΩ
R239	RT0533214	3.3KΩ
R240	RT0510214	1KΩ
R241	RT0510214	1KΩ
R242	RT0515114	150Ω
R243	RT0510414	100KΩ
R244	RT0539114	390Ω
R245	RT0582214	8.2KΩ
R246	RT0515314	15KΩ
R247	RT0510214	1KΩ
R248	RT0510214	1KΩ
R249	RT0533114	330Ω
R250	RT0515114	150Ω
R251	RT0510414	100KΩ
R252	RT0547014	47Ω
R253	RT0510114	100Ω
R254	RT0510114	100Ω
R255	RT0510114	100Ω
R256	RT0510114	100Ω
R257	RT0510114	100Ω
R258	RT0512114	120Ω
R259	RT0510114	100Ω
R260	RT0547214	4.7KΩ
R261	RT0512314	12KΩ
R262	RT0510214	1KΩ
R263	RT0522214	2.2KΩ
R264	RT0533314	33KΩ
R265	RT0527314	27KΩ
R266	RT0547314	47KΩ
R268	RT0527314	27KΩ
R269	RT0547314	47KΩ
R270	RT0527314	27KΩ
R271	RT0527314	27KΩ
R272	RT0556214	5.6KΩ
R276	RT0522314	22KΩ
R277	RT0510514	1MΩ
		CAPACITORS
C201	DK1710301	Ceramic, 0.01μF ± 20%
C202	DK1710301	Ceramic, 0.01μF ± 20%
C203	DK1710301	Ceramic, 0.01μF ± 20%
C205	DK1710301	Ceramic, 0.01μF ± 20%
C207	DK1710301	Ceramic, 0.01μF ± 20%
C208	DK1710301	Ceramic, 0.01μF ± 20%
C209	DK1710301	Ceramic, 0.01μF ± 20%
C210	DK1710301	Ceramic, 0.01μF ± 20%
C211	DK1710301	Ceramic, 0.01μF ± 20%
C212	DK1710301	Ceramic, 0.01μF ± 20%
C213	DK1710301	Ceramic, 0.01μF ± 20%
C215	DK1840302	Ceramic, 0.04μF +100%, -0%
C216	EA1060169	Electroly, 10μF, 16V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C217	DK1840302	Ceramic, 0.04μF +100%, -0%
C218	EA1060169	Electroly, 10μF, 16V
C219	DK1840302	Ceramic, 0.04μF +100%, -0%
C220	EA1060169	Electroly, 10μF, 16V
C221	DK1840302	Ceramic, 0.04μF +100%, -0%
C222	EA1060169	Electroly, 10μF, 16V
C223	DK1840302	Ceramic, 0.04μF +100%, -0%
C224	EA1060169	Electroly, 10μF, 16V
C225	DK1840302	Ceramic, 0.04μF +100%, -0%
C226	EA1060169	Electroly, 10μF, 16V
C227	DK1840302	Ceramic, 0.04μF +100%, -0%
C228	DK1710301	Ceramic, 0.01μF ± 20%
C229	DK1710301	Ceramic, 0.01μF ± 20%
C230	DK1840302	Ceramic, 0.04μF +100%, -0%
C231	DK1710301	Ceramic, 0.01μF ± 20%
C232	DK1710301	Ceramic, 0.01μF ± 20%
C233	DK1710301	Ceramic, 0.01μF ± 20%
C234	DK1710201	Ceramic, 0.001μF ± 20%
C235	DD1620101	Ceramic, 200PF ± 10%
C236	DK1710201	Ceramic, 0.001μF ± 20%
C237	DD1620101	Ceramic, 200PF ± 10%
C238	DK1710201	Ceramic, 0.001μF ± 20%
C239	DD1620101	Ceramic, 200PF ± 10%
C240	DD1620101	Ceramic, 200PF ± 10%
C241	DK1710201	Ceramic, 0.001μF ± 20%
C242	DK1810402	Ceramic, 0.1μF +100%, -0%
C247	DD1540001	Ceramic, 40PF ± 5%
C248	EM2240251	Electroly, 0.22μF, 25V
C249	EV3350251	Electroly, 3.3μF, 25V
		SEMICONDUCTORS
H201	HT308291C	Transistor, 2SC829 (C)
H202	HT308291C	Transistor, 2SC829 (C)
H203	HT308291C	Transistor, 2SC829 (C)
H204	HT308291C	Transistor, 2SC829 (C)
H205	HT308291C	Transistor, 2SC829 (C)
H206	HT308291C	Transistor, 2SC829 (C)
H207	HT308291C	Transistor, 2SC829 (C)
H215	HD2001105	Diode, 1S1555
H216	HD2001105	Diode, 1S1555
H217	HD1000109	Diode, 1S1008
H218	HD1000109	Diode, 1S1008
H219	HD1000109	Diode, 1S1008
H220	HD1000109	Diode, 1S1008
H221	HD1000105	Diode, 1N60
H222	HD1000105	Diode, 1N60
H223	HD1000105	Diode, 1N60
H224	HD1000105	Diode, 1N60
H225	HD1000105	Diode, 1N60
H226	HD1000105	Diode, 1N60
H227	HD1000105	Diode, 1N60
H228	HD1000105	Diode, 1N60
H229	HD1000105	Diode, 1N60
H230	HD1000105	Diode, 1N60
		MISCELLANEOUS
F201 ~ F208	FF1107003	Ceramic Filter, SFA 10.7MC
J201 ~ J208	YP1000113	Plug

