LUXMAN

AM/FM STEREO TUNER

# WL550

# SERVICE MANUAL

## CIRCUIT DESCRIPTION

### GENERAL

LUX WL550 is all solid state high-fidelity AM/FM stereo transistorized radio tuner. The circuitry used in this instrument is mostly integrated in 2 printed circuit boards. The FM tuner circuit board is completely shielded, and mounted on a 7-gang AM/FM tuning capacitor. Conventional wiring is used in mains selector, function switch sections and front and rear panel assembly parts.

### FM TUNER FL516U BOARD

The RF-amplifier is designed to provide stable amplification, sharp selectivity at FM broadcast frequencies, and an optimum noise figure. The dual-gate junction FET is ideally suited for this job as it has superior cross-modulation performance as a function of AGC, and in addition has a very wide dynamic range. The stage employs dual-gate FET (3SK30) in a common-source configuration, and the RF signal and gain control signal are applied to gate NO.1 and gate NO.2 is grounded to earth potential. The double-tuned coupling is employed between RF and mixer stages to provide sharp selectivity. The mixer stage is designed to minimize the spurious responses and noise figure. The 2SC535 mixer transistor operates in the common emitter configuration with the RF signal and local oscillator signal are applied to the base terminal. The 10.7MHz IF output from the mixer is coupled to the first IF-amplifier stage by means of a double-tuned transformer T101. The SE3001 local oscillator transistor is operated in a common-collector circuit that generates a clean oscillator wave form to minimize the generation of spurious responses. The oscillator signal is coupled to the mixer by means of 1-picofarad capacitor, which isolates the tuned circuit of the oscillator from the input circuit of the mixer and this minimizes the possibility of oscillator instabilities as a result of "pulling".

### IF-AMPLIFIER

The IF-amplifier uses two 2SC381 transistors, a $\mu$pc555A integrated-circuit, and a TA7061P integrated-circuit. The selectivity stages are two ceramic filters, and a double tuned transformer. The $\mu$pc555A integrated-circuit is a basic differential amplifier with constant-current transistor that provides 31-dB power gain. The TA7061P integrated-circuit consists of three differential amplifier in cascade. Each differential pair is isolated from the succeeding pair by a common-collector stage used as a buffer. The amplifier section provides 68-dB total power gain at 10.7 MHz, and features an output stage with exceptionally good limiting characteristics because of its transistor constant-current sink. The selectivity of this IF section is determined by the ceramic filters in the interstage amplifying paths. The filters provide extremely sharp skirt selectivity and flat response inside the pass band. Detector transformer T203 and matched pair diodes D206, D207 form a balanced ratio detector, that transforms the frequency-modulated signal into an audio signal. The detector transformer T203 is designed to provide the wide peak-to-peak separation required for good multiplex operation. A null-type meter connected across the output of the ratio detector is used as a center tuning indicator. The IF signal for AGC is extracted from the base of Q202 to drive Q205. Q205 acts as an IF-amplifier to drive the voltage doubler D201, D202. This DC voltage is applied to Q101 on the FM TUNER as an AGC BIAS. The IF signal, extracted from the output of the T202, is amplified by Q206 buffer amplifier to drive the rectifier D204 and associated components. This DC voltage drives a signal meter and muting circuits. The amplitude component of IF signal, extracted from the output of the second ceramic filter F202 is rectified by D203. The AC component of this signal feeds to the multi-path check terminal.

### MULTIPLEX DEMODULATOR

The $\mu$pc554C is a monolithic FM stereo multiplex decorcer system constructed on a single silicon chip using the planner epitaxial process. This integrated circuit accomplishes the demodulation of a stereo multiplex signal into the right and left audio channels while inherently suppressing SCA frequency component. Internal provision is made for inter-station audio muting, stereo/mono mode switching and driving an external stereo mode indicator lamp.

Stereo demodulation in the $\mu$pc554C is achieved by a fully balanced differential synchronous demodulator (Figure). In this demodulator, the composite stereo signal is fed to the base of transistor Q11. The resulting AC current which flows in the collector of Q11 is then switched at 38KHz rate by the differential pair Q7 and Q8. The amplitude of the 38KHz switching signal is large enough to instantaneously gate the AC current alternately to the left and right audio channels. If the 38KHz gating signal is properly phased with respect to the composite stereo signal, this process will separate the stereo signal into its left and right audio components. A second differential stage (Q9, Q10 and Q13) is added to the stereo demodulator for two reasons. First, the 38KHz also switches the DC current flowing in the collector of Q11 resulting in a large undesired 38KHz voltage in both channels. By gating the DC current in Q13 and adding the resulting signals in phase opposition to those from Q12, these 38KHz components are cancelled. More importantly, however, the second differential stage provides improved stereo separation. With a single differential demodulator stage, the theoretical stereo sepa-

ration is limited to 13 dB due to the crosstalk inherent in the half-wave demodulation process. If a portion of the desired output is inverted and added to the crosstalk signal, however, this crosstalk component can be effectively cancelled resulting in stereo separations that are typically 45 dB. To demodulate the stereo signal, the 38KHz switching voltage must be reconstructed from the 19KHz pilot subcarrier. In the μpc554C this is accomplished by frequency doubling the 19KHz pilot. First, the pilot subcarrier is filtered from the composite stereo signal by 19KHz tuned circuit T204 and T206 and then amplified by the Darlington pair Q19 Q20. This amplified 19KHz pilot causes the composite PNP pair Q14 Q15 to conduct during negative swings. The resultant 19KHz pulses are then used to drive the 38KHz amplifier Q16. A 38KHz tuned circuit T205 at the collector of Q16 filters the 38KHz component from these pulses and also provides a DC path to insure balanced bias conditions at the demodulator transistor bases. The resultant DC voltage which appears at the emitter of Q16 when a 19KHz subcarrier is present, is used to drive the stereo indicator lamp circuits. Transistors Q30, Q31 and Q32 make up the Schmitt circuit which is set in the monaural mode when the external control voltage approaches zero. Under this condition, Q30 is biased off and Q31 and Q32 are conducting. When turned on, transistor Q30 saturates and prevents any 19KHz signal from reaching the 19KHz amplifier, Q19 Q20, by shunting the AC to ground. Now, when the DC control voltage rises to approximately to 0.6V, there is sufficient bias to turn on Q30. Transistor Q30 then fully gets saturated, removing bias from Q28 and allowing the 19KHz signal to be amplified. This sets the IC decoder in the stereo mode. IC multiplex decoders contain circuitry which will allow the audio signals to either pass normally or be attenuated by about 55 dB in response to an external DC control voltage applied to pin 5 of the IC. The audio mute switching is achieved with a Schmitt trigger construction of transistor Q21, Q22 and Q23 whose operation are similar to those of the stereo monaural circuit previously described. The μpc554C contains circuitry consisting of a Schmitt trigger switch and power NPN stage for driving a high current stereo indicator lamp. The lamp driver switch (Q27 Q28 Q29) is activated by the detected 19KHz. When sufficient 19KHz pilot is present the Schmitt trigger will be turned on by the resultant DC at pin 14. When the Schmitt circuit is on, it allows the power NPN stage (Q25, Q26) to be saturated placing the full supply voltage across the stereo lamp.

## FM MUTING AND ASSOCIATED CIRCUITS

The DC voltage, which is rectified by D204, drives Q213. When interstation noise or insufficient signal is available, the cumulate voltage, consisting of the preset forward bias and the positive voltage developed by the rectifier circuit is insufficient to make Q213 conduct. And Q214 conducts on saturation, therefore muting driver transistor Q215 is cut-off. In this case the signal is muted at Q207. The presence of an acceptable signal level makes the base voltage to Q213 large enough to overcome the sustain voltage on Q213. Then Q213, Q214, Q215 and Q207 are driven to alternate states. The forward bias to Q213 is fixed by VR201.

DC output of the 10.7MHz ratio detector is coupled to the base of Q401 and Q412 through D401. When there is zero DC at the ratio detector (i.e., the point of perfect tuning or the point of interstation), Q401 cuts off and Q402 conducts on saturation, therefore transistor Q403 cuts off. As a result, one gate of wired OR circuit turns on so Q215 drives only the other signal strength transistor Q214. When there is positive DC voltage at the ratio detector, Q401 conducts on saturation and Q402 cuts off, therefore wired OR transistor Q403 is gated off. While the appearance of negative DC at the ratio detector, the base of Q402 is biased to negative voltage through diode D401, since Q402 cuts off and the wired OR Q403 is gated off.

Audio muting is controlled by three gate circuits, that is, signal sterength gate Q214, center tuning gate Q403 and stereo gate Q216. Signal strength gate and center tuning gate are constructed by wired OR circuit and drive buffer amplifier Q215. Audio signal is muted at IC Q207 which is controlled by DC voltage at pin 5.

This DC voltage is selected by the function switch for "FM auto stereo", "mono" and "stereo only". When the muting switch is in on and the function switch in "FM stereo" or "mono", Q215 drives directly Q207. When the function switch is set to "stereo only" Q207 is driven by Q216 which is connected to the stereo indicator. The stereo indicator will operate only when a strong signal is received and the station transmits a stereo program, as mono-stereo mode is controlled by an external DC voltage (Q215 emitter voltage which is equal to the wired OR output signal) applied to pin 4 of Q207. Thus the tuner is muted except when a strong stereo signal is received.

## AM TUNER

A ferrite-rod antenna assembly which includes the tuned antenna transformer L1 selects the RF-signal from the desired radio broadcast station and couples it to the base of the Q208 RF-amplifier transistor. In the converter stage, the RF-signal from the RF-amplifier is mixed with a local oscillator signal to produce a signal at the receiver intermediate frequency of 455KHz. The antenna circuit, RF-amplifier, and converter are tuned together by means of mechanically ganged variable capacitor so that the local oscillator frequency is always 455KHz, and signal from the

converter stage is amplified by two IF-amplifier stages. The amplified IF-signal is then demodulated in the detector circuit consisting of D211 and associated components. D403 and associated components develop a negative voltage proportional to the input RF signal. This voltage is applied to the base of the first IF-amplifier Q210 as AGC bias. Since Q403 acts DC-amplifier, RF-amplifier transistor Q208 is controlled by the collector current of Q210. VR202 is used to adjust the Q208 collector current for set-point.