marantz

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P300	YD2890003	P.W. Board, MPX
	ZZ2887103	P.W. Board Ass'y
		RESISTORS
		All resistors are ±5% and ¼W, unless otherwise indicated.
R301	RA0202011	Trimming, 2KΩ (B)
R302	RT0522414	220KΩ
R303	RT0556314	56KΩ
R304	RT0568314	68KΩ
R305	RT0510114	100Ω
R306	RT0518414	180KΩ
R307	RT0522414	220KΩ
R308	RT0512414	120KΩ
R309	RT0510414	100KΩ
R310	RT0568214	6.8KΩ
R311	RA0502020	Trimming, 5KΩ (B)
R312	RT0516314	16KΩ
R313	RT0510214	1KΩ
R314	RT0522414	220KΩ
R315	RT0510214	1KΩ
R316	RT0510214	1KΩ
R317	RT0539214	3.9KΩ
R318	RT0539214	3.9KΩ
R319	RT0522414	220KΩ
R320	RT0522314	22KΩ
R321	RT0510114	100Ω
R322	RT0510014	10Ω
R323	RT0522414	220KΩ
R324	RT0522414	220KΩ
R325	RT0530314	30KΩ
R326	RT0530314	30KΩ
R327	RT0510414	100KΩ
R328	RT0510414	100KΩ
R329	RT0515514	1.5MΩ
R330	RT0515514	1.5MΩ
R331	RT0562114	620Ω
R332	RT0562114	620Ω
R333	RT0522314	22KΩ
R334	RT0522314	22KΩ
R335	RT0510114	100Ω
R336	RT0510114	100Ω
R337	RT0582214	8.2KΩ
R338	RT0582214	8.2KΩ
R339	RT0547114	470Ω
R340	RT0547114	470Ω
R341	RT0522414	220KΩ
R342	RT0522414	220KΩ
R343	RT0539214	3.9KΩ
R344	RT0556414	560KΩ
R345	RT0515314	15KΩ
R346	RT0512414	120KΩ
R347	RT0510114	100Ω
R348	RT0522414	220KΩ
R349	RT0556214	5.6KΩ
R350	RT0510314	10KΩ
R351	RT0510114	100Ω
R352	RT0533314	33KΩ
R353	RT0510114	100Ω
R354	RT0510414	100KΩ
R355	RT0527314	27KΩ
R356	RT0510414	100KΩ
R357	RT0510214	1KΩ
R358	RT0510114	100Ω
R359	RT0527314	27KΩ
R360	RT0533314	33KΩ
R361	RT0522414	220KΩ
R362	RA0104018	Trimming, 100KΩ (B)
R363	RA0103025	Trimming, 10KΩ (B)
R364	RT0522214	2.2KΩ
R365	RT0510114	100Ω
R366	RT0510314	10KΩ
R367	RT0510114	100Ω
R368	RT0527414	270KΩ
R369	RT0515314	15KΩ
R370	RT0512314	12KΩ
R371	RT0522114	220Ω
R372	RT0527414	270KΩ
R373	RT0533314	33KΩ
R374	RA0103025	Trimming, 10KΩ (B)
R375	RT0510114	100Ω
R376	RT0510414	100KΩ
R377	RT0510414	100KΩ
R378	RT0556214	5.6KΩ
R379	RT0533214	3.3KΩ
		CAPACITORS
C301	DF1622205	Film, 2200PF ±10%
C302	EA3360109	Electroly, 33μF, 10V
C303	DF1722305	Film, 0.022μF ±20%
C304	EA1060169	Electroly, 10μF, 16V
C305	DF5547101	Film, 470PF ±5%
C306	EA1060169	Electroly, 10μF, 16V
C307	EQ4740501	Electroly, 0.47μF ±20%, 50V
C308	EQ2240501	Electroly, 0.22μF ±20%, 50V
C309	EQ2240501	Electroly, 0.22μF ±20%, 50V
C310	DF1747301	Film, 0.047μF ±20%
C311	DF1515205	Film, 1500PF ±5%
C312	DF1515205	Film, 1500PF ±5%
C313	DD1536101	Ceramic, 360PF ± 5%
C314	DD1536101	Ceramic, 360PF ± 5%
C315	DF1533205	Film, 3300PF ±5%
C316	DF1533205	Film, 3300PF ±5%
C317	DF1515205	Film, 1500PF ±5%
C318	DF1515205	Film, 1500PF ±5%
C319	DF1522205	Film, 2200PF ±5%
C320	DF1522205	Film, 2200PF ±5%
C321	DF5532201	Film, 3200PF ±5%
C322	DF5532201	Film, 3200PF ±5%
C323	EV2240351	Electroly, 0.22μF ±20%, 35V
C324	EV2240351	Electroly, 0.22μF ±20%, 35V
C325	EV1050352	Electroly, 1μF ±20%, 35V
C326	EV1050352	Electroly, 1μF ±20%, 35V
C327	EA2270259	Electroly, 220μF, 25V
C328	EA2270169	Electroly, 220μF, 16V
C329	EA1060169	Electroly, 10μF, 16V
C330	DK1840302	Ceramic, 0.04μF +80%, -20%
C331	EA1050509	Electroly, 1μF, 50V
C332	EA1060169	Electroly, 10μF, 16V
C333	DD1210001	Ceramic, 10PF±10%
C334	DF1668301	Film, 0.068μF ±10%
C335	DF1740301	Film, 0.04μF ±20%
C336	DK1810402	Ceramic, 0.1μF +80%, -20%
C337	EA4750359	Electroly, 4.7μF, 35V
C338	EA1050509	Electroly, 1μF, 50V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
		SEMICONDUCTORS
H301	HF200301C	FET, 2SK34 (C)
H302	HT308281D	Transistor, 2SC828 (S)
H303	HT308281D	Transistor, 2SC828 (S)
H304	HT307322A	Transistor, 2SC732 (B or G)
H305	HT307322A	Transistor, 2SC732 (B or G)
H306	HT104942A	Transistor, 2SA494 (G or Y)
H307	HT104942A	Transistor, 2SA494 (G or Y)
H308	HT308281D	Transistor, 2SC828 (S)
H309	HT308281D	Transistor, 2SC828 (S)
H310	HT308281D	Transistor, 2SC828 (S)
H311	HT308281D	Transistor, 2SC828 (S)
H312	HF200300A	FET, 2SK30A
H313	HT308281D	Transistor, 2SC828 (S)
H314	HT308281D	Transistor, 2SC828 (S)
H315	HT308281D	Transistor, 2SC828 (S)
H316	HT308281D	Transistor, 2SC828 (S)
H317	HT308281D	Transistor, 2SC828 (S)
H318	HD1000105	Diode, 1N60
H319	HD1000105	Diode, 1N60
H320	HD2001105	Diode, 1S1555
H321	HC1000401	I.C., HA1156
		COILS
L301	LS1029004	MPX, 56mH
L302	LS1029004	MPX, 56mH
L303	LS1029005	MPX, 43mH
L304	LS1029005	MPX, 43mH
L305	LC2105001	Choke, 1mH
		MISCELLANEOUS
J301 ~ J322	YP1000113	Plug
P500	YD2887009	P.W. Board, FM DISC
	ZZ2887009	P.W. Board Ass'y
		RESISTORS **All resistors are ±5% and ¼W, unless otherwise indicated.**
R501	RT0515114	150Ω
R502	RT0510214	1KΩ
R503	RT0510114	100Ω
R505	RT0510114	100Ω
R506	RT0582114	820Ω
R507	RT0582114	820Ω
R508	RT0568214	6.8KΩ
R509	RT0568214	6.8KΩ
R510	RT0510114	100Ω
R511	RT0556214	5.6KΩ
R512	RT0515314	15KΩ
R513	RN1018414	180KΩ ±10%, ¼W
R514	RT0522214	2.2KΩ
R515	RN1010414	100KΩ ± 10%, ¼W
R516	RT0510114	100Ω
R517	RT0510114	100Ω
R518	RT0510414	100KΩ
R519	RT0510114	100Ω
R520	RT0510214	1KΩ
R521	RT0510114	100Ω
R522	RT0510214	1KΩ

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R523	RT0510414	100KΩ
R524	RT0582214	8.2KΩ
R525	RT0522414	220KΩ
		CAPACITORS
C501	DK1710301	Ceramic, 0.01μF ± 20%
C502	DK1840302	Ceramic, 0.04μF +100%, -0%
C503	EA1060169	Electroly, 10μF, 16V
C504	DK1840302	Ceramic, 0.04μF +100%, -0%
C505	DK1840302	Ceramic, 0.04μF +100%, -0%
C506	DD1620101	Ceramic, 200PF ± 10%
C507	DD1620101	Ceramic, 200PF ± 10%
C508	EA1060169	Electroly, 10μF, 16V
C509	EQ4740501	Electroly, 0.47μF ± 20%, 50V
C510	ED1050509	Electroly, 1μF, 50V
C511	EA1060169	Electroly, 10μF, 16V
C512	DK1840302	Ceramic, 0.04μF +100%, -0%
C513	DD1620101	Ceramic, 200PF ± 10%
C514	EA1070169	Electroly, 100μF, 16V
C515	DK1710301	Ceramic, 0.01μF ± 20%
C516	DK1840301	Ceramic, 0.04μF +100%, -0%
C517	DK1840301	Ceramic, 0.04μF +100%, -0%
C518	DF1710402	Film, 0.1μF ± 20%
C519	DK1840301	Ceramic, 0.04μF +100%, -0%
		SEMICONDUCTORS
H501	HC1000209	IC, NJ703W
H502	HT306441B	Transistor, 2SC644 (S)
H503	HD1000302	Diode, 20A90M
H504	HD1000302	Diode, 20A90M
		MISCELLANEOUS
J501 ~ J509	YP1000113	Plug
L501	LI1018802	IFT, FM DET
P800	YD2887003	P.W. Board, Power Supply
	ZZ2887003	P.W. Board Ass'y
		RESISTORS
R801	GS1015105	150Ω ± 10%, 5W
R802	RT0533214	3.3KΩ ± 5%, ¼W
R803	RT0510014	10Ω ± 5%, ¼W
R804	RJ1010202	1KΩ ± 10%, 2W
R805	RC1050012	50Ω ± 10%, ½W
R806	RJ1010202	1KΩ ± 10%, 2W
R807	RC1010112	100Ω ± 10% ½W
R808	RT0518314	18KΩ ± 5%, ¼W
R809	RT0533314	33KΩ ± 5%, ¼W
R810	RC1010112	100Ω ± 10%, ½W
R811	RC1010212	1KΩ ± 10%, ½W
R812	GJ0515202	1.5KΩ ± 5%, 2W
R813	GJ0515202	1.5KΩ ± 5%, 2W
		CAPACITORS
C801	DK1810351	Ceramic, 0.01μF +100%, -0%, 500V
C802	DK1810351	Ceramic, 0.01μF +100%, -0%, 500V
C803	EA3370509	Electroly, 330μF, 50V
C804	EA3370509	Electroly, 330μF, 50V
C805	EA1070169	Electroly, 100μF, 16V
C806	EA3370509	Electroly, 330μF, 50V
C807	EA3370169	Electroly, 330μF, 16V