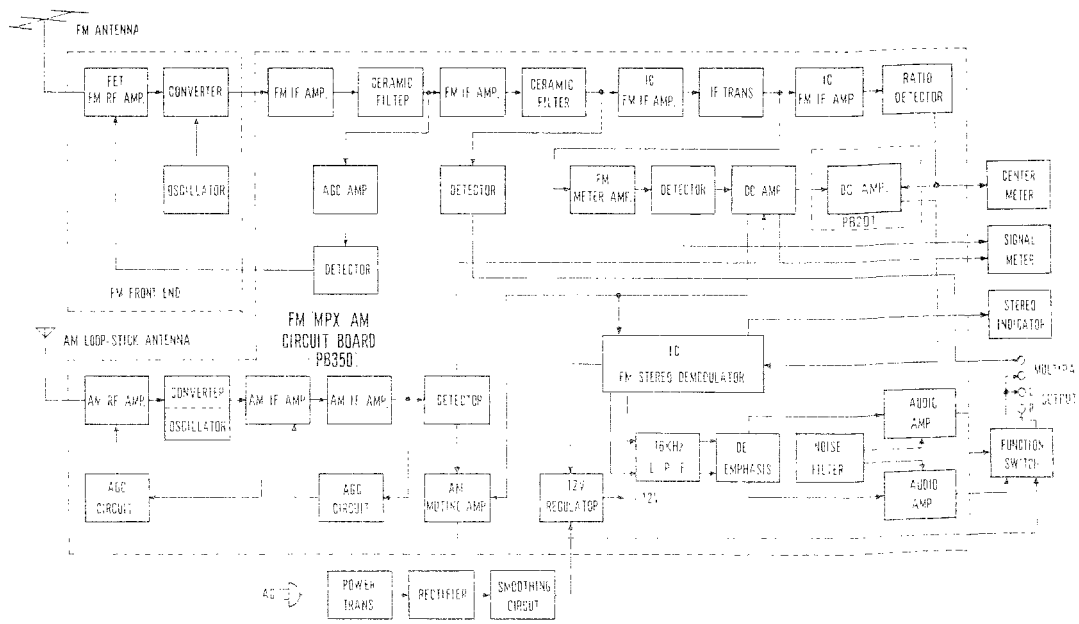
### AM MUTING

The DC output of D211 is amplified by Q213, Q214 and Q215 amplifiers. When interstation noise or insufficient signal is available, the DC output of D211 is insufficient to make Q213 conduction. In this case, Q213 cuts off, Q214 conducts on saturation and Q215 cuts off. Therefore Q212 cuts off and the audio signal is completely muted. When the tuner receives the sufficient signal, which is enough to turn on Q213, Q214 is off and Q215 is on. In this case Q212 is properly biased and allows the audio signal to pass to the succeeding circuit.

### POWER SUPPLY

A regulated power supply provides a stable DC voltage which is applied to all circuit boards. The DC output from the rectifier is filtered and applied to the series regulator Q217. Transistor Q219 compares a sample of the output voltage with a reference voltage supplied by the zener diode in Q207. A change in output voltage, detected by Q219, results in a change in conduction of Q218 and Q217 that offsets the original voltage shift.

## BLOCK DIAGRAM




## SPECIFICATIONS

### FM SECTION

| | |
|---|---|
| **IHF usable sensitivity:** | 1.8μV (100% mod.) |
| **Alternate channel selectivity:** | 70 dB (100 μV, ± 400 KHz) |
| **AM suppression:** | 53 dB (1 mV) |
| **Capture ratio:** | 1.3 dB |
| **Image ratio:** | 90 dB |
| **IF rejection ratio:** | 90 dB |
| **S/N ratio:** | 70 dB (1 mV, mono) |
| **Frequency response:** | 20 – 15,000 Hz (± 1.5 dB) |
| **Total Harmonic Distortion:** | 0.3% (400 Hz mono)<br>0.4% (400 Hz stereo) |
| **Separation:** | 40 dB (400 Hz)<br>30 dB (100 – 6 KHz) |
| **SCA rejection ratio:** | 60 dB |
| **Tuning frequency:** | 88 – 108 MHz |
| **Output:** | 1.5V (100% mod.) |

### AM SECTION

| | |
|---|---|
| **IHF usable sensitivity:** | 280 μV/m (30% mod., internal antenna) |
| **Image ratio:** | 80 dB (external antenna) |
| **IF rejection ratio:** | 75 dB (external antenna) |
| **S/N ratio:** | 45 dB (10 mV, 30% mod.) |
| **Frequency response:** | 80 – 3,000 Hz (-3 dB) |
| **Total Harmonic Distortion:** | 1% (400 Hz) |
| **Tuning frequency:** | 535 – 1605 KHz |
| **Output:** | 550 mV (30% mod.) |

### COMPOSITION ETC.

| | |
|---|---|
| **Composition:** | FET(1), IC(3), Transistor(25), Diode(15) |
| **Annexed devices:** | muting switch(FM, AM), treble noise filter(FM stereo), output level setter(FM, AM), multi-path detector(FM) |
| **Dimensions:** | 450mm(W) x 268mm(D) x 160mm(H) |
| **Weight:** | 7.5 kg |

## WL 550 ALIGNMENT PROCEDURE

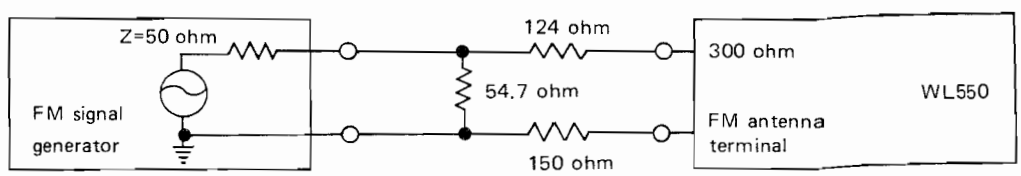
The alignment procedure described in each chart may be performed independently, without affecting the others.
Warm up the signal generators for at least 15 minutes to make certain if they are stabilized at their operating temperature particularly generators containing vacuum tubes. Consult the instruction manual supplied with the particular test instrument for specific information concerning connection and operation.
The test equipment listed here is intended only as a guide, but alternate instruments should be of similar quality.
The following instruments are required for a complete alignment of the tuner.

### 1. Measurement instruments and tools

| | | |
|---|---|---|
| Signal source | 1) FM signal generator (FMSG) | Meguro MSG–285A or equivalent |
| | 2) Sweep generator (SWG) | JRC NJM –5217C or equivalent |
| | 3) AM signal generator (AMSG) | Meguro MSG–221C or equivalent |
| | 4) FM stereo modulator (MPXSG) | Sound technology –1000A or equivalent |
| | 5) Audio oscillator (AFO)<br>10-100KHz<br>0.2% accuracy, Dist. 0.1% | Oscillation freq. range 10-100,000Hz, calibration error within 0.2%, distortion 0.1% |
| | 6) AM standard loop antenna | Meguro MLA-1001B or equivalent |
| Output indicator | 7) Oscilloscope (CRO)<br>Mid bandwidth 5$\mu$Hz | Iwatsu SS-5057V or equivalent |
| | 8) Distortion meter (HDM) | Shibaden CR-6S or equivalent |
| | 9) AC volt meter (ACVTVM) | Kikusui 164 or equivalent |
| | 10) DC volt meter (DCVTVM) | Kikusui 107A or equivalent |
| Tools | 11) Hex head alignment tool | |
| | 12) Thin plastic shaft alignment tool | |

### 2. General alignment conditions

1) The normal test voltage is 220V R.M.S. 50Hz with less than 2% harmonic distortion.
2) Unless otherwise specified, the normal ambient temperature is 15–25°C and humidity 55–75%. But as far as correct judgement is ensured 5–35°C, 45–85% is allowable.
3) FM dummy antenna shall be as follows if not otherwise specified. The output voltage of the signal generator is 1/4 of the unloaded terminal voltage.




4) Connect the low side of signal source and the output indicator to the chassis ground as close as possible to the high side connection unless otherwise specified.
5) The 10.7 MHz marker used in each section of the alignment should be the same.
6) Marker insertion and amplitude should not distort the oscilloscope trace.
7) The AM standard loop antenna should be set above the ferrite loopstick antenna.
8) The output level of the sweep generator is measured by the output attenuator regardless of its terminated impedance.
9) FM modulation 100% with ±75 KHz.

| Step. | Signal Source<br>Connected to | Set Signal to | Set Radio<br>Dial to | Output Indicator<br>Connected to | Adjust | Adjust for |
|---|---|---|---|---|---|---|
| 1 | Set selector switch to FM mono, muting switch to off, noise filter switch to off and the mains power switch to off | | | | | |
| 2 | Press power switch for on | | | | | |
| 3 | | | | DCVTVM<br>PB350 27 point | VR203 | 12～13 DCVTVM reading |
| 4 | | | | ref. circuit diagram | | Check each part voltage if necessary |
| 5 | Sweep generator<br>Point 11 of PB350 | ±400KHz sweep centred at 10.7MHz<br>generator output level<br>90—100 | Quiet point on band | Oscilloscope<br>PB350 29 | | Find a centre frequency where symmetrical response can be obtained in the vicinity of −3dB～−6dB and make note of it. |
| 6 | | | | Oscilloscope<br>+ to PB350 32<br>and — to 31 | T201 T202<br>core | Symmetrical response centred at the frequency noted by step 5. |
| 7 | | | | Oscilloscope<br>through 100KΩ series to wire underneath the right part of PB350, T203 | T203<br>top core | Maximum linearity and amplitude of "S" curve centered at the frequency noted by step 5. |
| 8 | | | | | T203<br>bottom core | |
| 9 | FM Signal generator<br>Across FM antenna terminals (300Ω) through matching network | Reduce the output level to zero. (interstation receiving condition) | Quiet point on band near 98MHz | | T203<br>top core | Centre indication of the tuning meter |
| 10 | | 98MHz at 400Hz 100% modulation output level 1mV | Correct reception of 98 MHz signals from FMSG at the centre of tuning meter | Oscilloscope<br>distortion meter<br>ACVTVM<br>output terminals | T203<br>bottom core | Maximum reaching of ACVTVM |
| 11 | | | | | CT201 | Minimum distortion |
| 12 | Repeat steps 9, 10 and 11 as necessary to obtain maximum output level and minimum distortion at "O" point of tuning meter and to let the meter shows "O" at interstation state | | | | | |
| 13 | FM signal generator<br>Across FM antenna terminals through 300 ohm matching net work | 88MHz at 400Hz 100% modulation, generator output level 1mV | 88MHz | Oscilloscope<br>Distortion meter<br>ACVTVM<br>Output terminals | L104 | Accurate reception of 88MHz signals at 88MHz dial calibration |
| 14 | | 108MHz at 400Hz 100% modulation, generator output level 1mV | 108MHz | | CT104 | Accurate reception of 108MHz signals at 108MHz dial calibration |