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REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C808	EA3370169	Electroly, 330μF, 16V
C809	EA4760509	Electroly, 47μF, 50V
C810	EA4760509	Electroly, 47μF, 50V
C811	EA4760509	Electroly, 47μF, 50V
		SEMICONDUCTORS
H801	HT403154A	Transistor, 2SD315 (C, D, E, F)
H802	HT313182Q	Transistor, 2SC1318 (Q or R)
H803	HD3003209	Diode, CZ142
H804	HD3002109	Diode, BZ140
H805	HD3002109	Diode, BZ140
H806	HD2000501	Diode, W06B
H807	HD2000501	Diode, W06B
H808	HD2000501	Diode, W06B
H809	HD2000501	Diode, W06B
		MISCELLANEOUS
J801 ~ J812	YP1000113	Plug
T801	273026702	Heat Sink
P900	YD2887007	P.W. Board Ass'y, Scope Amp.
	ZZ2887007	P.W. Board Ass'y
		RESISTORS **All resistors are ±5% and ¼W, unless otherwise indicated.**
R901	RT0522414	220KΩ
R902	RT0522414	220KΩ
R903	RT0522414	220KΩ
R904	RT0522414	220KΩ
R905	RA0502020	Trimming, 5KΩ
R906	RA0502020	Trimming, 5KΩ
R907	RT0547214	4.7KΩ
R908	RT0547214	4.7KΩ
R909	RT0568214	6.8KΩ
R910	RT0568214	6.8KΩ
R911	GU0568312	68KΩ ±5%, ½W
R912	GU0568312	68KΩ ±5%, ½W
R913	GU0568312	68KΩ ±5%, ½W
R914	GU0568312	68KΩ ±5%, ½W
R915	RA0202011	Trimming, 2KΩ
R916	RA0102021	Trimming, 1KΩ
R917	RT0515314	15KΩ
R918	RT0515314	15KΩ
R919	RT0515314	15KΩ
R920	RT0515314	15KΩ
R921	RT0547314	47KΩ
R922	RT0510214	1KΩ
R923	RT0510214	1KΩ
R924	GT0568401	680KΩ ±5%, 1W
R925	GU0568312	68KΩ ±5%, ½W
		SEMICONDUCTORS
H901	HF200300C	FET, 2SK30Y
H902	HF200300C	FET, 2SK30Y
H903	HF200300C	FET, 2SK30Y
H904	HF200300C	FET, 2SK30Y
H905	HT309950F	Transistor, 2SC995F

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
H906	HT309950F	Transistor, 2SC995F
H907	HF309950F	Transistor, 2SC995F
H908	HF309950F	Transistor, 2SC995F
		MISCELLANEOUS
J901 ~ J935	YP1000113	Plug
T901	281811806	Spacer
T902	281811806	Spacer
T903	281811806	Spacer
T904	281811806	Spacer
J936	YP1000113	Plug
J002	YJ0500018	Socket, For CRT
1534	51060212B	P.H.M. Screw x 3
1535	53110203E	Hexagon Nut x 3
PP01	YD2887004	P.W. Board, Scope Supply
	ZZ2887004	P.W. Board Ass'y
		RESISTORS **All resistors are ±5% and ¼W, unless otherwise indicated.**
RP01	RC1010412	100KΩ ±10%, ½W
RP02	RT0510514	1MΩ
RP03	RT0515514	1.5MΩ
RP04	RT0547214	4.7KΩ
RP05	RC1022212	2.2KΩ ±10%, ½W
RP06	GU0582312	82KΩ ±5%, ½W
RP07	RT0515514	1.5MΩ
RP08	RT0518214	1.8KΩ
RP09	RT0522314	22KΩ
RP10	RT0522414	220KΩ
RP11	RT0522414	220KΩ
		CAPACITORS
CP01	DF1747450	Film, 0.47μF ±20%, 630V
CP02	DF1747450	Film, 0.47μF ±20%, 630V
CP03	DF1747450	Film, 0.47μF ±20%, 630V
CP04	DF1747450	Film, 0.47μF ±20%, 630V
CP05	DF1747352	Film, 0.047μF ±20%, 200V
CP06	ED2262501	Electroly, 22μF, 250V
CP07	ED2262501	Electroly, 22μF, 250V
CP08	DK1810383	Ceramic, 0.01μF, 1.4KV
CP09	DF1710452	Film, 0.1μF ±20%, 200V
CP10	DF1710452	Film, 0.1μF ±20%, 200V
CP11	EA2260169	Electroly, 22μF, 16V
		SEMICONDUCTORS
HP01	HD2000908	Diode, SH-1A
HP02	HD2000908	Diode, SH-1A
HP03	HD2000908	Diode, SH-1A
HP04	HD2000908	Diode, SH-1A
HP05	HD2000908	Diode, SH-1A
HP06	HD2000908	Diode, SH-1A
HP07	HD2000413	Diode, SIB-01-02
HP08	HD2000413	Diode, SIB-01-02
HP09	HT309952A	Transistor, 2SC995 (F or H)

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
		MISCELLANEOUS
JP01 ~ JP13	YP1000113	Plug
TP01	281811806	Spacer
0403	288716050	Bracket K
0422	288726251	Pulley K
1309	288210901	Shield x 2
0512	288416003	Bracket
0513	288416004	Bracket
0513	288420101	Partitioner
0521	281912004	Insulator
0703	51100306A	B.H.M. Screw x 4
0704	51100306A	B.H.M. Screw x 2
0711	51042606S	F.H.M. Screw x 4
0712	53112603E	Hexagon Nut x 2
0713	54022601E	Flat Washer P x 2
0624	51100306A	B.H.M. Screw x 2
0625	54050300R	T.L. Washer OR x 2
0628	257710602	Bearing
0629	141511801	Spacer
0631	51040306A	F.H.M. Screw x 2
0726	51100306A	B.H.M. Screw x 2
0730	51100406A	B.H.M. Screw x 5
0731	51570306B	P.H. Tapt Screw x 2
0733	62031650W	Lug
0718	51100306A	B.H.M. Screw x 2
0720	51480306A	B.H.M. Screw F x 2
0429	288427401	Reflector
PY01	YD2887002 ZZ2887002	P.W. Board, Function Lamp P.W. Board Ass'y
MY01	IN1006301	Lamp, FM
MY02	IN1006301	Lamp, AM
MY03	IN1006301	Lamp, Mono
MY04	IN1006301	Lamp, Muting
MY05	IN1006301	Lamp, Hi Blend
MY06	IN1012011	Lamp, Stereo
JY01 ~ JY09	YP1000113	Plug

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0722	51570306B	P.H. Tapt Screw x 2
0431	288427102	Holder
PZ01	YD2884003 ZZ2884003	P.W. Board, Dial Lamp P.W. Board Ass'y
MZ01 ~ MZ05	IN1008007	Lamp, Dial
JZ01 ~ JZ10	YJ0800017	Socket
JZ11 ~ JZ14	YP1000113	Plug
0430	288427101	Holder
0717	51570306B	P.H. Tapt Screw x 3
S002	SP0201010	Push Switch, Power
0409	288405150	Guide K
0412	257726201	Pulley
0413	64002400R	R.G. Ring E
0415	288726252	Pulley K
0715	51102604A	F.H.M. Screw x 2
0519	281810107	Support
PT01	YD2887001 ZZ2887001	P.W. Board, Display Switch P.W. Board Ass'y
		RESISTORS **All resistors are ±5% and ¼W, unless otherwise indicated.**
RT01	RT0547314	47KΩ
RT02	RT0515214	1.5KΩ
RT03	RA0103025	Trimming, 10KΩ
RT04	RC1010112	100Ω ±10%, ½W
RT05	RT0556214	5.6KΩ
RT06	RT0556214	5.6KΩ
RT07	RT0556214	5.6KΩ
RT08	RT0556214	5.6KΩ
RT09	RT0556214	5.6KΩ
RT10	RT0556214	5.6KΩ
RT11	RT0556214	5.6KΩ
RT12	RT0556214	5.6KΩ
RT13	RT0556214	5.6KΩ
RT14	RT0556214	5.6KΩ
RT15	RT0556214	5.6KΩ
RT16	RT0556214	5.6KΩ
RT17	RT0527414	270KΩ
RT18	RT0510314	10KΩ
RT19	RT0512414	120KΩ
RT20	RT0527414	270KΩ

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REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
RT21	RT0527414	270KΩ
RT22	RT0512414	120KΩ
RT23	RT0527414	270KΩ
RT24	RT0518414	180KΩ
RT25	RT0510414	100KΩ
RT26	RT0510414	100KΩ
RT27	RT0539414	390KΩ
RT28	RT0539414	390KΩ
RT29	RT0510414	100KΩ
RT30	RT0510414	100KΩ
RT31	RA0503012	Trimming, 50KΩ
RT32	RT0510514	1MΩ
RT33	RT0510514	1MΩ
RT34	RT0515114	150Ω
RT35	RT0515114	150Ω
RT36	RT0556214	5.6KΩ
RT37	RT0556214	5.6KΩ
RT38	RT0510414	100KΩ
RT39	RT0510414	100KΩ
RT40	RT0510514	1MΩ
RT41	RT0510514	1MΩ
RT42	RT0515114	150Ω
RT43	RT0515114	150Ω
RT44	RT0556214	5.6KΩ
RT45	RT0556214	5.6KΩ
RT46	RT0556214	5.6KΩ
RT47	RT0556214	5.6KΩ
RT48	RT0556214	5.6KΩ
RT49	RT0556214	5.6KΩ
RT50	RC1033012	33Ω ± 10%, ½W
		CAPACITORS
CT01	DF1610405	Film, 0.1μF ± 10%, 50V
CT02	DF1722405	Film, 0.22μF ± 20%, 50V
CT03	DF1710305	Film, 0.01μF ± 20%, 50V
CT04	DF1710305	Film, 0.01μF ± 20%, 50V
CT05	DF1733405	Film, 0.33μF ± 20%, 50V
CT06	DF1710305	Film, 0.01μF ± 20%, 50V
CT07	DF1710305	Film, 0.01μF ± 20%, 50V
CT08	DF1710305	Film, 0.01μF ± 20%, 50V
CT09	DF1710305	Film, 0.01μF ± 20%, 50V
CT10	EA1060359	Electroly, 10μF, 35V
CT11	EA1060359	Electroly, 10μF, 35V
CT12	EA1060359	Electroly, 10μF, 35V
CT13	EA1060359	Electroly, 10μF, 35V
		SEMICONDUCTORS
HT01 ~ HT04	HD1000302	Diode, 20A90M
HT05 ~ HT08	HF200301C	FET, 2SK30A (Y)
		MISCELLANEOUS
JT01 ~ JT18	YP1000113	Plug
ST01	SP0606001	Push Switch