| Step. | Signal Source<br>Connected to | Set signal to | Set Radio<br>Dial to | Output Indicator<br>Connected to | Adjust | Adjust for |
|---|---|---|---|---|---|---|
| 15 | Repeat steps 13 and 14 as necessary to obtain correct tuning on dial scale. | | | | | |
| 16 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 88MHz at 400Hz 100% modulation generator output level 5-10μV | 88MHz | | T101 top core | Maximum swing of signal strength meter |
| 17 | | | | | T101 bottom core | |
| 18 | | | | | L101 | |
| 19 | | | | | L102 | |
| 20 | | | | | L103 | |
| 21 | | 108MHz at 400Hz 100% modulation generator output level 5-10μV | 108MHz | | CT101 | |
| 22 | | | | | CT102 | |
| 23 | | | | | CT103 | |
| 24 | | Reduce the output level to zero (interstation receiving condition) | quiet point on band near 98MHz | | T203 top core | Centre indication of tuning meter |
| 25 | | 98MHz at 400Hz 100% distortion generator output level 1mV | correct reception of 98 MHz signals from FMSG at the centre of tuning meter | Oscilloscope distortion meter<br>ACVTVM<br>Output terminals | T203 bottom core | Maximum reading of ACVTVM |
| 26 | | | | | CT201 | Minimum distortion below 0.25% and output level 1.2 – 1.9v |
| 27 | Repeat steps 24, 25 and 26 as necessary to obtain the maximum output level and minimum distortion at "O" point of tuning meter and to let the meter show "O" at interstation state. | | | | | |
| 28 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 108MHz at 400Hz 100% modulation | 108MHz | Oscilloscope distortion meter<br>ACVTVM<br>Output terminals | | IHF maximum usable sensitivity which is the minimum output level of FMSG required for distortion and noise to be −30dB of total output |
| 29 | | 88MHz at 400Hz 100% modulation | 88MHz | | | |
| 30 | Repeat steps 16～27 (if necessary 13～27) so that the maximum IHF usable sensitivity can be obtained. | | | | | |
| 31 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 98MHz at 400Hz 100% modulation output level 7μV | 98MHz | | VR203 | Swing of signal strength meter within 1 or 1 ±0.5 calibration scale |
| 32 | Put the muting switch to "on". | | | | | |

| Step. | Signal Source<br>Connected to | Set signal to | Set Radio Dial to | Output Indicator<br>Connected to | Adjust | Adjust for |
|---|---|---|---|---|---|---|
| 33 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 98MHz at 400Hz 100% modulation generator output level 7μV | 98MHz | Oscilloscope<br>ACVTVM<br>Output terminal | VR201 | Fix VR201 at the point where output signals appear |
| 34 | Set the function switch to "FM auto stereo" and the muting switch to "off". | | | | | |
| 35 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 98MHz at 19KHz 3-4% modulation generator output level 1mV | 98MHz | Oscilloscope<br>TP204 | T204 (Black) core | Maximum amplitude of oscilloscope |
| 36 | | | | | T206 (Black) core | |
| 37 | | | | | T205 (Yellow) core | |
| 38 | Repeat steps 35 ~ 37 as necessary for alignment of perfect tuning. | | | | | |
| 39 | FM signal generator<br>Across FM antenna terminals through 300Ω matching net work | 98MHz at 19KHz 10% (L-R) 400Hz 45% or 90% output level 1mV | 98MHz | Oscilloscope<br>distortion meter<br>ACVTVM<br>Output terminal | T205 | To obtain peak of output voltage turning T205 (yellow) core |
| 40 | Set the function at AM position. | | | | | |
| 41 | Connect T202 and T203 on PB350. | | | | | |
| 42 | Output of sweep generator<br>to PB350 16 and frame of variable capacitor through 1μF mylar capacitor | ±40KHz sweep centred at 455KHz generator output level 80-90dB | Quiet point on band near 1600KHz | Oscilloscope<br>PB350<br>terminal 24 | T209 top core | Maximum symmetrical response cerntred at 455KHz with same height at 450KHz and 460KHz |
| 43 | | | | | T209 bottom core | |
| 44 | | | | | T210 top core | |
| 45 | | | | | T210 bottom core | |
| 46 | | | | | T211 core | |
| 47 | Remove wiring at step 41. | | | | | |
| 48 | Connect the terminal 17 of PB350 with the frame of variable capacitor. | | | | | |

| Step. | Signal Source / Connected to | Set signal to | Set Radio Dial to | Output Indicator / Connected to | Adjust | Adjust for |
|---|---|---|---|---|---|---|
| 49 | | | Quiet point on band near 1600KHz | DCVTVM / TP201 on PB350 | VR202 | 10V on DCVTCM reading |
| 50 | Remove wiring at step 48. | | | | | |
| 51 | Standard radiating loop antenna placed near AM built-in antenna | 600KHz at 400 Hz, 30% modulation field strength 50dB/m | 600KHz | Oscilloscope / ACVTVM / Output terminal | T208 core | dial pointer to be tuned at 600KHz |
| 52 | | | | | Bar antenna coil L1 | Maximum ACVTVM reading - Slide coil bobbin |
| 53 | | | | | T207 core | Maximum ACVTVM reading |
| 54 | | 1,400KHz at 400Hz, 30% modulation field strength 50dB/m | 1400KHz | | TC3 | dial pointer to be tuned at 1,400KHz |
| 55 | | | | | TC2 | Maximum ACVTVM reading |
| 56 | | | | | TC1 | |
| 57 | Repeat steps 51 ~ 56 as necessary to obtain maximum sensitivity and exact tuning point on dial scale. | | | | | |
| 58 | Fix by adhesive agent the core and bobbin aligned at step 52. | | | | | |
| 59 | Set the muting switch at "ON". | | | | | |
| 60 | Standard radiating loop antenna placed near AM built-in antenna | 1,000KHz at 400Hz, 30% modulation field strength 56dB/m | 1000KHz | Oscilloscope / ACVTVM / Output terminal | VR202 | Fix VR202 at the point where output signals appear |
| 61 | Set the muting switch at "OFF". | | | | | |
| 62 | Standard radiating loop antenna placed near AM built-in antenna | 600KHz at 400Hz, 30% modulation | 600KHz | Oscilloscope / ACVTVM / Distortion Meter / Output terminal | | IHF maximum usable sensitivity which is equivalent electric field strength at the loopstick antenna adjusted by attenuator of AMSG so that noise and distortion can be −20dB of total output |
| 63 | | 1,400KHz at 400Hz 30% modulation | 1400KHz | | | |
| 64 | Put the power switch to "off". Remove all connections among the tuner, measuring instruments and main power sources. | | | | | |

## SEMICONDUCTOR SPECIFIC CHART

### TRANSISTORS (Ta = 25°C)

| Type | MAX. RATING | | | CHARACTERISTICS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pt | Vceo | Ic | hfe | | | | fT MHz | | | | NF |
| | W | V | mA | min | max | Ic mA | Vce V | min | tye | Ic mA | Vce | maxdB |
| 2SC381 | 0.1 | 30 | 20 | 40 | 140 | 1 | 6 | 250 | --- | 1 | 6 | --- |
| 2SC372 | 0.2 | 30 | 100 | 70 | 240 | 10 | 1 | 80 | 200 | 1 | 10 | --- |
| 2SC1000 | 0.2 | 50 | 100 | 200 | 1200 | 2 | 6 | --- | 80 | 2 | 6 | 2 |
| 2SC735 | 0.3 | 30 | 400 | 70 | 240 | 100 | 1 | --- | 300 | 50 | 5 | --- |
| 2SD235 | 1.5 | 35 | 3000 | 40 | 240 | 500 | 5 | --- | 1 | 500 | 5 | --- |
| 2SC535 | 0.1 | 20 | 20 | 35 | 200 | 1 | 6 | 450 | 700 | 5 | 6 | 5.5 |
| SE3001 | 0.2 | 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 4 |

### FIELD EFFECT TRANSISTORS (Ta = 25°C)

| Type | MAX. RATING | | | CHARACTERISTICS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pch | $V_{G1SS}$, $V_{G2SS}$ | $I_{G1}$, $I_{G2}$ | $I_{DSS}$ mA | | | Crss | pF | NF | |
| | mW | V | mA | min | max | Vds V | | Vds V | tye | Vds V |
| 3SK30 | 200 | −15 | 10 | 3 | 20 | 10 | 0.6 | 10 | 2.0 | 10 |

### DIODES (Ta = 25°C)

| Type | MAX. RATING | | | CHARACTERISTICS | | | |
|---|---|---|---|---|---|---|---|
| | IF | Vr | Surge | If | | Ir | |
| | A | V | A | mA | Vf V | μA | Vr V |
| 1S188 | 0.05 | −35 | 0.5 | 0.004 | 0.1 | −75 | −10 |
| KB165 | 0.05 | --- | --- | 0.003 | 0.65 | --- | --- |
| KB265 | 0.03 | --- | --- | 0.003 | 1.31 | --- | --- |
| SIRC10 | 1.8 | −100 | 30 | 0.9A | 1.05 | −10 | −100 |

## INTEGRATED CIRCUIT SPECIFIC CHART

### μPC554C

### ABSOLUTE MAXIMUM RATING (Ta = 25°C)

| | Symbol | Rating | Unit |
|---|---|---|---|
| Supply voltage | Vcc | 15 | V |
| Max. device current | Icc | 18 | mA |
| Lamp driver current, max. | $I_L$ | 100 | mA |
| Device dissipation, max. | $P_D$ | 400 | mW |
| Operating temperature | Topr | 0～±75 | °C |
| Storage temperature | Tstg | 40～±125 | °C |

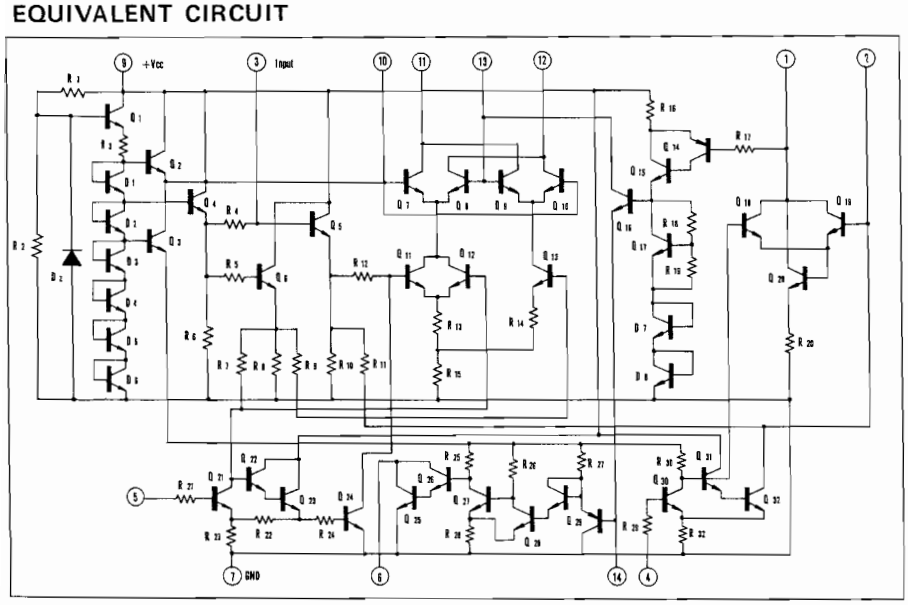
## ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vcc = +9.0V)

| | | Symbol | Circuit for measurement | Condition of measurement | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| Circuit current | | Icc | 1 | at zero signal | | 10 | 18 | mA |
| Input impedance | | Zi | 1 | | | 20 | | KΩ |
| Separation | | | | f = 100Hz | | 35 | | dB |
| | | | | f = 1KHz | | 45 | | |
| | | | | f = 10KHz | | 30 | | |
| Gain (dB) | | Av | 1 | 38KHz B.E.F | | −1.5 | | dB |
| Channel balance | | ch. B | 1 | (Mono) | | 0.2 | 2.0 | dB |
| Distortion | | T.H.D | | (Mono) | | 0.5 | 1.0 | % |
| Audio / muting changeover level | | Mute OFF | 1 | | | 0.85 | 1.00 | V |
| | | Mute ON | 1 | | 1.00 | 1.08 | | |
| Sensitivity of stereo indicator lamp | | Lamp ON | 1 | (Pilot level) | | 12 | | mV |
| | | Lamp OFF | 1 | | | 8.4 | | |
| Stereo / mono changeover level | | STEREO | 1 | | 1.00 | 1.13 | | V |
| | | MONO | 1 | | | 0.82 | 1.00 | |
| AM suppression | 19KHz | | | (within 1KHz) | | 30 | | dB |
| | 38KHz | | | | | 25 | | |
| SCA rejection | | SCA Rejection | | | | 55 | | dB |
| Muting | | | 1 | | 45 | 55 | | dB |

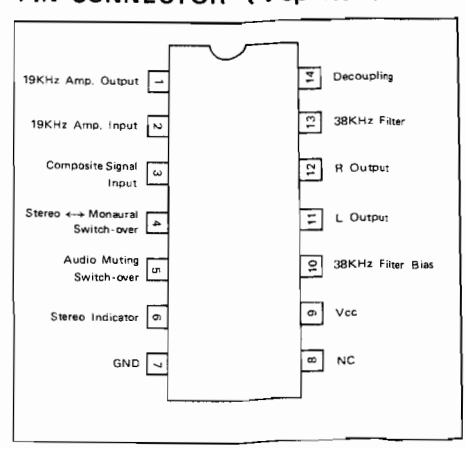
Note 1. Condition of measurement = input signal 200mV rms (Pilot 10%), frequency 1KHz.

2. R.P.F of f = 15KHz shall be used for separation measurement.

## EQUIVALENT CIRCUIT




## PIN CONNECTOR (Top view)



## INTEGRATED CIRCUIT SPECIFIC CHART

### TA 706P

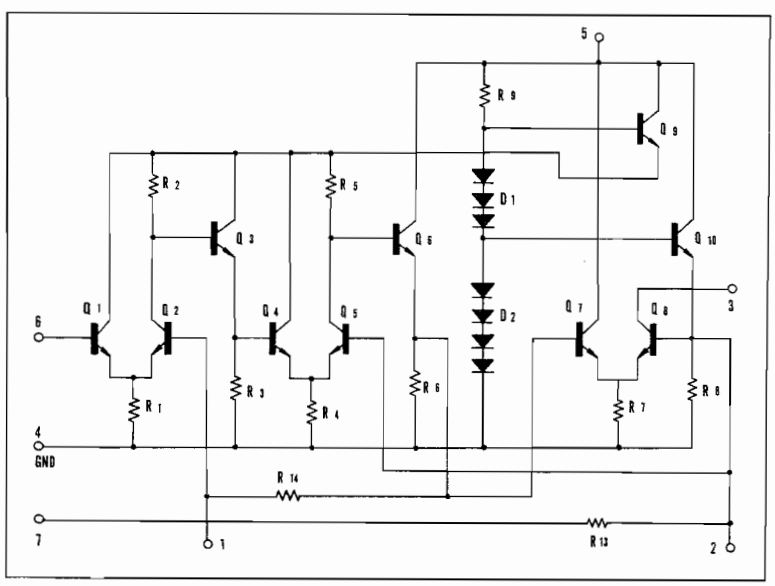
### MAXIMUM LIMITS OF DEVICE (Ta = 25°C)

| | Symbol | Rating | Unit |
|---|---|---|---|
| Max. Vcc | Vcc | 8.5 | V |
| Input voltage (terminals 6 – 7) | VI | ±3 | V |
| Max. dissipation | PD | 300 | mW |
| Operating temperature (Vcc = 7.5V) | Topr | −30～75 | °C |
| Storage temperature | Tstg | −55～125 | °C |

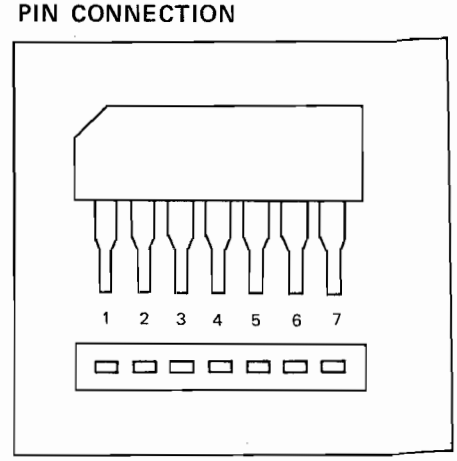
### ELECTRICAL SPECIFICATION (Ta = 25°C)

| | Symbol | Condition of measurement | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Current vs supply Vcc | Icc | Vcc = 6.0V | 8 | 13 | 18 | mA |
| | | Vcc = 7.5V | 10 | 15 | 20 | |
| Gain (dB) | Gp | Vcc = 7.5V, f = 10.7MHz | 65 | 68 | 71 | dB |
| Input impedance | RI | Vcc = 7.5V, f = 10.7 MHz | – | 2.7 | – | KΩ |
| Input capacitance | CI | | – | 7.1 | – | pF |
| Output impedance | Ro | Vcc = 7.5V, f = 10.7MHz | – | 90 | – | KΩ |
| Output capacitance | Co | | – | 4.6 | – | pF |
| Input voltage for full limitting | VI(lim) | Vcc = 7.5V, RL = 1KΩ | – | 600 | – | μV |