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
PS01	YD2887006	P.W. Board, Function Switch
	ZZ2887006	P.W. Board Ass'y
		RESISTORS
RS01	RT0556114	560Ω ± 5%, ¼W
RS02	RT0556114	560Ω ± 5%, ¼W
RS03	RC1002212	2.2Ω ± 10%, ½W
RS04	RC1002212	2.2Ω ± 10%, ½W
RS05	RT0515314	15KΩ ± 5%, ¼W
RS06	RC1002212	2.2Ω ± 10%, ½W
RS07	RC1002212	2.2Ω ± 10%, ½W
RS08	RT0556314	56KΩ ± 5%, ¼W
CS01	DF1622301	Film Cap. 0.022μF ± 10%
SS01	SP0605003	Push Switch
JS01 ~ JS05	YP1000113	Plug
0616	281810650	Bearing K
0620	51640412D	Set Screw C.R.
0621	54040402N	Spring Washer
0622	53110403E	Hexagon Nut
R004	RK0103021	Variable Resistor, 10KΩ (B)
R005	RK0103021	Variable Resistor, 10KΩ (B)
R014	RM0254026	Variable Resistor, 250KΩ (B)
R015	RM0254026	Variable Resistor, 250KΩ (B)
0819	145525903	Bush x 2
0829	257816010	Bracket
0830	257816011	Bracket
0832	53228059E	Nut x 5
0835	288710103	Support
R010	RK0104014	Variable Resistor, 100KΩ (B)
R011	RK0104014	Variable Resistor, 100KΩ (B)
S001	SS0202017	Slide Switch, FM Ant
J001	YT0304003	Terminal, ANT
J004	YT0204003	Terminal, Scope Input
J005	YT0101003	Terminal, Ground
J007	YJ0800012	Socket, Fuse
F001	FS1015005	Fuse, 1.5AUL
W001	YC0240010	AC Cord
R012	RC1022512	Resistor, 2.2MΩ ± 10%, ½W
G001	BF1040001	Printed Compo.
0903	51100308S	B.H.M. Screw x 2
0904	53110303E	Hexagon Nut x 2
0906	51100308S	B.H.M. Screw x 6

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0907	53110303E	Hexagon Nut x 5
0913	54040302N	Spring Washer
0914	53110303E	Hexagon Nut
0916	51100306S	B.H.M. Screw x 2
0917	62031650W	Lug
0920	51100306S	B.H.M. Screw x 4
0924	62041760W	Lug
0926	54050400R	T.L. Washer OR
0934	51100306S	B.H.M. Screw x 3
0935	54040302N	Spring Washer x 3
J013	YL0102003	Terminal
R001	RC1008212	Resistor , 8.2Ω ± 10%, ½W
R002	RC1068012	Resistor , 68Ω ± 10%, ½W
R003	RC1068012	Resistor , 68Ω ± 10%, ½W
L002	LB3007526	Balum Coil
R006	RK0203016	Variable Resistor, 20KΩ (B) Muting
R008	RK0504009	Variable Resistor, 500KΩ (B) Focus
R009	RK0104013	Variable Resistor, 100KΩ (B) Bright
J003	YT0201006	Terminal, Quadradial
J006	YT0202007	Terminal Tuner Out
PD01	YD2887005	P.W. Board, Pre Amp
	ZZ2887005	P.W. Board Ass'y
		RESISTORS
		All resistors are ±5% and ¼W.
RD01	RT0539114	390Ω
RD02	RT0539114	390Ω
RD03	RT0510514	1MΩ
RD04	RT0510514	1MΩ
RD05	RT0510514	1MΩ
RD06	RT0510514	1MΩ
RD07	RT0510314	10KΩ
RD08	RT0510314	10KΩ
RD09	RT0515114	150Ω
RD10	RT0515114	150Ω
RD11	RT0510414	100KΩ
RD12	RT0510414	100KΩ
		CAPACITORS
CD01	EV1050352	Electroly, 1μF, 35V
CD02	EV1050352	Electroly, 1μF, 35V
CD03	EV1050352	Electroly, 1μF, 35V
CD04	EV1050352	Electroly, 1μF, 35V
		TRANSISTORS
HD01	HT313441E	2SC1344 (E)
HD02	HT313441E	2SC1344 (E)

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
		MISCELLANEOUS
JD01 ~ JD04	YP1000113	Plug
L001	LF1120023	Ant Coil, AM
0811	257816052	Bracket
0816	281927103	Holder
0833	318827102	Holder
0929	51100310S	B.H.M. Screw x 2
0930	53110303E	Hexagon Nut x 2
0931	51100308S	B.H.M. Screw x 2
0932	53110303E	Hexagon Nut x 2
0933	54050300R	T.L. Washer OR x 2
R013	RA0202012	Variable Resistor, 2KΩ (B)
1316	288716008	Bracket
H001	VB0034001	Picture Tube, Scope 3.5"
L005	LD0004001	Deflection Coil
1222	288705602	Buffer
1225	288710906	Shield
0502	288727101	Holder
0503	288705601	Buffer x 4
0507	288705302	Cover
0508	288730203	Dial
0509	288710401	Retainer
0510	288705303	Cover
M002	IN1005003	Lamp, Scope 60mA 5V
0706	51102606S	B.H.M. Screw x 2
J010	YL0105004	Jack
J012	YL0103001	Terminal
L003	LC1332002	Choke Coil, 3.3μH
C002	DK1710301	Ceramic Cap., 0.01μF ± 20%, 50V
PQ01	YD2887010	P.W. Board, Fuse Mount
	ZZ2887010	P.W. Board Ass'y
JQ01 ~ JQ06	YJ0800017	Socket
JQ07 ~ JQ12	YP1000099	Plug