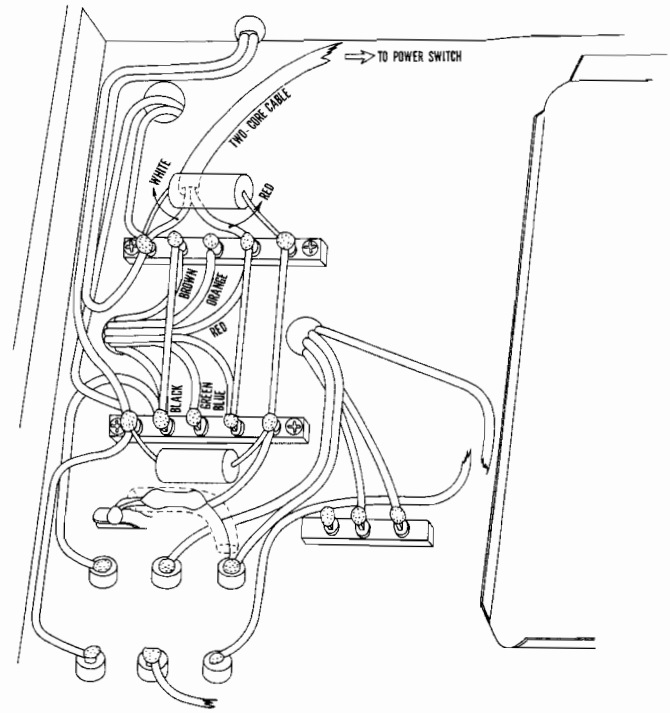
### EQUIVALENT CIRCUIT



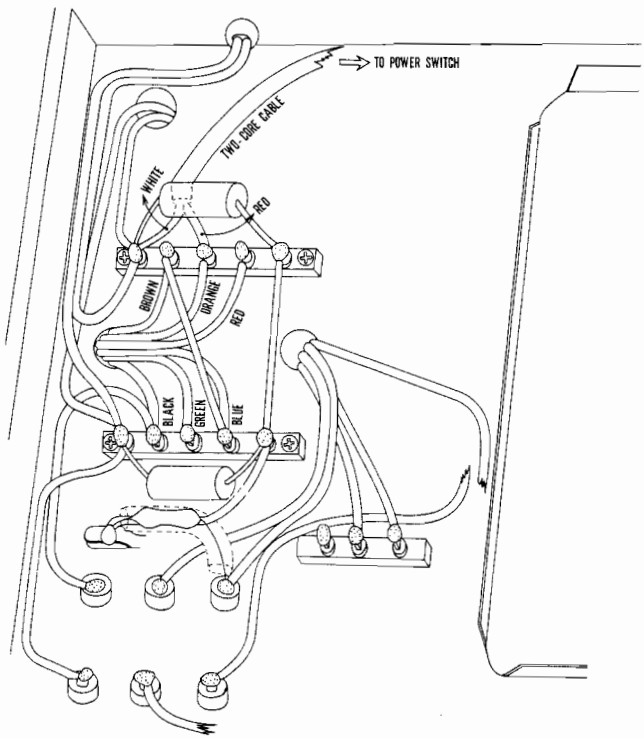

### PIN CONNECTION



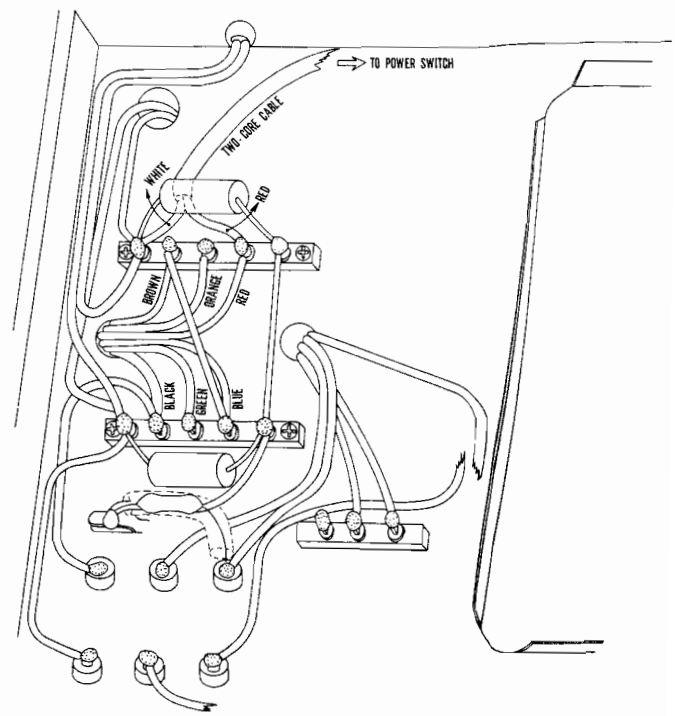
## SCHEMATIC FOR 117V OPERATION




## SCHEMATIC FOR 220V OPERATION




## SCHEMATIC FOR 240V OPERATION

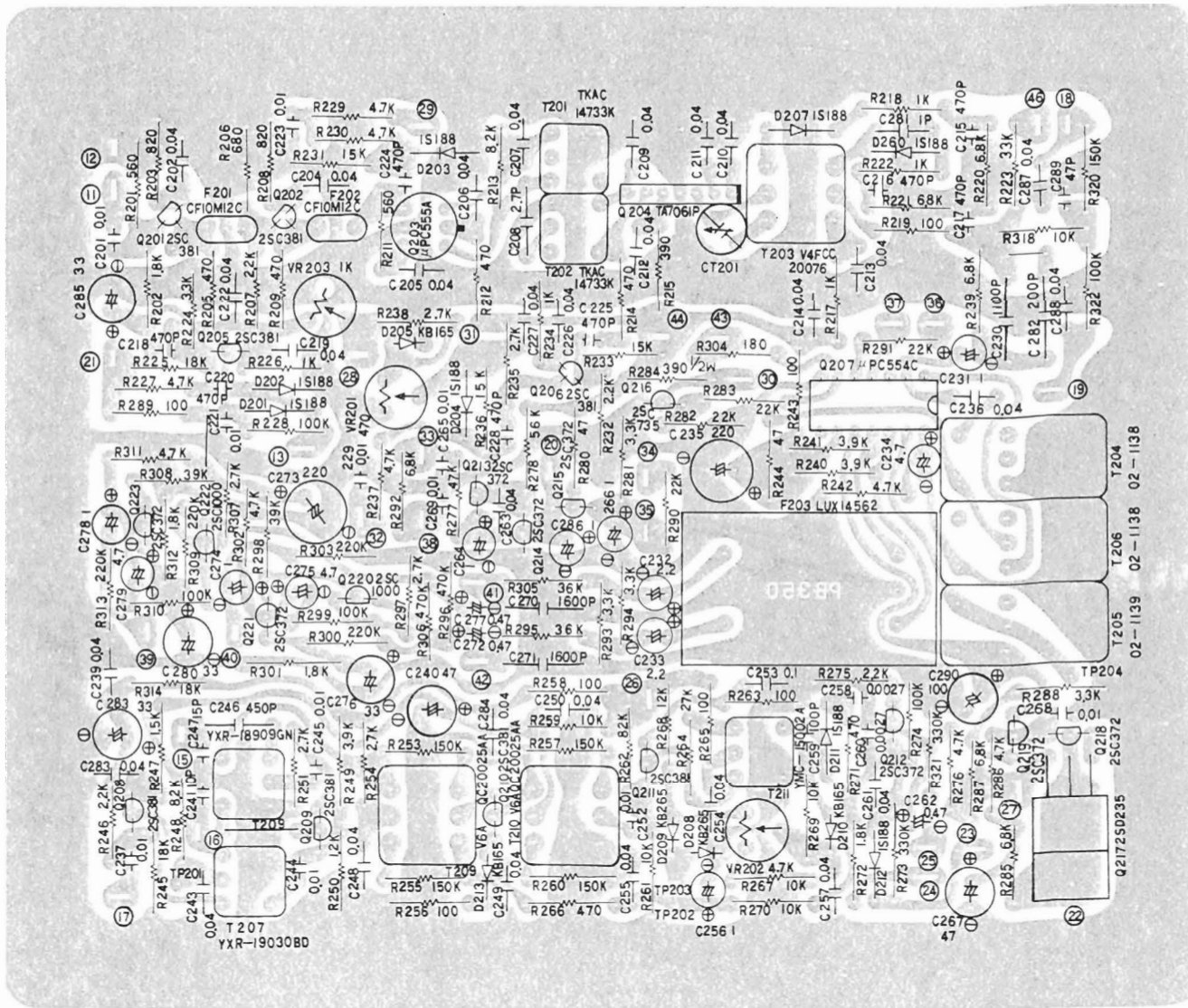


## PB350 CIRCUIT BOARD COMPONENT LOCATION

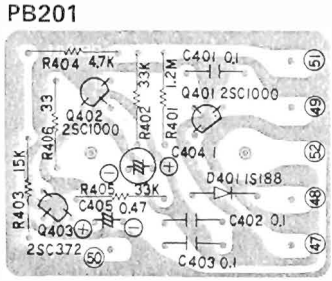
COMPONENT VIEW

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| R201 | X1 | R261 | Z3 | C201 | X1 | C268 | Z4 |
| R202 | X1 | R262 | Z3 | C202 | X1 | C269 | |
| R203 | X1 | R263 | Z3 | C203 | | C270 | Y2 |
| R204 | PB350 BOTTOM | R264 | Z3 | C204 | X1 | C271 | Z2 |
| | | R265 | Z3 | C205 | X2 | C272 | Y2 |
| R205 | X1 | R266 | Z2 | C206 | X2 | C273 | Y1 |
| R206 | X1 | R267 | Z3 | C207 | X2 | C274 | Y1 |
| R207 | X1 | R268 | Z3 | C208 | X2 | C275 | Y1 |
| R208 | X1 | R269 | Z3 | C209 | X3 | C276 | Z2 |
| R209 | X1 | R270 | Z3 | C210 | X3 | C277 | Y2 |
| R210 | | R271 | Z4 | C211 | X3 | C278 | Y1 |
| R211 | X2 | R272 | Z4 | C212 | X3 | C279 | Y1 |
| R212 | X2 | R273 | Z4 | C213 | X4 | C280 | Y1 |
| R213 | X2 | R274 | Z4 | C214 | X3 | C281 | X4 |
| R214 | X3 | R275 | Z4 | C215 | | C282 | X4 |
| R215 | X3 | R276 | Z4 | C216 | X4 | C283 | Z1 |
| R216 | PB350 BOTTOM | R277 | Y2 | C217 | X4 | C284 | Z2 |
| | | R278 | Y2 | C218 | X1 | C285 | X1 |
| R217 | X3 | R279 | | C219 | X1 | C286 | Y2 |
| R218 | X4 | R280 | Y2 | C220 | X1 | C287 | X4 |
| R219 | X4 | R281 | Y3 | C221 | Y1 | C288 | X4 |
| R220 | X4 | R282 | Y3 | C222 | X1 | C289 | X4 |
| R221 | | R283 | Y3 | C223 | X1 | C290 | Z4 |
| R222 | X4 | R284 | X3 | C224 | X2 | | |
| R223 | X4 | R285 | Z4 | C225 | X2 | VR201 | Y2 |
| R224 | | R286 | Z4 | C226 | X2 | VR202 | Z3 |
| R225 | X1 | R287 | Z4 | C227 | X2 | VR203 | X1 |
| R226 | X1 | R288 | Z4 | C228 | Y2 | | |
| R227 | X1 | R289 | Y1 | C229 | Y2 | CT201 | X3 |
| R228 | Y1 | R290 | Y3 | C230 | X4 | | |
| R229 | X1 | R291 | X4 | C231 | X4 | D201 | Y1 |
| R230 | | R292 | Y2 | C232 | Y3 | D202 | Y2 |
| R231 | X1 | R293 | Y3 | C233 | Y3 | D203 | X2 |
| R232 | Y3 | R294 | Y3 | C234 | Y4 | D204 | Y2 |
| R233 | X3 | R295 | Y2 | C235 | Y3 | D205 | X2 |
| R234 | X2 | R296 | Y2 | C236 | Y4 | D206 | X4 |
| R235 | X2 | R297 | Y2 | C237 | Z1 | D207 | X3 |
| R236 | Y2 | R298 | Y1 | C238 | Z1 | D208 | Z3 |
| R237 | Y2 | R299 | Y1 | C239 | Z1 | D209 | Z3 |
| R238 | X2 | R300 | Y1 | C240 | Z2 | D210 | Z3 |
| R239 | X4 | R301 | Z1 | C241 | Z1 | D211 | Z3 |
| R240 | Y3 | R302 | Y1 | C242 | | D212 | Z4 |
| R241 | Y3 | R303 | Y1 | C243 | Z1 | D213 | Z2 |
| R242 | Y4 | R304 | X3 | C244 | Z1 | | |
| R243 | Y3 | R305 | Y2 | C245 | Z1 | Q201 | X1 |
| R244 | Y3 | R306 | Y2 | C246 | Z1 | Q202 | X1 |
| R245 | Z1 | R307 | Y1 | C247 | Z1 | Q203 | X2 |
| R246 | Z1 | R308 | Y1 | C248 | Z2 | Q204 | X3 |
| R247 | Z1 | R309 | Y1 | C249 | Z2 | Q205 | X1 |
| R248 | Z1 | R310 | Y1 | C250 | Z2 | Q206 | X2 |
| R249 | Z1 | R311 | Y1 | C251 | | Q207 | Y4 |
| R250 | Z1 | R312 | Y1 | C252 | Z3 | Q208 | Z1 |
| R251 | Z1 | R313 | Y1 | C253 | Z3 | Q209 | Z1 |
| R252 | | R314 | Z1 | C254 | Z3 | Q210 | Z2 |
| R253 | Z2 | R315 | | C255 | Z3 | Q211 | Z3 |
| R254 | Z2 | R316 | | C256 | Z3 | Q212 | Z4 |
| R255 | Z2 | R317 | | C257 | Z3 | Q213 | Y2 |
| R256 | Z2 | R318 | X4 | C258 | Z4 | Q214 | Y2 |
| R257 | Z2 | R319 | | C259 | Z3 | Q215 | Y2 |
| R258 | Z2 | R320 | X4 | C260 | Z4 | Q216 | Y3 |
| R259 | Z2 | R321 | Z4 | C261 | Z4 | Q217 | Z4 |
| R260 | Z2 | R322 | X4 | C262 | Z4 | Q218 | Z4 |
| | | | | C263 | Y2 | Q219 | Z4 |
| | | | | C264 | Y2 | Q220 | Y2 |
| | | | | C265 | Y2 | Q221 | Y1 |
| | | | | C266 | Y3 | Q222 | Y1 |
| | | | | C267 | Z4 | Q223 | Y1 |