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0515	288730201	Dial
0434	288410701	Sheet
W002	YW2887001	Wire Material
W003	YX2887001	Wire Material
0504	288710101	Support x 2
0505	54040302N	Spring Washer x 2
0707	51100304S	B.H.M. Screw x 2
0708	54040302N	Spring Washer x 2
0126	275905701	Leg x 4
R007	RK0503009	Variable Resistor, 50KΩ (B)
L004	TS1860401	Power Transformer
0313	51490408S	B.H.M. Screw F.S. x 4
1108	51100306S	B.H.M. Screw x 3
1006	288710901	Shield
1502	51100306S	B.H.M. Screw x 3
1503	51100306B	B.H.M. Screw x 4
1504	54040302N	Spring Washer x 4
1505	51100306S	B.H.M. Screw x 2
1506	51570306B	P.H. Tapt Screw x 2
1507	51570306B	P.H. Tapt Screw x 2
1508	51570306B	P.H. Tapt Screw x 5
1509	51570306B	P.H. Tapt Screw x 13
1510	54050300R	T.L. Washer OR x 13
1511	62031650W	Lug x 2
1514	54020301S	Flat Washer R
1516	51100306B	B.H. Tapt Screw
1522	51100306S	B.H.M. Screw x 2
1526	51100306B	B.H.M. Screw x 4
1527	51570306S	P.H. Tapt Screw x 4
1528	51100306S	B.H.M. Screw x 2
1529	54020301S	Flat Washer x 2
1531	51570306B	P.H. Tapt Screw x 4
1403	51570306B	P.H. Tapt Screw x 6
1406	51570305B	P.H. Tapt Screw x 4
1407	51100306S	B.H.M. Screw x 4
1409	51570408B	P.H. Tapt Screw x 2
1410	54020401E	Flat Washer P x 2
1411	54040402N	Spring Washer x 2
1413	51100306S	B.H.M. Screw x 2
1414	59030805F	Fiber Washer x 2
1415	51100306S	B.H.M. Screw x 2
1417	51100306S	B.H.M. Screw x 2
1418	59030805F	Fiber Washer x 2
1419	51100306S	B.H.M. Screw x 2

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
1421	51100306B	B.H.M. Screw x 5
1422	51570306B	P.H. Tapt Screw x 4
1425	51100306B	B.H.M. Screw x 2
1427	51100304B	B.H.M. Screw x 2
1429	51100306B	B.H.M. Screw x 3
1431	51100306S	B.H.M. Screw x 3
1432	51100306B	B.H.M. Screw x 3
1433	51040306B	F.H.M. Screw
1434	54040302N	Spring Washer x 4
1301	282610102	Support
1302	282610101	Support x 8
1310	138200503	Clamper x 8
1311	288700501	Clamper x 5
1312	287100501	Clamper
1314	288710907	Shield
1318	288716009	Bracket
1320	288810102	Support x 2
1321	288712002	Insulator
1323	288686101	Label
1324	288786101	Label
1202	288710550	Chassis K
1209	288710902	Shield
1210	289010103	Support x 2
1212	288710903	Shield
1213	380210102	Support x 2
1215	281810906	Shield
1217	288710905	Shield
1218	288710102	Support x 2
1290	288716005	Bracket
1221	288716006	Bracket
1223	288710904	Shield
1224	288700502	Clamper
1227	288405302	Cover x 4
1229	281805601	Buffer x 2
0110	281815402	Knob
0111	281815401	Knob x 11
0112	282615401	Knob x 4
0116	282625701	Lid
0117	257711803	Spacer x 4
0121	282625702	Lid
0130	145512001	Insulator
0132	288406450	Case K, For CANADA

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0303	52017039J	H. Head Bolt x 4
0305	51100406S	B.H.M. Screw x 9
0309	51480406S	B.H.M. Screw x 4
0317	52010420A	H. Head Bolt, x 4 For CANADA
0318	54080400R	T.L. Washer R.R. x 4 For CANADA
0427	282626901	Protector
0522	288700701	Strip
0534	56382540G	Eyelet
0607	285011202	Shaft
0608	54040402N	Spring Washer
0919	51100306S	B.H.M. Screw x 2
1722	952281501	Serial NO Card x 4
1723	952301512	Serial NO Card x 4 For CANADA
0724	51100306S	B.H.M. Screw x 2
FQ01	FS1010008	Fuse, 1A UL
FQ02	FS1030006	Fuse, 3A UL
FQ03	FS1030006	Fuse, 3A UL
0303	52017039J	H. Head Bolt x 4
0305	51100406S	B.H.M. Screw x 9
0309	51480406S	B.H.M. Screw F x 4
0317	52010420A	H. Head Bolt x 4 For CANADA
0318	54080400R	T.L. Washer R.R. x 4 For CANADA
0202	288726501	Indicator
0203	288726502	Indicator, For CANADA
0211	257886101	Label, UL Caution
0212	257886102	Label, Do Not Remove . . .
0213	257886103	Label, See Marking . . .
0214	250626506	Indicator, Do Not Use As . . .
0219	282186101	Label, For CANADA
0220	282186102	Label, Fuse Caution, For CANADA
0224	951110103	Label, UL
0225	245786104	Label, CSA, For CANADA
0229	951091102	Label, Factory Code
0231	951022101	Label
1702	288780101	Packing Case
1703	288780111	Packing Case
1705	288780102	Packing Case, For CANADA
1706	288780112	Packing Case, For CANADA
1708	288480301	Partitioner x 2
1710	288480303	Partitioner x 2 For CANADA

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
1712	901433533	Polyethylen Bag
1713	901453535	Polyethylen Bag, For CANADA
1714	901302501	Polyethylen Bag x 2
1717	102980401	Sleeve
1719	273182101	Silicagel x 2
1720	281905601	Buffer
1731	ZA0200007	EXT Antenna
1733	ZD0120006	Connective Cord
1602	288785101	Instructions
1609	288785601	Schematic Diagram
1611	288785603	Schematic Diagram, For CANADA
1617	281885104	Instructions
1618	288785108	Instructions
1619	288785109	Instructions, For CANADA
1620	282685107	Instructions
1623	257785450	Guarantee Card K

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SPECIFICATIONS

FM SECTION

Tuning Frequency Range	88 MHz—108 MHz
IHF Usable Sensitivity	2.3μV
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. 75μ sec. de-emphasis)	±1 dB (30 to 15 KHz)
Stereo Separation	42 dB at 1 KHz 26 dB at 15 KHz 36 dB at 200 KHz

AM SECTION

Tuning Frequency Range	540 KHz—1605 KHz
Usable Sensitivity	20μV
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	2 CH: AC 34mV/cm 4 CH: AC 48mV/cm
Input Impedance	250 Kohm
Input Capacitance	Less than 30 pF
Maximum Permissible Input Voltage	15V AC

2. Horizontal Amplifier

Deflection Sensitivty	2 CH: AC 34mV/cm 4 CH: AC 48mV/cm
Input Impedance	250 Kohm
Input Capacitance	Less than 30 pF
Maximum Permissible Input Voltage	15V AC

GENERAL

Power Requirements	120V AC 50 Hz to 60 Hz 40 Watts
Dimensions	
Panel Width	15-3/8 Inches
Panel Height	5-3/4 Inches
Depth	11-13/16 Inches
Weight	
Unit Along	23.8 lbs
Packed for Shipment	30.4 lbs

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

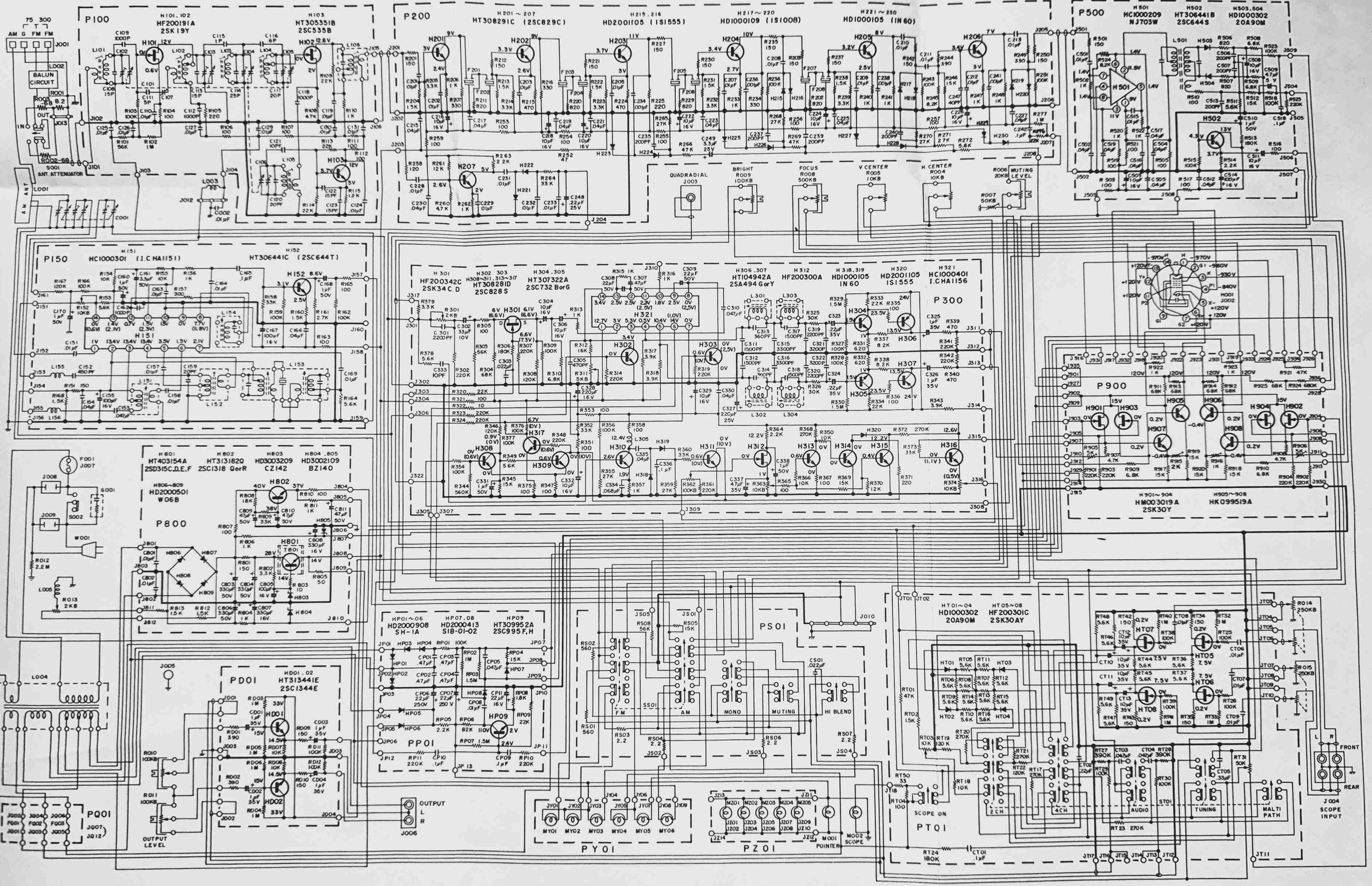

Figure 21. Schematic Diagram

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