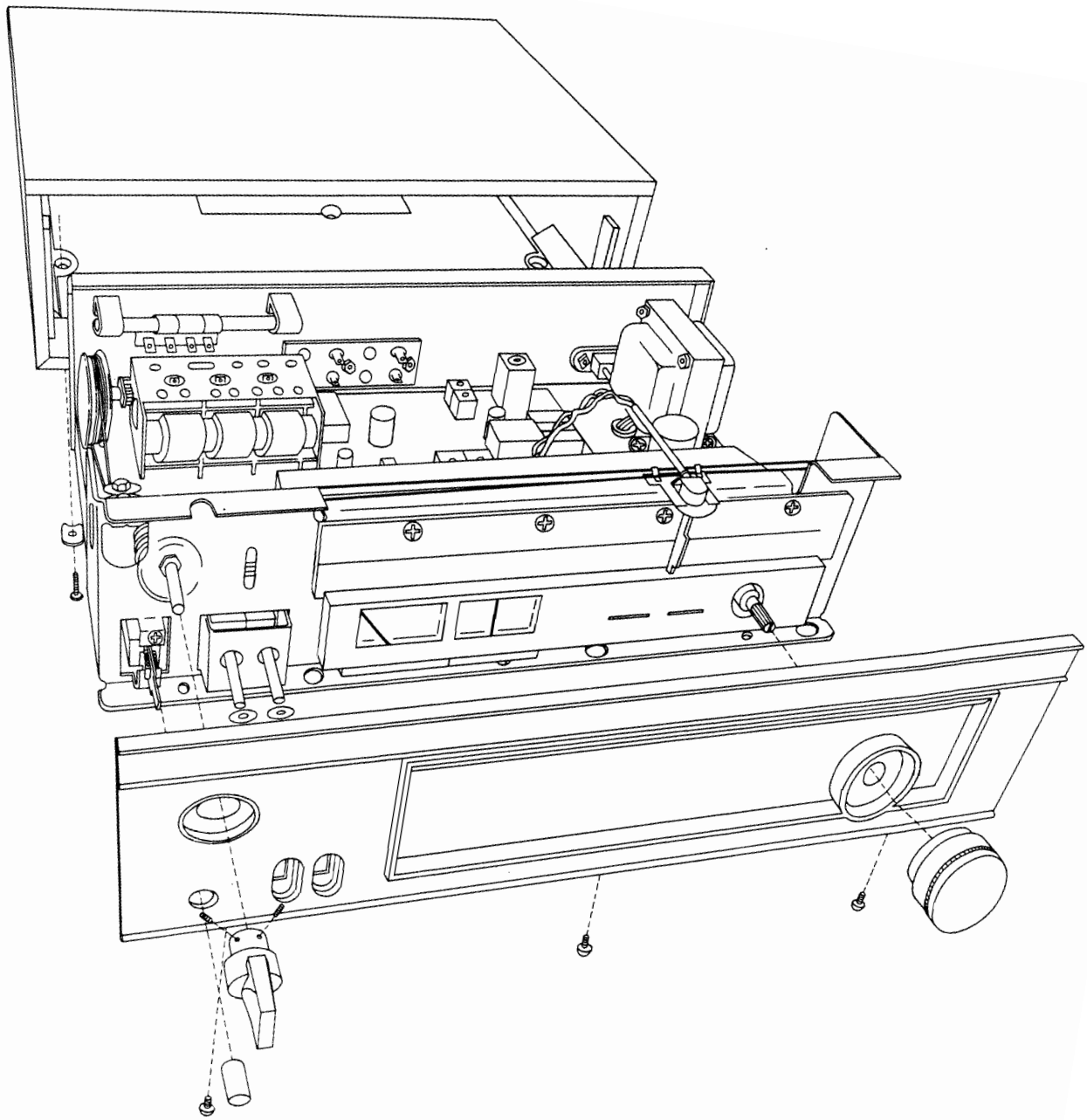
| | |
|---|---|
| F201 | X1 |
| F202 | X1 |
| F203 | Y3 |
| T201 | X2 |
| T202 | X2 |
| T203 | X3 |
| T204 | Y4 |
| T205 | Y4 |
| T206 | Y4 |
| T207 | Z1 |
| T208 | Z1 |
| T209 | Z2 |
| T210 | Z2 |
| T211 | Z3 |
| ⑪ | X1 |
| ⑫ | X1 |
| ⑬ | Y1 |
| ⑮ | Z1 |
| ⑯ | Z1 |
| ⑰ | Z1 |
| ⑱ | X4 |
| ⑲ | Y4 |
| ⑳ | Y2 |
| ㉑ | X1 |
| ㉒ | Z4 |
| ㉓ | Z4 |
| ㉔ | Z4 |
| ㉕ | Z4 |
| ㉖ | Z3 |
| ㉗ | Z4 |
| ㉘ | X1 |
| ㉙ | X2 |
| ㉚ | X3 |
| ㉛ | X2 |
| ㉜ | Y2 |
| ㉝ | Y2 |
| ㉞ | Y3 |
| ㉟ | Y3 |
| ㊱ | X4 |
| ㊲ | X4 |
| ㊳ | Y2 |
| ㊴ | Z1 |
| ㊵ | Z1 |
| ㊶ | Y2 |
| ㊷ | Z2 |
| ㊸ | X3 |
| ㊹ | X3 |
| ㊻ | X4 |
| TP201 | Z1 |
| TP202 | Z3 |
| TP203 | Z3 |
| TP204 | Z4 |

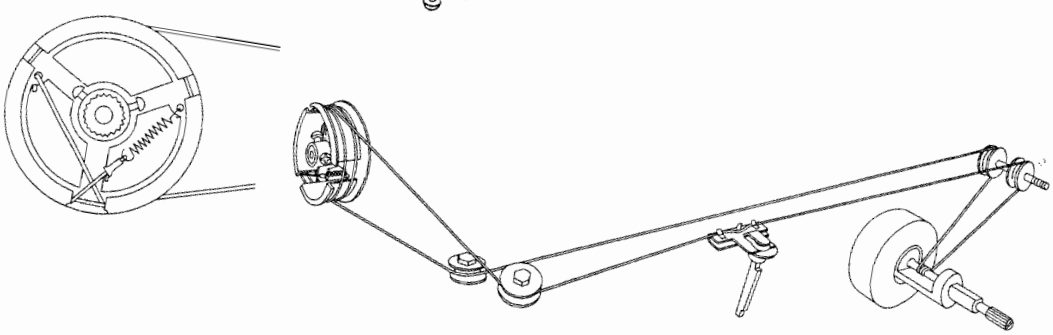


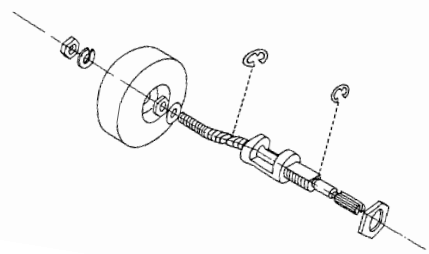
PB201



## DISASSEMBLY







## REPLACEMENT PARTS

**RESISTORS : ±10% ¼ watt deposited carbon, unless noted otherwise**

| SYMBOL NO. | DESCRIPTION | SYMBOL NO. | DESCRIPTION | SYMBOL NO. | DESCRIPTION | SYMBOL NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| R1 | 470Ω | R229 | 4.7K | R263 | 100Ω | R297 | 2.7K |
| R2 | 470Ω | R230 | 4.7K | R264 | 27K | R298 | 39K |
| R3 | 100Ω | R231 | 15K | R265 | 100Ω | R299 | 100K |
| R4 | 1Ω | R232 | 2.2K | R266 | 470Ω | R300 | 220K |
| R5 | 33K | R233 | 15K | R267 | 10K | R301 | 1.8K |
| R6 | 150K | R234 | 1K | R268 | 12K | R302 | 4.7K |
| R201 | 560Ω | R235 | 2.7K | R269 | 10K | R303 | 220K |
| R202 | 1.8K | R236 | 15K | R270 | 10K | R304 | 180Ω |
| R203 | 820Ω | R237 | 4.7K | R271 | 470Ω | R305 | 36K |
| R204 | 1.5K | R238 | 2.7K | R272 | 1.8K | R306 | 470K |
| R205 | 470Ω | R239 | 6.8K | R273 | 330K | R307 | 2.7K |
| R206 | 680Ω | R240 | 3.9K | R274 | 100K | R308 | 39K |
| R207 | 2.2K | R241 | 3.9K | R275 | 2.2K | R309 | 220K |
| R208 | 820Ω | R242 | 4.7K | R276 | 4.7K | R310 | 100K |
| R209 | 470Ω | R243 | 100Ω | R277 | 47K | R311 | 4.7K |
| R210 | | R244 | 47Ω | R278 | 56K | R312 | 1.8K |
| R211 | 560Ω | R245 | 18K | R279 | | R313 | 220K |
| R212 | 470Ω | R246 | 2.2K | R280 | 47Ω | R314 | 18K |
| R213 | 8.2K | R247 | 1.5K | R281 | 3.3K | R315 | |
| R214 | 1K | R248 | 8.2K | R282 | 22K | R316 | |
| R215 | 390Ω | R249 | 3.9K | R283 | 22K | R317 | |
| R216 | 8.2K | R250 | 1.2K | R284 | ½W390Ω | R318 | 10K |
| R217 | 1K | R251 | 2.7K | R285 | 6.8K | R319 | |
| R218 | 1K | R252 | | R286 | 4.7K | R320 | 150K |
| R219 | 100Ω | R253 | 150K | R287 | 6.8K | R321 | 330K |
| R220 | 6.8K | R254 | 2.7K | R288 | 3.3K | R322 | 100K |
| R221 | 6.8K | R255 | 150K | R289 | 100Ω | | |
| R222 | 1K | R256 | 100Ω | R290 | 22K | R401 | 1.2M |
| R223 | 33K | R257 | 150K | R291 | 22K | R402 | 33K |
| R224 | 3.3K | R258 | 100Ω | R292 | 6.8K | R403 | 15K |
| R225 | 18K | R259 | 10K | R293 | 3.3K | R404 | 4.7K |
| R226 | 1K | R260 | 150K | R294 | 3.3K | R405 | 33K |
| R227 | 4.7K | R261 | 10K | R295 | 36K | R406 | 33Ω |
| R228 | 100K | R262 | 82K | R296 | 470K | | |

**CAPACITORS**

| SYMBOL NO. | DESCRIPTION | SYMBOL NO. | DESCRIPTION |
|---|---|---|---|
| C1 | 10pF ±1pF NPO., 50WV ceramic | C212 | 0.04μF +80% −20% 50V ceramic |
| C2 | 0.01μF +80% −20% 50WV ceramic | C213 | 0.04μF +80% −20% 50V ceramic |
| C3 | 0.01μF +80% −20% 50WV ceramic | C214 | 0.04μF +80% −20% 50V ceramic |
| C4 | 4700pF ±20% 250V r.m.s polyester film | C215 | 470pF ±20% 50V ceramic |
| C5 | 4700pF ±20% 250V r.m.s polyester film | C216 | 470pF ±20% 50V ceramic |
| C6 | 2200μF +100% −10% 25V electrolytic | C217 | 470pF ±20% 50V ceramic |
| C7 | 47μF +50% −10% 16V electrolytic | C218 | 470pF ±20% 50V ceramic |
| C8 | 450pF ±5% 50WV polystyrol | C219 | 0.04μF +80% −20% 50V ceramic |
| C9 | 2200pF ±20% AC200V polyester | C220 | 470pF ±20% 50V ceramic |
| C10 | 2200pF ±20% AC200V polyester | C221 | 0.01μF +80% −20% 50V ceramic |
| | | C222 | 0.04μF +80% −20% 50V ceramic |
| C201 | 0.01μF +80% −20% 50V ceramic | C223 | 0.01μF +80% −20% 50V ceramic |
| C202 | 0.04μF +80% −20% 50V ceramic | C224 | 470pF ±20% 50V ceramic |
| C203 | | C225 | 470pF ±20% 50V ceramic |
| C204 | 0.04μF +80% −20% 50V ceramic | C226 | 0.04μF +80% −20% 50V ceramic |
| C205 | 0.04μF +80% −20% 50V ceramic | C227 | 0.04μF +80% −20% 50V ceramic |
| C206 | 0.04μF +80% −20% 50V ceramic | C228 | 470pF ±20% 50V ceramic |
| C207 | 0.04μF +80% −20% 50V ceramic | C229 | 0.01μF +80% −20% 50V ceramic |
| C208 | 2.7pF ±5% 500V small molded | C230 | 1100pF ±5% 50V polystyrol |
| C209 | 0.04μF +80% −20% 50V ceramic | C231 | 1μF +75% −10% 25V electrolytic |
| C210 | 0.04μF +80% −20% 50V ceramic | C232 | 2.2μF +75% −10% 25V electrolytic |
| C211 | 0.04μF +80% −20% 50V ceramic | C233 | 2.2μF +75% −10% 25V electrolytic |

| SYMBOL NO. | DESCRIPTION |
|---|---|
| C234 | 4.7μF +50% −10% 25V electrolytic |
| C235 | 220μF +50% −10% 16V electrolytic |
| C236 | 0.04μF +80% −20% 50V ceramic |
| C237 | 0.01μF +80% −20% 50V ceramic |
| C238 | 0.04μF + 80% −20% 50V ceramic |
| C239 | 0.04μF +80% −20% 50V ceramic |
| C240 | 47μF +50% −10% 16V electrolytic |
| C241 | 10pF ±1pF NPO 50V ceramic |
| C242 | |
| C243 | 0.04μF +80% −20% 50V ceramic |
| C244 | 0.01μF +80% −20% 50V ceramic |
| C245 | 0.01μF +80% −20% 50V ceramic |
| C246 | 450pF ±5% 50WV polystyrol |
| C247 | 15pF ±10% 50V ceramic |
| C248 | 0.04μF +80% −20% 50V ceramic |
| C249 | 0.04μF +80% −20% 50V ceramic |
| C250 | 0.04μF +80% −20% 50V ceramic |
| C251 | |
| C252 | 0.04μF +80% −20% 50V ceramic |
| C253 | 0.1μF +80% −20% 25V ceramic |
| C254 | 0.04μF +80% −20% 50V ceramic |
| C255 | 0.04μF +80% −20% 50V ceramic |
| C256 | 1μF +75% −10% 25V electrolytic |
| C257 | 0.04μF +80% −20% 50V ceramic |
| C258 | 2700pF ±10% 50V mylar |
| C259 | 100pF ±10% 50V ceramic |
| C260 | 2700pF ±10% 50V mylar |
| C261 | 0.04μF +80% −20% 50V ceramic |
| C262 | 0.47μF +50% −20% 35V solid tantalum |
| C263 | 0.04μF +80% −20% 50V ceramic |
| C264 | 1μF +75% −10% 25V electrolytic |
| C265 | 0.01μF +80% −20% 50V ceramic |

| SYMBOL NO. | DESCRIPTION |
|---|---|
| C266 | 1μF +75% −10% electrolytic |
| C267 | 47μF +50% −10% 16V electrolytic |
| C268 | 0.01μF +80% −20% 50V ceramic |
| C269 | 0.01μF +80% −20% 50V ceramic |
| C270 | 1600pF ±5% 50V polystyrol |
| C271 | 1600pF ±5% 50V polystyrol |
| C272 | 0.47μF +5% −20% 35V solid tantalum |
| C273 | 220μF +50% −10% 16V electrolytic |
| C274 | 1μF +75% −10% 25V electrolytic |
| C275 | 4.7μF +50% −10% 25V electrolytic |
| C276 | 33μF +50% −10% 16V electrolytic |
| C277 | 0.47μF + 50% −20% 35V solid tantalum |
| C278 | 1μF +75% −10% 25V electrolytic |
| C279 | 4.7μF +50% −10% 25V electrolytic |
| C280 | 33μF +50% −10% 16V electrolytic |
| C281 | 1pF ±5% 500WV small molded |
| C282 | 200pF ±5% 50V polystyrol |
| C283 | 47μF +50% −10% 16V electrolytic |
| C284 | 0.04μF +80% −20% 50V ceramic |
| C285 | 33μF +50% −10% 16V electrolytic |
| C286 | 1μF +75% −10% 25V electrolytic |
| C287 | 0.04μF +80% −20% 50V ceramic |
| C288 | 0.04μF +80% −20% 50V ceramic |
| C289 | 47p ±10% 50V ceramic |
| C290 | 100μF +50% −10% 6.3V electrolytic |
| CT201 | Trimmer 10pF MAX |
| C401 | 0.1μF +80% −20% 25V ceramic |
| C402 | 0.1μF +80% −20% 25V ceramic |
| C403 | 0.1μF +80% −20% 25V ceramic |
| C404 | 1μF +75% −10% 25V electrolytic |
| C405 | 0.47μF +50% −20% 35V solid tantalum |

**TRANSISTORS**

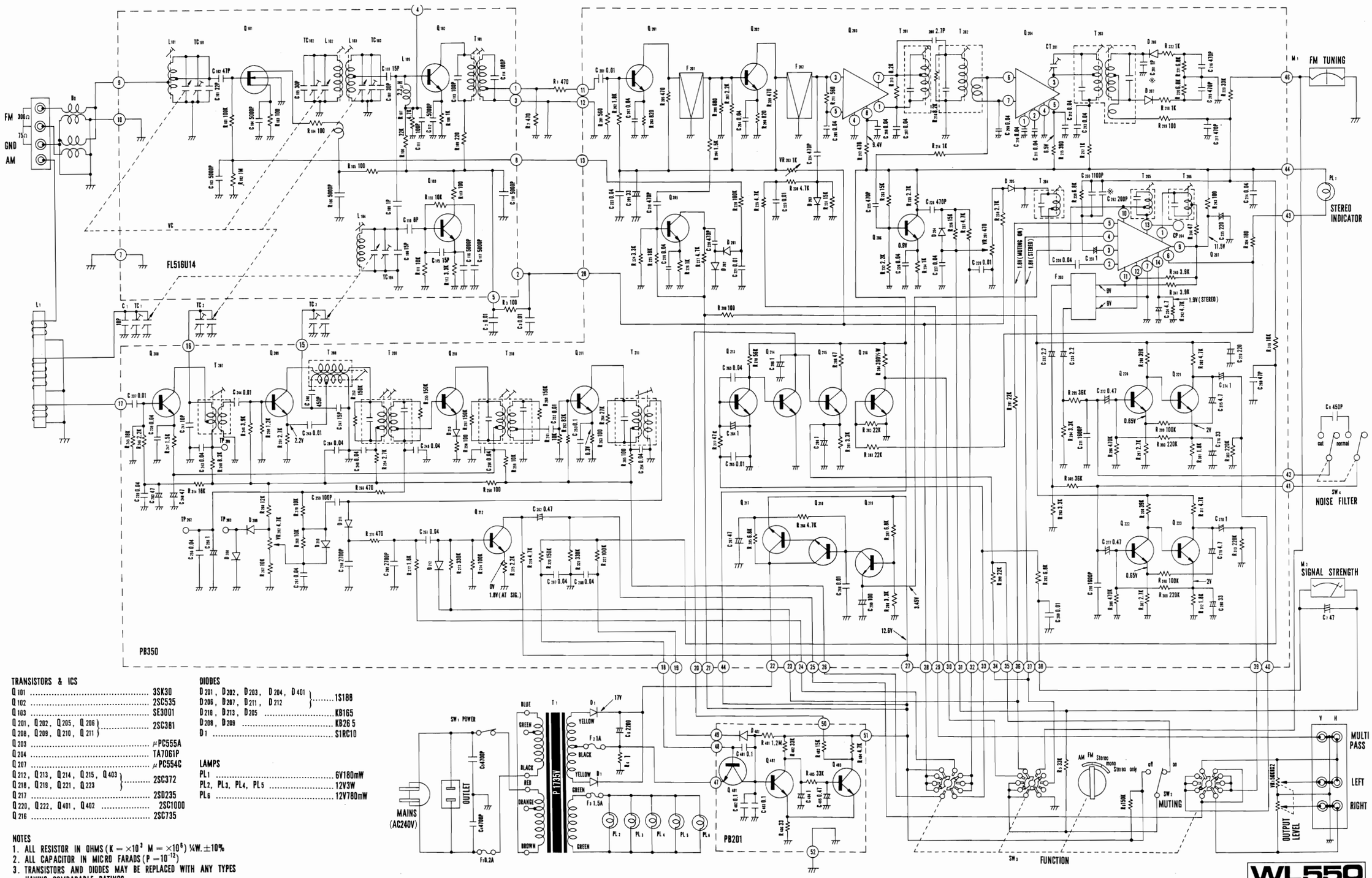
| SYMBOL NO. | DESCRIPTION | |
|---|---|---|
| Q101 | FM RF AMP | 3SK30 |
| Q102 | FM MIXER | 2SC535 |
| Q103 | FM LOACAL oscilator | SE3001 |
| Q201 | FM IF AMP | 2SC381 |
| Q202 | " | " |
| Q203 | " | μPC555A (NEC) |
| Q204 | " | TA7061P (TOSHIBA) |
| Q205 | FM AGC AMP | 2SC381 |
| Q206 | SIGNAL METER AMP | 2SC381 |
| Q207 | MPX and Mute switching | μPC554C (NEC) |
| Q208 | AM RF AMP | 2SC381 |
| Q209 | AM MIXER | 2SC381 |
| Q210 | AM IF and AGC AMP | 2SC381 |
| Q211 | AM IF AMP | 2SC381 |
| Q212 | AM AUDIO AMP | 2SC372 |
| Q213 | DC AMP FOR MUTING | 2SC372 |
| Q214 | " | 2SC372 |
| Q215 | " | 2SC372 |
| Q216 | STEREO ONLY circuit | 2SC735 |
| Q217 | Voltage stabilizer | 2SD235 |
| Q218 | " | 2SC372 |
| Q219 | " | 2SC372 |
| Q220 | FM AUDIO AMP | 2SC1000 |
| Q221 | " | 2SC372 |
| Q222 | " | 2SC1000 |
| Q223 | " | 2SC372 |

| SYMBOL NO. | DESCRIPTION | |
|---|---|---|
| Q401 | FM CENTER TUNING prove | 2SC1000 |
| Q402 | DC AMP FOR MUTING | 2SC1000 |
| Q403 | " | 2SC372 |

**TRANSFORMERS & FILTER**

| SYMBOL NO. | DESCRIPTION | |
|---|---|---|
| T201 | FM IF TRANS | TKAC-14733K |
| T202 | " | " |
| T203 | FM DISCRIMINATOR TRANS | V4FCC-20076BJK |
| T204 | 19KHz TRANS | 02-1138 |
| T205 | 38KHz TRANS | 02-1139 |
| T206 | 19KHz TRANS | 02-1138 |
| T207 | AM RF TRANS | YXR-19030BD |
| T208 | AM LOACAL oscilator trans | YXR-18909GN |
| T209 | AM IF TRANS | V6AQC20025AA |
| T210 | " | " |
| T211 | AM DETECTOR TRANS | YMC-15002A |
| T1 | POWER TRANS | P-1735V |
| F203 | FM LOW-PASS FILTER TRANS | LUX-14562 |

## CIRCUIT DIAGRAM




### TRANSISTORS & ICS

| | |
|---|---|
| Q101 | 3SK30 |
| Q102 | 2SC535 |
| Q103 | SE3001 |
| Q201, Q202, Q205, Q206, Q208, Q209, Q210, Q211 | 2SC381 |
| Q203 | μPC555A |
| Q204 | TA7061P |
| Q207 | μPC554C |
| Q212, Q213, Q214, Q215, Q403, Q218, Q219, Q221, Q223 | 2SC372 |
| Q217 | 2SD235 |
| Q220, Q222, Q401, Q402 | 2SC1000 |
| Q216 | 2SC735 |

### DIODES

| | |
|---|---|
| D201, D202, D203, D204, D401, D206, D207, D211, D212 | 1S188 |
| D216, D213, D205 | KB165 |
| D208, D209 | KB26 5 |
| D1 | S1RC10 |

### LAMPS

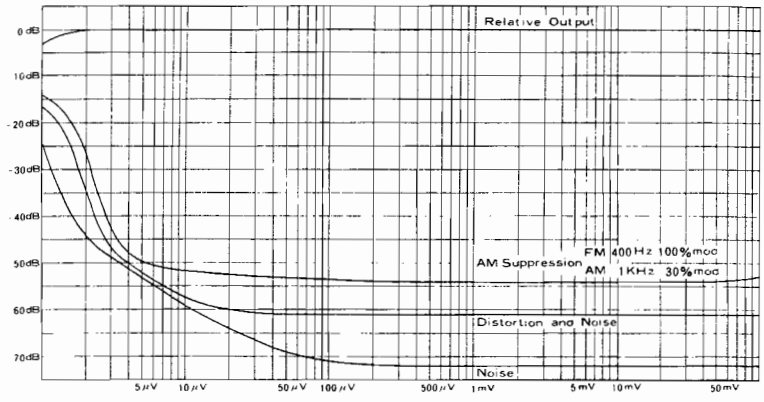
| | |
|---|---|
| PL1 | 6V180mW |
| PL2, PL3, PL4, PL5 | 12V3W |
| PL6 | 12V780mW |

### NOTES

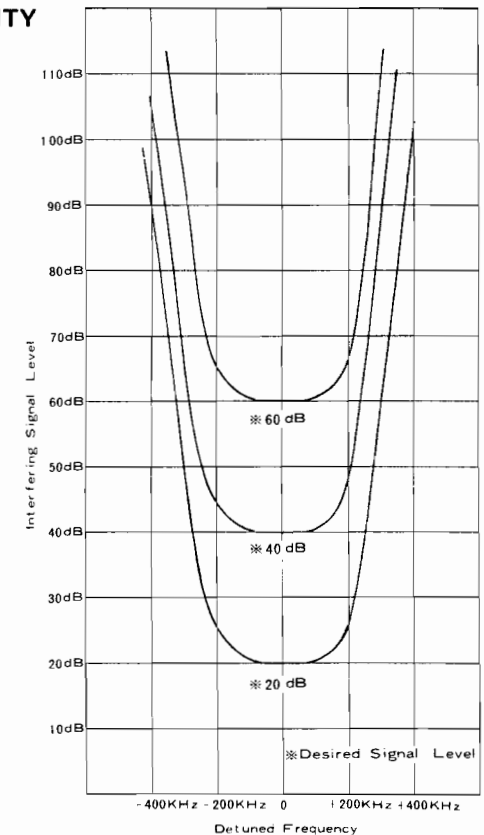
1. ALL RESISTOR IN OHMS (K = $\times 10^3$ M = $\times 10^6$) ¼W. ±10%
2. ALL CAPACITOR IN MICRO FARADS (P = $10^{-12}$)
3. TRANSISTORS AND DIODES MAY BE REPLACED WITH ANY TYPES HAVING COMPARABLE RATINGS.
4. VOLTAGES MEASURED WITH "VTVM" WITH NO SIGNAL INPUT. UNLESS NOTED OTHERWISE
5. THERE MIGHT BE SLIGHT CHANGES IN THE ACTUAL SET. (ESPECIALLY*)

**WL550**

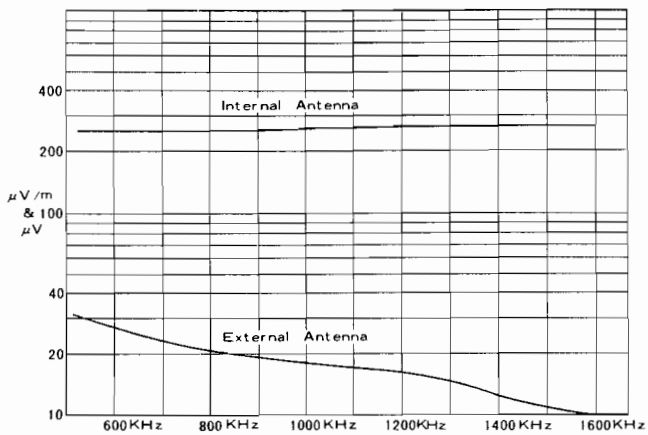
## OUTPUT LEVEL, AM SUPPRESSION, DISTORTION & NOISE



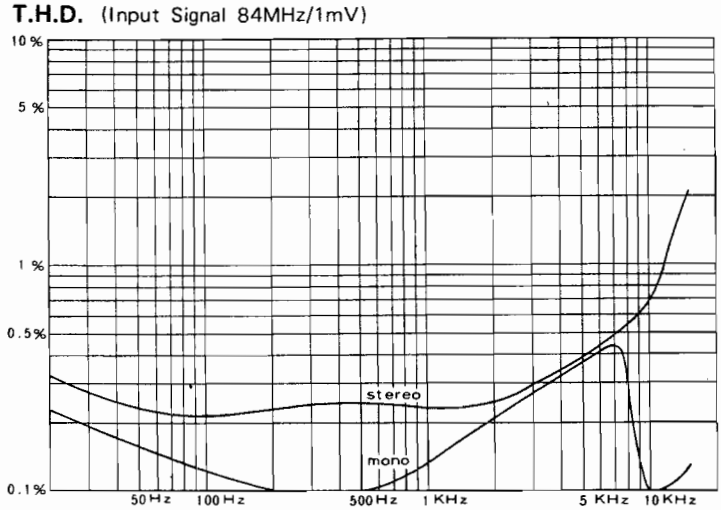

## SELECTIVITY



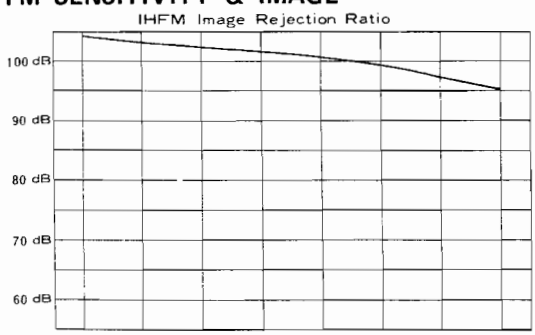

## AM SENSITIVITY & IMAGE

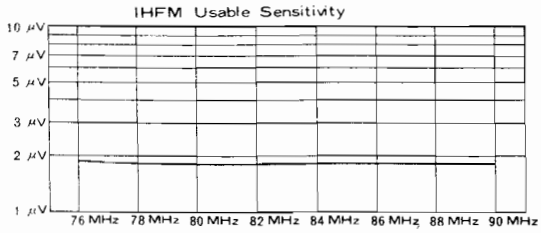



## T.H.D. (Input Signal 84MHz/1mV)




## FM SENSITIVITY & IMAGE




## STEREO SEPARATION (Input Signal 83MHz/1mV, Modulation 100%)